

Dec. 20th.

Vice President BRIDGES in the Chair.

Seventeen members present.

The following papers were presented for publication and referred to committees.

"Catalogue of the Cold-blooded Vertebrata of Michigan." By E. D. Cope.

"Descriptions of six new Western Asiatic Unionidae." By Isaac Lea.

"Notes on some species of Birds from South America." By John Cassin.

Dec. 27th.

Mr. JEANES, in the Chair.

Twenty-eight members present.

On report of the respective Committees, the following papers were ordered to be published.

## Partial Catalogue of the Cold-blooded VERTEBRATA of Michigan.

Pt. I.

BY PROF. E. D. COPE.

The material whence the present synopsis is derived, is a collection sent to me by Prof. Manly Miles, of Lansing, composed of specimens belonging to the Flint Scientific Institute, to the State Agricultural College, and to the State Collection. As we have but few exact synopses of local collections made at the Northwest, it is hoped the following list may prove of value in indicating the general character of this part of the fauna.

## DERMOPTERI.

*Ichthyomyzon argenteus* Gird. *Petromyzon* Kirtland.

## GANOIDEI.

*Lepidosteus huronensis*. Numerous specimens. Saginaw Bay.*Lepidosteus oculatus* Winchell. Pr. Ac. Nat. Sci., 1864. Duck Lake, Calhoun Co.*Amia calva* L. Specimens with and without the caudal ocellus.

## TELEOSTEI.

## NEMATOGNATHI.

*Ictalurus gracilis* Gill. *Pimelodus gracilis* Hough.

A specimen with narrower head and larger eye than the *caerulescens* assigned to the above species with doubt, on account of the very imperfect descriptions given,

*Ameiurus cupreus*. Oakland Co.

Although Prof. Gill has assigned not more than nine branchiostegals to this genus, and I find ten in five specimens, and though Prof. Kirtland gives an

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anterior position to the adipose fin, which the latter do not exhibit, and though Rafinesque assigns fifteen anal rays and mine have 23 and 24, I prefer doubting the infallibility of these statements to giving another name to the Michigan fish; it is in any case no other described species.

*Noturus flavus*. No. 294, Swartz Creek, Genesee Co.

Six large specimens, not apparently differing specifically from smaller individuals from the Youghiogheny and Susquehanna Rivers. Some, however, have but nine branchiostegals instead of ten in the eastern specimens. The orifice of the duct of the poison gland\* is irregular in position, being sometimes at the base of the posterior pectoral rays, and sometimes even on the side behind the fin, besides in its normal location below the scapular process. From it may frequently be drawn a solid gelatinous style ending in a tripod, each limb of which is dichotomously divided into short branches of regular length.

#### TELEOCEPHALI.

##### *Eventognathi.*

*Semotilus corporalis*, Putnam, not Abbott. Many specimens from near New Hudson, Oakland Co., from Swartz Creek, Genesee Co. and from Grosse Isle.

The *Semotilus rhotheus* has been regarded by my friend F. W. Putnam, as identical with this species (vid. Bulletin Mus. Comp. Zool., p. 8,) although I pointed out the differences in my first description (Proc. A. N. S., 1861, p. 564,) when I employed the name *cataractus* for *corporalis*. The latter occurs sparingly in the tributaries of the Delaware, but is very common in the affluents of the Susquehanna and Ohio. The former is rare west of the Delaware, where it is abundant, and reaches a large size. *S. dissimilis* and *pallidus* are good species from west of the Mississippi.

*Ceratichthys cyclothis*, † sp. nov.

Body much compressed, dorsally flat; the height 4 2-5ths in. total length. Muzzle obtuse, rounded; head entering  $4\frac{1}{3}$  times in length (to emargination

\* Vid. Günther Catal. Siluridæ, Brit. Mus. 1864.

† Of an allied genus, *Pogonichthys*, Dr. Hammond brought from near Bridger's Pass, an undescribed species. It may be called *P. (Platygobio) gulonellus*. It may be compared with the *P. communis* as follows:

<i>communis.</i>	<i>gulonellus.</i>
Ventrals acuminate, reaching anus.	Ventrals truncate, falling far short of anus.
Anal longer, with eleven rays.	Anal shorter, nine rays.
Breadth between eyes more than half the top of the cranium, and more than the height of operculum.	Breadth between eyes scarcely half length of cranium above, equal height of operculum.

Head  $4\frac{1}{2}$  times in length to caudal emargination; eye  $5\frac{2}{3}$  times in length of head. Scales  $748\frac{5}{5}$ . Fins D. 1-8; C. 19; V. 1-8; P. 16. From caudal to front base of anal, 2 in. 10 l. Total length, 6 in. 3 lines. Above ruddy ash, a faint longitudinal dark band on one row of scales above lateral line. Below yellowish white, lips and chin yellow; suborbital region ruddy.

† To *Ceratichthys* must probably be referred the *Leuciscus dissimilis* Kirtld., a common fish in the tributaries of the Ohio. The general appearance differs considerably from that of the other species, especially in the more prominent muzzle, and, therefore, inferior mouth; but I find no ordinary characters indicating a different genus.

*Ceratichthys micropogon* is a species sent me by Jacob Stauffer, Secretary of the Linnæan Society, of Lancaster, and was taken in the Conestoga by a member of the Society, on one of its excursions. The appearance of the head of this fish is that of a *Hypsilepis* rather than of a chub, and the difficulty of discerning the minute barbels increases the liability to err in determining its affinities. Mouth slightly oblique, angle opposite anterior border of orbit. Lower enters  $3\frac{1}{2}$  times in length of head, which is measured  $3\frac{3}{4}$  times in length from muzzle to base of tail. The greatest depth is measured  $4\frac{1}{2}$  times in the same distance. Head broad, muzzle obtuse, profile rounded descending. Caudal peduncle long. Scales, as in *C. biguttatus*,  $\frac{6}{3}40$ . Teeth 4-4, without proper masticatory surface, the posterior considerably hooked. Length, from origin of tail to anterior base of dorsal equal from dorsal to posterior nostril. Rays. D. 1-8; C. 9; A. 1-7; V. 8; P. 13. Above pale yellowish brown; a broad brown shade from end of muzzle to base of tail; below pale yellowish. Length, 3 in. 6 lin.

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of caudal.) Anterior base of dorsal measures one-half the distance from end of muzzle to base of tail. Lateral line nearly straight. Operculum rounded posteriorly, scarcely concave above. Eye contained  $5\frac{1}{2}$  times in length of head. Scales  $\frac{7}{5}41$ ; radii fewer and weaker than in *biguttatus*. Dermal head tubercles longest on vertex, smallest on muzzle, in four alternating rows, one on each side becoming superciliary. Fins, D. 1·9; P. 15; V. 1·8, just reaching vent; A. 1·8; C. 19. The dorsal and anal are much prolonged posteriorly, the greatest horizontal length of the former nearly equalling the length of the upper surface of the head. Six and eight inches are the longest dimensions before us. Color of upper surfaces olive brown; below, from above lateral line, yellowish; preopercular region rosy; pectorals slightly dusky, otherwise no fin markings.

This fish is shorter, stouter and blunter than the *biguttatus*, and has larger dorsal and anal fins, there being one more ray in the latter. The operculum is not so angulated or concave above.

In some of the specimens of this species, especially among the half-grown, I find a tooth of the second row of pharyngeals, found in *Semotilus* proper. Nevertheless the barbel is on the end of the maxillary, as in the type of *Ceraticthys*, and not above it, as in *Semotilus*. Specimens from Grosse Isle, from Waterford, Oakland Co., from Clinton River and from Bruce, Macomb Co., Michigan.

*Ceraticthys stigmaticus*, sp. nov.

Dorsal outline rising gradually from end of muzzle to base of dorsal fin. Muzzle projecting a little beyond premaxillary outline. Head (equal greatest depth)  $4\frac{1}{2}$  times in total length; eye  $3\frac{1}{3}$  times in length of head, its superior rim upon the frontal plane. Scales  $\frac{7}{6}40$ . Radii about 15 exposed, stronger than the concentric lines. Fins short, ventrals a little anterior to dorsal, not reaching the vent. D. 1·8; C. 20; A. 1·7; V. 8. From base of caudal to anterior base of dorsal, equal from latter to posterior nares. General color reddish, operculum and cheeks more silvery. A brown band from muzzle to eye, and a very distinct spot at base of tail. Total length, two and a half inches. Pharyngeal bones stout, the superior limb broad; teeth 1·4—4 : 1. Barbel on the end of the o. maxillare.

*Rhinichthys lunatus*, sp. nov.

Stout, the head broad, and contained four times in length to base of tail. Greatest height  $4\frac{1}{3}$  times in the same. Dorsal fin a little behind opposite ventrals; latter reaching anal. Caudal lunate, or with a broad shallow emargination. Eye a little less than one-fourth the length of the head. About twenty longitudinal rows between dorsal and ventral fins, and sixty traversed by the lateral line. From end of muzzle to base of first dorsal ray equal from latter point to concavity of caudal. Muzzle projecting just beyond mandible. Rays, D. 1·8; C. 19; A. 1—7; V. 1—8; P. 15. The largest specimens are  $2\frac{1}{2}$  inches long.

Above reddish brown, with irregular, rusty spots, which in small specimens trace a lateral shade, and extend on the abdomen; usually the latter is unspotted silvery.

Specimens from Grosse Isle, obtained by Prof. Fox. This fish is stouter than the *atronasus*, has a smaller eye and a less deeply forked tail, besides the difference in color. *Marmoratus* has a longer nose, (one more anal ray) and a caudal spot. From *obtusius*, *meleagris* and *nasutus*\* it can also be readily distinguished.

\* Another species, brought by Dr. Hammond from Kansas, has not been described. *Rhinichthys maxillosus* is peculiar in its heavy muzzle, and broad mouth, and gular region, and for an elongate form and backward position of fins. Eye with considerable vertical range, entering  $5\frac{1}{4}$  times into length of head, latter four times to base of tail. Greatest height five and a half times. From base of caudal to base of front ray of dorsal equal from latter point to opposite middle of orbit. Fins all small, especially the ventrals, which reach the vent. Dorsal originating a little

*Hybopsis storerianus*\*. No. 329, Flint River at Flushing, Genesee Co.

*Hybopsis hudsonius*, Agass. No. 531. Lake.

*Hypsilepis diplœmia*. Specimens from near Lansing.

*Hypsilepis frontalis*†, Agass.

Numerous specimens from Grosse Isle, Detroit River, Three Mile Lake and Waterford, Oakland Co.; Swartz Creek, Genesee Co. and Monroe Co.

Specimens from the last locality, seven in number, represent a strongly-marked variety, characterized by the great elevation of the outline in front of the dorsal fin, and other points. From the first dorsal ray, the outline again descends, giving the fin a very oblique position: this extends also, when laid back, as far as above the fifth anal ray, while in *frontalis* it most usually reaches a point opposite the first ray only. The eye is contained four times in the length of the head—more frequently four and a half times in *frontalis*. The length of the head measures in the depth of the body, from the dorsal outline to the middle of the row below that bearing the lateral line; it extends nearly to the ventral outline in *frontalis*. The pharyngeal bones appear to be relatively rather stouter than in typical *frontalis*, and are not furnished with so prominent an inferior angle to the external ala. This, with the form of the body, would almost indicate a species; but as I find approximations in these and transitions in the other characters, I cannot so consider it. In *H. frontalis* the number of scales traversed by the lateral line varies from 38 to 43.

*Hypsilepis cornutus* Bd.

Specimens from Pine Lake, Emmet County, Bruce, Macomb County, and one from Swartz creek, agree with the many Susquehanna specimens in my possession in a more elongate form of head and body than specimens from tributaries of the Delaware. They often differ from those of the Susquehanna in having a row of scales or two more below the lateral line. In Delaware specimens the head is shorter than in the latter, not more so than in the former, but the depth of the body is greater than in either, entering in length to base of tail  $3\frac{1}{2}$  times—in the others 4 and  $4\frac{1}{3}$  times. The dorsal fin is a

behind ventrals, like the anal slightly concave on the border. Caudal not deeply forked. Rays, D. 1–8; C. 19; A. 1–7; V. 7; P. 13. Twenty-five rows of scales from dorsal to ventral. Largest specimen nearly 3 inches. Silvery. Pale cinnamon above; a dark lateral shade; yellowish below. A dark spot at base of caudal.

\**Hybopsis phaëna* is a species found in some of the tributaries of the Delaware, which I have received from Trenton, N. J., from my friend Charles C. Abbott. It is more elongate in form than *H. hudsonius* and *storerianus*, and has not the rounded front of the first or the small, compressed head of the last. Eye a little less than one-third length of head; latter  $5\frac{1}{3}$  times to concavity of tail, and more than equal greatest depth of body; in *storerianus* the head does not equal the depth, and the back is more compressed. Angle of mouth not posterior to anterior nostril. Scales  $\frac{5}{4}$  38. Lateral line very slightly deflected opposite dorsal fin. Base of caudal to posterior edge of dorsal equal from latter to beginning of skin of head. Rays D. 1–8; C. 19; A. 1–8, its outer border concave like that of dorsal; V. 1–9; P. 15. Length 4 inches.

Lateral band and below silvery, a dark shade passing through former; no spot at base of tail. Above pale ochre, with a faint median line.

The operculum of this fish is narrower than that of the *hudsonius*, rather than broader as in *amarus*, and the head is longer than in the latter. In *storerianus* the mouth is smaller, and the operculum broader, and with a prominent superior angle. The *gracilis* is said to have the pectorals reaching the ventrals, which I have not seen in any of the species at my disposal.

†*Cyprinella*, distinguished from *Hypsilepis* by its crenate teeth, must receive the *Leuciscus kentuckiensis* of Dr. Kirtland. It is abundant in the tributaries of the Ohio, where it represents the nearly allied *C. analostana*, Gird., of the Susquehanna and Delaware. The differences between these species are as follow:

*analostana*.

Head  $3\frac{2}{3}$  to 4 times in length to base of tail.  
5—(6)  
Scales ——— 32–5.  
2—(3)

*kentuckiensis*.

Head  $4\frac{1}{3}$  times; muzzle more acute.  
6—7  
Scales ——— 38–40.  
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little more anteriorly situated in the Delaware specimens, and there is a row of scales more below the lateral line than in Susquehanna specimens. With typical specimens only, these might be regarded as representing two species, and as such I have already alluded to them; \* but in the large number of individuals at my disposal, I find transitions in all the points. The Delaware specimens more nearly resemble the *H. cornutus*, figured by Dr. Storer.

#### *Squalius proriger.*

Until more characteristic points are presented, I provisionally preserve unbroken a series of beardless Chilognath Cyprinoids, with pharyngeal teeth 2 or 1—4 or 5: 5 or 4—1 or 2, of the type uncinato-subconici raptatorii, and not crenate; the scales, with the usual extent of surface exposed; the isthmus not wide, and the anal fin short. The long anal fin distinguishes *Alburnus* from it; and the narrow exposed scale surface and masticatory teeth, *Hypsilepis*. *Clinostomus* Gir., may be said to be distinguishable by the prominent mandible and large gape, but *Sq. lepidus* (Heck. Fische Syriens, 89,) is quite similar in the former point, and the *Clin. photogenis* † has the cleft as short as in most *Squalii*. *Ptychochilus* Ag. seems not yet to have been sufficiently distinguished from *Clinostomus*, and resembles *Squalius* even more in its terminal mouth. If different genera are here united erroneously, it is because their characters have as yet not been pointed out. They embrace five Pacific slope species, six Eastern American, and many from the old world.

In the species now named the prolongation of the lower jaw is very great: it presents a symphyseal knob beyond and above the premaxillary border. End of the maxillary opposite the middle of the pupil. Angle of opercular outline less than 90°. Head narrowed anteriorly; eye four times in its length: latter four times in length to concavity of tail. Greatest height  $5\frac{1}{4}$  times in the same. Ventrals a little in advance of dorsal: from front base of latter to base of tail equal from former point to half way between end of muzzle and nares. Teeth 2.5—4.1 in two specimens. Scales small, with especially strong concentric lines,  $\frac{1}{5}$  62. Dorsal high 1.8; Caudal deeply furcate, 19; Anal rather elongate,  $1.8\frac{1}{1}$ . V. 8, not reaching vent; P. 14, elongate. Total length three inches.

Rufous brown above half way to the lateral line; a dark shade from end of muzzle to tail, covered with silvery, the latter extending to the belly. Sides punctulate anteriorly.

\* Proc. Acad. Nat. Sci., Phila. 1861, 522.

† *Squalius photogenis*. A species resembling some *Alburni* in its large caducous scales and attenuated form. Mouth quite oblique; under jaw scarcely projecting: maxillary not reaching line of margin of orbit. Head entering  $4\frac{2}{3}$  times into length to fork of caudal; greatest depth seven times. Back broad. Fins D. narrow 8; C. 19, A. 1—10. V. little anterior to dorsal 9. P. narrow fulcate 13. Scales  $\frac{5}{3}$  39. Radii stronger than concentric lines. From base of caudal to base of first dorsal ray, equal from latter to anterior border of iris.

Above pale ochre, with a median brown line, and one on each side, from opercular upper angle to tail. Sides and below bright silvery, especially brilliant on the operculum and suborbital region. Lips blackish edged.

Length three inches.

Two specimens from the Youghiogheny River, Pa. This may be the species on which Rafinesque established his *Luxilus interruptus*, but the discrepancies are so numerous that the identification cannot be made.

Besides the *S. (Clin.) funduloides* of Girard, another species occurs in the waters flowing into the Susquehanna. This, which may be called *S. hyalope*, was obtained in the Conestoga by J. Stauffer. Its form is that of a true *Squalius*—as *S. cephalus*, not having the prominent mandible and compressed body of the species included by Girard in *Clinostomus*. Mouth little oblique, extending to beyond opposite anterior border of orbit. Muzzle obtuse; head elongate, broad, entering length to base of caudal  $3\frac{3}{4}$  times. Diameter of eye contained  $3\frac{1}{2}$  times in length of head, equal lower posterior border of operculum. Base of caudal to front base of dorsal equal from latter point to anterior border of pupil of eye. Teeth 1.4—5.1. Greatest depth  $4\frac{1}{2}$  times in length to base of caudal. Scales  $\frac{7}{4}$  45, with ten or eleven strong radii visible. Fins small; radii D. 8. C. 17. A. 1.8. V. 8. P. 11. Total length about three inches. Color whitish, becoming bluish dorsally; no markings.

This fish is more compressed posteriorly, has a larger head and eye, and more projecting under jaw than the *S. elongatus*.

It resembles an *Aspius* no little, but differs in the shorter anal, and fewer pharyngeal teeth. The *Alburnus acutus*, badly described by Latham, is evidently an allied species.

Two specimens; exact locality in Michigan not stated.

Since the above was penned, I have found that Bleeker (in *Comptes Rendus* xv. 1863,) has united the genera which I have attached to *Squalius* to *Aspius*, placing *Squalius* with *Telestes*, *Scardinius* and *Cyprinella* as synonyms of *Leuciscus*. That *Squalius* and *Telestes* are identical, I fully believe; but if *Cyprinella* and *Scardinius* are not different from *Leuciscus* our ideas of characters must undergo a change.

#### *Plargyrus americanus*.

From Saginaw Bay, No. 253, and a variety from Grosse Isle, Detroit River, distinguished by its very elongate form, especially in regard to its caudal peduncle. Scales  $\frac{9}{2}$ 46; that is, two rows less above the lateral line than in many high-bodied specimens; there are others quite intermediate.

*Chrosomus eos* Cope, Proc. Acad. Nat. Sci., Philadelphia, 1861, 523.

From New Hudson, Livingston County, from streams flowing into Lake Erie. Larger specimens of this species exhibit a short lateral line, though in many it is wanting. Its points of separation from *erythrogaster* are as follows:

#### *erythrogaster*.

Head less than one-fourth length to base of caudal. Head narrower; parietal width one-fourth distance from base of first dorsal ray to base of caudal, which is equal from first dorsal ray to nares.

Muzzle longer, overhanging, angle of mouth opposite nares.

Scales above lateral line 24 rows.

#### *eos*.

Head more than one-fourth do. Head broader; parietal width one-third from first dorsal ray to caudal, which equals from dorsal to posterior margin of orbit.

Muzzle shorter, mouth more oblique, reaching edge of orbit.

Scales above lateral line 18 rows.

#### *Alburnops heterodon*.

A species having the general structure of *Alburnops*, and pharyngeal teeth usually, but not always, presenting its characteristic masticatory surface. They have sometimes a trace of the crenulation pertaining to *Cyprinella*, and are arranged usually in but one row of four on each side, which is sometimes accompanied by a single tooth of the inner row. This species is, therefore, allied to *Codoma*, *Cyprinella* and *Squalius*. Scales  $\frac{5}{3}$ 36, with about eleven distant radii on the rather broad exposed surface. Fissure of mouth not reaching line of orbit. Head one-fourth of length to base of tail, a little greater than greatest depth. Diameter of eye one-third of length of head. Operculum higher than long. Outline from end of muzzle to base of dorsal greatly ascending. Greatest breadth of head one-fourth of the distance from end of muzzle to base of dorsal. Dorsal high; the bony ray long; its front ray to the hinder as  $2\frac{1}{2}$  to 1, and contained  $2\frac{1}{2}$  times in the distance from its base to the origin of the caudal fin: like the ventrals, it is nearer the end of the muzzle than the base of the caudal. Ventrals reaching anus; pectorals falling much short of ventrals. Rays, D. 48; A. 8; V. 8.

Length two and a half inches.

Above yellowish-brown; the scales darker bordered; below yellowish-rosy, or sometimes golden. A dark lateral band from end of muzzle to tail, which is covered on the sides by a silver band with blue reflections.

Numerous specimens from Lansing; others from Grosse Isle.

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*Alburnops plumbeolus*.

Form compressed; mouth oblique; mandible slightly more prominent than premaxillary border. Eye  $2\frac{3}{4}$  in length of head; operculum higher than long; the superior border very short; the supero-posterior concave; posterior angle more than  $90^\circ$ . Length to base of tail a little over four times length of head, and  $4\frac{2}{3}$  the greatest depth. Frontal and dorsal outline a gentle arch. Anterior base of dorsal half way between base of caudal and end of muzzle. Height of dorsal less than half length from its anterior base to base of caudal. Fins short; ventrals extending  $\frac{2}{3}$  way to vent. Scales moderate  $\frac{6}{3}39$ , with seven or eight rather faint radii, and minute numerous concentric lines. Radial formula D. 1—8. A. 1—9. V. 8. P. 13.

Length three inches. Pharyngeal bones with strong ala, especially dilated on the superior angle, terminating in a sharp angle opposite the second tooth from above; lower limb long; teeth 2, 4—4, 2.

Everywhere silvery, with a blueish reflection, except a dusky vertex and brownish dorsal region and basal caudal spot.

From Flint, on a branch of the Saginaw.

I have regarded this species as an *Alburnops* on account of the distinct masticatory surface of the teeth, although the upper jaw does not overlap the lower as in the types of that genus. The form of the scales distinguishes it readily from *Hypsilepis*. It is generally similar to *Squalius*.

*Alburnus\* rubellus* Agass.

The anal fin of this fish is shorter than in true *Alburnus*: teeth 2, 4—4, 2, without masticatory surface. Scales  $\frac{6}{3}38$ . Head  $4\frac{1}{4}$  times in length to base of caudal.

Three specimens from Flint.

*Pimephales milesii*, sp. nov.

A species differing from the *promelas* in its larger scales, longer muzzle and other points approximating *Hybognathus*.

Mouth oblique, outlines of snout forming less than a right angle in profile. Eye entering  $4\frac{1}{2}$  times in length of head, which latter is one-fourth of length to base of tail, and equal to greatest depth of body. Scales  $\frac{7}{3}40$ , nearly round, lateral line extending as far as the fourteenth. Dorsal fin with 1, 9 rays; the first and last jointed are equal, the middle the highest. Caudal wide; complete rays 21. Anal small, longer than wide, 1, 7. Ventrals not reaching anal, 1, 8. Pectorals extending three-fifths distance to ventrals. From base of caudal to front base of dorsal equal from latter point to anterior nostril. Frontal breadth double diameter of orbit. Length 2 in. 5 lines.

General color pale reddish-brown, much paler below, and a faint blackish longitudinal line. Top of head blackish; its sides silvery.

From Grosse Isle, Detroit River. Named from Prof. Miles, who, in connection with Prof. Fox, has added much to north-western Zoology.

*Pimephales promelas*, Raf.

Specimens from near Lansing.

*Hyborhynchus† notatus*, Agass.\* *Alburnus oligaspis*.

Under jaw projecting a little beyond upper; maxillary extending to opposite posterior nostril. Head conic in profile, with muzzle compressed, one-fifth of length to notch of caudal. Eye three and one-fifth times in length of head. Operculum higher than long. Fins short (except anal); ventrals anterior to dorsal. Dorsal 1—8. C. 20. A. 1—14. V. 7. P. 15. Scales rather large,  $\frac{5}{3}41$ . Lateral line, with a long, gentle anterior deflection.

Length about two inches.

Above reddish; sides of head and broad lateral band silvery. Below medially yellowish.

Brought from Kansas, by Dr. W. A. Hammond.

† In this place may be described the *Algansea antica*, sp. nov., brought by Dr. Woodhouse from Texas, and presented to the Academy Museum. It is nearest to the *formosa* of Girard,

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One specimen from Grosse Isle, Detroit River.

Though differing in the development of the lateral line, this species stands near *Pimephales* in the character of the separation of the bony dorsal ray from the first cartilaginous by a membrane, (erroneously alluded to by some as a peculiar ray,) and in the arrangement of the tubercles on the front. Of the latter, there are two rows crossing the front of the muzzle; the inferior of six, of two on each side on the premaxillary border, and the outer near the eye; the superior of five, one on the middle line. A third row of four is on the border of the superior plane, one behind each pair of nares, and one on each side the middle line of the muzzle.

#### *Hybognathus stramineus*.

This genus embraces the described species *argyritis*, *evansi*, *nuchalis*, *nitidus*, *regius* and probably *gardoneus* (C. V.), to which are added here three others.

In the present species, the dorsal is situated nearer the end of the muzzle than to the base of the caudal, and its height is much less than half the distance from the base of its first ray to the same point; the head enters the length to the caudal a little over four times, being relatively longer than in the species described by Agassiz and Girard, while the eye, entering the length of the head but three times, is relatively larger. The depth enters the length  $4\frac{3}{4}$  times. Scales  $\frac{5}{4}36$ ; in *evansi*  $\frac{5}{4}40$ . Ventral fins do not extend to the vent. The dorsal outline rises gently to the base of the dorsal; the profile descends abruptly at the end of the muzzle, which is prolonged in front of the orbit about three-fourths the longest diameter of the latter. Superior border of operculum usually shorter than the posterior. Pharyngeal teeth 4—4.

The general form is stout, and the head broad; caudal not deeply forked. Fin rays—D. 1. 8. C. 19. A. 7. V. 8. P. short, 13. Length about three inches. Color brownish straw color; sides and below silvery, the former most brightly. No dorsal line; a faint line on posterior part of lateral line, and a small spot at base of tail.

Many specimens from Grosse Isle, Detroit River.

#### *Hybognathus volucellus*.†

A species distinguished by its depressed elongate head and elongate fins, especially the dorsal. The latter is as far from the end of the muzzle as from

but differs in the much more posterior position of the fins. In this, the anterior base of dorsal is equidistant between end of muzzle and base of tail: in the *antica* much behind the median point; the ventrals are much nearer the caudal than the chin; in the *formosa*, the reverse is the case. Scales  $\frac{10}{5-6}50$ . Head in adults a trifle more than one-fourth total length; eye one-fifth length of head. Maxillary not reaching line of margin of orbit; mouth oblique. Profile long, flat, descending; dorsal outline arched. Body of medium proportions, shortened behind; caudal Peduncle short, thick. Fins, D. 1—7  $\frac{1}{1}$ ; C. 19, short, emargination shallow; A. 1—8; V. 9; P. 16.

Sides of head and edges of scales punctulate; general tint above purplish-slate; below, with sub- and inter-operculum, yellow. Largest specimen five inches long. In some small specimens the eye is only one-fourth the length of the head. To the allied genus *Lavinia* belongs most probably the *Leuciscus boscai* of Cuv. et Val., from Carolina. The same genus occurs in Lake Ponchartrain.

\* Brought by Hammond from the Upper Platte.

† *Hybognathus proeue* has been sent me by my friend, Jacob Stauffer, as an inhabitant of the Conestoga, tributary of the Susquehanna. A small silvery fish, with compressed body and elongate caudal peduncle. Head enters total length  $4\frac{1}{4}$  times; diameter of eye into head  $2\frac{3}{4}$  or three times. Depth into length five or a little more times. From anterior base of dorsal to base of caudal longer than from former to end of muzzle; dorsal high, anterior rays equal  $\frac{1}{2}$  from their base to base of caudal. Scales  $\frac{5}{2}31$ . Tail entering total length  $5\frac{1}{4}$  times, deeply forked; forks acute. Obliquity of mouth slight. Operculum higher than long; its infero-posterior border very oblique, long. Teeth R. 5—4 L. Length 2.5 inches.

Top of head, a narrow dorsal band, and the borders of the upper scales blackish; belly and sides of body and head silvery, along the middle line with blue reflections and black punctulations, the latter collected into a streak on the lateral line. Belly yellowish.

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its anterior ray to the base of the caudal fin. Its anterior rays are three times the length of the posterior, and equal to half the length from their base to the base of the caudal. Muzzle obtuse; vertex plane; dorsal outline arched from nape to fin. Caudal peduncle slender. Head entering length to base of caudal  $3\frac{3}{4}$  times, the greatest depth 4 times; diameter of orbit in length of head  $3\frac{1}{2}$  times. Operculum as broad as long. Scales  $\frac{4}{3}$  34. Radial formula D. 1—8; C. 19, not deeply forked; anal elongate, with short base, 1—7. Ventrals reaching anus, 8. Pectorals just reaching ventrals, falcate. Length 2.5 inches.

Above reddish-straw color, without band; sides and below silvery; a dark shade on the lateral line, most distinct on caudal peduncle.

Grosse Isle, Detroit River.

*Hybognathus nuchalis*, Agassiz.

Numerous specimens from Grosse Isle.

*Campostoma callipteryx*, sp. nov.

Lips well developed, free round the arched margins of both jaws. Muzzle elongate, steeply descending from front; outline to half way to dorsal strongly but less steeply ascending. Eye superior, small, entering five times into length, and nearly four times into breadth of head; latter four and a half times into length to emargination of caudal, a trifle less than greatest depth. Ventrals under anterior margin of dorsal, not reaching to vent; anal rounded anteriorly. Scales with many weak radii,  $\frac{8}{7}$  54, a much narrower area exposed anteriorly than posteriorly. Caudal acute above, rounded below. Radii, D. 1. 8. C. 19. A. 1. 8. V. 8 one side, 10 the other. P. 16. Pharyngeal teeth uniserial, 4—4. From end of muzzle to anterior base of dorsal in a straight line, equal from base of caudal to middle of base of dorsal. Head above with spinous tubercles.

General color pale, dorsal regions and edge of operculum darker. Median part of all the fins black, terminal membrane opalescent. Total length  $5\frac{1}{2}$  inches.

From Flint on the Flint River, which empties into Saginaw Bay.

For distinguishing this genus from *Chondrostoma* I have relied on the less number of teeth in the principal, usually the only, row. The development of the lips diminishes in allied species, so that Girard's *Hybognathus placitus* cannot well be excluded from this genus.

*Campostoma mormyrus*, sp. nov.

Muzzle more elongate and much more depressed than in the next species. Head four and one-half times in total length to caudal emargination; eye five times into length of head. Dorsal outline arched. Greatest depth four and one-third times in length,—greater than in *gobionium*. Scales about equal,  $\frac{7}{7}$  49. Fins, D. 1. 8. C. 19. A. 1. 7. V. 8. P. 15, with the last longer than in *gobionium*. Length about two and a half inches.

Head and body above reddish; sides and below silvery. Fins unspotted. In these species the outline of the broad mandibular sheath is a flattened arch.

From Bruce, Macomb Co.

*Campostoma gobionium*.

This and the *C. mormyrus* and *hippops*\* belong to the type of *nasu-*

\* *Campostoma hippops*, sp. nov.

Muzzle very long and decurved, with the front convex transversely. Eyes high, small, enter six times into length of head. Back broad, arched in front of dorsal, not so steep as front. From base of caudal to front base of dorsal a little less than from latter to end of muzzle. Head  $4\frac{3}{4}$  times in length. Scales  $\frac{8}{8}$  57. Fins small; D. 1. 8. C. 19. A. 1. 7. V. 1. 8, two-thirds distance to

tum, Gir., with the muzzle elongated and not elevated as in the callipteryx, and the lips little developed. Scales little less exposed anteriorly than posteriorly,  $\frac{7}{8}$  53. Head short, one-fifth of length to notch of tail. Eye four and a half times in length of head. Operculum little higher than long, little concave above. Fins small; D. 1. 8. C. 19. A. narrow, 1. 7. V. 8, reaching three-fifths distance to vent. P. rounded, 16, reaching three-fifths distance to vent. Back arched to dorsal. Tail broad; seven rows of scales on middle of peduncle.

One specimen is three inches long.

Color of head and body above dark-brown; below yellowish. Fins without markings.

*Locality*.—Bruce, Macomb Co., and Grosse Isle.

*Hylomyzon nigricans*, Agassiz.

Grosse Isle.

*Ptychostomus aureolus*, Agassiz. No. 231.

Saginaw Bay and Grosse Isle.

*Carpiodes thompsoni*, Agassiz. Am. Journ. Sci. and Arts, xix. p. 76. and Thoms. Hist. Vermont, p. 133. Nos. 228 and 230. Saginaw Bay,

I find one and two more rows of scales than described by Thompson, and the outlines of the latter not quite as regularly continuous as one might infer from Agassiz's remarks. *C. damalis*, brought by Hammond from the upper Platte, has larger scales and is more elongate, and there are but 25 rays in the dorsal fin.

#### Description of Six new species of Western Asiatic UNIONIDÆ.

BY ISAAC LEA.

*UNIO HOMSENSIS*.—Testâ lævi, suboblongâ, inæquilaterali, ad latere planulatâ, posticè angulatâ; valvulis crassis, anticè crassioribus; natibus prominulis, ad apices plicatis; epidermide tenebroso-fuscâ; dentibus cardinalibus crassis crenulatisque; margaritâ purpurecente et iridescente.

*Hab.*—Lake Homs, (ancient Emesa), River Orontes, North Syria. C. M. Wheatley.

*UNIO KULLETHENSIS*.—Testâ lævi, oblongâ, inæquilaterali, at latere planulatâ, anticè subtruncatâ, posticè obtusè angulatâ; valvulis crassis, anticè crassioribus; natibus prominulis; epidermide luteolâ, posticè radiatâ et tenebroso-viridi; dentibus cardinalibus parvis, acuminatis crenulatisque; margaritâ vel albâ vel aureâ et valdè iridescente.

*Hab.*—Near Mardin, in a stream from Kulleth falling into the Tigris, Asia. C. M. Wheatley.

*UNIO ORPHAENSIS*.—Testâ lævi, oblongâ, inæquilaterali, anticè rotundatâ, posticè obtusè subbiangulatâ; valvulis crassiusculis, anticè crassioribus; natibus subprominentibus, ad apices crebrè et minutè undulatis; epidermide olivaceâ, virido-radiatâ; dentibus cardinalibus parvis, compressis, crenulatis,

vent. P. 14, extending half way to ventrals. Posterior angle of operculum right; anterior border shorter than postero-inferior. Length 4 inches.

Body above reddish; head paler; sides and below silvery; a dark spot on base of middle of tail and on middle of dorsal and anal.

Platte River, at Ft. Kearney, Kansas. Dr. W. A. Hammond.

This species resembles the *C. mormyrus* more than any other. In *C. nasutum* the head is much longer and the scales larger.

1864.]



Cope, E. D. 1865. "Partial catalogue of the cold-blooded Vertebrata of Michigan. Part I." *Proceedings of the Academy of Natural Sciences of Philadelphia* 16, 276–285.

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