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NOTES ON A COLLECTION OF FISHES FROM THE
HEAD OF CHESAPEAKE BAY.

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In the course of an investigation for the Bureau of Fisheries in the spring of 1912, in the head of Chesapeake Bay and vicinity, opportunity was afforded to make a small collection of the fishes of the region. The territory covered included the Susquehanna River from Port Deposit to its mouth, the Northeast River, the Elk River and its tributary, the Bohemia, the Sassafras River, the Susquehanna Flats, and Chesapeake Bay south to a line from Howell Point to Stony Point. From April 8th to May 8th the numerous pound-nets were visited almost daily, and many visits were made to the several large seines in operation during this time. Small collecting seines were also used in Heron Run and the old canal (here connected with the river by a break in the bank) at Lapidum, near Port Deposit, Maryland; in Swan Creek, the Elk and Bohemia rivers, the Sassafras River and Turner's Creek, and at the Bureau of Fisheries station at Battery Island, $3\frac{1}{2}$ miles below Havre-de-Grace, Maryland.

In June, 1882, Dr. Tarleton H. Bean made a small collection of fishes in this region, the results of which were published in the Proceedings of the U. S. National Museum, Vol. VI, 1883, pp. 365-367.

PETROMYZONTIDÆ.

1. **Petromyzon marinus** Linnæus. Lamprey.

An abundant species at this season. Many small ones, 14 to 17 cm., seen among the river herring taken in the seines and pound-nets. A few adults reported by the fishermen.

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ACIPENSERIDÆ.

2. **Acipenser sturio** Linnæus. Sturgeon.

This species is reported to be very scarce. None seen by us.

LEPISOSTEIDÆ.

3. **Lepisosteus osseus** (Linnæus). Black gar.

A single example 85 cm. in length, weighing $4\frac{1}{4}$ lbs., was taken in a fyke-net in the Bohemia River.

SILURIDÆ.

4. **Ameiurus catus** (Linnæus). White cat.

Abundant, and of considerable market value to the pound-net fishermen.

5. **Ameiurus nebulosus** (LeSueur). Yellow cat.

More abundant than the preceding species. Individuals ranged in color from a uniform muddy yellow through various degrees of marbling to a uniform dark slate, almost black.

CATOSTOMIDÆ.

6. **Carpoides cyprinus** (LeSueur). Carp sucker.

A single example, 34.8 cm. long, taken in a shore seine at Cherry Tree Point, in brackish water.

7. **Catostomus commersonii** (Lacépède). Sucker.

Common. The largest example seen was 45 cm. in length and weighed 2 lbs.

8. **Hypentelium nigricans** (LeSueur).

An example 23.6 cm., taken in a pound-net in the Elk River, and a small one in Swan Creek, were the only examples seen.

9. **Erimyzon oblongus** (Mitchill). Chub sucker.

Two males, 21 and 20 cm. long, from Bohemia River and Swan Creek. The larger example shows, in addition to the three tubercles on each side of the head usual in breeding males of this species, a fourth and smaller tubercle on each side just below a line from nostril to pupil. Both examples have numerous small excrescences on the anal fin, largest on basal portion; in the smaller example there are also excrescences on the lower caudal lobe, under side of caudal peduncle, and along sides nearly to base of ventrals.

These examples agree with specimens taken by us in the Chesapeake and Ohio Canal at Seneca, Maryland, and with an example in the U. S. National Museum from New Bedford, Mass. We have compared these examples with two examples of *E. suetta*, one from Savannah, Georgia, and the second from Lost Lake, Indiana, and find the difference in scaling between the two species to be as follows:

	<i>E. suetta</i>	<i>E. oblongus</i>
Number of transverse rows of scales running downward and backward between shoulder and base of caudal	36 or 37+1	42 to 45 +1 or 2
Predorsal scales	12 or 13	15 or 16
Scales from origin of ventral upward and forward to and including median line of back	15	18
Scales upward and backward from the same point	13	15
Scales from origin of anal upward and forward	13	15

10. **Moxostoma macrolepidotum** (LeSueur). Mullet.

Common; many caught in pound-nets. The largest example seen was 41 cm. in length, and weighed 1¾ lbs.

CYPRINIDÆ.

11. **Cyprinus carpio** (Linnæus). Carp, Dutchman.

Common.

12. **Hybognathus nuchalis** Agassiz. Gudgeon.

This form, common throughout the region, was found to be extremely abundant in Swan Creek. The individuals here were of large size (reaching 16.2 cm.) and far outnumbered *Notropis hudsonius amarus*, from which they could be readily distinguished by the lustrous brassy sheen covering the entire body.

13. **Semotilus corporalis** (Mitchill). Chub.

Only taken in the old canal basin at Lapidum, Maryland, where it occurs in considerable numbers.

14. **Semotilus atromaculatus** (Mitchill). Chub.

A single example taken at Lapidum, Maryland.

15. **Leuciscus vandoisulus** Cuvier & Valenciennes.

Common in Swan Creek. A breeding male 6.3 cm. long had many small tubercles distributed over entire surface of head; among the small ones on top of head were enlarged ones; a row of seven large ones above orbit; a small tubercle near apical margin of scale on nearly all of the body scales; upper margin of first pectoral ray armed with a row of small, antrorse, spine-like tubercles, largest on distal portion of ray.

16. **Notemigonus crysoleucas** (Mitchill). Pond roach.

Common. One example 18 cm. long, taken in a pound-net in the Bohemia River, showed the characteristic coloration of *N. versicolor* (De Kay).

17. *Notropis procne* (Cope).

This species appears to be common in the small streams, being especially abundant in Swan Creek. A few examples were taken at Lapidum and Heron Run.

In our examples of this species the scales of the back are narrowly edged with brownish, forming a very distinct cross-hatching. Lateral band dusky, not (or indistinctly) continued around tip of snout. Lateral line complete. Six divided rays in anal fin.

18. *Notropis bifrenatus* (Cope).

Our examples of this species were seined on the beaches of the Sassafras, Elk, Bohemia and Susquehanna Rivers, where it seems to be common. None were taken in the small creeks, where *N. procne* was abundant.

In our examples the dusky edging of the scales of the back is continued onto the body of the scale, the cross-hatchings being much less distinctly outlined than in *N. procne*. Lateral band darker than in *N. procne*, and continued distinctly around tip of snout. Lateral line incomplete. Six divided rays in anal fin.

In alcoholic examples of this and the preceding species, the black edgings to the scales immediately above the dark lateral band are absent, giving the appearance of a light band above the dark one.

19. *Notropis hudsonius amarus* (Girard). Gudgeon.

Everywhere abundant. Lateral band silvery or leaden, with traces of a blackish blotch at base of caudal. No light band above this stripe. Lateral line continuous; anal rays 7 (rarely 8).

20. *Notropis analostanus* (Girard).

Mostly confined to the small creeks, and especially abundant in the old canal at Lapidum, Maryland.

21. *Notropis cornutus* (Mitchill).

Taken only in Swan Creek and in the old canal at Lapidum, in both of which places it was abundant.

Two males (10.1 and 11 cm. in length) in breeding dress, had in addition to the tubercles on head and nape, smaller tubercles arranged in rows on the upper surface of the pectorals.

22. *Notropis photogenis amœnus* (Abbott).

This species, which we have taken in large numbers in several of the tributaries of the Potomac near Washington, D. C., appears to be less abundant here, only three examples being taken, one from Swan Creek and two from Lapidum.

23. *Rhinichthys atronasus* (Mitchill).

Ten examples were taken in the rocky pools of Heron Run.

24. **Exoglossum maxillingua** (LeSueur). Cut Lips.

Sparingly common in Swan Creek, and one example taken at Lapidum, Maryland.

ANGUILLIDÆ.

25. **Anguilla rostrata** (LeSueur). Eel.

Abundant everywhere.

DOROSOMATIDÆ.

26. **Dorosoma cepedianum** (LeSueur). Mud shad.

A single individual, 32 cm. in length, taken in a pound-net in the Elk River, was the only example seen.

CLUPEIDÆ.

27. **Pomolobus mediocris** (Mitchill). Hickory shad.

Three females, 35.7, 37.5 and 46.2 cm. in length, with roe well advanced but not ripe, were the only examples seen.

28. **Pomolobus pseudoharengus** (Wilson). Branch herring.

Reported to be much less abundant than in former years. This spring no large run of this species occurred.

The average length and weight of 7 males (from 26.5 to 29 cm. long) was 28.3 cm. and .5 lb.

The average length and weight of 5 females (from 29 to 31 cm. long) was 30 cm. and .6 lb.

Twenty-five examples (sex and length not recorded) averaged .54 lbs. each.

29. **Pomolobus æstivalis** (Mitchill). Glut herring.

FAT-BACK, BLUE-BACK, BLACK-BELLY.

It is reported that there is a falling off in the run of this species from that of the past three or four years.

This year (1912) this species was first taken in the Elk River on April 11th, but did not appear in any considerable numbers until the 16th. The run reached its height on April 27th, and by May 8th was almost over.

The average weight of 25 males (26.5 to 31.5 cm. long) was .56 lbs. per fish.

The average weight of 50 females (27.5 to 34 cm. long) was .68 lbs. per fish.

The average weight of 99 fish of both sexes (27 to 34.5 cm. long) was .61 lbs. per fish.

Of the many thousand individuals seen the majority had a single black blotch at shoulder, but individuals with a row of from three to nine blotches were not uncommon, and a considerable number were seen which showed traces of a double row.

30. ***Alosa sapidissima*** (Wilson). Shad, white shad.

Prior to May 8th the catch of shad was extremely small, most of the catch coming from brackish water.

31. ***Brevoortia tyrannus*** (Latrobe). Bug-fish.

None seen. A few reported to have been taken in a shore seine at Cherry Tree Point, Maryland, prior to May 3d. At this point the water is usually slightly brackish. The fishermen report that this species is generally abundant towards the close of the shad season.

ESOCIDÆ.

32. ***Esox reticulatus*** LeSueur. Pike.

Common. Females, in spawning condition, with ripe eggs, were seen as follows:

April 11, 1 example 31 cm., $\frac{1}{2}$ lb., Elk River.

April 18, 1 example, Elk River.

April 24, 1 example 50 cm., $1\frac{3}{8}$ lbs., Elk River.

April 25, 1 example 58 cm., $2\frac{1}{4}$ lbs., Bohemia River.

Several large examples were seen at Cherry Tree Point, taken with a shore seine in brackish water.

PŒCILIIDÆ.

33. ***Fundulus heteroclitus*** (Linnæus). Bull minnow.

Six examples taken in the Sassafras River.

34. ***Fundulus diaphanus*** (LeSueur). Bull minnow.

Abundant.

BELONIDÆ.

35. ***Tylosurus marinus*** (Walbaum). Silver gar.

One example, 40.1 cm. long, taken in Turner's Creek, Sassafras River.

GASTEROSTEIDÆ.

36. ***Apeltes quadracus*** (Mitchill). Stickleback.

Taken only in the Sassafras River, Turner's Creek, and at Battery Station. Apparently not abundant.

ATHERINIDÆ.

37. ***Menidia beryllina*** (Cope). Silversides.

Abundant in the Sassafras River and Turner's Creek. A very few examples taken at Lapidum, Maryland, Battery Station and in the Bohemia River.

CENTRARCHIDÆ.

38. ***Enneacanthus gloriosus*** (Holbrook).

Several examples taken in sluggish streams tributary to the Sassafras River.

A single example from the inner basin at Battery Station.

39. **Lepomis auritus** (Linnæus). Moccasin.

Common in the Elk and Bohemia rivers. One small example from Swan Creek.

40. **Lepomis gibbosus** (Linnæus). Moccasin, Tobacco-box.

Abundant.

41. **Micropterus dolomieu** (Lacépède). Black bass.

One example, 35.2 cm. in length, weighing $1\frac{1}{4}$ lbs. taken in a pound-net in the Bohemia River. This example was afflicted with "pop-eye." No others were seen.

42. **Micropterus salmoides** (Lacépède). Oswego bass.

BLACK BASS.

Common in the Elk and Bohemia Rivers where many are taken in pound-nets. The largest example seen was 49 cm. in length and weighed $4\frac{1}{2}$ lbs.

Two small examples seen in Swan Creek.

PERCIDÆ.

43. **Perca flavescens** (Mitchill.). Yellow perch.

Abundant. It would appear from our measurements that in this region this species attains a length of from 6 to 9 cm. one year after hatching, and first breeds at the age of two years, when a length of 15 to 19 cm. is attained.

44. **Hadropterus sellaris** Radcliffe & Welsh.

The type and co-type, both 4.9 cm. in length, were taken with a 25 ft. seine, in a swift riffle of Swan Creek, near Havre-de-Grace, Maryland, on May 2d. For description of this species see Bull. Bur. Fisheries, Vol. XXXII, 1912 (1914), p. 29-32, pl. XVIII.

45. **Bolesoma olmstedi** (Storer).

Everywhere abundant. The differences in size and coloration between the sexes of this species, which was in breeding dress, were very striking. The average length of 38 adult males (5.5 to 8.7 cm.) was 7.36 cm. Forty-five adult females (4 to 7.8 cm.) averaged 6.15 cm. in length. All these fish were in spawning condition. The average length of examples taken in the smaller streams was considerably less than of those from the shores of the larger rivers.

In the breeding males the ground color was a dark olive gray, darkest dorsally, with saddles and W-shaped markings indistinct or absent; vertical fins greatly enlarged; membranes between the first and third dorsal spines mesially jet black, rest of spinous dorsal with irregular plumbeous mottlings; second dorsal and caudal with numerous wavy plumbeous lines, these not extending onto lowermost rays of caudal; anal and ventrals slate-gray to slate-black; pectorals lighter with traces of mottlings.

Breeding females showed the usual coloration of the species.

In the male the anal papilla is small, bilobate, the sperm duct opening at the tip of the papilla between the lobes, while in the female the opening of the oviduct is much larger, and situated immediately in front of a large, expanded, heart-shaped papilla, three times as large as that of the male.

SERRANIDÆ.

46. **Roccus lineatus** (Bloch). Bass, striped bass, rockfish, rock.

Common. Many ripe males were taken throughout April, but no ripe females were seen. The males of this species mature when very small. The following measurements were taken:

- 1 ripe male 28 cm. long, weight $\frac{1}{2}$ lb.
- 1 ripe male 26.5 cm. long, weight $\frac{3}{8}$ lb.
- 1 ripe male 24 cm. long, weight $\frac{1}{4}$ lb.
- 1 ripe male 21.8 cm. long.

One female with roe well developed, but quite hard, measured 96 cm. in length and weighed 23 lbs.

47. **Morone americana** (Gmelin). White perch.

By far the most abundant resident species. The largest example seen was 35 cm. long, and weighed $1\frac{1}{4}$ lbs. Individuals 26 to 28 cm. in length, weighing 1 lb., were abundant. Small individuals, however, are so exceedingly numerous that the average weight per fish, as taken in the pound-nets, runs from .15 to .17 lbs. Examples of both sexes 12.5 to 17 cm. in length, averaging .11 lbs. in weight, were found in spawning condition.

Eggs of this species were first received at the Battery Station on April 4th, and on the 8th of May the breeding season was by no means over, a large proportion of the females still carrying unripe eggs.

PLEURONECTIDÆ.

48. **Pseudopleuronectes americanus** (Walbaum). Flounder.

One example 32.5 cm. long, received from Robin's Point, Maryland. The water here is usually brackish.

SOLEIDÆ.

49. **Achirus fasciatus** Lacépède. Hog-choker.

Abundant.



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