

This species is not rare at Mazatlan, where it is known as *Raia*. It is also occasionally taken at Panama.

Three females and one male specimen, from 12 to 16 inches in length, were brought from Mazatlan, and one young male from Panama.

Specimens in United States National Museum.

28204. Mazatlan, Gilbert.

29524. " "

29542. " "

29580. " "

29318. Panama, "

The species of *Urolophus* thus far known from the Pacific coast of tropical America may be distinguished by the following analysis:

- a. Anterior margins of disk nearly straight; insertion of caudal spine in front of the middle of the tail; the spine longer than snout.
- b. Disk everywhere perfectly smooth; no spines or prickles; disk broader than long, considerably longer than tail, teeth obtuse in both sexes; length of snout less than one-fourth disk; brown above, with many yellowish spots..... HALLERI *
- bb. Disk smooth, or with a few minute prickles; upper part of tail with a few (2 to 8) large buckler-like spines on the median line; disk slightly longer than broad, slightly shorter than tail; teeth in males acute; length of snout, about one-third disk; brown above, nearly plain ASPIDURUS †
- bbb. Disk covered with small stellate prickles; a series of small spines along median line from shoulder to caudal spine; disk a little broader than long, as long as tail; length of snout, about one-fourth disk; teeth in males acute; brown above, nearly plain..... ASTERIAS
- aa. Anterior margins of disk convex; insertion of caudal spine in front of middle of tail; the spine not longer than snout; tail rather longer than body; teeth sharp in both sexes; skin beset with stellate tubercles MUNDUS ‡

NOTES ON A COLLECTION OF FISHES FROM CHARLESTON, SOUTH CAROLINA, WITH DESCRIPTIONS OF THREE NEW SPECIES.

By DAVID S. JORDAN AND CHARLES H. GILBERT.

Four weeks during the months of July and August, 1882, were spent by Mr. Gilbert in collecting and studying the fishes of Charleston and vicinity in the interests of the United States National Museum. One hundred and twenty-three species of marine fishes were observed; of these twenty one had not been previously recorded from our South Atlantic coast, nineteen being additions from the West Indies and the Gulf of Mexico.

* *Urolophus halleri*, Cooper, Proc. Cal. Acad. Nat. Sci., 1863, III, 95. Point Concepcion to Panama (Santa Barbara, San Pedro, San Diego, Mazatlan, Panama.)

† *Urolophus aspidurus* Jor. & Gilb., Bull. U. S. Fish Com., 1881, 307. Panama.

‡ *Urotrygon mundus* Gill. Proc. Acad. Nat. Sci., Phila., 1863, 173. Panama. (Dow collection; the type now lost.)

Especial acknowledgments are due to Mr. Charles C. Leslie for aid of various kinds rendered Mr. Gilbert while in Charleston. It was only through his co-operation that the present collection was made possible. Dr. G. E. Manigault kindly gave free access to the collections in the museum of Charleston College, and also presented several interesting specimens.

1. *Ginglymostoma cirratum* (Gmel.) Müller and Henle.

A stuffed skin of this species, about 5 feet long, is in the Charleston Museum.

2. *Mustelus canis* (Mitch.) De Kay.

A single specimen seen; probably not common.

3. *Scoliodon terrænovæ* (Rich.) Gill.

Very abundant in the harbor.

4. *Sphyrna tiburo* (Linn.) Raf.—*Shovel-head Shark*.

Probably the most abundant shark in Charleston Harbor. It is skinned and eaten by the negroes.

5. *Sphyrna zygzæna* (Linn.) Raf.

No specimens obtained. A large skin of this species is in the Charleston Museum.

6. *Odontaspis littoralis* (Mitch.) J. & G.

A stuffed skin is in the Charleston Museum. A large pair of jaws was also obtained from Mr. Leslie.

7. *Hypoprion brevirostris* Poey.

Body robust, its greatest height equaling the greatest breadth of the very depressed, flattened head; snout short, flat, broadly rounded anteriorly, the greatest height before mouth equaling distance from tip of snout to nostril; nostril midway between tip of snout and posterior edge of pupil; distance from snout to front of eye two-thirds the broad interorbital space; preoral portion of snout about one-half interorbital width; flap of anterior nostril very short, ending in an acute angle; width of mouth equaling distance from tip of snout to posterior margin of orbit, and slightly less than twice distance from tip of lower jaw to line connecting angles of mouth; angle of mouth with a short, deep, fold, half diameter of orbit, extending on upper lip only.

Teeth, $\frac{3}{3}\frac{2}{2}$; those in upper jaw from a broadly triangular base, which is distinctly though minutely serrulate on outer side only; above the base the cusp is abruptly constricted, narrowly triangular, with entire edges, the point turned but little towards the side. Teeth in lower jaw much narrower and shorter than those in the upper, erect, with base and edges of cusp entire.

Eye small, its diameter about one-fifth interorbital width.

Gill openings very wide; width of first slit nearly equaling its distance from fourth gill slit. Branchial area about as deep as long.

First dorsal inserted posteriorly, its origin nearly midway between anterior insertions of pectorals and ventrals; the fin but little higher than long, the upper margin lunate, the greatest height one-half length of head from snout to third gill slit. Second dorsal similar to the first, the height but little less. Distance between dorsals twice the base of the first, $2\frac{1}{2}$ times base of second.

Anal smaller than second dorsal, the margin very deeply incised; its origin slightly posterior to that of second dorsal, the two fins terminating about on the same vertical.

Caudal with a deep groove-like pit at base above, and a shallow, inconspicuous one below. Length of upper caudal lobe rather more than length of head from snout to last gill slit.

Pectorals short and very broad, their posterior margins crescentic; tips reaching nearly half way to middle of ventral base, scarcely to end of first third of dorsal base. Outer edge of ventrals one-third length of caudal, one-half that of pectoral.

Color greenish olive, dusky above; fins all, except first dorsal, with black margins, which are very wide on anal and caudal; eyes very light grayish; tongue and inside of mouth generally, brilliant white.

A single specimen, about $2\frac{1}{2}$ feet long, was taken in Charleston Harbor. It was not recognized by the fishermen as a common shark.

The description given by Professor Poey is so short that we cannot consider the present identification of it as certain.

8. *Pristis pectinatus* Latham—*Saw-fish*.

A large skin of this species and several "saws" are in the Charleston Museum, having been taken on the coast of South Carolina.

9. *Rhinobatus lentiginosus* Garman.

Olive-brown above, everywhere, except on dorsal and caudal fins, and on sides of snout covered with small, round, bluish-white spots, about one-third diameter of pupil; these spots extend on rostral cartilage two-thirds distance to tip; lateral margins of snout, as well as rostral cartilage, dusky below; ventrals margined posteriorly with whitish, very distinctly white in the young; entire coloration distinct in young before birth.

Body narrow, the greatest width of disk one-half distance from snout to origin of first dorsal; snout very long and narrow, its length from front of eye equaling one-third its distance to vent; rostral ridges wholly united below for their entire length; above, the ridges are very narrow, uniting to form a spatulate tip, thence separated by a very narrow groove, which becomes wider on posterior fourth; sides of snout semi-translucent.

Eye equal to the concave interorbital space, which is contained $4\frac{3}{8}$

times in snout. Greatest width of spiracle two-thirds eye; posterior margin of spiracle with two folds. Nostrils about one-sixth wider than the interspace; anterior valve with a narrow wing-like membrane reaching outer angle, the valve not reaching inner angle by nearly one-third width of nostril.

Mouth perfectly straight, the lower jaw with a very inconspicuous projection, fitting into a slight emargination of the upper; width of mouth $2\frac{3}{5}$ times in distance to tip of snout; teeth not pointed, in about 75 vertical series in each jaw.

Distance from snout to end of pectoral $2\frac{2}{3}$ in total length; distance to vent, $2\frac{1}{3}$ in total.

Dorsals equal, the interval between them three-fourths length of snout (to eye); their base one-half their height, which equals length of snout and eye. Distance from first dorsal to root of ventrals, $1\frac{1}{4}$ in snout.

Caudal broad and short, the two lobes of nearly equal width, the upper pointed; posterior margin of fin obliquely truncate, without notch; upper lobe five-sixths length of snout.

Skin very minutely granular; a group of six large tubercles at tip of snout; a series of smaller tubercles on anterior rim of orbit, and a few on upper rim posteriorly; a series of similar small tubercles, compressed, and with backward-directed spine, running from head along median line of back to dorsal; those between dorsals obsolescent; a single tubercle on each shoulder.

Sides of tail with a very conspicuous wide fold, extending to lower lobe of caudal.

A single specimen, a female, about 2 feet long, with five well-developed young, was obtained (July 26) in Charleston Harbor. This species is well known to fishermen, but is said to be not abundant.

10. *Torpedo occidentalis* Storer.

Traditions of the electric fish being taken at Charleston are current among the fishermen. No specimens were seen, and the fish is doubtless rare.

11. *Pteroplatea maclura*, (Le Sueur) M. & H.

Abundant in the harbor, where numerous specimens were taken. None of these had any trace of the caudal spine, though the largest seen was 18 inches long. At what size, if at all, is the caudal spine developed?

12. *Trygon sabina* Le Sueur—*Sting Ray*.

Agreeing well with Garman's account of the species (in J. & G., Syn. Fish. N. A. 68), but with the snout somewhat produced and acute. Teeth about $\frac{3}{2}$, those in sides of upper jaw enlarged. Width of mouth equaling that of interorbital space; nasal flap broadly concave behind. Length of disk greater than its width, contained $1\frac{4}{5}$ times in length of tail. Caudal spine long, nearly equaling snout; a short, rather high, cutaneous

fold, beginning immediately behind its tip, and extending for a distance rather less than length of spine; a much longer, rather higher fold on under side of tail, beginning slightly in advance of base of spine, and extending beyond end of upper fold.

Top of head between eyes rather sparsely covered with small stellate prickles (these almost wanting in one specimen), which do not extend backward on body; body naked with exception of the median dorsal series of very strong backward-hooked prickles, each arising from a long narrow base; a single prickle on each shoulder (sometimes wanting); upper surface of tail behind the fold with numerous minute backward-hooked prickles, arising from stellate bases; a few also on lower surface of tail towards tip.

Very abundant in the harbor.

13. *Stoasodon narinari* (Euphrasen) Cantor—*Clam-cracker*.

Not rare. A single large specimen seen.

14. *Manta birostris* (Walb.) Jor. & Gill.—*Devil-fish*.

Two stuffed skins in the Charleston Museum. The "devil-fish" is said to be abundant off Port Royal, S. C., each year, about the last of August.

15. *Lepidosteus osseus*. (Linn.) Agassiz.—*Gar*.

Two specimens were taken in the salt water of the harbor.

16. *Amia calva* Linn.

A specimen in Charleston Museum from Black River, South Carolina.

17. *Arius felis* (Linn.) J. & G.—*Small-mouthed cat-fish*.

Exceedingly abundant in the harbor, but eaten only by the poorer classes. In this species the maxillary barbel frequently extends beyond base of pectoral spine, thus agreeing in all respects with "*A. equestris*" Bd. & Grd. In July many males were captured with mouths full of their young.

18. *Ælurichthys marinus*, (Mitch.) B. & G.—*Large-mouthed cut-fish*.

Very abundant, although much less so than the preceding.

19. *Elops saurus* Linn.—*Jack Mariddle*.

Common in the harbor, but not eaten, the flesh said to be tasteless.

20. *Brevoortia tyrannus* (Latrobe) Goode.—*Menhaden*.

The young are very abundant in the harbor during the summer months. A study of the material in our possession, comprising specimens from Beaufort, N. C., Charleston, S. C., Saint John's River, Florida, Pensacola, Fla., Mobile, Ala., and Galveston, Tex., convinces us that the Gulf menhaden (*B. patronus*, Goode) should be considered a scarcely tangible variety of *tyrannus*, rather than a distinct species. We are

unable to appreciate any constant differences in proportions of head and fins, or in the serration of the scales. The length of the head in our specimens is about one-third length of body, sometimes a little more, sometimes less, and without reference to locality.

21. *Dorosoma cepedianum* (Le Sneur) Gill.—*Gizzard-shad*.

Comparison with specimens from White River, Indiana, and from Charleston, where the species is abundant, fails to show any difference between them. Examples from Galveston, however, as has been already noted (Proc. U. S. Nat. Mus., 1882, 248), differ conspicuously in appearance from the ordinary type because of much slenderer body, the depth being $2\frac{5}{8}$ in length (instead of $2\frac{1}{2}$): in the Galveston form the caudal peduncle is notably longer and slenderer, and the head slenderer. This Galveston form seems to us worthy of being distinguished as a subspecies, and may be called *Dorosoma cepedianum* subsp. *exile*.

22. *Stolephorus mitchilli* (C. & V.) J. & G.

(Jor. & Gilb. Proc. U. S. Nat. Mus., 1882, 248.)

Very common in Charleston Harbor, and agreeing perfectly with specimens from Wood's Holl, Galveston and Pensacola. Head. $3\frac{3}{4}$: depth, $3\frac{5}{8}$; D. 14; A. 27.

23. *Stolephorus browni* (Gmel.) J. & G.

Several specimens in Charleston Museum.

24. *Synodus foetens* (Linn.) Gill.—*Providence Whiting*.

Common in the harbor and on the Black-fish banks. Cautiously handled by the fishermen because of its supposed poisonous properties.

25. *Fundulus majalis* (Walb.) Günther.

Several specimens in the Charleston Museum, collected on the South Carolina coast.

26. *Fundulus similis* (Girard) Jordan.

Many young specimens caught in tide-pools in the harbor.

27. *Fundulus heteroclitus* (Linn.) Günther.—*Mud fish*.

Many specimens from Charleston enable us to make a more detailed comparison with specimens from the Gulf, and to demonstrate the permanence of the characters separating the two forms. Of these the east-coast form (typical *heteroclitus*) has all the fins conspicuously larger, and the white spots on vertical fins, in the male, smaller and more numerous. Other details of form and coloration are the same in both, and it will probably be better to consider the Gulf form as a subspecies.

In adult male *heteroclitus* the longest dorsal ray is contained $1\frac{3}{5}$ times

in head (in *grandis* 2); longest anal ray $1\frac{1}{5}$ (in *grandis* $1\frac{4}{5}$); caudal $3\frac{1}{2}$ in length (in *grandis* 4); ventrals reaching front of anal, 2 in head (in *grandis* $2\frac{2}{5}$ in head, barely reaching vent); base of dorsal 2 in head (in *grandis* $2\frac{2}{5}$). The young of both sexes, one inch long, are conspicuously barred with darker; in females the bars narrower than the interspaces, in males much wider than the interspaces and less numerous.

28. *Zygonectes cingulatus* (C. & V.) Jordan.

Fundulus zonatus et cingulatus C. & V., xviii, 196, 197 (not *Esox zonatus* Mitch.)
? Hydrargyra lucia Baird, Ninth Smithsonian Rept., 1855, 344. (♂ ?)
Haplochilus chrysotus Günther, vi, 317.

A single specimen from Black River, South Carolina, presented by Dr. G. E. Manigault, agrees in most respects with Günther's description of *H. chrysotus*. It differs in having all the vertical fins dotted with brown, the dots not forming distinct cross bands on the caudal, and in having the dorsal inserted rather more anteriorly (opposite the third anal ray instead of the fifth). The following is a detailed description of our specimen:

Body short and robust; the caudal peduncle high and compressed, its least height $1\frac{3}{4}$ in head; head short, wide, and flat, the interorbital width one-half its length. Teeth in jaws in a narrow band, the outer series much enlarged, those in the lower jaw larger and more numerous than those of the upper. Snout very short and blunt, the two jaws nearly equal in closed mouth; length of snout nearly two-thirds diameter of orbit, which is contained $1\frac{1}{2}$ times in interorbital width, and $3\frac{1}{3}$ times in head.

Origin of dorsal midway between tip of caudal and posterior rim of orbit; its distance from base of caudal one-half distance from front of orbit; base of dorsal $2\frac{1}{2}$ in head, its height $1\frac{4}{5}$ in head; its origin is opposite the nineteenth scale of lateral line, and the third ray of the anal fin.

Base of anal fin rather less than half length of head, its greatest height somewhat more than half; dorsal and anal not nearly reaching caudal when depressed. Caudal mutilated, apparently broadly rounded.

Pectorals reaching ventrals, $1\frac{2}{5}$ in head. Ventrals short, not nearly reaching vent, one-half head.

Head, $3\frac{1}{2}$ in length; depth, $3\frac{4}{5}$; D. 9; A. 11; scales, 32-12. L. $1\frac{3}{4}$ inches.

Color in spirits: Light olive-brown, top of head and a narrow median streak in front of dorsal fin darker; middle of sides, especially behind, with rather indistinct pearl-colored dots; middle of sides of trunk and tail with about 14, not clearly defined, narrow half-bars; an elongate dark area above base of pectorals. Vertical fins with small, black specks, less numerous on caudal fin; other fins plain.

29. *Gambusia patruelis holbrookii* (Agassiz) J. & G.

A specimen from Black River, South Carolina, was presented by Dr. Manigault.

Head $3\frac{2}{3}$ in length; eye $2\frac{1}{8}$ in head, $1\frac{2}{3}$ in interorbital width; D. 7; A. 9; lat. l. 30. The dark bar across cheeks is distinct, and the vertical fins are marked with blackish dots, which form two very distinct cross-bands on caudal fin. In *G. patruelis* from Galveston, these bars on the caudal are either indistinct or altogether wanting, and the dark bar on cheeks is often obsolete; in all specimens of *holbrookii* seen by us, these markings are conspicuous.

Three young males (less than 1 inch long), from Eutaw Springs, S. C., show dark spots on dorsal fin, and a dark shade across cheeks. The specimens agree in proportions and fin rays with adult females.

30. *Ophichthys chrysops* Poey—"Sea-serpent."

A single specimen, 20 inches long, evidently of the same species as our mutilated specimen from Pensacola (Proc. U. S. Nat. Mus. 1882, 261), and answering well Poey's description of *Ophichthys chrysops*, shows the following characters:

Olive-brown above, thickly dusted with dark points; pectorals wholly dusky; dorsal and anal translucent, with blackish margins; body white below; mucous pores on head conspicuous, black; lower jaw with dusky cross-blotches; no dark lines on throat.

Head and trunk $1\frac{2}{3}$ in tail; head $2\frac{1}{2}$ in trunk; eye equaling interorbital space $1\frac{1}{4}$ in snout, $9\frac{1}{8}$ in head; a series of about eight mucous pores along side of each mandible; numerous pores on nape and top of head, three in a vertical series behind eye, about four along sides of upper jaw below eye; cleft of mouth $2\frac{2}{3}$ in head. Teeth conical, short and strong, not blunt, uniform in size, none of them enlarged; in two very distinct series on all the dentigerous bones. Anterior nostrils not elongate, the tube less than diameter of eye. Gill openings broadly crescent-shaped, separated by a distance $1\frac{1}{2}$ their width, which is about one-third gape of mouth.

Dorsal beginning over last fourth of pectoral, the distance of its origin from snout equaling two-fifths distance from snout to vent; pectoral about equaling gape of mouth. Free portion of tail sharp, compressed, about two-thirds diameter of orbit.

The description of *Ophisurus gomesii* Castelnan is possibly based on a specimen of this species, and the specific name would, in that case, supersede *chrysops*. But the description is inadequate and might refer to one of several other species. We think it best to retain Poey's name.

31. *Tylosurus marinus* (Bl. & Schn.) J. & G.

Numerous specimens seen swimming about in the harbor, where it is doubtless abundant.

32. Hemirhamphus unifasciatus Ranzani.

The single example obtained agrees in all respects with specimens of *unifasciatus* from Beaufort, N. C., but has the anterior rays of dorsal and anal, and the upper and lower rays of caudal, jet black. In these respects it agrees with specimens obtained at Mazatlan, Mexico.

33. Exocoetus mesogaster Bloch.

(*Exocetus hillianus* Gosse.)

Evidently not rare in the open sea off Charleston Harbor. Two specimens were brought in by a fishing smack, having flown on board during the night. A third specimen was presented by Mr. Leslie. D. 11-12; A. 12-13.

34. Siphostoma louisianæ (Günther) J. & G.—“*Gar-fish*.”

Abundant. Dorsal on 9 or 10 rings; snout exceedingly variable in length, sometimes half longer than rest of head, and longer than base of dorsal; often much shorter than this; occiput and belly more or less strongly carinate; rings 16+9+31 or 15+10+31. D. 33 to 35. An adult female has the dorsal whitish, with oblique dusky bands about as broad as the interspaces.

35. Hippocampus stylifer Jor. & Gilb.—*Sea-horse*.

(J. & G., Proc. U. S. National Museum 1882, 265.)

A single specimen, nearly 2 inches long, was obtained. The characteristic coloration is well shown at this age, the light gray cross-bands with dark brown borders being very distinct. The body is very slender, its greatest depth about two-thirds length of head; snout somewhat shorter than in the specimen from Pensacola, its length equaling post-orbital part of head. Dorsal inserted on four rings, a half only of the first and fourth rings being covered; dorsal rays, 16; plates of body, 12+35.

Still another specimen of this species, collected in the Gulf of Mexico by Prof. O. P. Hay, has 18 rays in the dorsal, and the body plates 12+34.

36. Mugil albula Linn.—*Mullet*.

Abundant.

36(b). Mugil brasiliensis Ag.—*Mullet*.

Rather more abundant than the preceding.

37. Querimana harengus (Gthr.) J. & G. (*Gen. nov.*)

(*Myxus harengus* Gthr., iii, 467.)

Several specimens, about two inches in length, were taken, agreeing entirely with others from Mazatlan, Panama, and Zorritas, Peru. The wide distribution of this little mullet is remarkable. It probably does not reach a greater length than 2 or 3 inches. It is not a true *Myxus*, as it has but two anal spines (instead of three), fixed teeth in the upper

jaw only. We therefore consider it as the type of a distinct genus *Querimana* (from *Queriman*, a Portuguese or Spanish name of *Mugil liza*, in Surinam). The stomach is gizzard-like as in *Mugil*. Eyelid not adipose.

38. *Menidia laciniata* Swain.—*Silver-fish*.

Four young specimens were obtained, in all of which the anal rays are 1, 19, thus agreeing with specimens from Beaufort, N. C., and differing from typical *vagrans* from Galveston, which has the anal rays usually 1, 17 (1, 14 to 1, 17). These young specimens show the following coloration: Clear translucent, greenish above; back with two or more rather regular series of minute black dots, usually not more than one on each scale; snout and lower jaw dusky; lateral silvery streak rather wide, covering the third row of scales, not bounded above by a dark line, but the entire band dusted with dark points. A few minute dots on base of anal; caudal dusky.

39. *Menidia bosci* (C. & V.) Swain.—*Silver-fish*.

(*Menidia dentex* Goode & Bean, Proc. U. S. Nat. Mus., 1882, 429.)

Two young specimens, one having the anal rays 22, the other 23, are colored as follows: Greenish-yellow on back, very thickly covered with fine dots, as are also the snout and lower jaw; lateral streak very narrow, bordered above with a conspicuous greenish-black line; the stripe about as wide as pupil, covering the middle of the fourth series of scales. Caudal conspicuously light yellow; dorsal and pectoral fins less so; base of anal dusky.

40. *Sphyræna picuda* (Bloch) Poey.—*Barracuda*.

Rare off Charleston Harbor; said to be very infrequently seen. A single specimen, about 18 inches long, was taken on the bottom in 10 fathoms of water. It shows the following characters:

Color, dusky bluish above and on sides, silvery white below; about 20 dusky bars, much wider than the interspaces, descend from back not quite to lateral line; lower part of sides with a few black blotches, irregular in shape and position, usually little larger than pupil; top of head blackish; opercular membrane above black; soft dorsal, anal, ventrals and caudal black; the dorsal and anal with tips of first and last rays white; pectorals and spinous dorsal fin dusky, the axil black; ventrals margined with white posteriorly.

Head very large, the lower jaw especially strong and heavy, the snout rather bluntly conical; maxillary about half length of head, reaching front of pupil. Premaxillary series of teeth small, compressed, of uniform size, about 40 in number; vomer with two pairs of very large, compressed teeth, triangular in shape, their length more than half diameter of pupil; the anterior pair directed downwards, the posterior downwards and backwards, the two pairs separated by an interspace equal to their length; palatines with a close-set series of about 8 teeth similar to those

on the vomer, but rather smaller; a large compressed tooth at symphysis; those of the lateral series of lower jaw small anteriorly, increasing constantly backwards, where they equal those of the palatine series. Eye large, $2\frac{1}{2}$ in snout, 2 in postorbital part of head, nearly equaling interorbital area. Interorbital space concave, with a shallow median groove, divided by a ridge in front and behind; supraocular ridge bony, striate.

Distance from snout to front of dorsal $1\frac{1}{4}$ in distance from latter to root of caudal; second dorsal spine longest, one-half length of snout and eye; space separating dorsals $5\frac{1}{2}$ in length of body; second dorsal and anal opposite and equal, their margins concave, the longest ray about $2\frac{2}{3}$ in head. Caudal broad, moderately forked; the middle rays half the outer; the two lobes equal, concave. Pectoral reaching somewhat beyond front of dorsal, one-third head. Ventrals inserted slightly in advance of dorsal; their distance from snout two-fifths length of body; their length $3\frac{2}{3}$ in head. Scales large, uniform in size; head naked, except cheeks and opercles, which are covered with small embedded scales.

Head three in length; depth equaling snout, $2\frac{2}{7}$ in head. D. V—1, 9; A. II, 8. Scales 10—78—10 (the cross series counted from lateral line to front of dorsal, and anal fins respectively). About 12 series of scales on the cheeks.

41. *Polynemus octofilis* (Gill) J. & G.

In appearance much resembling *P. approximans*, the body comparatively little elongated, with short head and small mouth; snout heavy, projecting beyond mouth for a distance nearly equal to its own length, posterior margin of orbit midway between preopercular margin and anterior nostril; mouth small, the maxillary extending beyond orbit, for a distance equaling two-thirds diameter of orbit; maxillary $2\frac{1}{3}$ in head; snout three-fourths diameter of orbit; eye slightly less than interorbital space, $4\frac{1}{2}$ in head; preorbital two-fifths vertical diameter of orbit; longest-gill raker five-sixths diameter of eye; 18 on lower limb.

Interval between dorsals $1\frac{3}{4}$ in head; third dorsal spine highest, $1\frac{1}{4}$ in head, nearly reaching origin of second dorsal when depressed; second dorsal falcate, its highest ray $1\frac{2}{3}$ in head.

Anal not falcate, the tips of anterior rays not projecting beyond the gently concave outline of the fin; longest ray $1\frac{3}{4}$ in head; insertion of anal opposite second soft ray of dorsal; anal spines comparatively well developed, the third equaling diameter of orbit.

Lower caudal lobe $3\frac{1}{4}$ in body.

Ventrals inserted under fifth dorsal spine, their length nearly $\frac{1}{2}$ head.

Pectorals reaching vertical from tips of ventrals $1\frac{1}{3}$ in head. Filaments slender; 8 in number; the length of the upper one one-third distance from tip of snout to fork of caudal fin, reaching slightly beyond the vent; the lowermost filament two-thirds head.

Head $3\frac{2}{5}$ in length; depth $3\frac{1}{3}$; D. VIII—1, 12; A. III, 13. Lateral line forking at base of caudal; thence continued to margin of fin; 62 tubes from shoulder to fork; $5\frac{1}{2}$ series above lat. l., 10 below.

Color very light olivaceous, tinged with light yellow; scales on back, with wide dusky margins formed by dark punctulations; belly white; tip of snout with numerous coarse black points; a few of these on maxillary also; vertical fins yellowish and dusky, with black points; tip of anterior anal rays white; ventrals whitish; the outer rays dusky; pectorals almost uniform deep black, the color formed by closely approximated coarse black points; filaments translucent, slightly dusky.

It is probable that all species of *Polynemus* have three anal spines and not two, although this latter number has been assigned to various species by different authors. The first spine is very short, and usually largely enveloped in the scales. Our specimen differs from young specimens of *P. octonemus* Grd. (no adults being known) from the Gulf of Mexico in its shorter pectoral filaments, shorter ventral fins, and in the pectoral fins being black.

One specimen only was obtained at Charleston, where it is evidently very rare. It was wholly unknown to the fishermen.

42. *Echeneis naucrates* Linn.—Pilot-fish.

Of frequent occurrence. The specimen obtained has 22 laminae, the length of disk being $4\frac{2}{5}$ in total, and the greatest width between pectorals one-half length of disk. A specimen from Pensacola has 22 laminae in the disk, which is contained $4\frac{4}{5}$ times in total, and a third specimen, from Saint John's River, has the disk also with 22 laminae, but the length only $4\frac{1}{3}$ in total.

43. *Remora squalipeta* (Dald.) J. & G.

According to Lütken (Contributions Ichthyographiques V, 5) *Echeneis squalipeta* Daldorf is based on the young of *Echeneis remora* Linné. In case, then, it is considered desirable to give generic rank to *Remora*, Daldorf's name will be the oldest available for the species.

Numerous specimens from the vicinity of Charleston are in the Charleston Museum.

44. *Phthirichthys lineatus* (Menziés) Gill.

Body with the general form and appearance of *Echeneis naucrates*, the head much more narrowed anteriorly, the tip of lower jaw thus forming a very narrow, linguiform projection, out of line with the rounded profile of sides of head. Mouth with wide gape, the maxillary about $\frac{2}{5}$ head (from tip of snout). Teeth comparatively large and few in number, somewhat recurved, not forming a close-set band; those laterally in upper jaw in about 2 distinct series, forming a narrow patch in front; no external series of compressed, close-set teeth as is found in *Remora*, and no distinct canines, though the outer series are larger than the inner; teeth in lower jaw similar to those in the upper, arranged in about three series laterally, and forming a narrow wide-set patch in

front; teeth on vomer, palatines, and tongue similar to those in jaws, but much smaller; vomerine patch broad, concave, with two lateral backward processes; on each side of this is the short, narrow palatine band (wholly lacking in specimens examined of *Remora squalipeta*, and *Echeneis naucrates*) of about 3 irregular series. Eye $3\frac{2}{3}$ in head, half width of interorbital space. Disk wide, covering all of top of head, its width $1\frac{2}{3}$ in its length, which is one-fifth total length with caudal; lamellæ but 10 in number, very strongly pectinate.

Origin of dorsal midway between base of caudal and third cephalic plate; the shape of dorsal, anal, and caudal as in *Echeneis naucrates*, the median caudal rays being, in our young specimen, produced. Pectoral pointed, the rays all normal, about 18 in number; its tip not quite reaching tip of ventral, which is $\frac{5}{7}$ head.

D. X-30; A. 30. Head $5\frac{1}{4}$ in length; depth about $\frac{1}{2}$ length of head. Length 4 inches.

Color, slaty-black, a darker band along middle of sides, bounded above and below with a narrow white streak, the upper beginning on snout, the lower below eye, the two slightly converging backwards; under side of head lighter; anterior lobes of dorsal and anal, upper and lower caudal rays, and pectoral fins, broadly margined with white; ventrals and posterior dorsal and anal rays with narrow white margins.

The genus *Phthirichthys* is evidently most nearly related to *Echeneis*, from which it may be separated, as well by the peculiar dentition as by the reduced number of plates on the head.

A single small specimen, 4 inches in length, was taken at Charleston. This agrees well with descriptions given by Poey, of *Echeneis apicalis* and *Echeneis sphyænarum*, but has not the conspicuously enlarged teeth in sides of lower jaw, assigned to the latter.

45. *Elacate canada* (Linn.) Holbrook.—*Cobia*.

Not infrequently taken in the summer months. A single specimen was obtained.

46. *Trichiurus lepturus* Linn.—“*Sword-fish*”; *Silver-eel*.

Very abundant in Charleston Harbor, being brought in by every seine-boat.

47. *Scomber colias* Gmelin.

A single specimen of this species, captured at Charleston in the fall of 1880, was presented by Mr. Chas. C. Leslie.

The three species of *Scomber*, known to occur on our coasts, may be thus distinguished.

a. Air bladder none.

1. *S. scombrus* Linn.

Scomber scombrus Cuv. & Val. ix, 6.

? *Scomber vernalis* Mitch. Trans. Lit. and Philos. Soc. New York, 1815, 423.

Scomber vernalis DeKay, N. Y. Fauna, Fishes, 101.

Sides silvery below, immaculate; top of head almost uniformly dark, the cranium without conspicuous transparent area.

Eye small, slightly less than interorbital space, 5 in head. Maxillary $2\frac{2}{3}$ in head, the distance from tip of snout to angle of mouth $2\frac{2}{3}$; preopercle very wide, the posterior margin strongly convex, little oblique, the angle very bluntly rounded; a single series of evident pores along lower margin of preopercle; subopercle moderate, the greatest width $1\frac{1}{4}$ in orbit; head $3\frac{2}{3}$ in length (without caudal).

First dorsal normally with 12 spines.

Scales minute, not forming a corselet.

Specimens examined from the coasts of New England and Virginia, and from Venice and Genoa, Italy.

aa. Air bladder present, well developed (*Pneumatophorus*, subgen. nov.).

b. Sides below silvery, immaculate.

2. *S. PNEUMATOPHORUS* De la Roche.

Scomber pneumatophorus. De la Roche, Ann. du Mus. d'Hist. Nat. xiii, 335. Cuv. & Val. ix, 36. Gervais et Boulart, Poissons de France, ii, 119. Giglioli, Elenco Sistematico dei Pesci di Italia, 24. Günther, ii, 359.

Scomber grex Mitch., Trans. Lit. and Phil. Soc., N. Y. 1815, 422.

Scomber grex Cuv. & Val., ix, 46.

? *Scomber vernalis* Cuv. & Val., ix, 48.

Scomber diego Ayres, Proc. Cal'a Acad. Nat. Sci. 1856, 92.

Top of head with a very conspicuous transparent area, appearing whitish in alcoholic specimens. Eye somewhat larger, its diameter greater than interorbital space, $4\frac{2}{3}$ in head. Maxillary $2\frac{2}{3}$ in head, the distance from tip of snout to angle of mouth, $2\frac{2}{3}$ in head; posterior margin of preopercle straight or even slightly concave, the angle much less blunt, and the inferior margin more nearly straight than in *scombrus*; many very minute pores along lower part of preopercle, not arranged in series; subopercle wider than in *scombrus*, the greatest width $1\frac{1}{2}$ in diameter of orbit; opercle with a deeper emargination opposite base of pectoral. Head $3\frac{1}{2}$ in length (without caudal).

First dorsal normally with 9 spines; pectoral $2\frac{2}{3}$ in head.

Scales larger; those in lateral line more conspicuous; those around pectoral fin enlarged, forming a distinct corselet.

Specimens from Santa Barbara, Cal., from the coast of New England, and from Venice, Italy, show no appreciable differences.

bb. Sides below with very numerous, roundish, or oblong, dusky-olive blotches.

3. *S. COLLAS* Gmelin.

?? *Lacerto* or *Colias*, Cetti, Hist. Nat. Sard. iii, 190.

?? Gmelin, Syst. Nat. 1788, 1329.

Risso, Ichthyologie de Nice, 1810, 171.

? Rafinesque, Indice d'Ittiologia Siciliana, 1810, 20.

? Walbaum, Art. Pisc. 1792, 209.

? Bloch & Schneider, Syst. Ichth. 1801, 22.

Cuv. & Val. Hist. Nat. des Poiss. ix, 39.

Storer, Synop. Fish. N. A. 342.

DeKay, N. Y. Fauna Fishes, 104.

Day, Fishes Great Britain, 91.

Günther, ii, 361.

Gervais et Boulart, Poiss. de France 118.

Giglioli, Elenco, &c. 24.

Moreau, Hist. Nat. Poiss. de la France, 412.

? *Scomber lacertus* Walb., Art. Pisc. 209, 1792 (= *Lacerto* Cetti).

Scomber dekayi Storer, Hist. Fish. Mass. 52.

Top of head with a conspicuous transparent area, whitish in spirits; eye very large, wider than interorbital area, 4 in head. Maxillary $2\frac{3}{4}$ in head; the distance from tip of snout to angle of mouth $2\frac{1}{7}$ in head; posterior margin of preopercle straight, and rather less oblique than in *pneumatophorus*; the lower margin longer and less rounded than in *scombrus*; subopercle very long and narrow; its greatest width rather less than one-half diameter of orbit; opercle with a deep emargination opposite base of pectorals. Head $3\frac{1}{5}$ in length (without caudal).

Dorsal fin normally with 9 spines, a 10th sometimes present.

Scales still larger than in *pneumatophorus*; those on sides in about 175 oblique series; lateral line very conspicuous; corselet conspicuous, composed of large scales.

Our specimen from Charleston, S. C., one from Pensacola, Fla., and several from Venice and Genoa, Italy, agree in all respects.

The *Scomber colias* of Gmelin was founded on the fish called by Cetti *Lacerto* or *Colias*, and it can probably never be known with certainty which of the three species found in the Mediterranean was thus designated. There can, however, be no doubt as to the species called *colias* by Risso. The name may therefore be retained for the present species, inasmuch as no other name had been given prior to this definition.

Steindachner considers *S. pneumatophorus* as the young of *S. colias*. We have specimens young and old of both. We are not yet fully convinced, however, that the two forms are really distinct species.

48. *Scomberomorus maculatus* (Mitch.) J. & G.—*Spanish mackerel*.

Numerous specimens were observed in the market.

49. *Scomberomorus* (?) *caballa* (C. & V.) J. & G.—*King-fish*.

A large species of *Scomberomorus*, known as *King-fish*, and having inconspicuous dusky spots on sides, is, during the summer months, very abundant off shore, from Cape Hatteras southward. Coasting steamers catch them with trolling lines on every trip, the fish averaging from 3 to 5 feet long. A single specimen was seen, about $3\frac{1}{2}$ feet long, captured off Cape Lookout, but no description taken sufficient for the positive identification of the species. The fishermen at Charleston are well acquainted with the *King-fish*, though they seldom capture it.

50. *Caranx chrysus* (Mitch.) DeKay.—*Jack-Crevalle*.

Scomber crysos Mitchell, Trans. Lit. & Philos. Soc. N. Y. I, 424, 1815.

Caranx chrysos DeKay, N. Y. Fauna, Fish. 1842, 121.

Caranx pisquetus Cuv. & Val., IX, 98.

Caranx hippos Holbrook, Ichth. S. C., 1860, 90.

Paratractus pisquetus Gill, Proc. Acad. Nat. Sci. Phila., 1862, 432.

There can be little doubt that the species described by Mitchell as

"*Scomber crysos*," the "yellow mackerel," is the *Caranx pisquetus* C. & V., and not the *Caranx hippos* Linn. The only reason that can be urged for the identification of "*crysos*" with *hippos*, is the depth assigned to the former ($3\frac{1}{2}$ in total length), this being greater than that usually found in *pisquetus* ($3\frac{1}{2}$ to 4 in total). It is to be noted, however, that Mitchill's specimen was only $6\frac{1}{2}$ inches long, and the young of all the species of *Caranx* have the depth appreciably greater than do the adults. Furthermore, Mitchill's measurements, taken as they were in inches, would easily permit the slight inaccuracy necessary to account for this difference in depth. The figure given by Mitchill, if sufficiently accurate to be of value, would seem to be based on a young specimen of *hippos*. It differs, however, too widely from the accompanying description to allow us to consider it identical with the specimen used by Mitchill for the type of the species.

The following characters, given by Mitchill, leave little doubt as to the species he had in mind; "a neat, compact, handsome fish, about $\frac{3}{4}$ inch thick. He is plump, generally. Back forms a neat regular curve. Belly an opposite corresponding sweep. Head neither rostrated nor blunt." "A black spot frequently at the edge of the gill cover." "D. 8, 24, A. 20." These characteristics are exactly those of *pisquetus*, while *hippos*, on the contrary, is a high compressed fish, not at all plump, with the back forming a high uneven curve, and the belly not at all arched, but running in a straight oblique line from chin to front of anal; the head is also blunt, the rostral profile being sub-vertical, and the fin formula is 2d D. 21-22: A. 16-17. In addition we have the fact, of little importance, perhaps, that the *pisquetus* is by far the commoner form northward, and is generally known as the "Yellow Mackerel."

Caranx chrysus is the only species of *Caranx* brought in much abundance to the market of Charleston, during the summer months. The name *Jack-Creville* is there applied to all species of *Caranx* without distinction:

51. *Caranx hippos* (Linn.) J. & G.

But few specimens seen.

52. *Caranx setipinnis* (Mitch.) J. & G.

Many specimens taken in the harbor are in the Charleston Museum. A single immature example was seen in the market. As has been noticed by Bleeker and Steindachner, this species has the armed lateral line of *Caranx*, from which genus we do not see how it can be separated.

53. *Selene vomer* (Linn.) Lütken.—*Hog-fish*.

The young form of this species, with filamentous dorsal and elongate ventrals, was very abundant in the harbor. No adults were seen.

54. *Chloroscombrus chrysurus* (Linn.) Gill.—*Bumper*.

Very abundant.

55. *Trachynotus carolinus* (Linn.) Gill.—*Crevalle*.

The most highly prized of the fishes of Charleston. Not brought into the market in great numbers; known universally as *Crevalle*, the name *Pompano* being seldom used.

56. *Seriola carolinensis* Holbrook.—*Jack-fish*; *Amber-jack*.

Seriola carolinensis and *zonata* Holbrook, Ichth. S. C. 72 and 75.

Seriola stearnsi Goode & Bean, Proc. U. S. Nat. Mus. 1879, 48.

(?) *Seriola dubia* Poey, Memorias de Cuba, II, 228.

Two young specimens, each about 1 foot long, were obtained in the market, and many very young (3 or 4 inches long) were seen swimming on the surface, on the fishing grounds outside the harbor. These latter had the lateral bands intensely black and very conspicuous. The following is the color shown by the two larger specimens, when fresh:

Back dusky bluish, becoming dull white on sides and dull silvery below; five rather faint, broad, dark, half-bars downward from back to axis of body, about as wide as the interspaces; a light yellow streak from eye back along axis of body to tail, most distinct where it crosses the vertical bars; an irregular yellowish area on lower half of sides anteriorly; an oblique dusky band from front of dorsal to eye, and one from eye forward to suborbital; a broad dusky streak above base of anal; soft dorsal and anal blackish olive, margined with white, the margin broad anteriorly; spinous dorsal blackish; caudal dusky olive; ventrals silvery white, within dusky yellowish-green; pectorals with olive tinge; a horizontal blackish streak on opercle.

This species is exceedingly close to *S. zonata* Mitch., the number of fin rays, the pattern of coloration, and the general proportions of head and body being the same. The northern form, *zonata*, has, however, the bands on the sides appearing jet black at all ages, while in *carolinensis* of the same size these are merely darker shades. *Zonata* has also the depth much greater, and the body more compressed; in specimens 1 foot long, the depth is contained $2\frac{5}{8}$ times in length (to base of caudal), while in *carolinensis* of the same size the depth is $3\frac{1}{2}$ in length.

A detailed comparison of *carolinensis* from Charleston with a specimen of *stearnsi* from Pensacola fails to show any differences. In young specimens the occiput is more or less sharply keeled, as in *zonata*, this disappearing with age, the occiput becoming very broadly and obtusely rounded.

57. *Stromateus paru* Linn.

Very common during the summer months.

Above, light bluish; below, silvery; everywhere with iridescent and brilliant silvery reflections; sides often with chocolate-brown blotches; head light olive, translucent, without silvery reflections above; snout and sides of head with much coarse, black speckling; anal yellowish-silvery, more or less dusky on the falcate rays, everywhere with irides-

cent reflections; the falcate rays margined anteriorly and above with black, the posterior rays densely punctulate with black, especially towards tips. Dorsal rays pinkish or purplish, with bright reflections, margined with blackish; the posterior rays thickly dusted with dark points; pectorals and caudal with slight yellowish tinge, and much black specking towards tip, the caudal margined very narrowly above and below with white. Iris silvery.

Head, 3 to $3\frac{1}{2}$ in length; depth, $1\frac{1}{3}$ to $1\frac{1}{4}$; pectoral, $2\frac{1}{3}$ to $2\frac{1}{2}$; eye, $2\frac{2}{3}$ to 3 in head; D. III—I, 44 to 47; A. III, 43 to 45.

There is nothing to indicate that the West Indian form (*Rhombus xanthurus* C. & V., IX, 405) constitutes a species distinct from the above, unless it be the small number of fin rays attributed to the latter (D. IV, 40; A. III, 39). This is probably due either to a miscount or to the great variability of the species in this respect. Cuvier and Valenciennes identify with "*xanthurus*" the figure of Sloane, on which Linnæus founded his *Stromateus paru*. The latter name must then supplant "*alepidotus*," and "*gardeni*," unless it be shown that the form from the West Indies is really distinct.

58. *Stromateus triacanthus* Peck.

A single specimen obtained; evidently not abundant.

59. *Coryphæna hippurus* Linn.

Lampugus punctulatus Dekay, N. Y. Fauna, Fish. 134—not of C. & V.

Coryphæna globiceps Dekay, N. Y. Fauna, Fish. 132.

Coryphæna sueurii Cuv. & Val., IX, 302.

Coryphæna dorado Cuv. & Val., IX, 303.

Coryphæna guttata Poey, Mem. de Cuba, II, 245.

Lampugus punctatus Poey, Mem. de Cuba, II, 419.

Coryphæna hippurus Lütken, Spolia Atlantica, 1880, 45.

Two female specimens of the common dolphin of our Atlantic coast, each about two feet long, were caught with trolling lines off Cape Look-out, during a trip from Baltimore to Savannah. Later in the summer a larger, mutilated, specimen was examined, captured by a fishing-smack in the vicinity of Charleston. Still later, two young specimens were sent by Mr. Stearns, from Pensacola. This material has enabled us to make a careful review of the history of our Dolphins, which has convinced us that all names hitherto applied to Dolphins from North America are synonyms of one species, the *Coryphæna hippurus* Linnæus. It is not improbable that the *Coryphæna immaculata* of Poey is the *C. equisetis* Linn., as it has the fin rays, the inconspicuous spots, and the short pectorals of that species, but the name *equisetis* should not be introduced into our faunal lists until a *bona fide* example of the species is taken on our coast. From our own experience in counting the fin rays of the dolphin, it seems evident that a synonym cannot be referred either to *hippurus* or to *equisetis* on the basis of the count alone, even though,

as Lütken concludes, there probably are but two species, distinguished by different fin-formulæ. If the fins have become hardened or dried by exposure or by being immersed in too strong alcohol, it is impossible to obtain the correct count except by dissection.

C. hippurus is very abundant off our South Atlantic coast in summer, being caught south of Cape Hatteras by coast steamers on nearly every trip. North of the cape it is said to be rarely taken. The species reaches a length of 4 or 5 feet.

When first caught, the head, body, and tail, are greenish olive, or dark greenish olive-brown, lighter below; a series of about 15 round blue spots on back along each side of base of dorsal, these placed at nearly uniform distances apart, and about one-third size of pupil; sides below with numerous blue spots irregular in size, shape, and position, but none of them so large as those along back; lower lip largely blue; about three concentric blue lines around snout above. Dorsal purplish blue, with irregular areas of lighter and darker, and with some greenish reflections; in one specimen the dorsal and caudal are sparsely covered with blue spots similar to those on body. Caudal yellow; anal yellowish, with translucent border; pectorals translucent, with brownish axil; ventrals outwardly greenish olive, within of an indeterminate dark brownish, with olive cast. The play of color in the dying dolphin has been largely exaggerated, judging from our own observation. Such change as there is, seems to consist in the apparent rapid development of an external bright silvery pigment, with some blue and green reflections, this development being accompanied with partial restorations of the ground color, thus affording some real play of shades, which are, however, not brilliant. At death the fish is largely silvery, the intense deep lustrous blue of the spots remaining meanwhile unchanged; afterwards appear large irregular patches of the ground color, yellowish on sides, yellowish olive-brown on back.

D. 59 to 63; A. 29.

Head little elevated, its height at origin of dorsal $1\frac{1}{2}$ to $1\frac{1}{4}$ in its length; maxillary scarcely reaching middle of orbit, $2\frac{1}{2}$ in head; teeth recurved, in broad cardiform patches, those on vomer uniform, the patches on jaws and palatines with an external series of larger conical teeth. Eye $5\frac{2}{3}$ in head, $1\frac{1}{2}$ in snout. Head $4\frac{2}{3}$ in length to base of caudal; depth 5. Dorsal beginning slightly in advance of posterior margin of orbit; the longest ray about $\frac{5}{8}$ snout, slightly more than $\frac{1}{2}$ head; upper lobe of caudal $3\frac{1}{3}$ in body. Ventral inserted slightly posterior to base of upper pectoral ray, its length $1\frac{1}{3}$ in head, less than 6 in body; pectoral $1\frac{1}{2}$ in head, 7 in body.

60. *Centrarchus macropterus* (Lac.) Jor.

Many young specimens of this species, with the ocellated dorsal spot very conspicuous, are in the Charleston Museum, from Black River, South Carolina.

61. *Enneacanthus simulans* (Cope) McKay.

Several seen, taken in Black River, near Georgetown, S. C. D. IX, 11; A. III, 10. Depth, $\frac{1}{2}$ length; head, $2\frac{2}{3}$; longest dorsal spine, half head. Ventral spine reaching vent, the longest ray reaching base of last anal spine. Lateral line continuous, complete. Dark bars on body evident, about five in number (specimen 3 inches long); ear flap small, little wider than pupil.

62. *Mesogonistius chætoodon* (Baird) Gill.

Many specimens seen from Black River, South Carolina. A comparison with specimens from New Jersey fails to show any differences. This seems to be as yet the southernmost record for the species. D. X, 11; A. III, 12.

63. *Lepomis pallidus* (Mitch.) Gill & Jor.

A single specimen seen, from fresh water near Charleston.

64. *Perca americana* Schranck.

Many specimens seen from the Santee River. Evidently not rare in the southern streams.

65. *Pœcilichthys barratti* (Holb.) J. & G.

Pœcilichthys butlerianus Hay, in Jor. & Gilb. Syn. Fish. N. A., 519.

A specimen from Black River answers well the existing descriptions of *barratti*.

Head, 4 in length; depth, $5\frac{1}{4}$; eye, $3\frac{1}{2}$ in head. Lateral line on 18 to 20 scales. Cheeks and opercles completely scaled. Maxillary reaching anterior margin of pupil. D. X—12; A. II, 7. Scales 46.

Olivaceous very profusely tessellated with brownish on the sides; middle of sides with a series of about 10 blotches alternating with an equal number of square blotches on the back. A brown band below and one before eye. Vertical fins more or less barred with brown.

We can find nothing in the description of *butlerianus* to indicate that it is a distinct species from *barratti*.

66. *Roccus saxatilis* (Bloch & Schn.) J. & G.

This is the favorite game fish of the coastwise streams and inland lakes, but, according to fishermen, does not visit the salt water. Is it not possible that this difference in the habit of the fish in the North and in the South may have developed varietal or specific differences? No specimens were obtained at Charleston, so we are unable to make the comparison. The name *lineatus* ought not to be retained for this species, as *Sciæna lineata* Bloch, was apparently the European species.

67. *Serranus formosus* (Linn.) J. & G.—*Squirrel-fish*.

Perca formosa Linn., Syst. Nat. Not *Hæmulon formosum* C. & V., 230.

Serranus fasciularis Cuv. & Val., II, 245.

Very abundant, both in the harbor and on the fishing banks outside. D. X, 12; A. III, 7.

Perca formosa Linnæus, consists of the fin-formulæ and a description of the color of a "Squirrel-fish" received from Dr. Garden. The fin-rays ("D. X, 13; A. III, 7") are sufficient to show that Linnæus's specimen was not a *Diabasis* (D. XII, 17; A. III, 9), as has been generally supposed, while the color and the common name given leave no doubt as to the species in his possession. Catesby's *Perca marina capite striato* (= *Diabasis plumieri* Lac.) was wrongly identified by Linnæus with his *formosa*, apparently on the ground that it also had the head striped.

68. *Serranus atrarius* (Linn.) J. & G.—*Black-fish*.

The most abundant food-fish at Charleston, forming probably more than nine-tenths of all the fish caught on the banks by the smack-men. It is not considered a choice fish, and is bought mostly by the poorer people. It is caught on the bottom with hook and line, and is found abundantly at all seasons, though in much greater numbers in winter.

69. *Serranus philadelphicus* (Linn.) J. & G.—*Rock-fish*.

Perca philadelphica Linn., Syst. Nat., Ed. x & xii.

Perca trifurca Linn., Syst. Nat. Ed. xii.

Not rare in Charleston Harbor, though never abundantly taken. Five specimens were obtained during the summer. The fish is usually caught with hand-lines among the rocks. Better specimens than those noted by us (Proc. U. S. Nat. Mus. 1882, 273) must be examined from the Gulf of Mexico before the range of this species can be confidently extended to those waters, as the Gulf specimens are peculiar in several respects. Specimens from Charleston show the following traits:

Color in life, olivaceous above, whitish below; seven broad brown bars from back obliquely forwards to level of middle of pectorals, these almost obsolete along lateral line; the color of the bars is not intense, and is formed by shadings along the base and margins of the scales; the anterior bar crosses the nape, and is very indistinct. Snout and upper part of head with numerous brownish red spots and lines, three or four of these parallel and running from eye to snout, the interspace usually light blue; upper lip reddish brown; tip of lower jaw broadly purplish; a dark blotch on opercle anteriorly, and sometimes a small dark spot behind eye; lining of opercle and throat lemon yellow; a large jet black blotch behind pseudobranchiæ. Spinous dorsal translucent, with indistinct whitish and dusky longitudinal streaks; a large blackish blotch on membrane of last spines, immediately above fourth vertical bar of sides; some dark spots on the spines form two irregular lengthwise series; dorsal filaments bright scarlet; the fin usually with light bluish shading. Soft dorsal, with a series of bluish white spots near margin (one between each two rays); one or more incomplete series above and below this; the fin is margined with reddish brown, and has usually several series of reddish-brown spots, these most numerous posteriorly; some irregular olive-brown spots towards base; a small black spot on base of membrane between 8th and 9th and one between 10th and 11th rays,

the former frequently absent. Caudal translucent, with irregular cross-series of round brownish-red spots, the space between them often with bluish-white spots; the fin margined above with brownish red; lower lobe whitish, unspotted. Anal white, with a median sulphur-yellow streak, and a terminal dark bar; ventrals whitish, with dusky areas, often uniform blackish; pectorals translucent; peritoneum silvery.

Head $2\frac{2}{3}$ to $2\frac{4}{5}$ in length; depth $3\frac{1}{3}$ to $3\frac{2}{3}$. D. X, 11; A. III, 7; P. 17; C. 18. Scales 5-55-15. Length $9\frac{1}{2}$ inches.

Maxillary reaching posterior margin of pupil, $2\frac{1}{4}$ in head; mandibular band of teeth becoming a single series laterally; a few inner teeth in the front of each jaw enlarged; lower jaw with the inner series laterally, and the outer series anteriorly of enlarged conical teeth, the lateral teeth but little larger than those in front; outer series of upper jaw much enlarged, becoming smaller laterally, those in front larger than any in lower jaw; patch on vomer crescent-shaped; on palatines long and narrow. Head naked forwards from occiput, including suborbital ring, snout, preorbital, top of head, maxillary and lower jaw; scales on cheeks small, in 9 to 11 very regular oblique series; scales on opercles as large as those on body, in 8 or 9 oblique series, those on the flap again smaller; least interorbital width about four-sevenths diameter of eye, which is $4\frac{3}{4}$ in head; serræ on and below preopercular angle slightly enlarged and more distant than those above; subopercle and interopercle finely, evenly serrate. Gill-rakers one-half eye, three above angle, ten below.

First two dorsal spines short, the third and fourth nearly equal, the fourth one-half or nearly one-half head; the last spines are then much shortened, forming a notch much as in species of "*Paralabrax*;" the last spine $3\frac{2}{3}$ in head, two-thirds the ray following; membrane deeply incised between the spines, the upper angles produced beyond the spines in long, narrow filaments, very variable in length, usually less than diameter of orbit; the spines themselves are acute, and not at all filamentous as figured by Holbrook (Ichth. S. C. pl. VII, fig. 1); the structure of the dorsal thus does not differ from that of *S. atrarius*, which has also a trifurcate tail; this latter character does not however seem sufficient to warrant the retention of the genus *Centropristis*.

Caudal with the upper and middle rays much produced and nearly equal, the lower lobe but little lengthened; median rays nearly as long as head (seven-eighths to eleven-twelfths), the lower rays about two-thirds head. A young specimen, 5 inches long, has caudal nearly evenly convex behind, with the upper rays only slightly projecting.

Anal spines short, graduated, the second the strongest, the third slightly longer, about one-fourth head; longest rays nearly one-half head.

Middle ventral rays longest, not nearly reaching vent, four-sevenths head; pectoral sub-truncate, reaching vent, $1\frac{2}{3}$ in head.

Scales very strongly ctenoid, running well up on caudal fin, and in

narrow series on membranes of soft portions of vertical fins; ventrals with series nearly half-way to tip.

The description of *Perca philadelphia* given in the 10th edition of Linnæus could not have been identified with this species had not Linnæus himself, in his 12th edition, revised his description, correcting his count of fin rays, and adding numerous details. The first description stands: "Dorsal fins connate, with 11 spines and 9 soft rays. D. XI-9; P. 16; V. 6; A. III, 5; C. 11. Habitat in America." In the 12th edition the number of dorsal and anal rays is changed to: "D. X-11; A. III, 7," while the other counts are left uncorrected. The coloration given is characteristic and leaves no doubt as to the species described: "A black spot on middle of dorsal fin; sides with black spots and bands; red below; scales and opercles ciliate; opercle mucronate posteriorly; first two dorsal rays (spines) shorter. Habitat in North America. *Chub*. Dr. Garden."

70. *Pomadasys fulvomaculatus* (Mitch.) J. & G.—*Sailor's choice*.

Taken daily during the summer, but not in large numbers. Considered an excellent food-fish.

71. *Diabasis aurolineatus* (C. & V.) J. & G.—*Red-mouthed Grunt*.

? *Perca marina gibbosa* Catesby.

Hæmulon aurolineatum Cuv. & Val., v. 237.

Hæmulon chrysopteron Cuv. & Val., v. 240—not *Perca chrysoptera* Linnæus.

Hæmulon chrysopteron Holbrook, Ichth. S. C. 121.

? *Hæmulon quadrilineatum* Holbrook, S. C. 195—not of C. & V.

? *Perca striata* Linn. Syst. Nat.

The *Perca chrysoptera* of Linnæus is not identifiable with this species, probably not with any other. The description is based on a specimen which was received from Charleston through Dr. Garden, and which was identified by Linnæus with Catesby's figure of *Perca marina gibbosa*, this latter evidently some species of *Diabasis*. But as not a sentence in the description of *chrysoptera* agrees with Catesby's figure, we cannot admit the identification to have been correct, and denying this, there is nothing in the description of *chrysoptera* to indicate that it is any *Diabasis*, much less the species at hand.

Brownish-olive above, lighter on sides and below; scales of back with central portions olivaceous, the bases and margins brownish olive; bright specimens show narrow yellow streaks on margins of scales on back, following the series upwards and backwards, these, however, seldom visible; several longitudinal yellow streaks on sides; one midway between dorsal outline and lateral line, beginning on snout and running to last rays of soft dorsal; one on head just above eye, usually not continued on body; a third very distinct streak along median line of body, beginning on snout and running through eye to tail; several fainter streaks above and below the median one, following the series of scales, in bright specimens a streak on each series below median line; snout very dark brown; sides of head more or less silvery, with yellowish

tinge; in bright specimens showing seven or eight yellow stripes, two of which are forward continuations of the two principal body stripes, the others smaller and not joining body stripes; head white below; a dusky bar at base of pectoral; mouth, within, bright brick-red, becoming yellowish red on lining of opercles; fins all plain dusky olive, somewhat darker towards tips; the lower fins more distinctly yellowish; a diffuse black blotch at base of caudal. The color is very variable, differing much with the surroundings and condition of the fish. Specimens are frequently seen of a plain silvery cast, the yellowish lines indistinct or wholly wanting, and the caudal blotch obsolete. It is without doubt from such a specimen that Holbrook drew his description of "*Hamulon chrysopterus*," while his "*Hamulon quadrilineatum*" is quite evidently a somewhat careless description of a brightly-colored specimen of the same. The stripes vanish in spirits.

Head $2\frac{7}{8}$ in length; depth $2\frac{3}{4}$ to $3\frac{1}{2}$. D. XIII, 15; A. III, 9. Scales $\frac{7}{4}$: 55 pores or oblique series; 70 vertical series.

Body moderately elongate; snout $2\frac{3}{8}$ in head; maxillary reaching below middle of eye, $1\frac{5}{8}$ in head; teeth in a villiform patch anteriorly, with an outer enlarged series, which is continued singly on sides of jaws. Eye much more than half length of snout, less than greatest width of preorbital, $4\frac{1}{3}$ in head. Gill-rakers short and weak, $1\frac{1}{4}$ in number.

Scales above lateral line in oblique, below in horizontal series. None of the scales conspicuously enlarged; those on middle of sides anteriorly somewhat wider and less closely imbricated. Head scaled forwards to front of eyes, the snout above and the upper jaws largely naked; some imbedded scales on preorbital and mandible. Soft parts of vertical fins wholly enveloped in fine, thin scales. Spinous dorsal high, the fourth spine highest, 2 to $2\frac{1}{2}$ in head; the outline of the fin rather evenly rounded; last spine the shortest, about four-fifths longest soft ray, and two-fifths longest spine.

Upper lobe of caudal subfalcate, longer than the lower, $1\frac{2}{5}$ in head; the middle rays, $\frac{4}{11}$ the upper.

Second and third anal spines not very unequal in length, but the second evidently longer and much stronger, about equal to length of longest soft ray, and $\frac{1}{3}$ head.

Ventrals reaching to or slightly beyond vent, $1\frac{2}{5}$ in head; pectorals equaling distance from snout to preopercular margin.

This species is very abundant on the fishing banks outside the harbor, where it is taken in much greater quantity than any other species except the *Black-fish*.

72. *Diabasis plumieri* (Lac.) J. & G.—*Black Grunt*.

Perca marina capite striato Catesby.

Hamulon formosum Cuv. & Val.; not *Perca formosa* Linn. = *Serranus fascicularis* C. & V.

Hamulon arcuatum C. & V.

Frequently taken on the fishing banks, though not abundant. Compared with a specimen from Aspinwall, the stripes on sides of snout are

much narrower, and the color of body and fins is much darker; the preopercular denticulations are stronger, the snout longer and the eye smaller. It is possible that the southern form may represent a tangible variety, but our material is not sufficient to enable us to characterize it.

The Charleston specimens showed in life the following coloration: The basal half of each scale dark brown, the terminal half silvery, with bluish tinge; snout and lower jaw dark chocolate-brown, the end of the snout and the tip of lower jaw white; sides of head with brassy luster, and marked with about 18 very narrow, often wavy, blue lines, the widest on the snout being less than half width of interorbital space; a few of these lines are extended on the body for a very short distance (less than diameter of eye); two or three stripes run concentrically around snout above, joining anterior margins of orbits; mouth very bright scarlet. A dark brown bar across base of pectoral, continued half way down on axil; fins brownish olive; ventrals and anal blackish, the ventrals margined externally with white. Scales below pectorals with numerous very short and narrow, horizontal, black lines; scales on lower part of sides, and above lateral line, with dendritical clusters of dark lines diverging from the base. No blue streaks on lower part of sides.

73. *Lobotes surinamensis* (Bloch) Cuv.—*Black Perch*; *Sea Perch*.

Occasionally taken; a single specimen seen during the summer.

74. *Calamus bajonado* (Bloch & Schneider) Poey. *White-bone Porgy*.

A well-known food-fish at Charleston, averaging much larger than the common *Porgy*, specimens 18 inches long being of not infrequent occurrence.

Our specimens fail in many respects to answer the incomplete description given by Poey (*Monogr. des Sparini*, 176), notably in the number of canines in each jaw (8 instead of 6); but this is in all probability the species described by him.

Head $3\frac{1}{4}$ in length; depth $2\frac{1}{4}$; pectoral 3; snout two-thirds head; eye two-ninths; maxillary three-sevenths, and ventral five-eighths head. D. XII, 12; A. III, 10. Pores in lateral line 44.

The young (5 inches long) is olivaceous, with white longitudinal lines above and on sides, formed by series of spots, one on each scale; sides of body with many irregular narrow dusky blotches, with a tendency to form bars on lower half of sides; belly whitish; vertical fins and ventrals with irregular wavy bars of dusky and whitish; pectorals with a dusky bar at base. Adults have all the markings less evident, with usually no trace of vertical bars on sides; the dusky and whitish bands on fins persisting.

75. *Stenotomus chrysops* (Linn.) Bean.—*Porgy*.

An abundant food-fish, usually not reaching a length of more than 8 inches. The second ray of the dorsal is frequently filamentous. The

young show a broad, dusky, vertical bar on middle of sides. Both the *argyrops* and *chrysops* of Linnæus are based on this species as is also *Chrysophrys aculeatus* C. & V.

76. *Lagodon rhomboides* (Linn.) Holbrook.—*Brim*.

Rather less abundant in Charleston Harbor than at other points along our Atlantic and Gulf coasts.

77. *Diplodus probatocephalus* (Walb.) J. & G.—*Sheepshead*.

A fine food-fish, not taken in great abundance.

78. *Diplodus holbrooki* (Bean) J. & G.—*Salt-water Brim*.

Taken abundantly with hook-and-line on the banks outside the harbor. None were seen in the harbor, although this species is very abundant around the wharves at Beaufort, N. C. On the banks it reaches a length of 12 inches.

Color in life: Body dark brassy-olive; the large black blotch across caudal peduncle often not intensely black; naked part of head dark olive-brown; opercular membrane black; a black blotch above and below at base of pectoral, that above continued around on upper half of axil of fin; margins of all membrane-bones of head black, this often conspicuous on membrane of opercle only; ventrals black, the rays with greenish tinge; other fins uniform olive-brown.

Although by no means satisfied that this species is distinct from *D. caudimacula* (Poey), we think it preferable to retain the name given to specimens from our own waters until comparison can be made with a sufficient series from the West Indies.

79. *Pogonias chromis* (Linn.) C. & V.—*Drum*.

Esteemed as a food-fish, but not very abundant.

80. *Sciæna lanceolata* (Holbrook) J. & G.

Rather uncommon; taken occasionally with hook-and-line on the margins of deeper channels in the harbor.

Color: grayish-olive above, silvery below; fins all nearly uniform, dusky; the ventrals margined with white; much coarse, black speckling along middle of sides, base of anal fin, and inner lining of opercle.

Head = depth, 3 to $3\frac{1}{4}$ in length. D. XI, I, 22-23; A, II, 7-8. Scales, $\frac{4}{1\frac{1}{2}}$, 47-50 (pores).

Mouth large, maxillary reaching beyond middle of eye, sometimes to posterior margin of orbit, $2\frac{1}{5}$ - $1\frac{1}{3}$ in head; teeth in lower jaw uniform, in a very narrow band; the upper jaw with the outer series enlarged; eye medium, its long diameter oblique, $1\frac{2}{3}$ in interorbital width, 4 to $4\frac{2}{3}$ in head.

Preopercle evenly rounded, the serrations gradually increased in size towards the angle, which rarely shows three radiating spines larger than the others, the lowermost spine turned downward and backward. Pseudobranchiæ well developed. Gill-rakers rather long and slender, about 18 on lower limb.

Second dorsal spine two-thirds to three-fifths the third spine, which is $5\frac{2}{3}$ to 6 in length of body. Second anal spine $1\frac{2}{3}$ length of longest soft ray, $2\frac{2}{3}$ in head. Caudal, $1\frac{1}{4}$; pectoral, $1\frac{1}{10}$; ventrals, $1\frac{2}{3}$ in head.

This species differs in numerous respects from *S. trispinosa* (C. & V.) (??=*Bodianus stellifer* Bl.) and from *S. microps* (Steind.), as can be seen from the comparative descriptions of the two latter by Steindachner (Ichth. Notiz. I, 6).

81. *Sciæna chrysuræ* (Lac.) J. & G.—*Yellow-tail*.

Very common.

82. *Sciæna ocellata* (Linn.) Günth.—*Red Bass*.

Of frequent occurrence.

83. *Liostomus xanthurus* Lac.—*Chub*.

Very abundant.

84. *Micropogon undulatus* (Linn.) C. & V.—*Croaker*.

Abundant.

85. *Menticirrus alburnus* (Linn.) Gill.—*Whiting*.

Very abundant, forming one of the most valuable food-fishes of Charleston.

86. *Menticirrus littoralis* (Holbr.) Gill.—*Surf Whiting*.

Abundant, but less so than the preceding, and not reaching so large a size.

87. *Larimus fasciatus* Holbrook.—*Bull-head*.

Not uncommon in the harbor; numerous specimens procured, the largest about 8 inches long.

In life the color is grayish-olive above, with some silvery; below, clear silvery-white; back with 7 to 9 rather inconspicuous darker bars downwards and backwards to below middle of sides, the bars about as wide as the interspaces; fins, dusky-olive; the anal fin and lower rays of caudal yellow; ventrals, orange-yellow, dusky towards tips; lower side of head very bright silvery; inside of mouth, and lining of gill-cavity, as well as cheeks and opercles, with some light yellow.

Head, $3\frac{1}{3}$ in length; depth, 3. D. X, 1, 25-26; A. II, 5-6. Scales: 41 oblique series, 54 vertical series, 5 above lateral line, 10 below.

Head rather larger and less compressed, with less oblique gape, than in *L. breviceps*, and the body much less compressed and elevated. Gape placed at an angle of about 25°. Teeth, uniserial, uniform, very small. Mandible less projecting than in *breviceps* and *argenteus*, the symphyseal knob little marked. Head above cavernous, spongy, as in *Sciæna lanceolata*. Preorbital narrow, but little widened below, its width rather less than diameter of pupil; maxillary about reaching posterior margin of pupil, 2 in head. Eye large, $3\frac{3}{4}$ to $3\frac{1}{2}$ in head, much longer than snout, equal to interorbital width. Preopercular margin nearly

vertical, entire, inconspicuously striate. Gill-rakers $\frac{14}{2}$, very long, $1\frac{1}{3}$ in orbit.

First dorsal spine short, the spines thence increasing to the fourth, which is $2\frac{1}{10}$ times in head; longest soft ray equals length of snout and eye. Caudal double-truncate, $1\frac{1}{3}$ in head. Base of anal fin rather less than diameter of eye, the second spine strong, about one-third head, and two-thirds the longest anal ray. Pectorals as long as head, not quite reaching vertical from vent. Ventrals, $1\frac{1}{5}$ in head.

Series of scales run nearly to tips of all the vertical fins, except spinous dorsal; ventrals likewise scaly.

88. *Cynoscion maculatum* (Mitch.) Gill.—*Salmon Trout*.

An abundant food-fish, caught with seines in muddy channels in the harbor.

89. *Cynoscion regale* (Bl. Schn.) Gill.—*Trout; Shad-Trout*.

Less abundant than the preceding.

90. *Cynoscion nothum* Holbrook.—*Bastard Trout*.

Caught mostly outside the harbor, where it can be found at all seasons, though most abundant in summer. It is never so abundant as the other species of the genus, and though occasionally reaching a length of 3 feet, the specimens caught are mostly of small size; the largest seen by us was about 12 inches long. It is universally known to the fishermen as "bastard trout," the belief prevailing that being unspotted and still evidently a "trout," it must be a cross between *maculatum* or *regale*, and some silvery species, as the "whiting."

Color in life, grayish-silvery above, and on sides to lower level of pectorals; then abruptly silvery; upper parts thickly punctulate with darker; inconspicuous dark streaks follow the rows of scales above, formed by the darker centers of the scales. Snout and tip of lower jaw blackish; mouth white within. Anal and ventrals white, other fins dusky.

Head $3\frac{1}{3}$ to $3\frac{2}{3}$ in length; depth, 4. D. IX, I, 29; A. I, 9. Scales, 58 (oblique series or pores); 70 vertical series. L. 8 inches.

Body well compressed; lower jaw distinctly projecting; maxillary $2\frac{1}{5}$ in head, reaching slightly beyond pupil; teeth in lower jaw anteriorly small, in a very narrow band; laterally enlarged and in a single series; upper jaw with a very narrow band in front and on sides, the outer row enlarged; one or two long, slender canines in front. A deep pit on each side of vomer.

Eye large, longer than snout, or than interorbital width, 4 in head. Preopercle very broad, the angle much produced backwards, the thin membranaceous portion with conspicuous radiating striæ. Opercle terminating in two very long, slender spines, the membrane continued beyond them. Gill-rakers long and strong, $\frac{3}{8}$ in number, the longest one-half orbit.

Spinous dorsal not high, connected with the second by a low membrane; the third spine the highest, about $2\frac{3}{8}$ in head, the upper margin of the fin descending obliquely in a straight line; soft dorsal little lower than spinous. First three or four spines with series of scales behind them; a well-developed scaly sheath at base of soft dorsal and anal; both fins being thickly scaled to tip. Anal spine small, firmly imbedded in the scaly membrane. Pectorals and ventrals also scaled, the former $1\frac{2}{3}$ in head; the ventrals reaching about half-way to vent, $1\frac{5}{8}$ in head. Caudal with median rays produced.

91. *Gerres gula* C. & V.

The young found abundantly in small tide-pools in the harbor.

92. *PlatyGLOSSUS radiatus*, (Linn.) J. & G.—*Butter-fish*.

Sparus radiatus Linn. Syst. Nat. not *Charojulis radiatus* Goode = *Julis cyanostigma* C. & V.

? *Labrus bivittatus* Bloch, taf. 284, fig 1.

Labrus psittaculus Lac. iii, 522.

Julis humeralis Poey, Mem. Cub. ii, 212.

Charojulis grandisquamis Gill, Proc. Acad. Nat. Sci. Phila. 1863, 206.

PlatyGLOSSUS florealis Jor. & Gilb. Proc. U. S. Nat. Mus. 1882, 287 (young).

Common in the harbor.

It is undoubtedly to this species that we must refer the *Sparus radiatus* of Linnæus, received from the coast of Carolina through Dr. Garden. As Garden made most of his collections at Charleston, it is most highly probable that this, rather than *Pl. cyanostigma*, was the species sent by him, the latter never having been recorded north of Key West. In addition, we have points in Linnæus's description ("Green above, sides purple, head with blue lines, variegated with greenish-yellow. Opercle with a purple and a yellow spot.") which answer very well to our Carolina specimens, but could not well apply to *P. cyanostigma*.

Color in life: Pinkish olive above, whitish below, a narrow, vertical, vivid blue or green line across the middle of each scale, the line usually convex forwards. Adults in life with traces only of two broad dark longitudinal bands on sides, the upper running from opercular spot to base of tail, the lower from below base of pectoral, very narrow and obscure, vanishing on middle of body; the young show this marking much more plainly; it is occasionally very conspicuous in adults, though usually appearing as indistinct darker shades on back and sides. An olive green streak nearly as wide as eye running upwards and backwards from orbit to sides of nape, thence along back and parallel with it; another green streak above this from eye to nape, where it meets its fellow. Head pinkish-bronze, overlaid with greenish-yellow on cheeks and opercles below eye; the latter area is bounded above and behind by a narrow blue line passing from snout in a wavy course below eye to near posterior margin of opercle, where it turns abruptly downwards and forwards; opercular flap greenish, ocellated

with light blue; an intense dark blue spot at upper angle of opercle, surrounded above and below with some greenish bronze margined with a light blue line; the green streak backwards and upwards from eye tapers to a point anteriorly, and is margined by a <-shaped blue line; lower jaw with two blue cross-bands; subopercle with two or three blue spots or streaks; branchiostegal membrane blue mesially.

Dorsals narrowly margined with blue; below this a broad streak of orange red; then one of greenish-yellow, bordered below with blue (this median streak distinctly black in one specimen); then a streak of purplish, separated from the greenish-yellow area at base by an oblique line running downwards and backwards on the membrane between each two rays. Caudal with five concentric, more or less irregular, bars alternately of reddish and of greenish-yellow margined with blue, the bars strongly convex posteriorly; a terminal blue-black bar, much widest at corners of fin; anal pinkish, with a broad median greenish bar, margined above and below with blue; the fin with a narrow blue margin, and a blue spot at base of each ray; in a second specimen the anal is greenish-yellow, with the median band lighter, and the blue markings as described. Ventrals translucent, pinkish-brown towards tips, with a blue streak before each ray; pectorals light bluish or greenish, without decided markings, light at base.

Head = depth, $3\frac{1}{3}$ to $3\frac{1}{2}$ in length; 26 or 27 pores in lateral line. D. IX, 11; A. III, 12.

Maxillary $3\frac{1}{2}$ in head; teeth large, the posterior canines well developed. Eye 6 to $6\frac{2}{3}$ in head.

Last rays of dorsal highest, scarcely reaching base of caudal, $2\frac{1}{2}$ in head. Caudal (from true base of rays) $1\frac{2}{3}$ in head; pectorals $1\frac{3}{4}$; ventrals $1\frac{3}{8}$.

Seven specimens were procured, from 6 to 7 inches in length.

93. *Xyrichtys lineatus* (Linn.) J. & G.

Coryphæna lineata Linn., Syst. Nat. (not *Xyrichtys lineatus* Cuv. & Val., xiv, 50).

?*Xyrichtys martinicensis* Cuv. & Val., xiv, 49.

Xyrichtys vermiculatus Poey, Mem. ii, 215.

This species was not seen in life, but numerous specimens are in the museum at Charleston, having been taken in the harbor, where it is said to be not rare. We cannot doubt that this, and not *X. lineatus* C. & V., is the species described by Linnæus as *Coryphæna lineata*. The specimens described by Linnæus were sent from Charleston by Dr. Garden; the color given agrees well with our fish, while "*lineatus* C. & V." has not "the dorsal and anal fins painted with lines." *X. lineatus* C. & V. has apparently not been seen since the original description, and there is no probability that it reaches our coasts. No differences have ever been pointed out between our species and the Mediterranean *X. novaacula*, but Labroids are not as a rule fishes of wide distribution, and it is wiser to retain our name until a comparison of the two forms has been made.

Our alcoholic specimen shows about six narrow blue lines on the snout, these angulated below and continued across the interopercle; scales with very narrow vertical blue lines, with some interspersed blue dots; anal fin with very evident broad vertical blue streaks.

Head 4 in length; depth $3\frac{1}{2}$. D. IX, 12; A. II, 13. Pores in lateral line 25.

Last rays of dorsal and anal equal, reaching beyond base of caudal, two-thirds head; caudal $1\frac{1}{6}$ in head; pectoral $1\frac{1}{3}$: ventral $1\frac{2}{3}$.

94. *Chaetodipterus faber* (Brouss.) J. & G.

Less abundant than at other points along our South Atlantic coasts.

95. *Astroscopus y-græcum* (Cuv. Val.) Gill.

? *Uranoscopus anoplus* C. & V. viii, 493.

Astroscopus anoplus Jor. & Gill. Proc. U. S. Nat. Mus. 1882, 289.

Astroscopus guttatus Abbott, Proc. Acad. Nat. Sci. Phil. 1860, 473.

Frequently taken in the harbor. The comparison made by us (Proc. U. S. Nat. Mus. 1882, 289) between examples from the Gulf ("*anoplus*") and *y-græcum* was with specimens of very unequal size, those of the former being $3\frac{1}{2}$ inches long, while those of the latter were nearly adult. Specimens now in our possession from Charleston, less than 5 inches long, and evidently the same as an adult of *y-græcum* from the same locality, enable us to make a more satisfactory comparison, and show that the characters supposed to distinguish our Gulf specimens are due to their immature condition only. Thus the bones cuirassing the top of the head become narrower with age; the Y-shaped process becomes much narrower, and has the fork proportionally shorter; the profuse black-specking on body behind, still visible in specimens 5 inches long, entirely disappears in adults; and the white spots on body become much larger in proportion to size of eye. We strongly doubt the existence of a second species of *Astroscopus* in our waters. In case such should be demonstrated, it would still be very probable that the *anoplus* of C. & V., based on a specimen two inches long, was the young of *y-græcum*, everywhere common on our southern coasts.

96. *Culius amblyopsis* Cope.

A single specimen, 4 inches long, was taken in the harbor.

Color in spirits; brown, lighter above and below; each scale on middle of sides with a dusky streak, these forming obscure lengthwise lines; back anteriorly with a few small, black spots; under parts, including sides of head, very thickly punctulate with black. Lips black; a dark streak from snout through eye to upper angle of preopercle; two dusky streaks from eye downwards and backwards across cheeks; a very conspicuous black blotch as large as eye in front of the upper pectoral rays. Pectorals and ventrals transparent, dusky; vertical fins all barred with light and dark in fine pattern.

Body slender, compressed, the head depressed, becoming very narrow

anteriorly; a notable depression above orbits, the premaxillary processes protruding before it; lower jaw longest; maxillary reaching vertical behind pupil, $2\frac{3}{5}$ in head.

Teeth in the jaws in narrow, villiform bands, becoming a single series on sides of lower jaw; those of the outer and inner series in each jaw are somewhat enlarged, the largest being the single series in sides of lower jaw. Preopercular spine as usual in the genus.

Scales smooth above and below, ctenoid on sides.

Head $3\frac{1}{4}$ in length; depth $4\frac{1}{3}$. D. VI-9; A. 9. Lat. l. 48. Eye $6\frac{3}{4}$ in head; pectoral $1\frac{1}{5}$; ventral $1\frac{1}{2}$; highest dorsal ray 2; highest anal ray 2; caudal $1\frac{1}{4}$.

97. *Gobius encæomus* sp. nov. (20673.)

Three specimens, two males and one female, were obtained in tide-pools in the harbor, the largest $1\frac{3}{4}$ inches in length. The type is numbered 29,673 on the register of the United States National Museum.

Colors in life: ♂ light olivaceous, mottled above with darker olive brown; a series of about 4 obscure oblong dark blotches along middle of sides; a dark spot at base of caudal; each side of nape with an intense blue-black spot larger than eye; an obscure dusky streak from eye forward to mouth; a small dusky spot sometimes present on upper portion of base of pectorals. Both dorsals translucent, with series of bright reddish-brown spots, as large as pupil; upper lobe of caudal light reddish, the lower lobe blue-black. Anal and ventrals dusky-bluish; pectorals slightly dusky, with a narrow, bright pink border behind.

♀ without bright markings; body light olive, with 5 oblong dark blotches on sides, the last on base of caudal; from each of the three middle blotches a V-shaped bar runs to the back (these visible also in males); back somewhat mottled with dusky; a black blotch on scapula; a small one on opercle; a dark bar from eye forward to mouth. Vertical fins with dusky streaks, these appearing on caudal in the form of cross-bars. Ventrals light, with two lengthwise dark streaks; pectorals plain.

Head 4 in length; depth $5\frac{3}{4}$. D. VI-11; A. 12. Lat. l. about 37 (a few of the anterior scales gone, the count, therefore, not certain).

Body very elongate, much tapering backwards; head compressed, the cheeks high and vertical; snout very short, compressed, obtusely rounded vertically. Mouth nearly horizontal, low, large, the maxillary one-half head, nearly reaching vertical from posterior margin of orbit. Teeth in very narrow bands in both jaws, those of the outer series in the upper jaw much enlarged; eyes inserted high, the interorbital space very narrow, about as wide as pupil; diameter of orbit much greater than snout, nearly one-third head. Gill-opening $2\frac{1}{3}$ in head; the isthmus wide. Dorsals contiguous, the membrane of spinous dorsal reaching nearly to base of soft dorsal; dorsal spines high, of nearly uniform length, the last reaching well beyond origin of soft dorsal when depressed; the longest spine about half length of head. Soft dorsal and anal long

and high, the posterior rays of both fins reaching at least to base of caudal when depressed. Caudal lanceolate, the middle rays produced, $2\frac{2}{3}$ in body. Ventrals reaching vent, somewhat longer than pectorals, which about equal length of head; ventral sheath well developed, its length two-sevenths that of fin.

Body wholly covered with large, strongly ctenoid scales, which are much reduced in size anteriorly; head, ante-dorsal region, and breast naked.

In the female specimen, the mouth is evidently smaller, and the caudal less elongate.

99. *Gobius thalassinus* sp. nov. (29574.)

Closely allied to *G. emblematicus* J. & G.

Head and body translucent, overlaid by brilliant green luster, which is formed by exceedingly minute close-set green points; the luster is intense towards the head, where it assumes a blue tint, and becomes hardly noticeable on caudal peduncle; three conspicuous translucent bars wider than the interspaces, crossing body immediately behind head; head with two brilliant narrow blue or green lines running obliquely across cheeks below eye; opercle with greenish luster; branchiostegal membrane white. Dorsals whitish, with two or three lengthwise series of large reddish-brown spots; spinous dorsal blackish at base. Upper caudal rays marked with red, the lower portion of caudal, and the most of the anal fin blackish, anal whitish at base, the anterior rays tipped with brilliant white. Ventrals light buff. Pectorals translucent. In spirits the body appears dusted with dark points; two light cross-bars towards head; lower part of caudal and anal black.

Head $3\frac{1}{2}$ in length; depth $4\frac{3}{4}$. D. VII-16; A. 15.

Body elongate, much compressed, highest in front of ventrals, thence tapering regularly to a very narrow, short, caudal peduncle; the body with a peculiar, translucent, fragile appearance, common also to *G. emblematicus*. Head compressed, much higher than wide; snout very short, acute, the preorbital not as wide as pupil; mouth terminal, very wide and oblique, the jaws equal; maxillary reaching vertical from middle of orbit, one-half length of head; teeth in a narrow band in each jaw, the outer series enlarged, canine-like (under a microscope the band of small teeth behind the outer series seems evident, but the size of our specimens does not enable us to verify it with certainty); eyes placed high, separated by a narrow ridge, the diameter about one-third length of head.

Dorsals very closely contiguous; spines very slender, the fifth slightly produced and filamentous, reaching (in our specimens) to base of third soft ray when depressed; caudal lanceolate, very long and pointed, the middle rays produced, $2\frac{2}{3}$ in body; pectorals as long as head; the upper rays not silk-like; ventrals with basal membrane well developed; the

fin long, reaching to or slightly beyond front of anal, somewhat longer than head.

Body covered with rather small cycloid scales; head naked; the scales are very readily deciduous; as they have in our specimens mostly fallen off, the count cannot be given.

Two specimens, the largest $1\frac{1}{2}$ inches long (No. 29674, U. S. Nat. Mus.), were taken in muddy tide-pools in Charleston Harbor. The species has thus much the habit of its congener, *G. emblematicus*, from Panama.

100. *Gobionellus oceanicus* (Pallas) J. & G.

Gobius lanceolatus Bloch., Fische Deutsch. II, 12, pl. 38, 1784.

??*Gobius lanceolatus* C. & V., XII, 114.

Gobionellus hastatus Grd., U. S. Mex. Bonn. Surv. 1859, 24.

A single specimen, 11 inches long, was taken in the harbor.

Color in spirits, reddish-olive; a distinct, round, blackish blotch below spinous dorsal, twice as large as orbit; an indistinct dusky shade along middle of sides, terminating in a distinct dusky blotch on base of caudal; middle of sides with a series of <-shaped marks, formed by very narrow veiny lines widely diverging backwards; a similar narrow line from eye to maxillary, and one from eye backwards to upper angle of preopercle; evident traces of the emerald spot at base of tongue; two small dark spots on first dorsal spine; spinous dorsal dusky, with a light and a dusky streak at base; soft dorsal dusky, a light (? bluish in life) area behind each ray; anterior rays barred with light and dark; anal and ventrals whitish (probably blue in life), the ventrals without dark markings; pectorals dusky, the base lighter, and with some indistinct dusky bars; a dusky half-bar on upper part of axil.

Head 6 in length ($8\frac{1}{2}$ in total); depth $8\frac{1}{2}$. Eye 5 in head; ventrals=pectorals=head; D. VI—14; A. 1, 14.

Upper part of opercle with a broad patch of about 20 scales, arranged in 4 series; head otherwise naked. Scales on body very small, becoming much larger behind; arranged in 80 cross-series.

All the dorsal spines more or less filamentous. Caudal fin nearly one-third total length.

There is apparently another species very closely related to *oceanicus*, and occurring with it in the West Indies. This is represented in our collection by a specimen from Colon, U. S. C., and appears to be characterized by a longer head (5 in length, 7 in total), by the much larger scales (60 in lateral line), by the obsolescence of the patch of scales on opercles, and by different coloration. *Gobius lanceolatus* C. & V. and *Gobionellus lanceolatus*, Poey, Syn. Pisc. Cub., 393, seem to refer to this latter species.

101. *Gobiosoma bosci* (LaC.) J. & G.

Very abundant along the muddy shores of lagoons, hiding in oyster-shells and holes in the mud.

102. *Scorpaena stearnsi* Goode & Bean.

A single specimen obtained. This may be identical with *S. brasiliensis* C. & V. The description of the latter given by Kner (Novara Fische, 114) applies well to our specimen.

103. *Prionotus palmipes* (Mitch.) Storer.

?? *Trigla carolina*, Linn., Mantissa.

Trigla palmipes, Mitch. Trans. Lit. and Phil. Soc. N. Y., I. 431.

Prionotus carolinus, C. & V., iv, 90.

Evidently not abundant in Southern waters, no specimens being obtained by us during the summer. Several examples are, however, preserved in the Charleston museum, from the coast of South Carolina. Linnaeus' description of *Trigla carolina* applies almost equally well to any of our species. The fin formula given by him ("D. X—13; A. 12") is found commonly only in the present species and in *scitulus*, but this does not lend any high degree of probability to the identification. We must, therefore, make use of Mitchill's name *palmipes*, it having been given prior to the use of *carolinus*, definitely for this species, by Cuvier and Valenciennes.

104. *Prionotus scitulus* J. & G.—*Sea Robin*.

Not rare, several specimens having been obtained. Probably not reaching as large a size as other species of the genus, the largest examples seen being but $5\frac{1}{2}$ inches long.

The coloration given by us (Proc. U. S. Nat. Mus., 1882, 288) was apparently drawn from a female specimen. The following is the life color of the male:

Light olive brown, with four saddle-like dark blotches on back, one downwards and forwards from middle of spinous dorsal to humeral spine; a second from front of soft dorsal; a third from end of dorsal downwards and forwards to below lateral line, thence continued forwards as a narrow horizontal streak; a fourth on caudal peduncle; sides everywhere with reddish-brown spots, as in the female. Opercle reddish-brown; branchiostegal membrane, and palatine region largely jetblack. Spinous dorsal olive-brown, with two irregular lengthwise translucent streaks and an intense well-defined black spot on membrane above, between fourth and fifth spines. Second dorsal olive-brown vermiculated with whitish translucent, and without round spots. Caudal reddish-brown, blackish towards tip, with a conspicuous white longitudinal streak on upper lobe. Anal blackish, with white base and margin. Pectoral dark brown, irregularly barred and blotched with greenish and light brown. Free rays of pectorals, and inner face of ventrals dusky, tinged with orange.

Head $2\frac{3}{4}$ to 3; depth $5\frac{1}{3}$ to 6; D. X—13; A. 12. Longest dorsal spine (in ♂) $1\frac{5}{7}$ in head; pectoral fin $2\frac{1}{8}$ to $2\frac{2}{5}$ in body. Preopercular spine with an inconspicuous cusp above and one below its base; small specimens show also inconspicuous spinous teeth on preorbital.

105. *Prionotus tribulus* C. & V.—*Sea Robin*.

Abundant.

106. *Prionotus sarritor* sp. nov.—*Sea Robin* (29675.)*Prionotus evolans* J. & G. Proc. U. S. Nat. Mus., 1878, 374. (Not *Trigla evolans* L.)*Prionotus evolans* J. & G. Syn. Fish N. A., 735.

This form is in many respects intermediate between *P. strigatus* C. & V., and *P. tribulus* C. & V. The color is in most particulars like that of *tribulus*, but the white spots on back and sides are much less numerous, or wholly wanting, and the brown bar backward from humeral spine is present, as in *strigatus*, and the dorsal fin is not barred; the gill rakers are, as in *strigatus*, slender and fine, 18 to 20 developed on lower limb; the spines on the head are not strong as in *tribulus*, that above orbit behind not conspicuously raised above surface of head; in two specimens from Beaufort, N. C., the pectorals are much lengthened, reaching nearly to base of caudal, but this seems to be here, as in *tribulus*, a very variable feature, as specimens from Charleston have the pectorals but one-half length of body.

Head $2\frac{2}{3}$ in length; depth $4\frac{3}{4}$. D. X—12; A. 11.Lat. 1. 53 (pores). Soft dorsal high, the longest ray = longest spine, $2\frac{1}{2}$ in head; caudal $3\frac{1}{2}$ in length.

Color in life, olive-brown above, becoming light olive on sides, white below; back with three brown cross-bars, the first under spinous dorsal, the second under first third of second dorsal, the third under its end, all of these bars extending downwards and forwards to lateral line, the posterior forming a brown blotch on base of last dorsal rays; back and sides with numerous small white spots, irregular in shape and size; these often wanting; a lateral line running in a narrow brown streak; distinct broad reddish-brown streak from humeral spine backwards to opposite end of anal; traces of a narrow streak above this. Branchiostegal membrane yellowish above; a dark brown streak from angle of mouth to base of preopercular spine; opercle dusky brown without, deep reddish-brown within. Caudal with a light brown bar at base, then a broad translucent bar, the terminal two-thirds orange-yellow, narrowly margined behind with white.

Spinous dorsal dusky, with a diffuse black blotch between fourth and sixth rays above; soft dorsal translucent brownish, without streaks of any kind; anal wine-color, translucent at base and tip. Ventrals light reddish. Pectorals glaucous green within, the lower rays reddish, the upper white; the outer side dark greenish-brown, unbarred, with a very narrow blue margin behind.

The description given by Linnæus of "*Trigla evolans*," is too meager to permit identification, and the name should therefore not be used for any of our species. We are obliged also to reject the name *lineata* as applied to our northern species, the *Trigla lineata* of Mitchill being merely a mistaken identification of *Trigla lineata* Bloch, as described by

Shaw. The oldest name available for the northern form will therefore be *Prionotus strigatus* Cuv. & Val.

107. *Cephalacanthus volitans* (Linn.) J. & G.—“*Flying Fish*.”

But few specimens seen.

108. *Batrachus tau* Linn.

Very common.

109. *Porichthys plectrodon* J. & G.

Rare in Charleston Harbor; a single specimen obtained.

110. *Chasmodes bosquianus* (La Cépède) J. & G.

Common in muddy tide pools in the harbor.

111. *Isesthes scrutator* J. & G.

Two specimens obtained.

112. *Isesthes punctatus* (Wood) J. & G.

Bleinius heutz Le Sueur, Jour. Acad. Nat. Sci. Phila., iv, 363.

A single specimen obtained, 4 inches in length.

Color in spirits: Olivaceous, back and sides of head and body everywhere covered with brown spots, very irregular in size and shape; on posterior part of body the spots are larger, and show a tendency to form vertical bars; cheeks dark; lower side of head with traces of three cross-bars; spinous dorsal with an elliptical black spot on membrane of first three spines; soft dorsal and caudal obscurely barred; anal, ventrals, and lower rays of pectorals dusky; pectorals olivaceous, spotted with brown.

Head $3\frac{2}{3}$; depth 3. D. XII, 15; A. 18. Pectoral $1\frac{1}{4}$ in head; ventral $1\frac{3}{4}$; gill slit $2\frac{1}{4}$; eye $4\frac{1}{2}$; maxillary $2\frac{2}{3}$. Orbital tentacle very slender, once forked, 3 in head.

Tip of each dorsal spine with a filiform, articulated, ray-like appendage.

113. *Phycis earlli*, Bean.—“*Tom-cod*.”

Two specimens seen in the Charleston Museum. Said by the fishermen to be not uncommon in the harbor during the winter.

Head 4 in length; depth $5\frac{1}{3}$. Eye $5\frac{1}{4}$ in head; maxillary 2. Gill-rakers 2+9. D. 10-59; A. 46.

114. *Paralichthys ommatus* Jor. & Gilb.—“*New York Flounder*.”

Abundant in Charleston Harbor, where many specimens were obtained.

The ground color is usually light olivaceous, rather than olive brown; the ocellated spots are frequently furnished with a bright white center; and the sides and vertical fins have often a few scattered white spots. A small, indistinct, dark spot on middle of each 8th or 10th ray of dorsal and anal.

Head $3\frac{3}{4}$ – $3\frac{4}{5}$ in length; depth $1\frac{2}{3}$. D. 70 to 76; A. 57 to 59. Pores in lateral line, 83 to 90; vertical series of scales, 70. Gill-rakers very short, 2 + 6. Fourth or fifth dorsal ray longest, nearly two-thirds length of head. Caudal $1\frac{1}{5}$ in head; ventral of colored side, $1\frac{2}{3}$.

115. *Paralichthys ocellaris* (DeKay) J. & G.—*Flounder*.

Platessa ocellaris De Kay, N. Y. Fauna, Fish, 1842, 300, pl. 47, fig. 152.

Platessa oblonga Storer, Hist. Fish. Mass. 1867, 395, pl. 31, fig. 2.

Paralichthys ophryas Jor. & Gilb. Syn. Fish. N. A. 822.

Abundant in the harbor, but much less so than the following species. It does not reach as large a size as *dentatus*, and is much less valuable as a food-fish. The largest specimen obtained is about 1 foot long. This species has by recent writers been confounded with *dentatus*, along with which it occurs on both northern and southern portions of our East coast. From *dentatus* it is readily distinguishable by the ocellated spots, the narrow, interorbital, and especially by the slender, more numerous gill-rakers.

Color in life: Light olive-brown; adults with very numerous small white spots on body and vertical fins; sometimes a series of larger white spots along bases of dorsal and anal fins; about 14 ocellated dark spots on sides, these sometimes little conspicuous, but always present; a series of 4 or 5 along base of dorsal, and 3 or 4 along base of anal, those of the two series opposite, and forming pairs; two pairs of smaller less distinct spots midway between these basal series and lateral line anteriorly, with a small one on lateral line in the center between them; a large distinct spot on lateral line behind middle of straight portion; fins without the round dark blotches characteristic of *dentatus*.

Head $3\frac{1}{2}$ to 4 in length; depth $2\frac{2}{5}$; eye 6 in head; maxillary 2; pectoral $2\frac{1}{5}$; ventral $3\frac{1}{2}$; caudal peduncle 4; caudal $1\frac{1}{4}$. D. 86 to 91. A. 65 to 71. Lat. l. 108 (tubes). Curve of lateral line $3\frac{2}{3}$ to $4\frac{1}{3}$ in straight portion.

Gill-rakers comparatively long and slender, 5 + 15 to 6 + 18 in number. Length 12 inches.

Teeth as in *dentatus*, very long, in a single series, those in lower jaw larger.

Scales smooth; the posterior margin of each scale of colored side beset with a row of minute accessory scales.

116. *Paralichthys dentatus* (Linn.) J. & G.—*Flounder*.

The only flounder of much value for food found at Charleston. It is much more numerous than other species, and reaches a larger size. Specimens were seen $2\frac{1}{2}$ feet long.

This species is readily distinguished by the nearly uniform dark olive-brown coloration, without a trace of ocellated spots; the fins are plain, with characteristic round, dusky blotches; the interorbital space is, in adults, wide and flat; the gill-rakers are comparatively short and strong, very constantly 2 + 9 in number, rarely 3 + 10.

There is nothing in Linnaeus's description of *dentatus* to indicate that he had the present species rather than *ocellaris*. But as the original type of *dentatus* is still preserved by the Linnaean Society of London, judgment may be suspended until a re-examination of this has been made.

117. Citharichthys spilopterus Günther.

Very common in the harbor, where numerous specimens were obtained. Compared with a large series from Mazatlan, Mexico, our Atlantic form differs constantly in having the interorbital space consisting of a single sharp, knife-like ridge, while those from the Pacific have the interorbital space broader, three-fourths width of pupil, and composed of two ridges with a groove between them. The Charleston specimens have constantly the depth slightly less, and the coloration much lighter. In spite of the slightness of the differences noted it is probable that the Pacific form is worthy of separation as a subspecies.

Head $3\frac{3}{8}$ – $3\frac{3}{4}$ in length; depth $2\frac{1}{3}$ – $2\frac{1}{5}$. D. 76; A. 58. Lat. l. 45 (pores). Eye $5\frac{1}{2}$ in head; maxillary $2\frac{2}{3}$; pectoral $1\frac{2}{3}$. Gill-rakers 14 on lower limb.

117. Etropus crossotus Jor. & Gilb.

Abundant. Specimens observed differ from those from Panama in slightly greater depth, which is more than half length of body.

118. Achirus lineatus (Linn.) Cuv.

(*Solea brownii* Günther, iv, 477.)

Very abundant. Specimens with the left side plain whitish, and those having it covered with dusky spots, are equally common. Some were also observed with the eyeless side dusky, but not spotted. As no other differences could be appreciated, it is not probable that this difference in coloration is significant of specific distinctness.

119. Aphoristia plagiusa (Linn.) J. & G.—*Tongue-fish*.

Not rare.

120. Pterophrynooides histrio (Linn.) Gill.

Two specimens seen.

121. Balistes capriscus Gmelin.—*Old-wife*.

Common on the fishing banks where it is often caught with hook-and-line, and used for bait.

122. Monacanthus hispidus (Linn.) J. & G.

? ? *Monacanthus setifer* Bennett, Proc. Comm. Zool. Soc. 1830, 112.

Monacanthus broccus Mitch. Trans. Lit. and Phil. Soc. N. Y., 1, 467.

A single specimen obtained on the fishing bank, caught with hook-and-line in 10 fathoms of water. The caudal peduncle shows the characteristic lengthened setæ, and the first dorsal ray is produced and filiform. The species is evidently not abundantly found at Charleston.

The description given by Linnæus of *Balistes hispidus* is based on a specimen, evidently of the present species, received by him from South Carolina through Dr. Garden. The body was "hispid, roughened towards the tail with setæ." A reference is also made by Linnæus to the account given by Seba of *Monacanthus longirostris*. This, however, cannot invalidate a description made from a specimen in hand, and the name *hispidus* must be used for our species.

123. *Ostracium quadricorne* Linn.—*Cow-fish*.

Very common.

124. *Lagocephalus lævigatus* (Linn.) Gill.

Two specimens seen.

125. *Tetrodon turgidus* Mitch.

Common.

From specimens of *T. nephelus* in our collection from Pensacola and Galveston, this species differs conspicuously in its coloration, in having the snout entirely covered with spines, and in having all the spines short and immovable. *T. nephelus* has a broad space below eye, and the snout, with exception of a small median patch above, naked, and the spines of head and body are longer, slender, and erectile.

126. *Chilomycterus geometricus* (Bl. & Schn.) Gill.—*Pin-cushion*.

Very abundant.

Very young specimens have the body soft and flabby, with the spines admitting of considerable movement because of the looseness of the skin; the caudal peduncle is scarcely noticeable; the belly is often of purplish black, with pink spines.

ADDITIONS.

The following species, included in the present list, are here for the first time authentically recorded from our coast north of Key West, Fla.

1. *Ginglymostoma cirratum*.
2. *Hypoprion brevirostris*.
3. *Rhinobatus lentiginosus*.
4. *Fundulus similis*.
5. *Ophichthys chrysops*.
6. *Exocætes mesogaster*.
7. *Hippocampus stylifer*.
8. *Querimana harengus*.
9. *Sphyræna picuda*.
10. *Phthirichthys lineatus*.
11. *Calamus bajonado*.
12. *Xyrichthys lineatus*.
13. *Calius amblyopsis*.

14. *Gobius encæomnis* sp. nov.
15. *Gobius thalassinus* sp. nov.
16. *Gobius oceanicus*.
17. *Scorpæna stearnsi*.
18. *Porichthys plectrodon*.
19. *Isesthes scrutator*.
20. *Etropus crossotus*.

Additional facts are also made known with regard to the distribution of *Scomber colias*, *Coryphæna hippurus*, *Mesogonistius chatodon*, and *Pæcilichthys barratti*.

In a list given by us of the fishes of Beaufort Harbor, North Carolina (Proc. U. S. Nat. Mus. 1878, 365), the following errors of identification are made:

Siphonostoma fuscum = *Siphostoma louisianæ* and *floridaæ*.

Pseudorhombus ocellaris = *Paralichthys dentatus*, *ocellaris* and *albigutta*.

Prionotus punctatus = *Prionotus scitulus*.

Prionotus evolans = *Prionotus sarritor*.

Carangus chrysus = *Caranx beani* type (probably young of *Caranx ruber*.)

Chirostoma menidium = *Menidia bosci* and *laciniata*.

Belone hians = the young, probably, of *Tylosurus caribbæus*.

Under the heading of *Lophopsetta maculata*, it should have been stated that the species was admitted to the list on the authority of Dr. Yarrow, but was not seen by us.

INDIANA UNIVERSITY, November 6, 1882.

LIST OF FISHES NOW IN THE MUSEUM OF YALE COLLEGE, COLLECTED BY PROF. FRANK H. BRADLEY, AT PANAMA, WITH DESCRIPTIONS OF THREE NEW SPECIES.

By **DAVID S. JORDAN** and **CHARLES H. GILBERT**.

About the year 1866 a considerable collection of fishes was made at Panama and in the neighboring Pearl Islands, by the late Prof. Frank H. Bradley. These specimens are now preserved in the museum of Yale College. By the courtesy of Prof. A. E. Verrill they have been placed in our hands for determination. We give here a list of the species contained in the collection, with remarks on some of the more interesting forms. Three species appear to be still undescribed, and a very large proportion of the others were unknown at the time the collection was made. A series of duplicates has been presented by Professor Verrill to the National Museum. Unless otherwise stated, all the species mentioned were obtained at Panama, by Professor Bradley.

1. *Ginglymostoma cirratum* (Gmel.) M. & H.

A single young example.