

ART. III.—*Discoveries of the United States Fish Commission : Notices of fifty species of east-coast Fishes, many of which are new to the fauna* ; by G. BROWN GOODE and TARLETON H. BEAN.

THE object of the present paper is to give a brief summary of the coast investigations of the United States Fish Commission (Professor S. F. Baird, Commissioner) since the publication of a similar paper in this Journal for December, 1877, pp. 470-478. Certain species which should be mentioned here have not yet been identified ; these will be reserved for a future paper. Full descriptions of species and discussions of questions hinted at in these notices have appeared or will appear in the Proceedings of the United States National Museum.

1. *Chilomycterus fuliginosus* (DeKay) Gill.

This species had been dropped by common consent from the faunal list ; but after careful study of a specimen seined on Watch Hill beach, Rhode Island, September 12, 1874, we feel compelled to restore it.

2. *Hippocampus antiquorum* Leach.

Taken with a school of mackerel on George's Bank, August, 1873.—An addition to the fauna of the Western Atlantic.

3. *Glyptocephalus cynoglossus* (Linné) Gill.

The craig flounder abounds in deep water off the coast from Cape Ann to Halifax, occurring at a depth of thirty-five fathoms in Ipswich Bay, Massachusetts, and in Bedford Basin, Halifax Harbor, and seaward to a depth of 111 fathoms. Careful study of a large series of specimens has enabled us to unite with this species *Glyptocephalus acadianus* Gill and *Pleuronectes elongatus* Yarrell.

4. *Hippoglossoides limandoides* (Bloch) Günther.

Hippoglossoides dentatus (Storer) Günther, is apparently identical with this European species. The genus *Pomatopsella* Gill,

which was founded on Storer's *Pleuronectes dentata*, has no characters by which it may be distinguished from *Hippoglossoides*, and it should be set aside. *Hippoglossoides limandoides* is a deep water species found constantly with the preceding.

5. *Pleuronectes glaber* (Storer) Gill.

As a rule, the female may be distinguished from the male by its smooth scales, especially in the breeding season, and by its greater size. Gravid females were received from Salem, Massachusetts, January 10, 1878. The eggs are one-thirtieth of an inch in diameter. (Bean.)

6. *Ancylosetta quadrocellata* Gill.

Of this species, which was described from Pensacola, Florida, and not elsewhere recorded, Professor S. F. Baird obtained two specimens in Charleston Market, South Carolina, April, 1877.

7. *Reinhardtius hippoglossoides* (Walb.) Gill.

The southern range of this Arctic species has been extended to latitude 42° N. Fishermen take them frequently in the gully between Le Have and George's Banks, at depths greater than 200 fathoms. They appear to inhabit the abrupt oceanic slopes of the banks beyond and below the range of the halibut; this fact, together with the uniform dark coloration of the under side of the body, seems to indicate that its habits differ from those of other pleuronectoid fishes.

8. *Chaenopsetta oblonga* (Mitch.) Gill.

One specimen was trawled August 15, 1878, in the harbor of Gloucester. It has not previously been recorded in Massachusetts Bay except at Provincetown, where Captain Atwood obtained it in 1846, and where it has since been occasionally observed.

9. *Macrurus Bairdii* Goode and Bean.

The unique specimen of this species has been supplemented by three additional ones captured August 27, 1878, forty-two miles off Eastern Point Light (Cape Ann), E. $\frac{3}{4}$ S., in 175 fathoms, which is within two or three miles of the locality at which the type was secured.

10. *Macrurus rupestris* Bloch.

Many specimens have been brought in by fishermen whose testimony is that it is abundant in the deep waters on George's and the more northern banks.

11. *Phycis Chesteri* Goode and Bean.

Three specimens of a new species of *Phycis* were caught in the trawl-net thirty-three to forty-two miles E. by S. from Cape Ann in 110 to 140 fathoms. The largest measured

0.242^m (without caudal), the others 0.143^m and 0.142^m: the latter were immature, and with the specific characteristics, particularly the length of the fin rays, not fully exhibited. The species may be characterized as follows. Head contained in length of body (without caudal) four and one-third times. Height of body in length five times. Diameter of orbit in length of head three and a half times, length of maxillary twice. Barbel one-third diameter of orbit. Vent in vertical from twelfth ray of second dorsal, and equidistant from tip of snout and extremity of second dorsal. Distance of first dorsal from snout equal to twice the length of mandible. Third ray of dorsal extremely elongate, extending to the thirty-third ray of second dorsal and two-thirds of the distance from snout to tip of caudal, its length more than twice that of the head. Anal inserted immediately behind the vent, at a distance from the ventrals equal to that of dorsal from snout. Ventral composed of three rays,* the first and second much prolonged, the first almost one-third as long as the body, the second three times as long as the head, extending to the fortieth ray of the anal fin and to a point three-fourths of the distance from snout to tip of caudal; the third shorter than the diameter of the orbit. Pectoral four times as long as the operculum. Scales large and thin, easily wrinkling with the folding of the thick flabby skin. Lateral line much broken on the posterior half of the body. Scales in ninety to ninety-one vertical rows and thirty-five horizontal rows, of which seven are above the lateral line. Radial formula: D., 9 or 10, 55 to 57. A. 56, C. 5, 18 to 21, 5. P. 17 or 18, V. 3.

The species has been named in honor of Captain H. C. Chester, well known as an Arctic explorer, and for four years attached to the United States Fish Commission.

12. *Haloporphyrus viola* Goode and Bean.

Two specimens of an undescribed species of the genus *Haloporphyrus* of Günther were brought in August 24, 1878, by Captain Joseph W. Collins of the schooner "Marion." They were taken on a halibut trawl-line on the outer edge of Le Have Bank at a depth of four or five hundred fathoms. The species may be briefly characterized as follows:

The head is contained four and one-third times in total length without caudal. The diameter of the orbit is one-fourth of the length of the head, or slightly more. The maxillary extends

* A critical study of the ventral fins of *Phycis* leads us to believe that one of the accepted characters of the genus and of the sub-family *Phycinæ* is false, there being three separately articulated rays in each ventral. In the young of *Phycis chuss*, for instance, the short third ray is apparent, but in the adult it is hidden in the thick skin which envelopes the bases of the first and second rays, causing them to appear like "a single long ray bifid at the end."

to the vertical from the posterior margin of the orbit. The barbel scarcely equals half the diameter of the orbit.

The vent is situated under the nineteenth ray of the second dorsal, equidistant from snout and tip of caudal.

The anal is inserted behind the vent at a distance equal to the length of the second anal ray; it has a considerable depression in its middle and terminates in a line with the end of the second dorsal.

The pectoral is slightly more than four-fifths as long as the head and extends to the vertical from the ninth ray of the second dorsal. Its length equals greatest height of body.

The longest ray of the ventral is about seven-eighths of the length of the head, and extends half way to the vent.

Radial formula: D. 4, 53; A. 40; V. 6. Scales in lateral line about 115; above lateral line 11.

13. *Hypsiptera argentea* Günther.

A single individual was taken at the surface, May, 1878, about forty miles off Cape May, New Jersey, by Captain Robert H. Hurlbert of Gloucester. This is an addition to the fauna of the Western Atlantic.

14. *Lota maculosa* (Le Sueur) Richardson.

After close study of a large series of specimens representing every locality from which species of *Lota* have been described in America and many places in Europe, Dr. Bean agrees with late writers in referring all the American species, so called, to *Lota maculosa*. This species, in the skeletons examined, has sixty-four vertebræ. The European variety, in two examples studied, shows sixty-one vertebræ. Dr. Günther gives the number as sixty. On the basis of this difference in the number of vertebræ Dr. Bean, for the present, separates the European from the American burbot as a variety with the name *Lota maculosa* (LeSueur) Rich. var. *vulgaris* Jenyns. Further observation of the number of vertebræ is very desirable.

The specific name *maculosa*, formed by LeSueur in 1817, seems to have priority. Walbaum's *Gadus lacustris* was evidently a catfish.*

The name *vulgaris*, though attributed to Cuvier and Jurine was not used nor claimed until in 1835 by Jenyns in his Manual of the Vertebrate Animals.

15. *Lycodes Verrillii* Goode and Bean.

Taken sparingly in from 73 to 114 fathoms off Cape Ann, at one time within seven miles of Thatcher's Island.

* See the description and also "Mathemeg" in Rich. Faun. Bor. Amer., p. 135, and Jordan, Bull. x, U. S. Nat. Mus., p. 84.

Professor Robert Collet* has considered this species identical with his *L. Sarsii*; but even the comparative tables which he introduces in support of this position show that the two species are clearly distinct.

16. *Leptoblennius serpentinus* (Storer) Gill.

Taken occasionally in seventy fathoms or more.

17. *Anarrhichas lupus* L.

Specimens of an *Anarrhichas* with brown cross bars instead of spots and which cannot in any way be distinguished from the European species, have been taken during the past season. We add this species to the faunal list without expressing an opinion as to the validity of the species *A. vomerinus* Agassiz.

18. *Eumicrotremus spinosus* (Fabr.) Gill.

Three specimens were secured, September 2, 1878, seventeen and three-quarter miles S. E. $\frac{1}{2}$ E. from Eastern Point Light, Cape Ann, in twenty-three to twenty-eight fathoms.

19. *Trichidion octonemus* (Girard) Gill.

Of this species, hitherto known only from Texas, the United States National Museum has lately received a specimen collected by Mr. Silas Stearns at Pensacola, Florida.

20. *Oreynus pelamys* (Linné) Poey.

A specimen of the oceanic bonito was taken in July or August, 1877, off Provincetown, Massachusetts, and presented by Mr. Jas. H. Blake to the Museum of Comparative Zoology. An addition to our fauna.

21. *Caulolatilus microps* Goode and Bean.

A specimen two feet three inches in length, taken March 13, 1878, on the Snapper Bank, off Pensacola, Florida, in thirty-five fathoms of water, was received from Mr. Silas Stearns. For a full description see Proc. U. S. National Museum, 1878, p. 42.

22. *Cynoscion regalis* (Bloch) Gill.

Three individuals have been taken during the summer in Capt. Webb's trap near Thatcher's Island, off Cape Ann. It had not previously been recorded farther north than Provincetown, Massachusetts.

23. *Menticirrhus nebulosus* (Mitch.) Gill.

One specimen was secured in the summer of 1878 by Captain Webb in the trap just referred to. Provincetown has been heretofore its recorded northern limit.

* Fiske fra den norske Nordhavs—Exped. 1876-77, Christiania Vidensk.—Selsk. Forhandl. 1878, No. 4.

24. *Stenotomus argyrops* (Linné) Gill.

The northern range of the scup is extended to Thatcher's Island, off Cape Ann, where it has recently been taken in considerable numbers by Captain Webb.

25. *Sargus Holbrookii* Bean.

Six specimens of this new species, from Savannah Bank, were sent to the United States National Museum, March 29, 1878, by Mr. Goode. Numerous individuals apparently belonging to the same species were collected at Beaufort, North Carolina, by Professor D. S. Jordan during the summer of 1878.

Diagnosis: Body ovate, compressed, a very slight protuberance above the upper anterior margin of the orbit, and a very marked one in the supra-occipital region. Distance from origin of ventral to origin of spinous dorsal is about two-fifths of total length to end of middle caudal rays.* Least height of tail is about equal to length of upper jaw.

Length of head is contained three and three-quarter times in total. The interorbital area is slightly less than one and a half times the long diameter of eye. The length of snout is one-tenth of total length and about equals that of mandible. The eye is contained nearly four and one-fifth times in length of head.

The longest dorsal spine is contained from eight and one-half to ten times in total length of body.

The distance of anal from snout is contained one and five-eighth times in total length. Longest anal spine equals one-twelfth of total length.

The length of middle caudal rays equals that of snout.

The distance of pectoral from snout is contained three and one-half times, and its length about three times in total length.

The distance of ventral from snout slightly exceeds the length of pectoral. Length of ventral averages nearly one-fifth of total length.

Radial formula: B. vi; D. xii, 13-14; A. iii, 13-14; P. 15-16; v, 1, 5.

Scales: 8-60 to 62-16.

Teeth: eight incisors in each jaw, their greatest width equal to half their length. Three rows of molars above, two below, with sometimes a tendency to increase the number of rows.

For a full description, see Proc. U. S. National Museum, 1878.

26. *Rhomboplites aurorubens* (Cuv. and Val.) Gill.

A specimen of this species, hitherto known only from the West Indies was secured in May from Mr. C. C. Lesley, of

* This length is the basis of comparison for all my measurements of this species.

Charleston, South Carolina, another was collected at Pensacola, Florida, by Mr. Silas Stearns a few days later.

27. *Lutjanus Blackfordii* Goode and Bean.

The "red-snapper" of the Southern Atlantic and Gulf coasts proves to be distinct from the West Indian species with which it had previously been confused. It was named in honor of Mr. E. G. Blackford of New York City, a gentleman who has rendered many important services to American ichthyology. Full descriptions of this and the following species may be found in the Proceedings of the U. S. National Museum.

28. *Lutjanus Stearnsii* Goode and Bean.

The "mangrove snapper" of the Gulf of Mexico proved to be new and was named in honor of Mr. Silas Stearns of Pensacola, by whom the only known specimen was collected. *Rhomboplites aurorubens*, mentioned above, is known at Charleston as the "mangrove snapper," at Pensacola as the "bastard snapper."

29. *Epinephelus Drummond-Hayi* Goode and Bean.

This magnificent species was first discovered at the Bermudas in 1851, by Col. H. M. Drummond Hay, C.M.Z.S., by whom a sketch and partial description were prepared. The National Museum has lately received two specimens from Florida, one from Mr. Blackford, collected at the Keys, the other from Mr. Stearns at Pensacola. The species attains the weight of fifty pounds or more.

30. *Epinephelus niveatus* (Cuv. and Val.) Poey.

This species has been taken twice at Newport, Rhode Island, by Samuel Powel, Esq. The first specimen, a young individual, was made the type of the genus *Hyporthodus** by Professor Gill. A comparison of *Hyporthodus flavicauda* Gill with Cuban specimens of *Epinephelus niveatus* proves their identity. The second specimen was received from Newport in 1877. It has not been recorded elsewhere on the East coast.

31. *Roccus lineatus* (Bl. Schn.) Gill.

The "rock-fish" is taken in winter in the Altamaha River, in considerable numbers. South of this region its occurrence is extremely rare. Two were observed in the St. Johns River, Florida, in 1874; and in May, 1878, a stray individual was sent by Mr. Stearns from Pensacola.

32. *Remoropsis brachyptera* (Lowe) Gill.

Two specimens of this rare species have been obtained from fishing schooners. One was found clinging to the side of a

* Proc. Acad. Nat. Sci. Philad., 1861, pp. 98-99.

sword-fish harpooned in the channel southwest of George's Bank, another on the deck of a halibut-trawler fishing in the gully northeast of George's Bank, at a time when sword fish were being taken on the trawls. This species may very probably be a parasite peculiar to *Xiphias*, as the allied species, *Rhombochirus osteochir* is to *Tetrapturus albidus*.

33. *Belone latimanus* Poey.

The occurrence of a single specimen of this West Indian form in Buzzard's Bay, where it was obtained by the Commission in 1875, has already been recorded (Proc. U. S. National Museum, i, 1878, p. 6.) Several additional specimens from North Carolina or Chesapeake Bay, were obtained in Fulton market, New York, June 1, 1878.

34. *Belone hians* Cuvier and Valenciennes.

In company with the preceding were several specimens of this species hitherto recorded only from Bahia, the West Indies, and the Bermudas.

35. *Fundulus seminolis* Lesueur.

This species, long lost sight of, was collected in quantity by Professor Baird on the upper St. Johns River.

36. *Lucania parva* (Baird and Girard) Bean.

The *Cyprinodon parvus* of Baird and Girard should be referred to the genus *Lucania* Girard. The species is recorded only from Beesley's Point, New Jersey, Sinepuxent Bay, Maryland, Greenport, Long Island and Noank, Connecticut. (Bean.)

37. *Alepidosaurus ferox* Lowe.

Six specimens of this species are now on record in the United States—one in the collection of the Boston Society of Natural History and five in the United States National Museum. All of these have been captured within the limits of lat. 41° and 44° and at depths of 200 to 400 fathoms.

The first capture of *Alepidosaurus* in the Western Atlantic, was by Captain D. C. Murphy of the schooner Centennial in July, 1877, in 200 to 300 fathoms. Lat. 43° 46' N.; long. 59° 19' W.

38. *Salmo salar* L.

The salmon has been transported by the Commission of Fisheries to the rivers of the Middle States, to many points in the Mississippi valley and to the California coast. It may be regarded as acclimated in the Hudson, Delaware and Susquehanna Rivers, and re-acclimated in the Connecticut.

39. *Brevoortia tyrannus* (Latrobe) Goode.

The common menhaden was described under the name *Clupea tyrannus* by Latrobe in 1802, and the specific name then proposed has priority over all others. An extended study of the species of this group indicates that the *B. tyrannus* occurs on the coast of Brazil, as far south as Bahia, and that Spix's *Clupanodon aureus* is specifically identical and should be included as a subspecies, *B. tyrannus* subspecies *aurea*.

40. *Brevoortia patronus* Goode.

A species occurring at several points on the north shore of the Gulf of Mexico, from the mouth of the Rio Grande to Pensacola, Florida, where Mr. Stearns observed it in great abundance.

41. *Alosa sapidissima* (Wilson) Storer.

Through the agency of the United States Commission of Fisheries the common shad has been introduced into most of the rivers flowing through the Southern States into the Gulf of Mexico, and may now be considered a member of the fauna of that region, its range south and west having been extended over at least twelve hundred additional miles of coast line. It is also acclimated in California.

42. *Pomolobus pseudoharengus* (Wilson) Gill.

Abundant in Lake Ontario, Cayuga and Seneca Lakes, New York. The variety *lacustris*, founded on Cayuga Lake specimens by Professor Jordan, is precisely like the average coast alewife. After careful measurements of numerous lake and coast specimens I am unable to separate them. (Bean.)

43. *Nemichthys scolopaceus*? Richardson.

A single specimen nineteen inches long, of a curious eel-like fish was obtained from a fisherman who took it, living, from the stomach of a cod fish caught on George's Bank in February, 1875, in forty-five fathoms. Another, preserved in the collection of the Cape Ann Literary and Scientific Association at Gloucester, was picked up on the deck of a cod vessel. It belongs to the genus *Nemichthys* described by Sir John Richardson from a specimen collected by the exploring ship Samarang in the South Atlantic. Only one species has been described, the type was from the South Atlantic. Another specimen of the genus was taken at Madeira and described by Lowe under the name *Leptorhyncus Leuchtenbergii*. Günther considers it to be identical with *N. scolopaceus*. The American fish is at present assigned to the same species. The family *Nemichthyidae* is new to the Western Atlantic.

44. *Amia calva* L.

The range of the mud-fish has not hitherto been recognized to extend south of Charleston, South Carolina, whence Garden sent specimens to Linnæus. It occurs abundantly in the St. Johns River, Florida, and Mr. S. C. Clarke found it in Spruce Creek, a tributary of Halifax River, about lat. 28°.

45. *Chimaera plumbea* Gill.

Within the past twelve months seven individuals have been secured—one by the Boston Society of Natural History and six by the United States National Museum.

The first specimen was taken by Captain D. C. Murphy of the schooner Centennial in July, 1877, in 200 to 300 fathoms, lat. 43° 46' N., long. 59° 19' W. Others have since been taken within the latitudes 42° and 44° N. and in water from 200 to 350 fathoms deep.

46. *Torpedo occidentalis* Storer.

Taken occasionally near Thatcher's Island, off Cape Ann, by Captain Webb, in his trap. A specimen was taken at Lanesville, Massachusetts, July 13, 1878, the only instance of its occurrence to the northward of the point of Cape Ann.

47. *Hypoprion longirostris* Poey.

A West Indian species; collected in the Gulf of Mexico, by Dr. J. W. Velie, of Chicago, and sent to Washington for identification.

48. *Centroscymnus coelolepis* Bocage and Capello.

This species was described from the coast of Portugal. It is recorded, also, from Madeira. Three specimens were presented to the United States National Museum, August 26, 1878, by the crew of the schooner Marion, who captured them on the Nova Scotia banks, the first specimens known from the Western Atlantic.

49. *Centroscyllium Fabricii* (Reinh.) Müller and Henle.

A Greenland species. One individual was received from Captain Jos. W. Collins, schooner Marion; locality same as the last. This species is new to the fauna of the Western Atlantic. Both this and the preceding are called by the fishermen "Black Dog fish."

50. *Ginglymostoma cirratum* (L. Gm.) Müller and Henle.

An adult specimen was taken in the Gulf of Mexico, by Dr. J. W. Velie of Chicago. A young individual was captured by Mr. Otto Luggier in Chesapeake Bay.

Gloucester, Mass., September 7, 1878.