SILURIDÆ.

rius felis (Linn.) Jor. & Gilb.
Elurichthys marinus (Mitch.) B. & G.

ANGUILLIDÆ.

nguilla vulgaris Raf.
nguilla tyrannus Girard.
onger caudicula Bean MSS.

MURÆNIDÆ.

phichthys macrurus Poey.
phichthys chrysops Poey.
isodontophis longus Poey.
rotalopsis mordax (Poey) G. & B.
phagebranchus scuticaris G. & B.
phagebranchus teres G. & B. MSS.
etharchus velifer G. & B. MSS.
erpetichthys ocellatus (Le ueur) Goode & Bean.
oconger mucronatus Girard.
yrophis lumbricus J. & G. MSS.
yrophis microstigmius Poey.
ymnothorax ocellatus Agassiz.
ymnothorax afer Bl.
ymnothorax moringa (Cuv.).

AMIIDÆ.

nia calva L.

LEPIDOSTEIDÆ.

pidosteus osseus (L.) Ag.
pidosteus platystomus Raf.
dosteus tristœchus (Bl. & hn.) Jor. & Gilb.

ACIPENSERIDÆ.

penser sp.

CEPHALOPTERIDÆ.

Ceratoptera birostris (Walb.) Goode.

TORPEDINIDÆ.

*Narcine brasiliensis (Olfers) M. & H.

MYLIOBATIDÆ.

*Rhinoptera quadriloba (Lac.) Cuv.

RHINOBATIDÆ.

*Rhinobatus lentiginosus Garman.

TRYGONIDÆ.

Pteroplatea maclura (Les.) M. & H.
*Trygon sabina Le Sueur.

PRISTIDÆ.

*Pristis pectinatus Lath.

SPHYRNIDÆ.

*Sphyrna tiburo (Linn.) Raf.

GALEORHINIDÆ.

*Hypoprion brevirostris Poey.
*Scoliodon terraenovæ Rich.
Carcharinus platyodon (Poey) J. & G.

LAMNIDÆ.

*Isurus DeKayi (Gill) Jor. & Gilb.

GINGLYMOSTOMIDÆ.

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

PETROMYZONTIDÆ.

*Petromyzon castaneus (Grd.) Bean.

NITED STATES NATIONAL MUSEUM,
Washington, March 31, 1882.

NOTES ON FISHES OBSERVED ABOUT PENSACOLA, FLORIDA, AND GALVESTON, TEXAS, WITH DESCRIPTION OF NEW SPECIES.

By DAVID S. JORDAN and CHARLES H. GILBERT.

The greater part of the month of March, 1882, was spent by Professor Jordan at Galveston and Pensacola, in the collection and study of fishes, in the interest of the United States National Museum. Fifty-one species of marine fishes were observed at Galveston and about 110 at Pensacola; making a total of 129. These are enumerated below. The "common names" here given are, in all cases, those in use among the Gulf fishermen. The letters P. or G. after the name of a species indicate that it was observed at Pensacola or Galveston, respectively. The specimens obtained are mostly in the United States National Museum.

Professor Jordan wishes to make especial acknowledgment of his indebtedness to Mr. Silas Stearns, of Pensacola, for enthusiastic and intelligent assistance. Mr. Stearns is a member of the firm of Warren & Co., wholesale fish-dealers at Pensacola, and the resources of this firm were in the most generous way placed at our disposal. The most valuable portions of the present collection were obtained from the vessels sent out for Red Snappers, the captains of these vessels being directed by Mr. Stearns to save for the Museum all small fishes taken from the mouths or stomachs of these fishes. Several interesting species were also obtained by Mr. Stearns and Professor Jordan, with a fine-meshed seine in the shallow waters of the Laguna Grande at Pensacola.

It will be observed that the shore-fishes, even as far westward as Galveston, are essentially the same as those found along the Carolina coast. The forms found in deeper water have a close relation with the West Indian fauna.

LAMNIDÆ.

1. Isurus dekayi (Gill) J. & G. P.

Lamna punctata Dekay, New York Fauna Fish. 352, pl. 63, f. 2[illegible] (not *Squalus punctatus* Mitch.; not *Lamna punctata* Storer Hist. Fish. Mass., which seems to be *Lamna cornubica*.)

Isuropsis dekayi Gill, Ann. Lyc. Nat. Hist. N. Y. vii, 409. (After Dekay.)

Isuropsis glaucus Poey, Synops. Pisc. Cubens. 1868, 446. (Probably not *Oxyrhina glauca* Müller & Henle.)

The synonomy of the American species of *Isurus* has been much confused, as appears from the above account of it. It is certain that two species of this type, viz, *Lamna cornubica* and *Isurus dekayi*, occur on our Atlantic coast. We find no evidence of the existence of *Isurus spallanzani* Raf. in our waters, although Dr. Günther has referred the descriptions both of Storer and Dekay to the latter species. We recognize the American *I. dekayi*, provisionally, as a species distinct from *I. glauca*, which inhabits the coasts of Asia and Africa, as, in the speci-

men examined by us, the pectoral is much larger than in the description and figure of the latter, published by Müller & Henle.

A single individual of *Isurus dekayi*, a female ten feet in length, was found on the beach of Santa Rosa Island, near Pensacola. It showed the following characters:

Color dark sooty-gray above, white below, the color abruptly changing on the tail. The whole of the caudal, the dorsal and upper edge of pectoral, dark. Anal and under side of pectoral white.

Head 5 in total length with caudal, the upper lobe of caudal $5\frac{1}{2}$ in the same. Pectoral fin falcate, as long as head; front of dorsal inserted well behind axil of pectoral, at a distance equal to $\frac{1}{4}$ the head or a little more than half the dorsal base, which is $2\frac{1}{3}$ in head. Height of dorsal, $1\frac{3}{5}$ in head. Distance from posterior edge of base of dorsal to front of ventral, $1\frac{3}{4}$ in head. Dorsal and pectoral somewhat falcate.

Second dorsal very small, in front of the slightly larger anal, and not twice as large as eye. Interspace between dorsals, $2\frac{3}{4}$ times base of first dorsal.

Gill area deeper than long; its depth $2\frac{3}{8}$ in length of head. Snout sharp, conical. Eye large, $4\frac{3}{4}$ in snout, which measured from eye, is 3 in head. Nostril half nearer eye than snout; eye slightly nearer tip of snout than angle of mouth. Labial fold very short. Caudal keel strong, a pit above and below it.

Greatest depth of body, three-fourths length of head. Teeth about $\frac{28}{28}$, none of them with basal cusps; those of the middle of each jaw much longer and narrower than the others, as in other species of the genus.

CARCHARIIDÆ.

2. **Carcharias,*** *sp. incert.* *Sharp-nosed Shark.* G.

The jaws of an unknown species of shark were obtained at Galveston. The teeth in the upper jaw are narrowly triangular, little oblique, and slightly notched on the inner side. Median teeth smaller and narrower than those on the sides. Bases of the teeth coarsely serrate, especially on the inner edge; crown of the teeth finely serrate. Lower teeth very narrow, nearly erect, their edges very minutely serrulate, appearing entire, except under a lens. Teeth about $\frac{28}{28}$.

*The name *Carcharias* first appears in Rafinesque's Caratteri di Alcuni nuovi Generi, etc., 1810, 10. Only *new* species are noticed in this paper, and but one is mentioned. *Carcharias taurus* Raf., a species of *Odontaspis* Ag., which does not agree with the original diagnosis of *Carcharias*. In Rafinesque's Indice d' Ittiologia Siciliana, 1810, p. 44, a work which appeared almost simultaneously with the preceding, we find three species mentioned under the head of *Carcharias*, viz, *lamia*, *glaucus*, *taurus*. It seems evident from the context that the former species was intended by Rafinesque as the type of the genus *Carcharias*. It is, however, not described and not identifiable, although the species called later "*Carcharias lamia*" by Risso, was probably intended. In view of the fact that nearly all modern writers have adopted the name *Carcharias* for the genus, to which *glaucus* and "*lamia*" belong, it seems to us that Cuvier's restriction of the name *Carcharias* may be retained, in spite of the evident objection to it. If *Carcharias* be retained, *C. glaucus* should be considered its type, being a species certainly identified and agreeing with the original diagnosis of the genus, with which *C. taurus* was associated by error, an error several times since repeated. The two papers of Rafinesque may well be considered as parts of the same memoir, the "Caratteri" containing an account of "new" species, "the Indice" an enumeration of known species.

3. **Carcharias platyodon** (Poey.) J. & G. *Shovel-nosed Shark* (*Galveston*).

?*Squalus platyodon* Poey, Memorias, Cuba, II, 331.
?*Squalus obtusus* Poey, Memorias, Cuba, II, 337.
?*Eulamia obtusa* Poey, Rep. Fis. Nat. Cuba, 1868, 447.

This is the commonest of the large sharks found on the coast of Texas in the summer. A young male specimen 32 inches long was obtained at Galveston, and the jaws of a very large example, in the possession of Mr. E. Gabriel, of Galveston, were also examined.

The following is a description of the specimen obtained:

Color slaty, with a distinctly bluish tinge above, whiter below, the white extending higher posteriorly, and forming a faint lateral stripe. Caudal fin all blackish; second dorsal and anal tipped with dusky.

Body comparatively short and stout. Head very short, broad, bluntly rounded anteriorly, and much depressed. Mouth very broad and short. Length of snout from mouth $1\frac{2}{3}$ in distance between angles of mouth. Breadth of mouth between angles twice length of mouth. Angle of mouth with a pit from which radiate two very short furrows.

Inner edge of nostril with a very blunt lobe. Distance between nostrils but a trifle less than length of snout from mouth. Length of nostril greater than eye and half its distance from eye. Eye slightly nearer nostril than angle of mouth. Nostril a little nearer eye than tip of snout. Distance from eye to snout $1\frac{1}{3}$ times in interorbital width, which is $1\frac{2}{3}$ in length of head to first gill opening. Gill openings short, the height of one a little more than half length of gill area. Top of head with numerous mucous pores.

First dorsal beginning close behind pectoral, at a distance from the posterior root of the latter equal to about $1\frac{1}{2}$ diameter of the eye; the fin moderate in size, its anterior lobe rather obtuse, the posterior little produced; the free edge of the fin little concave. Anterior lobe extending when depressed a little beyond posterior lobe; the fin a little higher than long, its base $2\frac{1}{3}$ times in the interspace between dorsals, and about equal to the distance from the posterior base of the first dorsal and the vertical from the insertion of the ventrals. Length of posterior lobe two-fifths base of the fin.

Second dorsal very small, its base 5 times in the interspace between dorsals, less than half base of first dorsal; the fin scarcely as long as high; its posterior lobe moderately produced.

Caudal moderate, the lower lobe not falcate, $2\frac{1}{3}$ times in the length of the upper lobe; the latter $3\frac{2}{3}$ in the total length, about equal to the distance from the snout to the base of the dorsal.

Anal a little larger than second dorsal and placed a little further back; its lobes more falcate, its distance from base of caudal $1\frac{1}{2}$ its base.

Ventrals moderate, their lobes bluntish, the anterior margin scarcely more than half the length of the base. Pectorals rather small, their tips not falcate, reaching slightly past posterior part of dorsal; their free margins a little concave, the anterior margin a little shorter than

head, 6 times in total length of body. Width of pectoral a little less than than two-thirds its length; the posterior lobe contained 3⅔ times in its anterior lobe.

Claspers, in specimen described, not reaching nearly to edge of ventral.

Teeth of upper jaw broadly triangular, nearly erect, not notched on the outer margin, the edges distinctly and rather coarsely serrate. Lower teeth narrowly triangular, with broad base, the edges finely serrate. Teeth in the young scarcely narrower than in the adult.

The specimen here described was not preserved, it having spoiled before the arrival of alcohol.

Among the described species of this genus *Carcharinus platyodon* (Poey) (=*obtusus* Poey) seems to be most nearly related to the species examined by us. The pectoral in *C. platyodon* is larger, the teeth somewhat different, and the second dorsal is said to be "assez grande," whereas in *C. cæruleus* the latter fin is very small. *C. fronto*, lately described by us from Mazatlan, is also very similar, but has a much larger second dorsal.

Another species, similar, but with longer snout, has been described by Dekay under the name of *Carcharias cæruleus*. This description has been referred by Professor Gill to the synonymy of the very different species, *Carcharias plumbeus* (*Nardo*) = *Carcharias milberti* M. & H., and has been called "*Eulamia milberti*".

There is, however, no good evidence that *C. milberti* (*plumbeus*) has ever been taken in our waters. The only record is that of Müller & Henle, who mention "ein Exemplar in Paris, von New York durch Milbert". This specimen is apparently not the type of the original description; it belonged to a collection in which there were several confusions of localities, and if really from New York it may have belonged to some species different from the type in the museum at Berlin—perhaps to *C. obscurus* or *cæruleus*.

There are apparently seven species of *Carcharias* (in the broad sense in which the genus is understood by Müller & Henle, Günther, etc.,) now known to inhabit the waters of the Atlantic and Gulf coasts of the United States. If others exist, their occurrence is yet to be verified.

These are,

1. *C. glaucus* (L.) Cuv.
2. * *C. obscurus* (Le S.) M. & H. (*Platypodon.*)

*The first four of these species may be readily recognized by the following characters:

a. First dorsal inserted nearer ventrals than pectorals. (*Carcharias*). GLAUCUS.

aa. First dorsal inserted close behind pectorals.

b. Upper teeth oblique, very deeply notched on the outer margin; pectorals long. (*Platypodon* Gill) ..... OBSCURUS.

bb. Upper teeth suberect, triangular, scarcely notched. (*Eulamia* Gill.)

c. Snout moderate; its length from mouth not less than width of mouth. CŒRULEUS.

cc. Snout very short; its length from mouth much less than width of mouth ..... PLATYODON.

3. *C. cæruleus* (Dek.) J. & G. (*Eulamia.*)
4. *C. platyodon* (Poey) J. & G. (*Eulamia.*)
5. *C. limbatus* M. & H. (*Isogomphodon maculipinnis* (Poey) Gill).
6. *C. brevirostris* (Poey) G'thr (*Hypoprion*).
7. *C. terræ-novæ* Rich. (*Scoliodon.*)

The *Squalus punctatus* Mitch. (Trans. Lit. and Phil. Soc. 1, 484), agrees well enough with the common *Scoliodon terræ-novæ*, and was probably founded on that species. It has, however, been identified by Gill with *Carcharias isodon* M. & H., a species of *Aprionodon*. This species is known only from a specimen collected by Milbert—the locality not stated; but as some other collections of Milbert were made at New York, this type of *C. isodon* has been assumed to be from that locality. So far as we know, no American collector has ever obtained a specimen of the species, and *Carcharias isodon*, or *Aprionodon punctatus*, should be erased from our lists.

It is not likely that the type of "*Scoliodon terræ-novæ*" really came from Newfoundland. It is a southern species, and is very abundant along our South Atlantic and Gulf coasts.

4. **Scoliodon terræ-novæ** (Rich.) Gill. P.

Two young specimens obtained at Pensacola, where the species are said to be common.

SPHYRNIDÆ.

5. **Sphyrna tiburo** (L.) Raf.—*Shovel-nosed shark* (Pensacola). P.

Abundant at Pensacola.

PRISTIDIDÆ.

6. **Pristis pectinatus** Latham.—*Saw-fish.* G.

Common. There is thus far no evidence of the occurrence of *Pristis antiquorum* in American waters, although the name occurs in several lists of species.

TRYGONIDÆ.

7. **Trygon sabina** Le Sueur.—*Stirg-ray; Sting-a-ree.* G. (31045).

Generally common. Also seen in the markets of New Orleans, being obtained in Lake Pontchartrain and Lake Borgne.

SILURIDÆ.

8. **Arius felis** (L.) J. & G.—*Sea cat-fish; Blue cat.* G.

Very common on the sandy beaches. It is seldom brought into the markets, and is eaten chiefly by the negroes. The specimens seen belong to the form described by Baird & Girard as *Arius equestris*. This form agrees in dentition, character of bony plates, etc., fully with the *Arius felis* of the Atlantic coast. The barbels in specimens of *equestris* examined are, however, somewhat longer, the maxillary barbel extend-

ing to about the end of the first fourth of the base of the pectoral; the others lengthened in proportion. In *felis* the barbel does not usually reach the gill opening. The pectoral in *equestris* extends slightly beyond last ray of dorsal. These peculiarities are not likely to be constant. There is probably no permanent difference on which to base a subspecies *equestris*.

9. **Ælurichthys marinus** (Mitch.) B. & G.—*Sea kittun; Sea cat-fish; Gaff-top-sail cat.* G.

Generally abundant.

ELOPIDÆ.

10. **Megalops atlanticus** C. & V.—*Grande Écaille; "Grandacoy"; Tarpun; Silver fish.* G.

This species is generally common along the Gulf coast, but only scales were obtained. It reaches a length of some 6 feet. Its habit of leaping out of water like the mullet causes it to be dreaded by fishermen. It is said that several persons have been killed or injured when in small boats by the "Grande Ecaille" leaping into the boat.

It seems to us that the specific name *atlanticus* should be adopted as the name of this species, being the oldest name ever really conferred on it. The earlier names "*cyprinoides*" Bloch, "*thrissoides*" Bloch & Schn., and "*giganteus*" Shaw, were alike based on a figure and description of Broussonet, as *Clupea cyprinoides*. Broussonet had evidently a specimen of the Indian species, *Megalops cyprinoides* (Brouss.) Bleeker, and for this species the name *cyprinoides* should be retained. Bloch took his name "*cyprinoides*" and his description from Broussonet, but added a figure from Plumier, of the American species. The names "*thrissoides*" and "*giganteus*" were given as substitutes for "*cyprinoides*," and were likewise based primarily on Broussonet's description. The earliest name intended for our species is *Megalops atlanticus* C. & V. The reference to *Clupea apalike* Lac., given by Günther, is fallacious. Lacépède describes *Clupea cyprinoides*, "la clupe apalike," after Broussonet, his synonymy, like that of all writers before Cuvier and Valenciennes, including references both to *M. cyprinoides* and *M. atlanticus*.

11. **Elops saurus** L.—*Lady-fish.* P.

Very abundant in summer; at Pensacola, largely salted as bait for the Red Snapper. Not used as food.

CLUPEIDÆ.

12. **Brevoortia patronus** Goode.—*Alewife.* G. P. (31046, 30907).

Generally common; reaching a length of about 13 inches; no use is made of it.

In life this species is bluish above, silvery below; a faint narrow dark stripe along the middle of each row of scales on the back. Caudal fin bright yellow, its posterior margin blackish; dorsal and anal dull yellowish; paired fins, pale; opercle, yellowish; a blackish blotch on its upper edge; a round blackish humeral spot.

13. **Opisthonema thrissa** (Osbeck) Gill. G. P.

Two specimens obtained at Pensacola, where it does not appear to be very abundant.

14. **Clupea sapidissima** Wils.—*Shad, Alewife.* P. (30809.)

Head, $3\frac{5}{8}$ ($4\frac{1}{8}$ in total); depth, $3\frac{1}{4}$ ($4\frac{3}{8}$). D. I, 16. A. I, 20. Scutes, 21 + 15.

This species is not uncommon about Pensacola, where numerous young specimens were obtained. It is known to the fishermen as "alewife" or "shad," and is used only for bait. The specimens seen were 8 to 9 inches in length. They are somewhat more elongate than the young of the northern shad, and the number of gill-rakers is pretty constantly smaller (about 38 below the angle of the arch, instead of 45 to 50).

15. **Clupea chrysochloris** (Raf.) J. & G.—*Blue herring.* P. G. (30809.)
(*Meletta sueviii* Cuv. & Val. xx, 375.)

Not rare on the Gulf coast. Known to the fishermen only as a marine species. One specimen obtained at Galveston and one at Pensacola.

The following is a description of the Galveston specimen:

Color in life deep bluish-green above, the color abruptly ceasing on level of upper edge of gill opening; sides white, with a strong tinge of golden, especially on head. Dorsal yellowish, more or less dusky at base and in front. Caudal soiled yellowish, dusky at tip. Ventrals and anal pale; pectorals pale, a dusky streak on the inner side, behind first ray; tips of jaws blackish; mouth yellowish within; tongue bluish; lining of opercle mostly pale; peritoneum white.

Body comparatively long and slender; head not very deep; lower jaw strongly projecting, its tip fitting into an emargination of the upper jaw and entering the profile; tip of lower jaw with a few slender deciduous teeth. Premaxillaries with a narrow band of rather strong *permanent teeth*; those of the outer series strongest. Tongue with feeble teeth; vomer toothless. Gill-rakers numerous, but not long, not so long as eye; about $5\frac{1}{2}$ in head (about 22 below angle). Eye not large, $4\frac{1}{4}$ in head. Maxillary reaching past middle of pupil, a little less than half head. Cheeks longer than deep; their depth below eye 4 in head; lower limb of preopercle $2\frac{1}{4}$ in upper. Longest ray of dorsal $1\frac{1}{4}$ in head. Ventrals small, nearer snout than base of caudal. Pectorals $1\frac{1}{2}$ in head.

Head 4 (5 in total); depth $3\frac{1}{2}$ ($4\frac{3}{4}$). D. 2, 17; A. 1, 18. Lat. l. 48. Scutes 16 + 15 (19 + 15 in the Pensacola specimen, 20 + 15 in a specimen from White River, Indiana).

The Pensacola specimen is remarkable for its extraordinary fatness, the body being very plump and full of oil. It is very greasy to the touch, even after having been for some time in alcohol.

16. **Clupea pseudohispanica** (Poey) Gthr. P. (30820.)

Four specimens of this species, each $6\frac{1}{2}$ inches long, were obtained at Pensacola. Its resemblance to the European sardine (*Clupea pilchardus*

Walb.) is very great; hence its name of "Sardina de España," among the Cuban fishermen.

Head 4⅛ to 4⅜ in length; depth 5 to 5⅓; D. 16, A. 16; lat. l., about 45.

Body slender, little compressed, the belly scarcely carinated, its scutes not prominent; mouth small, the maxillary not extending quite to front of pupil, its length 2⅞ in head; gill-rakers long, very slender and numerous, about two-thirds diameter eye, between 30 and 40 on arch below angle. Lower jaw with a few feeble teeth, visible with lens; tongue with some asperities; cheeks much longer than deep, the vertical depth below eye about two-thirds diameter of eye; eye 3¾ in head. Opercle without distinct striæ; interopercle with very few. Caudal well forked; the lower lobe a little the longer as long as head. Ventrals inserted nearly below middle of dorsal, a little nearer base of caudal than tip of snout; pectorals 1⅛ in head; a conspicuous sheath of scales at base of pectorals.

About 45 scales in a longitudinal series; the scales being thin and deciduous, their number cannot be exactly ascertained.

Color bluish above, becoming golden and silvery below, with no distinct markings anywhere.

Peritoneum pale; lining of opercle somewhat dusky. Intestinal canal somewhat elongate, about 1½ times length of body.

This species is mostly readily distinguished from *C. pilchardus* by the absence of radiating striæ on the opercles, these being very conspicuous in the sardine.

DOROSOMATIDÆ.

17. **Dorosoma cepedianum** (Le S.) Gill.—*Shad.* G. (30913.)

Generally abundant, especially along the coast of Texas. The specimens all differ somewhat from the usual form of this species, and apparently constitute a local variety or subspecies, perhaps worthy of a distinctive name. Compared with specimens from White River, Indiana, the Galveston form has a slenderer body (depth 3⅓ to 3 in length, instead of 2½ to 2⅔), and larger head (4 in length, instead of 4⅓). The dorsal filament is in all specimens shorter than the head. There seem to be no other permanent differences. D. 12; A 1, 32. Scales 56 to 20. Scutes 18 + 12.

This species is not used for food. It must spawn in or near the sea at Galveston, as individuals of all sizes are abundant in the bay

ENGRAULIDIDÆ.

18. **Stolephorus mitchilli** (C. & V.) J. & G. G. P. (30892 Galv.); (30857 Pens.).

Engraulis mitchilli, C. & V., Hist. Nat. Poiss. xxi, 50, 1848 (not *Engraulis mitchilli* Günther vii, 391; not *Clupea vittata* Mitch).
Engraulis vittata Storer, Hist. Fish. Mass. pl. xxvii, f. 3 (not description).
† *Engraulis duodecim* Cope, Trans. Am. Philos. Soc. 1866, 405.

Head 3⅓ in length (4⅔ in total); depth 4 (5) in adults, the young more slender; D. 14; A. 25 to 26; lat. l. 37.

Body rather short and deep, strongly compressed; the belly compressed and slightly serrated. Head short, compressed, bluntish. Snout extremely short, not longer than the pupil of the very large eye. Eye about 3 in head. Mouth somewhat oblique; mandible extending farther forward than eye. Maxillary extending beyond root of mandible about to margin of opercle. Both jaws well provided with teeth. Cheeks broadly triangular, almost equilateral, smaller than eye. Opercle short, little oblique. Gill-rakers rather long, about two-thirds diameter of eye.

Insertion of dorsal about midway between base of caudal and middle of eye. Caudal deeply forked, the lower lobe slightly the longer, about as long as head. Anal long and high, its base 3⅔ in body, considerably longer than head. Pectorals long, 1¼ in head, reaching about to the front of the small ventrals, which do not reach the vent and are about 2¼ times in head.

Scales thin, caducous.

Color in life translucent, very pale, with bluish reflections. Sides with a narrow and not sharply defined but bright silvery shade, scarcely wider than the pupil, distinct for the whole length of the body. Snout yellowish; top of head dusty; the occiput nearly black; sides of head lustrous silvery. Middle line of head blackish; a series of dark points along the base of the dorsal, becoming a well-defined dark streak behind the fin. Dark points along base of anal, these also becoming a dark stripe behind the fin. Caudal distinctly yellowish, with many dark points; its tip dusky; other fins pale; the dorsal slightly yellowish.

This species is very common in the Bay of Galveston, where many specimens were obtained. The longest about 2½ inches in length. One specimen was obtained at Pensacola; another is in our collection from Wood's Holl, Mass., where it is the commonest species of *Stolephorus*. From most of the North American species of this genus, *S. mitchilli* is distinguished by the length of the anal and by the less sharply-defined lateral stripe.

SCOPELIDÆ.

19 **Synodus intermedius** (Spix) Poey.—*Sand Diver, Sand Launce.* P. (30877.)

† *Saurus intermedius* Spix. Pisc. Bras. 81. Günther v, 396.
Saurus anolis C. & V., xxii, 483.
Synodus intermedius Poey, Syn. Pisc. Cub. 414 (No. 68).

Numerous specimens, most of them badly mutilated, were obtained from the stomachs of Red Snappers at Pensacola. Many of these were full of spawn. The most perfect specimens, about a foot in length, shows the following characters:

Color grayish-white above, becoming abruptly paler on the level of the upper margin of the pectorals; back and sides with eight broad dark cross-bands, which are broadest near the lateral line; lower part of sides with a pinkish tint. A jet-black blotch on shoulder girdle

above, hidden by upper part of opercle; some irregular dark blotches on cheeks and opercles; opercle with some yellow; membrane joining maxillary to head black. Dorsal with about 6 narrow dark bars formed by series of dark spots; caudal yellowish, margined posteriorly with black; a dark blotch at its base; pectoral faintly barred with dusky and light yellow; ventrals, anal, and gill membranes sulphur yellow. Tip of snout not black; jaws mottled with dark; top of head with dark cross-line; axil blackish.

Head 4 ($4\frac{3}{8}$); depth 8 (9); D. I, 10, A. I, 10. Scales about 4–50–7.

Body fusiform, somewhat depressed, especially posteriorily. Head bluntish, rather large; snout short, broader at base than long, scarcely longer than eye, $4\frac{1}{2}$ in head. Bones of top of head weakly striate; region behind eyes with strong radiating ridges; interorbital space deeply concave, its width 6 in head, superciliary bone prominent, scale-like, with radiating striæ.

Jaws subequal in front, the lower scarcely included. Maxillary $1\frac{2}{3}$ in head, considerably longer than pectoral. Teeth not very large, those on palatines and tongue rather small.

Scales on cheeks large, in 4 or 5 rows. Scales on body everywhere large, those on breast not reduced; three series between adipose fin and lateral line; lateral line conspicuous, slightly keeled on the tail.

Origin of dorsal midway between adipose fin and nostrils, the fin high, as high as long, the longest rays $1\frac{2}{3}$ in head. Caudal $1\frac{2}{3}$ in head; pectoral $1\frac{5}{8}$, reaching about to seventh scale of lateral line; ventral $1\frac{1}{3}$; insertion of ventrals under second third of pectoral, the fin extending to slightly beyond base of last ray of dorsal; base of anal as long as maxillary.

Our specimens are evidently identical with Poey's "Species dubia, an *Synodus intermedia*. No. 68."

CYPRINODONTIDÆ.

20. Cyprinodon variegatus Lac. (30829.)

Cyprinodon gibbosus Baird & Girard, Proc. Acad. Nat. Sci. Phila. 1853, 390.

Body very short and robust, in adults high and much compressed, the females abruptly constricted at base of caudal peduncle; caudal peduncle rather short and high, rapidly narrowed backwards to tail, its greatest height nearly equal to length of head, its least height one-half head; head short, little depressed, narrowed upwards and forwards, with sharp snout and small mouth; width of mouth rather less than length of snout; teeth large, in a single series, consisting of wedge-shaped incisors, much widened towards tips, the cutting edge tricuspid; no villiform teeth; eye moderate, its diameter longer than mandible, slightly less than interorbital width, about equal to length of snout, and contained $3\frac{1}{2}$ times in length of head; interorbital width 3 in head. Opercle joined by membrane to shoulder-girdle from a point slightly above base of pectoral.

Intestinal canal long, but not much convoluted, $2\frac{2}{3}$ times length of body.

Dorsal moderate, in females as high as the length of its base, in males much higher; origin of dorsal midway between base of caudal and end of snout; base of fin $1\frac{1}{3}$ to $1\frac{2}{3}$ in length of head; longest ray (in ♂ 2′ long) reaching half way from base of fin to base of caudal; the anterior rays equaling length of head and extending beyond tips of posterior rays where the fin is depressed; in females, the longest ray about $1\frac{1}{2}$ in head. Origin of anal under eighth or ninth ray of dorsal; the fin very small, and much higher than long; length of base about equaling snout; longest ray half length of head (less in females). No external oviduct. Caudal truncate or slightly emarginate, $1\frac{1}{4}$ in head. Ventrals, in adult males, reaching front of anal, $2\frac{1}{3}$ in head; in females, reaching vent. Pectorals long, reaching middle of ventrals, $1\frac{1}{6}$ in head.

Scales large, tuberculate in males, arranged in regular series; humeral scale much enlarged, its height nearly half length of head; 26 or 27 oblique series of scales from opercle to base of tail; 13 scales in an oblique series from vent to middle of back.

Head, $3\frac{2}{3}$ to $3\frac{3}{8}$ in length; depth, 2 to $2\frac{2}{3}$; D. 11; A. 10. Scales, 26–13.

Color: ♂, olivaceous; from dorsal forward above pectoral to head deep lustrous steel-blue, the color very intense and conspicuous in life; rest of upper parts with rather greenish luster, becoming dull slaty blue; and on cheeks, opercles, sides anteriorly, and belly, deep salmon-color; lower lip and preopercle, violet. Dorsal blackish, the anterior margin of fin orange; caudal dusky olive, with a jet-black bar at tip, and a narrow black cross-streak at base. Anal dusky at base, bordered entirely around with bright orange. Ventrals dusky, bordered with orange. Pectorals dusky-orange, darker below. Smaller specimens show some orange shading on the sides, and sometimes also traces of the cross-bands of the female.

♀, very light olive; lower half of sides with about 14, alternately wide and narrow, vertical, dark bars, those anteriorly narrower and closer together; usually 7 or 8 dark cross-bars on the back, alternating with the wide bars below; these bars are of various degrees of distinctness, sometimes almost obsolete; a dusky area below eye; young with broad greenish cross-shades wider than the interspaces. Belly pale or yellowish; lower jaw largely blue; cheeks brassy. Dorsal dusky, with an intense black, faintly ocellated spot near tip of last rays. Caudal faintly reddish, with a black bar towards base. Other fins pale orange, with some dark points.

Found very abundant at Galveston and still more so at Pensacola. Specimens from the Gulf ("*gibbosus*") are larger and somewhat brighter colored than those from the Atlantic farther north, but a careful comparison with specimens from Beaufort, N. C., and Wood's Holl, Mass., failed to show any differences of even varietal value. It is possible that

this species is identical also with *C. bovinus* (Baird & Girard, Proc. Acad. Nat. Sci. Phil. 1853, 389), and with *C. eximius* (Grd. Proc. Acad. Nat. Sci., Phil. 1859, 158). But as *bovinus* is described as having head 3 in length, eye 4 in head, ventrals under anterior margin of dorsal, fin rays fewer in number, D. 9, A. 8, and with somewhat different coloration, and *C. eximius* with head about 3⅓ in length, eye 4 in head, D. 12, A. 12, and different coloration, it is not advisable to include them, for the present, in the synonomy of *variegatus*.

21. Fundulus similis (Girard) Jor. P. G. (30812 Pens.; 30920 Galv.)

Body very long and slender, the outlines scarcely arched; adults much deeper than young; head narrow, very long, and regularly narrowed forwards; preorbital exceedingly wide, as wide as eye, 4½ to 5 in length of head; eye small, 5 to 5½ in head, 1½ to 1¾ in interorbital width; posterior margin of orbit slightly behind middle of head; eye 1¾ in length of mandible; mouth small, maxillary not nearly reaching vertical from anterior nostril; teeth very small, in broad villiform bands, the outer series not at all enlarged; interorbital width 3⅓ in head.

Dorsal fin long and rather low, the height less than length of base in adult males, 1⅓ in length of base in females; in males the last rays are but little higher than some of those preceding, in females the last are the lowest; longest ray (in ♂) 2⅙ in head; origin of dorsal midway between middle of eye and tip of caudal. Origin of anal under third dorsal ray, the fin much higher than dorsal, the longest ray 1⅓ in head; the rays regularly increase in length to the sixth; the seventh, eighth, and ninth then rapidly shortened, the last again somewhat longer; thus the anterior outline of the fin is convex, and the posterior deeply emarginate or falcate, or in females nearly vertically truncate; posterior margins of oviduct adnate along either side of third anal ray, forming a pouch at base of first and second rays, covering one-fourth length of first ray. Pectorals reaching origin of ventrals, 1⅝ to 1¾ length of head; ventrals not reaching vent, 2⅓ in head; their base midway between pectorals and origin of anal; caudal subtruncate, 1⅔ in head.

Scales large, in regular series; 33 oblique series from opercle to base of tail; 11 in an oblique series upwards from vent to middle of back; humeral scales not enlarged.

Head 3¼ in length; depth 3¾ to 4⅔; D. 11 to 13.

A. 10; scales 33—11.

Color: ♂, olivaceous, bronze below; lower parts of head strongly orange; sides with 10 to 15 narrow dark bars, one-third to two-thirds as wide as the interspaces, and not very dark, although distinct; a large, diffuse, dark humeral blotch, extending from above opercle to about base of pectoral; each scale with a distinct >-shaped intermarginal series of dots, forming conspicuous reticulations. Dorsal dusky with black specks, mostly black at base; a small ocellated black spot behind, disappearing in adults; caudal faintly clouded with dusky, especially about the middle; ventrals pale, somewhat soiled.

♀, olivaceous, sides paler olive, with metallic lustre; belly white; 7 to 15 very narrow sharply-defined black bars on sides, not extending on the back, scarcely broader than the pupil; scales marked as in the males, but much more faintly. Fins pale, almost immaculate.

This species is very abundant at Pensacola, where many specimens were collected; it was also obtained at New Orleans. The Galveston specimens show quite constantly: D. 11, A. 9, head 3½ in length; eye smaller, 1¾ in interorbital width, and width of preorbital 5½ in head; and may represent a tangible variety.

22. Fundulus grandis Grd. G. P. (30836.)

Fundulus floridensis Grd. Proc. Acad. Nat. Sci. Phil. 1859, 157.

Body stout, robust; adult females much compressed and elevated; caudal peduncle short and rather deep, its greatest depth (in ♀, 5 inches long) equaling its length, which equals one-half length of head; head long, broad, and heavy, the lower jaw conspicuously longer than the upper, and very strong; teeth in a narrow villiform patch, the outer series in each jaw enlarged; preorbital narrow, about one-half diameter of orbit; eye large, slightly less than length of snout or mandible, 4 to 4½ in head, slightly more than one-half interorbital space.

Dorsal fin small and low, but little elevated, in males 4½ inches long, where the tips reach scarcely more than half way from base of fin to root of caudal; the rays still shorter in adult females; origin of dorsal usually slightly nearer tip of caudal than tip of snout; base of dorsal contained from 2½ to 3 times in head; longest rays in male about one-half head, somewhat less in females. Origin of anal under fourth or fifth ray of dorsal, its base equalling length of snout; longest ray in males 1¾ in head, in females 2 to 2⅓ times; oviduct attached to first anal ray for a distance more than one-third length of ray; ventrals barely reaching vent in males, about 2½ in head; pectorals large, reaching to or beyond base of ventrals, and half or more than half length of head; caudal about 1½ in head.

Scales in 35 to 38 oblique rows; 15 in an oblique series from vent forwards to middle of back.

Head 3 to 3⅓ in length; depth 3½ to 3⅝; D. 11; A. 10 or 11; scales 35 to 38–15.

Color: ♂, very dark green above, paler posteriorly; sides with numerous small, round, pearly-white spots, occasionally some of them arranged in vertical series; posteriorly with traces of 8 to 10 very narrow, pale, vertical bars, alternating with broader, faint, dusky ones; belly yellowish; sides of head dusky. Caudal greenish, almost black behind, its edge translucent; the basal part with numerous small white spots. Dorsal olive, anteriorly orange, blackish on basal half, and marked with numerous small white spots. Anal and ventrals bright orange, the former sometimes dusky, and frequently with several white specks at base. Pectorals light yellow.

♀, sometimes nearly plain silvery, dusky olive above, and with much minute dark specking on lower half of sides; sides usually showing traces of from 12 to 15 narrow, silvery, vertical bars, less than one half as wide as the dusky interspaces; no white spotting on body or fins; fins all nearly plain dusky olive, with some yellow; top of head blackish.

This species is very closely allied to *F. heteroclitus*, but differs constantly in the much lower fins; the interorbital width is slightly less, and the fins show some slight differences in coloration. *F. grandis* was found very abundant in the Laguna Grande at Pensacola, and was also found at Galveston, Tex.

23. **Fundulus ocellaris** sp. nov. (29667, 29667, 30853.) P.

Head comparatively small and narrow, with short depressed snout, and weak jaws; body rather slender; lower jaw but little longer than upper; eye small, 4 in head, $1\frac{2}{3}$ in interorbital width, equaling snout, which equals length of mandible; teeth all villiform, in narrow bands in each jaw, the outer series but little enlarged, but projecting appreciably beyond the others; preorbital narrow, less than half diameter of orbit.

Dorsal fin (in ♂ 3 inches long) much elevated, reaching, when depressed, beyond base of rudimentary rays of caudal; much shorter than this in females and young males. Origin of dorsal midway between tip of caudal and tip of snout, or slightly nearer snout; the base of the fin $1\frac{1}{2}$ in height of longest ray, which is contained $1\frac{1}{4}$ in head; outline of fin rhomboid, the upper edge straight, the last rays highest. Anal fin similar to dorsal, but narrower and slightly lower, not reaching caudal when depressed; its origin under second ray of dorsal and distant from caudal half as far as from tip of snout; base half height of longest ray; greatest height of caudal peduncle two-thirds its length and half length of head; oviduct not attached to first anal ray, but forming a low sheath along base of first six rays. Caudal short, rounded, $1\frac{1}{4}$ in head; pectorals slender, reaching base of ventrals, $1\frac{2}{3}$ in head; ventrals (in adult ♂) extending beyond front of anal, half length of head.

Scales moderate, in somewhat irregular oblique series, of which there are 35 between gill opening and base of caudal; 15 scales in an oblique series from vent forwards to middle of back; about 18 cross series between nape and front of dorsal; humeral scale not enlarged.

Female with somewhat deeper body, and different coloration; the fins smaller, the last ray of dorsal shorter than those preceding, and not reaching half way from its base to rudimentary caudal rays; length of longest ray greater than base of fin; ventrals not nearly reaching vent; front of dorsal nearer tip of caudal than end of snout.

Head 3 to $3\frac{1}{3}$ in length; depth 4. D. 11; A. 10; V. 6; P. 13; scales 35–15.

Color: ♂, dark olive brown above, golden on sides and below, the golden tint extending farther up on caudal peduncle than on trunk; scales margined with darker; sides with 13 to 15 dark cross-bands of the color of the back, not extending on the belly, but almost reaching lower median line behind ventrals; these bands usually approximately parallel, and the anterior ones, at least, narrower than the interspaces, the widest of which is about two-thirds diameter of orbit; sides posteriorly to origin of dorsal finely speckled with small pearly spots which cover both bands and interspaces. Dorsal and anal margined with orange anteriorly, the color deeper on front of anal; the two fins tinged with orange and checked with black and pearl color; caudal light orange, indistinctly barred at base with series of linear blotches; pectorals and ventrals plain orange, the former slightly dusky.

♀ dark above, sides finely dusted with dark points, pale below, tinged with yellowish; middle of sides with about 13 very narrow, short, dark half bars; back sometimes with small dark blotches; dorsal dusky with a very distinct black spot ocellated with white, on its posterior rays; caudal and anal plain dusky; ventrals light yellowish.

About 15 specimens, the longest about 3 inches long, obtained in Laguna Grande, at Pensacola.

24 **Fundulus xenicus** nom. sp. nov. P. (29668; 30821; 30841.)

Adinia multifasciata Girard, Proc. Acad. Nat. Sci. Phil. 1859, 117 (not *Hydrargyra multifasciata* Le Sueur, nor *Fundulus adinia* Jor. and Gilb. Synopsis Fishes N. A. 334).

Body very deep and much compressed, with very high caudal peduncle, rapidly tapering head, and very slender, sharp, conical snout; tip of snout on axis with body, the ventral outline somewhat more arched than the dorsal; profile rising rapidly from tip of snout to origin of dorsal, slightly depressed at nape; body highest at origin of dorsal fin, where the profile is angulated; depth much greater in adults than in the young; in a male specimen, $2\frac{1}{4}'$ long, the depth equals one half the length; in younger males the depth is contained $2\frac{1}{3}$ to $2\frac{1}{2}$ times in length; greatest depth of caudal peduncle $3\frac{1}{4}$ in length. Head high and narrow; snout conical, pointed; jaws equal, the gape horizontal in closed mouth; mouth protractile downwards and forwards; teeth very small, in a villiform band, the outer series in each jaw enlarged and conical. Eye large, 3 in head, $1\frac{1}{5}$ in the narrow interorbital space, equal to length of snout, rather more than length of mandible. Branchiostegal membranes broadly joined across throat, united as far back as vertical from preopercular margin. Branchiostegal 5. Opercle joined by membrane to shoulder-girdle, down to a point just above base of pectoral.

Intestinal canal equaling length of body.

Dorsal in advance of anal, its origin midway between base of caudal and middle of orbit; the fin much higher than long, the longest rays reaching, in adult males, beyond rudimentary caudal rays; highest dorsal ray $1\frac{2}{3}$ in head. Anal beginning opposite middle of dorsal base, similar to dorsal, but lower, scarcely reaching base of caudal; the base

of the fin is very oblique and is about equal to length of caudal peduncle; distance from origin of anal to base of caudal, 2 in distance to tip of snout; longest anal ray $1\frac{1}{2}$ in head. Caudal broad, $1\frac{1}{4}$ in head. Ventrals (in ♂) reaching anal, $2\frac{1}{3}$ in head. Pectorals long, reaching middle of ventrals, $1\frac{1}{2}$ in head. Oviduct not adnate to first anal ray.

Female specimens have body less deep, fins much lower, and different coloration; the depth is $2\frac{2}{5}$ to $2\frac{1}{3}$ in length, and the longest dorsal ray $1\frac{2}{3}$ in head.

Head $2\frac{9}{10}$ in length; depth 2; D. 9 or 10; A. 11 or 12; V. 6; P. 14; B. 5; scales 25–10.

Color: ♂, dark green, sides with 10 to 14 narrow bands of bluish-silvery, the first of which is somewhat in front of dorsal; these bands are slightly oblique below, and are a little narrower than the interspaces; they become wider and farther apart behind; the interspaces are frequently divided by fainter silvery bands; a diffuse, broad, dusky blotch below and behind eye. Lower jaw bright orange; lower side of head and belly yellow.

Dorsal blackish, with very numerous round blue spots, the lower spots, and sometimes most of them, orange; anal similarly colored; caudal with irregular alternately dark and light bars, and a few white basal spots; ventrals dusky, tipped with sulphur-yellow; pectoral translucent.

♀ greenish, with a faint trace of a dusky lateral stripe, and with about 8 obscure pale cross-bands; dorsal, caudal, and pectorals plain dusky, the lower edge of caudal tipped with orange; anal and ventrals orange-yellow; lower jaws yellow; a dusky shade below and behind eye.

Very numerous specimens, the largest about 2 inches long, were obtained from the Laguna Grande, at Pensacola, in salt-water.

25. **Lucania venusta** Girard. P. (30819.)

Lucania affinis Grd. Proc. Acad. Nat. Sci. Phila. 1859, 118.

Body fusiform, rather strongly compressed, the dorsal and ventral outlines about equally arched; head narrow, compressed, flattened above the eyes, the upper profile of snout both longitudinally and transversely convex; snout compressed, conspicuously shortened and vertically rounded, its height greater than its width; caudal peduncle long and rather slender, its greatest height $1\frac{2}{3}$ in head, its length slightly less than head; mouth very small, protractile forwards, the lower jaw very much projecting in open mouth; mandible heavy, short, and strongly convex, less than diameter of orbit; teeth small, but firm and strong, conical, in a single series in each jaw, or forming an irregular double series anteriorly; no villiform teeth behind this outer series; eye large, 3 in head, slightly shorter than interorbital width, and greater than length of snout.

Intestinal canal rather less than length of body.

Origin of dorsal fin midway between tip of snout and base of caudal, or very slightly nearer the latter; the length of its base contained $1\frac{2}{3}$ in head; the upper margin of the fin rounded, the longest ray (in ♂) equalling the length of its base.

Origin of anal fin under middle of dorsal; distance from its origin to base of caudal from four-sevenths (♀) to five-sevenths (♂) of distance to top of snout; oviduct not attached to first anal ray, but produced backwards, forming a low sheath on both sides at base of first 6 rays; length of anal base, two-fifths head; longest ray (♂), one-half head; caudal $1\frac{2}{3}$ in head. Pectorals long, reaching beyond base of ventrals; $1\frac{3}{4}$ in head. Ventrals to slightly beyond vent; $1\frac{4}{5}$ in head.

Head $3\frac{1}{2}$ in length; depth $3\frac{1}{2}$. D. 11 or 12; A. 9 or 10; Scales 26–8.

Color ♂ light olive, pale on belly, sides with some silvery lustre and with indistinct trace of an obsolete dusky lateral stripe; scales conspicuously dark-edged; opercles and cheeks bright silvery; dorsal and caudal light yellow, and, as well as the anal, narrowly margined with black; dorsal with an elongate, vertical, black blotch at anterior margin, a yellow spot behind it; a vertical dusky streak behind each dorsal ray, composed of fine black points. Anal orange or translucent, white at base; ventrals similar to anal. Pectorals pale yellowish. A dark vertical streak through iris.

♀ similar, fins all plain.

Exceedingly abundant in the lagoons at Pensacola.

26. **Gambusia patruelis** Girard. N. O. G. 30922.

Heterandria affinis Baird & Girard, Proc. Acad. Nat. Sci. Phil. 1853, 390.
Gambusia gracilis Girard, Proc. Acad. Nat. Sci. Phila. 1859, 121.
Gambusia humilis Günther, vi, 335.

The specimens described are all females.

Body rather slender, compressed, the belly much distended with ova, projecting much beyond normal outline of body, and abruptly constricted at the vent; greatest height of caudal peduncle one-third greater than its least height, and three-fourths length of head; head small, very broad, and much depressed; teeth strong, in a broad villiform band in each jaw, the outer series much enlarged, the teeth not movable, straight; eye small, $1\frac{3}{4}$ in interorbital width, slightly greater than length of snout, and $3\frac{1}{3}$ to $3\frac{1}{2}$ in length of head; interorbital width $1\frac{2}{3}$ in head.

Intestinal canal short, about equal to length of body.

Dorsal small, inserted far back, its base scarcely greater than diameter of orbit; distance from its origin to base of caudal equaling one-half the distance to tip of snout; the origin of fin over middle of anal; highest ray $1\frac{3}{5}$ in head. Anal larger than dorsal, with longer base and higher rays; the longest anal ray slightly less than length of head; origin of anal about midway between rudimentary caudal rays, and gill opening. Caudal acutely rounded, slightly less than length of head

Ventrals short, not nearly reaching front of anal, 2 in head. Pectorals nearly as long as head, reaching to beyond base of ventrals.

Head 4 in length; depth 3 to 4; D. 7; A. 8 or 9. Scales 29 or 31–10.

Color, light olive with some bluish reflections; each scale edged with dark; a very narrow dark line along median row of scales on sides; top of head and upper part of opercle, dusky; an oblique, narrow and rather obscure, dark blue-black band below eye; a black spot on each side of belly, a dark median line on caudal peduncle below. Fins dusky.

Exceedingly abundant in the marshes about Lake Pontchartrain. A few specimens were also obtained at Galveston. This species is most closely allied to *Gambusia holbrooki* (Agassiz); a comparison with specimens of the latter from Indian River, Florida, show certain constant differences. Thus, in *holbrooki* the eye is larger, more than one-third length of head, and is contained $1\frac{1}{2}$ in interorbital width; and the head is larger, $3\frac{3}{8}$ in body. These slight differences may disappear on the examination of an extended series, but with our present material no variation is apparent. In the synonomy of *holbrooki* must be placed *Haplochilus melanops* Cope, Proc. Amer. Philos. Soc. 1870, 457 (*nec Zygonectes melanops* Jordan, Bull. Ill. Lab. Nat. Hist. No. 2, 52); and *Zygonectes atrilatus* Jordan & Brayton, Bull. U. S. Nat. Mus. xii, 1878, 84.

27. Mollienesia latipinna Le Sueur. P. (30823, 30870.)

Pœcilia multilineata Le Sueur, Journ. Acad. Nat. Sci. Philad. 1823, ii, 4.
? *Limia matamorensis* Grd. Proc. Acad. Nat. Sci. Phila. 1859, 116.

Body oblong, much compressed in males, of nearly equal height from dorsal backwards, the greatest height of body but one-third greater than that of caudal peduncle; females, with gibbous belly and narrower caudal peduncle; head very small, depressed, not narrowed forwards; mouth very small, vertical, and without lateral cleft; length of mandible about two-thirds diameter of orbit; teeth all very small, movable, in a rather narrow band; the outer series much larger than the others, but still very small, composed of slender pointed teeth, strongly curved inwards; eye moderate, $1\frac{1}{2}$ to $1\frac{2}{3}$ in interorbital width, equal to or slightly greater than snout, and $3\frac{1}{3}$ to $3\frac{1}{2}$ in head.

Dorsal very long, in adult males enormously elevated, exceeding height of body; the fin is almost square, the base slightly longer than the height, the upper margin nearly straight; longest ray $2\frac{1}{2}$ in length of body, the last ray reaching beyond base of caudal; base of fin $2\frac{1}{4}$ in body; origin of dorsal distant from base of caudal, $2\frac{1}{5}$ times its distance from the tip of snout. In females, the dorsal is low, the longest ray equaling two-thirds length of head, the last ray reaching but half way to base of caudal; the base of the fin $3\frac{2}{3}$ times in length of body, its origin distant from base of caudal $1\frac{1}{4}$ times the distance from tip of snout.

Anal very small; in the male, modified into an intromittent organ, and inserted in advance of middle of dorsal, its origin about half way between snout and base of caudal, the fourth ray longest and thickest, $1\frac{1}{4}$ in head; in females the origin is under twelfth ray of dorsal, and about midway between tip of caudal and tip of snout. Caudal rounded, about equaling length of head in females, one-fourth greater than head in males. Ventrals inserted behind vertical from origin of dorsal, reaching beyond vent in females; in males the first and second rays are thickened, the second filamentous, $1\frac{1}{3}$ in head. Pectoral long, longer in males, where it reaches beyond middle of ventrals, and is very slightly less than length of head.

Scales in very regular rows, 26 in a longitudinal series, 9 or 10 in an oblique series forward from vent to middle of back; humeral scale not enlarged. Intestinal canal about $2\frac{1}{2}$ times total length of fish (with caudal).

♂. Head 4 in length; depth $2\frac{3}{4}$ to 3. ♀. Head $3\frac{1}{2}$ to $3\frac{3}{4}$ in length; depth $2\frac{1}{2}$ to $2\frac{2}{5}$.

D. 15 or 16; A. 8; scales, 26—9 or 10.

Color: ♂. Light olive-green, marbled with darker and spotted with pale green; each scale on back and sides with an oblong, blackish spot, these forming continuous lengthwise stripes; head dusky above, opercle and cheek minutely speckled; an orange stripe above opercle; lower parts of head mostly orange; some orange tinge on breast. Dorsal translucent, its basal half with about five series of linear blackish horizontal spots, forming interrupted lines; above middle of fin, on membrane between each pair of rays, is a large, roundish dark spot. Between these spots and above them are many small, round bronze spots. Membrane between second and third rays red at base; all of these markings irregular on first and last rays; caudal narrowly margined all around with black, its base lavender; its lower parts mostly whitish; the middle orange; the upper parts pale, with round orange spots; other fins pale orange. Females have dorsal and caudal olivaceous, with indistinct, narrow cross-bands, formed by series of small dark spots on the rays.

Very abundant at Pensacola, where numerous specimens were procured from the Laguna Grande. It is also very common about the wharves, the gorgeous dorsal fin of the male being conspicuous in the shallow water.

28. Mollienesia lineolata (Grd.) J. & G. G.; N. O. (30891.)

? *Mollienesia pœcilioides* (Girard).

Four female specimens and one male, from Galveston, Tex. (the largest 2′ long), and two females from Lake Pontchartrain, are referred by us to this species. They show the following differences from *M. latipinna*:

Eye small, the iris jet black; diameter of orbit $3\frac{1}{3}$ to $3\frac{1}{2}$ times in head, and $1\frac{3}{4}$ to 2 times in interorbital width (the eye $2\frac{7}{8}$ in head, and $1\frac{3}{5}$ in interorbital width, in *latipinna* of same size); dorsal fin smaller, its base $3\frac{7}{8}$ in body in females, 3 in males, the rays constantly 13 or 14 in number (usually 13); origin of dorsal equidistant from tip of snout and ru

dimentary caudal rays in females; in males, distant from snout by length of base of fin; ventrals inserted in advance of vertical, from origin of dorsal, or, in male, opposite origin of dorsal; color the same as in *latipinna*, except that all the specimens show the 5 faint, dark, vertical half bars on the sides.

This species can hardly be regarded as more than a representative form of *M. latipinna*, and, on the examination of a sufficient number of specimens of the various localities, may be found to vary into the typical form. The differences pointed out above are, however, constant in the specimens in our possession, and seem to warrant the retention of the name for the present.

The male fish described by Girard as *Limia poeciloides*, is probably referable to this species. *Limia matamorensis*, on the contrary, seems to be a typical *latipinna*.

MURÆNIDÆ.

29. Muræna ocellata (Ag.) Jen. P.

One small specimen in good condition, together with the remains of several larger ones, were taken from the stomachs of Red Snappers at Pensacola. Color light olive green, darker above, becoming light yellowish on the belly, the dark color forming reticulations around whitish spots of various sizes; most of them round, some oblong and some confluent, the largest not quite as large as eye; spots becoming smaller toward head and largest toward the tip of the tail. Dorsal with dark marginal blotches; anal black edged; a small jet-black spot at angle of mouth; no black around gill-opening.

Teeth uniserial, the larger ones distinctly serrated on the posterior margin, rather strong and turned backward, those in front little larger than the others. Vomer, in all specimens examined, without trace of teeth; gape in head; dorsal beginning a little in advance of gill-opening. Head $2\frac{1}{3}$ in trunk; head and trunk a little shorter than tail; eye 3 in gape, half broader than gill-slit, equal to interorbital space.

ANGUILLIDÆ.

30. Ophichthys mordax (Poey) J. & G. P.

One specimen, nearly digested, from the stomach of a Red Snapper, at Pensacola. The dentition agrees better with Poey's account of his "*Macrodonophis mordax*," than with Günther's description of *Crotalopsis punctifer* Kaup. Dr. Günther considers the two identical.

31. Ophichthys macrurus Poey. P. (30895.)

A single specimen, in good condition 11 inches long, was presented to the National Museum by Dr. August Galny, of Galveston.

Color light olive, the back closely punctulate but pale, the belly whitish; fins all pale; dorsal and pectoral without darker margin.

Head $2\frac{2}{3}$ in distance from snout to vent; the distance from snout to vent $2\frac{1}{3}$ to $2\frac{2}{7}$ in total length; gape $2\frac{2}{3}$ in head, a little less than length of pectoral, which is about equal to greatest depth of body; teeth all distinctly biserial. Dorsal beginning a little in front of tip of pectoral. Fins all edged with black.

Body not very slender. Head narrow and pointed, the upper jaw projecting beyond lower. Eye large, more than half length of snout, its position over the middle of the gape, its diameter more than the interorbital width; gape $2\frac{2}{3}$ in length of head; teeth biserial on jaws and vomer, subequal, short, slender, and sharp, all of them more or less directed backward; no large canines; some of the vomerine teeth larger than the others; nasal tubes short and inconspicuous; gill-openings small, their height about $\frac{2}{3}$ eye.

Tail almost exactly twice length rest of body. Head slightly more than half trunk, nearly 9 in total length. Distance from snout to front of dorsal $2\frac{1}{3}$ in distance from snout to vent. Dorsal beginning opposite anterior fourth of pectoral, rather low. Pectorals long and narrow, about $2\frac{2}{3}$ in head. Free tip of tail sharp. This species is allied to *Ophichthys parilis* (Rich.), but seems to be well distinguished by the short tubes of the nostrils.

32. Ophichthys chrysops Poey. P.

? *Ophisurus gomesii* Castelnau, Anim. Amér. Sud., Poiss. p. 84.

Two specimens, one male and one female, the male about 20 inches long, in poor condition, were taken from the stomach of a Red Snapper at Pensacola. The male with the testes well developed; the female with two large ovaries extending for the entire length of abdominal cavity.

33. Myrophis lumbricus sp. nov. (G.) 30896.

A single specimen, 9 inches in length, obtained at Galveston.

Color light olivaceous, scarcely translucent in life, with a slight bluish luster towards the head. Everywhere, except on belly, finely and densely punctulate with black, besides which are small faint spots of greenish yellow. Eyes bright green. Underside of belly and head with steel-blue luster.

Body subterete, worm-like, tapering backward almost to a point, even the tail scarcely compressed. Diameter of head much less than of body. Head extremely small, slender, and pointed, the narrow upper jaw projecting well beyond lower. Eye small, considerably nearer angle of mouth than tip of snout, its length about half snout. Gape short, about 4 in head. Teeth all strong, slender, sharp, directed backward, apparently in single series, some of the anterior in the upper jaw canine-like, a single series of teeth on the vomer rather stronger than the teeth in the jaws.

Gill openings small, oblique, rather close together, subinferior, just below the minute rounded pectorals, which are narrower than the gill openings and not much larger than the eye. Opercular region long, with very conspicuous concentric striæ.

Head $10\frac{3}{4}$ in total length; greatest depth of body 33. Length of head and trunk $2\frac{3}{4}$ in total. Dorsal very low, beginning at a point nearer gill opening than vent, at a distance behind gill opening about equal to length of head. Lateral line distinct.

This species is evidently distinct from the *Myrophis* found at Panama, which Dr. Günther calls *Myrophis punctatus*. This species has larger head, larger mouth, longer pectorals, and the body more compressed, etc. *Myrophis microstigmius* Poey, from Cuba, is said to have the dorsal inserted farther back. Kaup's description of *M. longicollis* (= *M. punctatus*), from Surinam, also indicates a species with a longer head; but too little is known of that species to afford a comparison with *M. lumbricus*, *M. microstigmius*, or the Panama species, if that be really different from *M. punctatus* Lütken.

Three other eels, two of them *Ophichthys*, and the other perhaps an *Ophiosoma*, and all new to our coast, were obtained from stomachs of Red Snappers at Pensacola, but in such bad condition that they cannot be identified.

34. **Anguilla rostrata** (Le S.) DeKay.—"*Fresh-water eel.*" N. O.

Seen only in the New Orleans markets.

35. **Conger caudicula** Bean, MSS. P.

A species of *Conger* with the skin entirely digested was taken from the stomach of a Red Snapper. We were unable to distinguish its remains from the common species.

SCOMBERESOCIDÆ.

36. **Tylosurus longirostris** (Mitch.) J. & G.—*Needle-fish.* G.; P. (31010, G.)

(*Belone scrutator* Girard, U. S. Mex. Bound. Surv. 1859, 30, pl. xiii.)

Generally common; rarely brought into the markets, although considered good eating. It is not tangibly different from the northern form.

37. **Hemirhamphus unifasciatus** Ranzani. G. (31027.)

(*Hemirhamphus roberti* and *H. richardi* C. & V. xix, 24, 26.)

Generally common.

38. **Exocœtus hillianus** Gosse. P. (30866.)

One fine specimen, $5\frac{1}{2}$ inches long, from the "Snapper Banks" at Pensacola.

Color, back and sides to middle of base of pectoral dark green, thence abruptly bright silvery, this shade covering the lower two-thirds of the sides, belly, and sides of head. A rather faint purplish band from upper edge of pectoral base backward, parallel with back; occiput, snout, sides of head and silvery area on sides more or less flushed with pinkish purple. Dorsal fin translucent, with a large black blotch covering upper part of first 6 rays; the fin with narrow white edging posteriorly; caudal bright brick-red, speckled with dark points and edged posteriorly with translucent. Pectorals dusky translucent, with reddish tinge on basal two-thirds of upper rays. Ventrals translucent, with some reddish on base of central rays and with a distinct small dusky spot at base of outer ray, externally visible through the covering scale. Anal translucent, somewhat white anteriorly.

Head $4\frac{1}{3}$; depth 5. D. 12; A. 14; scales 38–5.

Body moderately compressed. Head rather short, the short snout $4\frac{3}{4}$ times in its length; the large eye 3 times, interorbital space flat, 3 in head. Gill rakers rather long.

Pectoral fin reaching about to middle of anal, its length $1\frac{3}{4}$ in body, its second ray scarcely shorter than third, not forked. Ventral fin inserted slightly nearer root of caudal than tip of snout, its tip extending very slightly past front of anal, its length $1\frac{1}{7}$ in head. Dorsal much higher than long, its longest rays slightly longer than head, reaching caudal. Lower lobe of caudal slightly longer than head.

This rare and beautiful species has not been hitherto recorded from our coast.

The species of the restricted genus *Exocœtus* (exclusive of *Halocypselus* and *Cypselurus*) represented in the National Museum from our Atlantic coast, may be recognized in the following analysis:

a. Ventrals moderate, shorter than head, reaching little past front of anal; second ray of pectoral simple. (*Parexocœtus* Bleeker.)

b. Dorsal higher than long, with a black blotch in front; ventrals plain; anal about as long as dorsal; D. 12, A. 14 ..... HILLIANUS.

aa. Ventrals long, longer than head, reaching usually past anal fin; second ray of pectoral forked. (*Exocœtus.*)

c. Ventrals pale; snout not very blunt.

d. Anal rather long, its base about three-fourths that of dorsal; its insertion nearly opposite front of dorsal; lower caudal lobe shorter than head; D. 11, A. 12 ..... EXILIENS.*

dd. Anal short, its base less than half that of dorsal; its insertion behind that of dorsal; lower caudal lobe nearly one-third longer than head; D. 14, A. 9..... NOVEBORACENSIS.†

cc. Ventrals black, with white edgings; snout very blunt; anal rather long, its base more than $\frac{2}{3}$ dorsal; its insertion slightly behind front of dorsal; lower caudal lobe half longer than head; D. 12, A. 12. RONDELETII.‡

SYNGNATHIDÆ.

39. **Siphostoma floridæ** sp. nov. P. (30826.)

Body comparatively slender, the belly scarcely keeled, even in the females. Head slender, the snout long, from one-third to one-half longer

* *Exocœtus exiliens* Gmelin, Syst. Nat. i, 1400, 1788; Günther vi, 291; Goode, Bull. U. S. Nat. Mus. v, 64.

† *Exocœtus noveboracensis* Mitchill, Amer. Monthl. Mag. ii, 233, 1817: *Exocœtus melanurus* C. & V. xix, 101.

‡ *Exocœtus rondeletii* Cuv. & Val. xix, 115. A specimen we examined (21870) from open sea, lat. 46°; long. 61°.

than the rest of the head, its upper edge with a low sharp keel; top of head without keel; supraocular ridge a little elevated, the region between eyes concave; opercle striate, without median keel. Lateral line not continuous with upper edge of tail. Dorsal fin on one body-ring and 6 or 7 caudal rings, the distance from its insertion to the tip of the snout $1\frac{1}{5}$ to $1\frac{2}{5}$ in total length. Head $5\frac{1}{2}$ to $6\frac{1}{2}$ in length. Dorsal rays 27. Rings 17 or 18 + 31 or 32. Caudal pouch in the male, covering about 18 rings. Tail longer than trunk, $1\frac{2}{5}$ in total.

Color in life, dark green; tail with faint darker bars broader than the interspaces; sides of body with horizontal pale streaks or vermiculations; sides of tail with some round pale spots, snout dusky, marbled or barred on side with paler; lower part of opercle nearly plain. Dorsal translucent, yellowish at base; caudal yellow, dusky at tip.

Many specimens, the longest about seven inches in length, were taken with the seine in sea-wrack and algæ in Pensacola Bay, especially in the Laguna Grande. In our paper on the Fishes of Beaufort Harbor (Proc. U. S. Nat. Mus. 1878, 368) we have recorded a "*Siphonostoma fuscum*" from that locality. The specimens referred to under that name belong to *Siphostoma louisianæ* chiefly; among them are examples of the present species.

40. Siphostoma affine (Gthr.) J. & G. P. (30827.)

(*Siphostoma* sp. Jordan, Proc. Ac. Nat. Sci. Phila. 1880, 22; Saint John's River.)

Abundant in Pensacola Bay in the same localities as the preceding, from which it is readily distinguished by the much shorter snout and the peculiar coloration.

Color in life: Females deep olive-green, varying to brown, blackish, or slightly reddish, according to the character of the surroundings; females with a black keel on the belly, which is obsolete in the male. Dark color of the back forming about 15 dark cross-bars, very faint and much wider than the interspaces. Plates of anterior parts of body, each with two narrow vertical stripes of shining silvery, very conspicuous in life. Sides of head mottled, especially on lower half of opercle. Snout dark above, abruptly paler below. Dorsal dark, like the body, with narrow dark oblique paler streaks formed of small pale spots. Caudal and anal dusky. Males olivaceous, mottled with darker, the vertical silvery streaks absent. Dorsal rays 28 to 31. Rings 16 + 32.

Specimens of this species from Saint John's River, Florida, are in our collection.

41. Siphostoma zatropis sp. nov. P. (30865.)

A single specimen, $5\frac{2}{3}$ inches long, obtained from the mouth of a Red Snapper.

Color brown, marbled with darker and with reddish. Back and sides with ten broad dark bands, the anterior portion of each band paler than the posterior; all the bands broader than the whitish interspaces.

Snout whitish, with two narrow dark bands; opercle and lower part of head with white vertical streaks. Behind the vent the dark bands encircle the body; before the vent the belly is immaculate. Caudal tipped with black. Dorsal rays 20; rings 18+30. Dorsal much shorter than head, on 1+4 rings. Head 9 in length; snout short, $2\frac{2}{3}$ in head; tail longer than rest of body, $1\frac{3}{4}$ in total length.

Occiput crested; opercle with a conspicuous keel. This species is very different from any other thus far found in our waters, and is an interesting addition to our fauna.

Our specimen is doubtless identical with *Syngnathus albirostris* Günther (viii, 170) from "Mexico." The original *Corythroichthys albirostris* of Kaup from Bahia and Mexico is uncertain, and must apparently have been some other fish. It is said to have D. 27; rings 12+29. *Syngnathus elucens* Poey is closely related, but apparently different.

42. Hippocampus zosteræ sp. nov. P. (30852.)

Two specimens, each less than two inches long; a male with distended egg-sac, and a female were taken with seine in the Laguna Grande. They were found in the sea-wrack (*Zostera*) in water about 3 feet deep.

Snout very short, about $2\frac{2}{3}$ in head; supraorbital spines moderate, diverging, each with a smaller spine in front of it. Coronet stoutish, high, fully two-thirds as long as snout, ending in five small, bluntish spines, besides which are a few filaments, which are about as long as snout; some filaments on the back of the neck; temporal spines sharp, pointing nearly straight out. Spine on side of throat rather short. Spines on body small, subequal, sharp, straight. A spine at base of pectoral, and one below it. Length of head about equal to greatest depth of body. Dorsal fin covering most of two body rings and one caudal ring; the fin rather high and very short, the number of rays but 12. Rings 11+26 to 30.

Color olive-green, the sides of the head mottled and with some paler spots, especially about the eye; dorsal mottled with dusky, in the male with a broad conspicuous red margin, in life.

The smaller number of dorsal rays seems to fully distinguish this species from all others found in the Atlantic.

43. Hippocampus stylifer sp. nov. P. (30876.)

One specimen (♀) about three inches long, "spewed up" by a Red Snapper at Pensacola.

Snout not very short, but little shorter than rest of head, equal to distance from middle of eye to gill-opening; a small tubercle on the median line at base of snout above; supraocular and temporal spines long, simple; a long spine on the median line in front of coronet, its length scarcely less than diameter of eye; coronet stoutish, high, its five spines broadly spreading, slender; the three posterior spines shortest and less divergent; extent of coronet greater than its height; spines of head with dermal tentacles.

Each alternate plate on the neck, armed on each of the dorsal ridges, with a long slender spine, which is as long as the eye, and scarcely tapering toward the tip; each provided with a filament about as long as the spine; upper lateral ridges of each plate similarly armed, the spines shorter; lower lateral and ventral ridge on two plates, likewise armed. Each fourth plate on the tail similarly armed with a long, slender spine on its upper and lower ridges. A strong spine in front of pectoral, and one below it. About fifty well-developed spinous processes on the body, besides numerous smaller spinous points. Base of dorsal elevated, the fin covering about 4 body rings, its number of rays 16. Rings about 12 + 31.

Color brownish, crossed at intervals by darker bars, which have a grayish center. These bars cross the plates which have the largest spines. Snout blackish, with two or three oblique whitish streaks, one of them forming a ring.

Two other specimens of this species, taken in gulf-weed off the east coast of Florida, by Prof. J. H. Comstock, are in the museum of Cornell University.

Another specimen of *Hippocampus*, in bad condition, was taken from the stomach of a Red Snapper.

Snout rather longer than postorbital part of head; coronet and supraorbital spines high; spines on body and tail large and sharp. Dorsal rays apparently 16. Whether this specimen belongs to *H. stylifer* or not, we are unable to say.

MUGILIDÆ.

44. Mugil albula L.—*Mullet, Molly, Meuille.* G. (30912, 30915, 30923, 31039, 31050.)

Mugil berlandieri Girard, U. S. Mex. Bound. Surv. Ichth. 20.
Mugil mexicanus Steindachner, Ichthyol. Beiträge, iii, 58, 1875.

Excessively abundant, particularly about Galveston, where they are found even in the gutters along the streets. Held in low esteem as a food-fish, and largely used for bait.

We do not believe that the mullet of Southern California and the west coast of Mexico, *Mugil mexicanus* Steind. can be distinguished as a species from the Atlantic fish. Both *Mugil albula* and *M. brasiliensis* appear to be equally abundant on both coasts, and their range on both sides is similar, *M. albula* reaching to Cape Cod, and Monterey *M. brasiliensis* to Virginia and Lower California.

ATHERINIDÆ.

45. Menidia peninsulæ (Goode & Bean) J. & G. P. (30918.)

Very abundant about Pensacola, in schools along the sandy beaches.

Light green; edges of scales with dark dots; lips and top of head dusky; a dusky streak along base of anal; eye silvery; lateral streak narrow, tapering behind; bases of pectoral and caudal bright yellow; fins otherwise nearly plain; D. IV–I, 8; A. I, 16. Scales 40–9. Scales thin and smooth, their edges entire, as in *M. notata*, from which closely allied species it differs mainly in the shorter anal. Vertical fins scaleless. Length 4 inches.

46. Menidia vagrans (Goode & Bean) J. & G. G. (30893.)

Very abundant about Galveston, in schools along the sandy beaches; originally described from Pensacola, but not obtained there by us.

Color in life, light greenish above, the lateral band broad, covering two half-rows of scales, becoming narrow posteriorly; sides and belly silvery. Tip of snout and of lower jaw yellow, soiled with blackish. Each scale of back with one to three dark points, these forming about 5 conspicuous streaks as seen from above; caudal yellow, with dark punctulations, its margin dusky; dorsal and pectorals somewhat dusky, lower fins white, the anal with dark points at base.

Head $4\frac{2}{5}$ in length ($5\frac{1}{5}$ with caudal); depth $5\frac{1}{4}$ ($6\frac{1}{4}$). D. IV–I, 8; A. I, 15 to I, 17. Scales 43–6.

First dorsal very small, its insertion over front of anal, midway between base of caudal and posterior angle of opercle; distance from its front to front of second dorsal $\frac{2}{3}$ head. Pectorals slightly shorter than head. Vertical fins with large scales.

Scales firm, adherent, their edges crenate or laciniate, feeling very rough to the touch. Scales of head large. Length 4 inches.

This species appears to represent in the Gulf the allied *Menidia bosci* (*Atherinia menidia* L.) of the South Atlantic coasts. *M. vagrans* differs from the latter chiefly in the shorter anal (A. I, 20 to I, 22 in *M. bosci*.).

ECHENEIDIDÆ.

47. Echeneis naucrates L. P.

One specimen 25 inches long and another 8 inches long were taken at Pensacola. The larger example shows the following characters: Color nearly uniform dusky, the black lateral band little marked, the tips of dorsal and caudal lobes little paler than the rest of the fin. D. XXII–34; A. 35. Caudal lunate, the lobes pointed.

The small specimen has but 20 laminæ; the lobes of the dorsal and anal are yellowish white, as are the upper and lower rays of the caudal; the median (black) rays of the caudal being abruptly produced.

TRICHIURIDÆ.

48. Trichiurus lepturus L.—*Sabre-fish; Silver Eel.* G. (30983.)

Rather common about Galveston.

SCOMBRIDÆ.

49. Scomber ?grex Mitchill. P. (30825.)

The anterior half of the body of a small mackerel was obtained at Pensacola, the posterior part having been cut off for bait. This speci-

men differs from others of this species examined by us in having the body very slender, the depth $1\frac{3}{5}$ in length of head. The coloration is peculiar, the back and sides being reticulated with black in fine pattern, on an olivaceous ground, there being about 12 cross streaks of black between the occiput and the dorsal fin. In *S. grex* these streaks are not usually half so numerous. The lower part of the sides is plain silvery. The air-bladder is developed, and the ovaries in this specimen, which was about a foot long, are full of eggs.

Scomber grex Mitchill (Trans. Lit. & Phil. Soc. N. Y. 1815, 422) of the Atlantic and *Scomber diego* Ayres (Proc. Cal. Ac. Sci. 92, 1855) of the coast of Southern California are apparently identical. The Mediterranean species, *Scomber colias* Gmel. (= *S. pneumatophorus* Delaroche), seems to differ in some particulars, slight, but constant in the specimens examined. These are shown in the following analysis:

a. Air-bladder present.

b. Dark bands on back broad, as broad as interspaces, usually confluent below with a wavy dark, lateral streak on the level of upper edge of pectoral; sides and belly below the streak immaculate; head $3\frac{1}{4}$ to $3\frac{3}{4}$ in length; longest dorsal spine not more than half head.....GREX.

bb. Dark dorsal bands narrow, more wavy, not so broad as interspaces; lateral streak obsolete or represented by a line of dots; lower part of sides with numerous irregular, wavy vertical streaks and reticulations of a dull gray color, which are usually broader than the interspaces; head 4 in length; longest dorsal spine a little more than half head.....COLIAS.

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

Abundant in spring and summer; one of the most important food-fishes.

51. Scomberomorus caballa (C. & V.) J. & G.—*King-fish.* P.

A specimen 4 feet in length was taken at Pensacola. Color in life steel-blue, paler below, slightly clouded, but without spots; upper fins dusky; lower fins whitish. Head 5 in length; depth 6. Maxillary $1\frac{4}{5}$ in head, reaching posterior margin of eye. Eye 6 in head; snout pointed, $2\frac{2}{3}$ in head. Teeth broad, triangular, smallest in front, those in lower jaw largest, their breadth at base $\frac{3}{4}$ their height. Gill-rakers very short, scarcely higher than broad. Pectorals $1\frac{3}{4}$ in head; ventrals $3\frac{1}{4}$. Dorsal lobe 3; anal lobe $2\frac{3}{4}$. Interspace between dorsals a little longer than eye. D. (spines injured) I, 14–9; A. III, 12–10.

CARANGIDÆ.

52. Decapterus punctatus (Agass.) Gill.—*Cigar-fish.* P.

Rather common at Pensacola, where several specimens were obtained.

53. Caranx trachurus (L.) Lac. P. (30833.)

Two specimens, one of them in fair condition, the other partly digested, taken from the stomach of a Red Snapper at Pensacola.

We identify the Gulf species with the *Caranx trachurus* proper, our

specimen agreeing well with the detailed accounts of Cuvier & Valenciennes (ix, 11) and of Day (Fishes of Gt. Brit. 1881, 124, pl. xliv). There are at least three well-defined species or varieties of the type called *Trachurus* represented in our collections. These appear to correspond to the three species described, but not named, by Cuvier & Valenciennes (ix, p. 17), and all three are, if descriptions are to be trusted, found in the Mediterranean, and pretty widely distributed over the globe.

The following characters are shown by our specimens:

a. Body comparatively deep and compressed, the depth 4 to $4\frac{1}{6}$ in length; scutes 34 to 36 + 36 to 38 in number, the anterior scutes scarcely lower than the posterior, their height about $\frac{2}{3}$ diameter of eye; length of curve of lateral line $1\frac{3}{4}$ to $1\frac{5}{8}$ in the straight part; maxillary reaching past front of pupil $2\frac{1}{4}$ to $2\frac{1}{3}$ in head; lining of opercle blackish .....TRACHURUS.*

aa. Body moderately compressed, the depth $4\frac{1}{8}$ to $4\frac{3}{8}$ in length; scutes 38 to 40 + 38 to 42 in number, the anterior little lower than the posterior, their height about three-fifths diameter of eye; curve of lateral line $1\frac{1}{4}$ to $1\frac{1}{3}$ in straight part; maxillary reaching to front of pupil, $2\frac{2}{3}$ in head; lining of opercle scarcely blackish.....DECLIVIS.†

aaa. Body elongate, little compressed, the depth 5 in length; scutes 50 + 46 to 48 in number, the anterior one-third lower than the posterior, their height $2\frac{1}{3}$ in diameter of eye; curve of lateral line scarcely shorter than straight part; maxillary reaching to just beyond front of eye, $2\frac{2}{3}$ in head; lining of opercle scarcely blackish.....PICTURATUS.‡

54. Caranx hippus (L.) J. & G.—*Jack-fish; Crevallé.* N. O.

(*Carangus hippos* and *Carangus chrysos* Gill, Proc. Ac. Nat. Sci. Phila. 1862, 434. *Caranx carangus* Günther, ii, 448. *Carangus esculentus* Gerard, U. S. Mex. Bound. Surv. Ichth. 23. *Caranx defensor* Holbr. Ichth. S. C. 1860, 87.)

Specimens of enormous size, weighing more than 25 pounds, were seen in the markets of New Orleans, having been taken in Lake Borgne.

---

* ? *Scomber trachurus* L. Syst. Nat. 298. *Scomber trachurus* Gmelin, Syst. Nat. 1335. *Caranx trachurus* Cuv. & Val. ix, 11. *Caranx trachurus* Risso, Ichth. Nice, 1810, 173. *Trachurus trachurus* Day, Fishes G't Brit. 124. ? *Caranxomorus plumierianus* Lacép. Hist. Nat. Poiss. iii, 84, pl. 11. *Trachurus saurus* Rafinesque, Indice d'Ittiol. Sicil. 1810, 20. Specimens examined from Pensacola and from Newport, Rhode Island.

† *Caranx trachurus* "première subdivision" C. and V. ix, 17 (specimens from various points in the Mediterranean). *Caranx declivis* Jenyns, Voyage Beagle, Fish. 1842, 68 (New Holland). *Trachurus trachurus* in part, of various writers, and apparently the most abundant type in the Mediterranean. We are unable to disentangle its synonymy entirely from that of the preceding into which it may perhaps be found to intergrade. We have collected numerous specimens of this type at Genoa and at Venice. A specimen collected by Mr. Xantus at Cape San Lucas is in the National Museum.

‡ *Seriola picturata* Bowdich, Excurs. Madeira, 1825, 123 (Madeira), *Trachurus curieri* Lowe, Trans. Zool. Soc. Lond. ii, 183, 1837 (Madeira). *Caranx symmetricus* Ayres, Proc. Cal. Ac. Nat. Sci. i, 1855, 63 (California) *Caranx amia* Risso, Ichth. Nice, 1810, 174 (not *Scomber amia* L.). *Caranx trachurus* "deuxième subdivision," C. & V. iii, 17 (specimens from various localities in the Mediterranean and from Valparaiso). *Trachurus fallax* Capello, Cat. Peix. Portugal, 1867, 318. *Trachurus risnoi* Giglioli, Catalogo degli Anfibi e Pesci Italiani, 1880, 27. Specimens examined by us from Monterey, Santa Barbara, and San Pedro, California, and Cape San Lucas.

These large examples were light brown above, silvery below, the pectoral creamy with a diffuse black blotch below; anal lobe and under side of tail deep yellow. Opercular spot jet black, sharply defined.

Head $3\frac{1}{5}$; depth $3\frac{1}{5}$; D. VI–I, 20; A. II–I, 16.

A portion of the true synonymy of this species has been detached to form a mythical "*Carangus chrysos*," by recent American authors. There is no doubt in our mind that the species called *carangus* Auct., *esculentus* Grd., and *defensor* Holbr. are identical with each other and with the original *Scomber hippos* of Linnæus. The original *Scomber chrysos* of Mitchill was probably the young of the same species.

Dr. Günther has identified the *Scomber hippos* of Linnæus with *Caranx fallax* C. & V. This must be erroneous, as *Caranx fallax* is rare at Charleston, whence Linnæus received his specimens, while the present species is very common. The two chief distinctive characters given by Linnæus "operculis postice macula nigra," and "dentium unica series, anterioribus duobus majoribus" apply, as Dr. Gill has shown, to the present species and not to the *fallax*.

55. **Trachynotus carolinus** (L.) Gill.—*Pompano.* P.

Generally abundant in summer; the most valuable food-fish of the Gulf coast. It reaches the weight of 10 or 12 pounds.

56. **Trachynotus glaucus** C. & V.—*Gaff-top-sail Pompano.* P.

Not rare; reaches a weight of two pounds; a food-fish of mediocre quality.

57. **Oligoplites occidentalis** (L.) Gill.—*Yellow-tail.* P.

Rather common in summer; not valued as food.

58. **Seriola stearnsi** Goode & Bean.—*Amber-fish.* P.

Not uncommon on the "Snapper Banks" about Pensacola; reaching a weight of about 10 pounds. One specimen was obtained and others were seen.

This species much resembles the "yellow-tail" of the Californian coast, *Seriola dorsalis* (Gill), which we have identified, with considerable doubt, with *Seriola lalandi* C. & V., a species originally described from Brazil.

S. stearnsi is, however, readily distinguished from the "yellow-tail" by its larger mouth, the maxillary reaching to the middle of the eye, about $2\frac{1}{4}$ in head (in *S. dorsalis* barely to front of pupil, $2\frac{2}{3}$ in head). *Seriola stearnsi* may be known from all the other Atlantic species, except *S. zonata*, by the greater number of rays in the soft dorsal. *S. zonata* has the occipital region carinated, while in *S. stearnsi*, as in *S. dorsalis*, this region is broadly rounded. *Seriola dubia* Poey seems to resemble *S. stearnsi*, and may be identical with it. In any event the name "*dubia*" could not be retained, as there is an earlier *Seriola dubia* Lowe. The description of *Seriola gigas* Poey does not indicate any character by which it may be separated from the true *Seriola lalandi*. The latter species has 2d D. I, 32 or 33; the Californian *dorsalis* I, 35.

The life coloration of *Seriola stearnsi* is light bluish above, whitish below; a very distinct stripe of brassy-yellow from snout through eye toward the tail. Caudal dusky, not yellow. Second dorsal and anal dusky; tip of dorsal pale. Pectoral dusky; ventral creamy, its inner edge somewhat dusky. Inside of mouth pale. D. V–I, 37; A. II–I, 21. Caudal keel unusually strong.

59. **Seriola lalandi** C. & V. P.

Seriola gigas Poey, Mem. Cuba.

A specimen weighing about 25 pounds, referred by us to this species, was seen in the New Orleans market. It was taken at Pensacola. This species appears to reach a larger size than *S. stearnsi*, and to have fewer rays in the dorsal.

60. **Seriola falcata** Cuv. & Val.—*Rock salmon.* P.

†*Seriola riroliana* C. & V. ix, 207 (Mediterranean †).
†*Seriola bosci* C. & V. ix, 209 (Charleston).
Seriola falcata C. & V. ix, 210 (Gulf of Mexico).
†*Seriola bonariensis* C. & V. ix, 211 (Buenos Ayres).
†*Seriola ligulata* Poey, Mem. ii, 231 (Cuba).
††*Seriola coronata* Poey, Mem. ii, 232 (Cuba).
†*Seriola bonariensis* Günther, ii, 464.
Seriola falcata Günther, ii, 464 (Jamaica).
Seriola bonariensis Goode & Bean, Proc. U. S. Nat. Mus. ii, 129 (Pensacola).
Seriola riroliana Lütken, Spolia Atlantica, 1880, 603 (considers *riroliana*, *bosci*, *falcata*, and *bonariensis* as identical).

Not uncommon on the Snapper Bank at Pensacola, reaching a weight of 10 to 12 pounds. The synonymy of this species is badly confused on account of the imperfections in the earlier descriptions. If it be true, as supposed by Lütken, that all the *Seriolæ* with falcate dorsal constitute a single pelagic species, this species will stand as *S. riroliana*. The only early description which applies well to our specimens is that of *Seriola falcata*. It is possible that the species with the black temporal band (which, according to Mr. Stearns, occurs in Southern Florida) may be different from *S. falcata*, in which case most or all the other synonyms referred to above might belong to it.

The life-coloration of *Seriola falcata* is as follows: Grayish above, paler but hardly silvery below. Fins blackish, the pectorals pale, the caudal not at all yellow. Eye white; lining of opercle pale; a very obscure olivaceous band from eye to front of dorsal, scarcely visible in fresh specimens. Preorbital and preopercle shaded with olive.

Head $3\frac{1}{5}$ ($4\frac{3}{5}$ in total); depth $3\frac{2}{3}$ (4). D. VII–I, 29; A. II–I, 21. Cœca 30.

Body rather deep and compressed. Head somewhat longer than deep, not conical. Snout $2\frac{3}{4}$ in head, maxillary reaching front of pupil, $3\frac{1}{2}$ in head, its tip broad, eye large, $5\frac{1}{4}$ in head, $1\frac{3}{4}$ in snout. Occiput somewhat carinated. Interorbital space wide, convex. Caudal keel little developed.

Dorsal high, somewhat falcate; its anterior lobe 1⅔ in head, 2⅓ in the base of the fin. Pectoral 2 in head; ventrals 1⅔; anal lobe 1¾; anal spines small.

NOMEIDÆ.

61. Nomeus gronovii (Gmel.) Gthr. P.

One specimen obtained from the stomach of a Red Snapper at Pensacola.

POMATOMIDÆ.

62. Pomatomus saltatrix (L.) Gill.—*Blue-fish.* P.

Rather common about Pensacola, and valued as a food-fish. Rare or unknown at Galveston.

CENTROPOMIDÆ.

63. Centropomus undecimalis (Bloch.) C. & V.—*Robalo.* G.

A food-fish of large size and delicate flesh, much valued along the Mexican coast. It is occasionally taken about Galveston in summer. It becomes more abundant southward along the Texas coast, and is one of the staple food-fishes about Brazos Santiago. An individual, weighing 15 pounds, in the Galveston market, taken at Indianola, showed the following characters:

Dull pale olivaceous; lateral line black; caudal dull yellowish; lower fins pale. Maxillary 2⅔ in head, extending to opposite posterior margin of pupil. Second dorsal spine reaching front of second dorsal, as long as from snout to edge of preopercle. All the dorsal spines strong. Second anal spine 2⅓ in head. Lat. l. 70.

SERRANIDÆ.

64. Epinephelus morio (C. & V.) Gill.—*Red grouper.* P.

Common on the "Snapper Banks" about Pensacola, reaching a weight of about 30 pounds; rather less valued as a food-fish than the related species.

Color brownish-olive, everywhere flushed with light red, the lower parts nearly salmon-color; whole body marked with obscure round pale spots, these obsolete on the fins, and most distinct in the young. Dorsal, anal, and caudal edged with blackish; pectorals plain red. Inside of mouth deep scarlet.

65. Epinephelus drummond-hayi Goode & Bean.—*Spotted hind.* P.

Rather common on the banks about Pensacola, reaching a weight of 30 pounds; a beautifully colored species, probably the handsomest of the genus.

Dark brown, densely covered with small pearly-white spots; those below smaller and nearly round, all of them arranged somewhat in irregular series.

Fins all covered with similar spots, those of the paired fins chiefly on the inner suface. Lower side of head flushed, immaculate. Caudal more densely spotted than body, the terminal spots of a fine lavender. Pectoral with a submarginal band of orange.

66. Trisotropis stomias Goode & Bean MSS.—*Black grouper.* P.

This species is about equally common with the Red Grouper at Pensacola, and reaches a weight of about 40 pounds.

Color dark gray, each scale finely vermiculate with darker but without distinct spots; some specimens with the body everywhere marbled with darker in the form of large roundish blotches; old examples more uniform; belly pale; fins all grayish, their tips or edges blackish; pectorals with no yellow or pale edging. Lips blackish, not tinged with yellow. Head 3 in length; depth 4. A. III, 11. Lat. l. 140. Scales smooth, with numerous accessory scales.

67. Trisotropis falcatus Poey.—*Scamp.* P.

Not rare on the "Banks"; a smaller species than the others, not exceeding 20 pounds. It is one of the best food-fishes, more delicate than the other "Groupers." It is called "*Scamp*" from its way of flapping when touched after lying apparently dead on the deck.

68. Serranus fascicularis C. & V.—*Squirrel-fish.* P. (30531.)

A single fine specimen obtained from the "Snapper Banks" at Pensacola. Three smaller specimens were taken from the stomachs of Red Snappers. The upper lobe of the caudal fin in this species is sometimes produced in a long filament.

69. Serranus trifurcus (L.) J. & G. P.

Several young specimens, from 2 to 6 inches long, apparently belonging to this rare species, were taken from the mouths and stomachs of Red Snappers at Pensacola.

Color light olivaceous, the sides with about six dusky bars, which are rather broader than the interspaces. They are distinct only posteriorly and near the lateral line. No white band before the anal. A very small jet-black spot close behind eye in the young, becoming obsolete with age; opercle with a dark diffuse blotch; chin and upper parts of head somewhat soiled with dark points; lower parts plain white; cheeks with yellowish markings. Dorsal and caudal vaguely barred or spotted; no black blotch on last spines of dorsal; other fins pale.

Head 2½ (3¼ in total); depth 3⅓ (4⅔). D. X, 11 or X, 12; A. III, 7. Scales 5–52–12.

Body slender, little compressed; head long and somewhat pointed; lower jaw a little the longer; maxillary reaching to posterior border of pupil, nearly half length of head; teeth small, the canines little developed, those on sides of lower jaw largest. Eye large, 4 in head. Preorbital and interorbital space very narrow. Preopercle with its edge evenly and sharply serrate. Interopercle sharply serrate. Gill-rakers slender, rather long. Scales on cheek in about 6 series.

Dorsal fin somewhat emarginate, the fourth spine highest, about 2½ in head; this spine and some of the others, occasionally filamentous; soft dorsal rather high, rather higher than fourth spine, the longest rays more than half head. Caudal with the upper ray filamentous, 2¼ in length of body; middle rays also produced, 1½ in head. Second anal spine stronger but shorter than third, 5 in head. Ventrals about as long as pectorals, 1¾ in head, not reaching front of anal.

Soft dorsal and anal scaleless. Scales moderate, ctenoid. Jaws, preorbital and top of head naked.

These specimens differ somewhat in form and color from others in the National Museum from Charleston, S. C. We cannot, however, separate them specifically.

70. Serranus subligarius (Cope) J. & G. P. (30859.)

(*Centropristis subligarius* Cope, Proc. Am. Philos. Soc. Phila. 1870.

Two young specimens, the largest 3 inches long, were obtained from the mouth of Red Snappers at Pensacola. Professor Cope's type, the only specimen of this species hitherto known, was also obtained at Pensacola.

Olivaceous, tinged with reddish above, paler below but not silvery; each scale on the sides with a blackish margin, these forming rather faint, continuous, dusky streaks. Posterior part of sides with faint traces of about 5 irregular cross-shades of darker along the sides. A large blotch of cream-color in front of the vent, extending upwards as an irregular cross-bar to near the middle of the side, its posterior edge sharply defined, its anterior fading into the color of the belly; a black ring around tail behind dorsal and anal; a large, black blotch on front of soft dorsal, extending downward on the body, where it is less distinct than on the fin. Cheeks yellowish; opercles darker; lower parts of head brown, the preopercle (below), interopercle, lower jaw, and branchiostegals covered by a network of wavy bluish streaks. Spinous dorsal dark gray, mottled; soft dorsal similarly and more distinctly marked. Pectorals, anal, and caudal grayish, with sharply defined narrow blackish bars, somewhat undulating. Ventrals faintly barred, mostly black.

Head 2½ (3); depth 2⅔ (3⅓), D. X. 13; A. III, 7. Scales about 6–42–17.

Body rather deep, compressed, the back elevated, the anterior profile nearly straight. Head long and low, slender, acuminate; its depth at middle of eye but half its length in the smaller specimen, in the larger proportionately deeper. Mouth rather small; lower jaw scarcely projecting; maxillary reaching to posterior margin of pupil, its length 2⅓ in head; teeth small, the canines little developed; those on sides of lower jaw largest, as usual in *Serranus*. Eye rather large, 4 in head. Preorbital and interorbital space very narrow. Edge of preopercle subequally and rather sharply serrate; none of the teeth directed forwards. Gill-rakers short, rather few. Scales on cheek small, in about 10 series.

Dorsal fin scarcely emarginate, the fourth spine not elevated, about 2½ in head, a little lower than the soft rays. Caudal subtruncate, a little more than half head. Second anal spine longer and stronger than third, 2⅓ in head. Ventrals 1¾ in head; pectorals 1⅔; neither reaching front of anal. Dorsal and anal fins, jaws, preorbital, and front of head scaleless. This species is technically close to the preceding, but is remarkably different in form and appearance, resembling somewhat a *Hypoplectrus*.

SPARIDÆ.

71. Lutjanus blackfordi Goode & Bean.—*Red Snapper; Pargo Colorado.* P.

This fish is at present taken in far greater numbers than any other on our Gulf coast. At Pensacola it is the most important food-fish, and in the New Orleans market it is sold in greater quantities than all other species combined. It is taken with hook and line on the "Snapper Banks" usually from 5 to 30 miles off shore. It reaches a weight of about 35 pounds, according to Mr. Stearns, to whom we are indebted for most of the statements of weights contained in this paper. It is a rather coarse fish, but bears transportation well.

This fish feeds on various small fishes—serranoids, eels, &c.—the species of which are thus far very little known. The systematic preservation of small fishes "spewed up" by the Snappers when caught, or found in their stomachs, has been begun by Mr. Stearns. We may in the future expect large results from this source, which has already yielded many of the most interesting forms contained in the present collection.

72. Lutjanus caxis (Bloch) Poey.—*Black Snapper; Lawyer.* P. (30848.)

Rather common about Pensacola, not reaching a large size. It is not often taken in nets, and its name "Lawyer" is said to be given in allusion to its skill in avoiding capture.

In life, young specimens are dark green, paler below; each scale above with a black spot which becomes gradually bronze down the sides; these spots forming distinct stripes along the rows of scales. Spinous dorsal with a blackish basal band, then a pearly band, a broad blackish band at tip. Soft dorsal yellowish, spotted at base. Ventrals and anal dark purplish red, darkest and spotted at base. Pectoral translucent yellowish. Caudal yellowish, tipped with reddish. A very distinct bright-blue stripe across preorbital and suborbital.

73. Lutjanus stearnsi Goode & Bean.—*Mangrove Snapper.* P.

Not uncommon on the "Snapper Banks" at Pensacola; one specimen obtained.

Color (in spirits) dusky brownish above, the sides and below paler, more or less flushed with salmon red; sides and lower parts of head flushed with red, especially behind jaws. Bases of scales on sides of breast and belly crimson; centers of scales on sides whitish. Vertical fins dusky; pectorals and ventrals largely rosy.

Scales above lateral line forming oblique series which are not throughout parallel with the lateral line. Teeth on vomer in an anchor-shaped patch, prolonged backward on the median line; outer pair of canines of upper jaw very strong; inner small; canines of lower jaw not much developed; maxillary reaching front of eye, $2\frac{3}{4}$ in head; preopercle little notched; band of scales on each side of occiput single, composed of about two series; 5 or 6 rows of scales on cheek; posterior nostrils ovate, pointed behind; gill-rakers stoutish, not very long; pectoral short, pointed, $\frac{2}{3}$ length of head; second and third anal spines subequal, shortish, the soft rays rather low. Caudal lunate, the upper lobe slightly longest.

74. **Diabasis formosus** (L.) J. & G.—*Red-mouth grunt.* P.
(*Hæmulon arcuatum* Holbr. Ichth. S. C. 124, pl. xvii, f. 2.)

A single large specimen obtained at Pensacola.

Body and fins dull gray; the middle of each scale paler; second dorsal, caudal, and tips of ventrals of a dusky slate-color; front of head with narrow stripes of steel-blue alternating with bronze, these stripes covering maxillary, preorbital, suborbital, whole naked part of snout above cheeks, and temporal region behind eye; the bands are faint or obsolete on opercle; a dark, vertical blotch on opercle, near angle of preopercle, mostly hidden by the latter; mouth orange within, the color fading anteriorly.

75. **Diabasis aurolineatus** (C. & V.) J. & G. P. (30869.)
Hæmulon aurolineatum C. & V. v, 237.
Hæmulon aurolineatum Gthr. i, 316.
Hæmulon caudimacula Poey, Syn. Pisc. Cub. 319 (not of C. & V.).

Color light olivaceous, grayish-silvery below; a dark-bronze band, narrower than pupil, darkest in the younger specimen, from snout through eye straight to base of caudal; above this, two or three dark streaks, the middle one most distinct, from eye to above gill-opening; another beginning on top of snout on each side, passing above eye, and extending parallel with the first-mentioned stripe straight to last ray of dorsal, where it meets its fellow of the opposite side; a dark streak from tip of snout along median line to front of dorsal; a large, rounded black blotch at base of the caudal, some obscure dusky shading below soft dorsal and at base of pectoral; fins all plain; upper slightly dusky; anal nearly white; pectorals, caudal, and ventrals light yellow; lining of opercle pale orange; inside of mouth scarlet. In the large specimen the dark stripes are fainter, paler, and more yellowish; several fainter bands occur between the broader ones, and faint oblique streaks of light bronze follow the rows of scales, those above lateral line oblique.

Head 3 ($3\frac{3}{4}$); depth $2\frac{4}{5}$ ($3\frac{3}{4}$). D. XIII, 15; A. III, 8.
Scales 7–52–13. Length of largest specimen 5 inches.

Body rather elongate, somewhat compressed, the back a little elevated. Head not deep, the snout short, but not blunt, 3 to $3\frac{1}{8}$ in head; preorbital very narrow, little wider than pupil; maxillary reaching middle of pupil, 2 in head; eye large, $3\frac{1}{5}$ in head; scales of cheek small, in about 11 rows; gill-rakers short, not one-third as long as pupil; preopercle sharply serrate.

Scales of moderate size, those above lateral line in very oblique rows, those below in horizontal rows.

Dorsal spines rather high, the longest $1\frac{3}{4}$ to $2\frac{1}{4}$ in head, longer than the second anal spine; caudal well forked, the upper lobe the longer, $1\frac{1}{8}$ to $1\frac{1}{2}$ in head; second anal spine strong, longer and stronger than third, $2\frac{1}{2}$ to $2\frac{4}{5}$ in head, reaching, when depressed, to base of last ray; ventrals $1\frac{2}{3}$ to $1\frac{3}{4}$ in head; pectorals $1\frac{1}{4}$ to $1\frac{1}{2}$.

Two specimens, in good condition, the largest $5\frac{1}{2}$ inches long, were taken from the mouth of a Red Snapper at Pensacola. Our specimens agree in color with *Hæmulon fremebundum*, described by Goode & Bean, from Clearwater Harbor. The latter species is, however, quite different, being less elongate, with much smaller mouth and much larger scales, there being but 9 or 10 series between the lateral line and the vent.

76. **Pomadasys fulvomaculatus** (Mitch.) J. & G.—*Pig-fish.* P. G. (31034.)
Orthopristis duplex Grd. U. S. Mex. Bound. Surv. 1859, 15.
Pristipoma fasciatum C. & V. v, 285; Günther, i, 301.

A common shore-fish of small size and good quality. It has little economic importance.

Color in life light blue above, shading gradually into silvery below; preorbital and snout of a clear sky-blue; a dash of blue on side of upper lip; each scale on body with a blue centre, the edge with a bronze spot; these forming on back and sides very distinct orange-brown stripes along the rows of scales; those above the lateral line extending obliquely upward and backward, those below nearly horizontal. Snout with bronze spots; one or two bronze cross-lines connecting front of orbits; two or three oblique lines on preorbital; besides numerous bronze spots larger than those on the body; preorbital also with dusky shades, one of which extends on upper lip. Cheeks and opercles with distinct bronze spots, larger than those on the body. Inside of mouth pale; inside of gill cavity tinged with golden.

Dorsal translucent, with about three bronze longitudinal shades, composed of spots, those on soft dorsal most distinctly spot-like; edge of the fin dusky. Caudal plain, yellowish at base, dusky toward the tip. Anal whitish, its edge dusky, its base shaded with bronze. Pectorals and ventrals yellowish, the latter darker at tip.

Fresh specimens, so far as we have noticed, show no trace of vertical bands. On examples preserved in alcohol, the yellowish and blue markings gradually disappear, and dark cross shades become apparent. A specimen 5 years in alcohol shows the following coloration: Silver-

gray, with faint streaks along the rows of scales. A distinct narrow dusky band from front of spinous dorsal through base of pectoral; behind this 7 or 8 cloudy, obscure bands, alternately broad and narrow; a horizontal dusky shade behind eye; spinous dorsal with a faint median pale shade, soft with three rows of faint spots; other fins nearly plain. This specimen evidently corresponds to the *Pristipoma fasciatum* of C. & V. and Günther, and as evidently belongs to *P. fulvomaculatus*; *Orthopristis duplex* Grd. does not seem to be at all different.

Head $3\frac{1}{3}$; depth 3. D. XII, 16; A. II, 13 or 14. Scales 8–54–16.

77. Lagodon rhomboides (L.) Holbr.—*Chopa Spina.* P. G. (31052.)

Exceedingly common everywhere along the shore. A fish of small size, little valued as food, and seldom brought to the market.

78. Diplodus probatocephalus (Walb.) J. & G.—*Sheephead.* P. G. (31041.)

Generally common, but less important as a food-fish than farther north. Specimens seen mostly small. Reaches a weight of about 12 pounds.

79. Stenotomus caprinus Bean MSS.—*Goat's Head Porgee.* P.

Two specimens, the larger partly digested, the smaller in good condition, were taken from stomachs of Red Snappers at Pensacola.

Color nearly uniform pale olive, silvery below; sides with faint traces of dark cross-bands; fins pale, the posterior margin of caudal blackish. Anterior teeth small, in a close-set band, the outer a little enlarged, compressed, and lanceolate. Two series of molars in each jaw. A well-developed antrorse spine before dorsal. Anterior profile irregular, abruptly depressed above eye, the snout rather pointed. Scaly part of cheek as deep as long. Pectoral a little longer than head, reaching soft rays of anal; dorsal spines slender, rather high, the first two short the third somewhat filamentous. Head $3\frac{1}{4}$; depth 2. D. XI, 12; A. III, 12. Scales 7–47–14.

This species is strongly marked. It is distinguished from *S. argyrops* by the deeper cheeks and preorbital region and the less elongate form, as well as by the structure of the spinous dorsal.

80. Sparus pagrus L.—*Porgee.* P. (30838.)

(*Pagrus vulgaris* C. & V.; *Pagrus argenteus*, Good & Bean, Proc. Ac. Nat. Sci. Phila. 1879, 133.)

Not uncommon at Pensacola; two specimens obtained.

Color golden-olive, the middle of each scale largely pinkish-red, giving a general reddish hue to the fish; sides and below silvery, flushed with red; many scales of back and sides each with a small round spot of deep purplish-blue, these forming distinct longitudinal streaks on the sides below lateral line, the series somewhat irregular, running along the margins of the scales; above the lateral line these spots are somewhat scattered, forming very irregular oblique series, running upward and backward; a few of these spots on nape and upper part of opercle; a dark blotch on upper part of orbital rim; snout tinged with purplish, occiput with olive; edge of opercle dusky; vertical fins largely orange, their edges translucent; spinous dorsal somewhat dusky; ventrals pale, with a pinkish blotch at base; pectorals yellowish, especially at base, the axil somewhat dusky; no antrorse spine before dorsal.

Our specimens agree with various descriptions of European examples of this species, except in the coloration. In none of these descriptions is there any allusion to the blue spots which form so striking a feature of the coloration of the American fish.

APOGONIDÆ.

81. Apogon maculatus (Poey) J. & G. P. (30863.)

A single specimen, 3 inches long, in perfect condition, "spewed up" by a Red Snapper at Pensacola.

Color intense scarlet, nearly uniform; a tinge of crimson about pectorals and on sides of head. A round, black, ink-like spot, a little larger than pupil, under second dorsal; another, smaller, on upper part of tail, on each side, just before root of caudal; tip of caudal whitish; iris red.

Head $2\frac{3}{4}$; depth $2\frac{1}{5}$. D. VI–I, 9; A. II, 8. Scales about $2\frac{1}{2}$–26–7 (some of them lost, so that the number cannot be exactly ascertained).

Maxillary $1\frac{1}{5}$ in head, reaching beyond pupil; eye very large, 3 in head; preopercle distinctly serrulate. Pectoral $1\frac{2}{3}$ in head, somewhat shorter than caudal.

This species has not been hitherto noticed north of Cuba.

82. Apogon alutus Sp. nov. P. (30874.)

A single specimen, $2\frac{1}{2}$ inches long, "spewed up" by a Red Snapper at Pensacola.

Color rusty-red with silvery lustre; sides of head little reddish. Body and fins everywhere much soiled and freckled with dark points. First dorsal blackish, thickly punctate; second dorsal, anal and caudal yellow, smutty with dark points, the posterior half of the caudal more dusky. Ventrals smutty yellow; pectorals colorless.

Head $2\frac{3}{4}$ in length; depth $2\frac{3}{4}$. D. VI–I, 9; A. II, 8. Lat. l. 21.

Head much compressed, short and high, its height at occiput six-sevenths its length; snout short and blunt, less than interorbital width, about half diameter of orbit; mouth very oblique, the maxillary reaching beyond pupil, but not to posterior margin of orbit; length of maxillary $1\frac{3}{4}$ in head; teeth in narrow villiform bands in each jaw, those on vomer and palatines minute; eye of moderate size, $2\frac{1}{5}$ in head; orbital rim elevated above and behind; interorbital width $3\frac{1}{3}$ in head, with a low median longitudinal ridge; both ridges of preopercle entire; opercle without spine; gill-rakers slender, the longest rather more than half diameter of orbit; 8 or 9 rakers on anterior branch of outer arch.

First dorsal low, of six rather weak spines, its base two-fifths length of head, and equal to greatest height of fin; second dorsal high, the

longest ray $1\frac{1}{2}$ in head. Anal similar to second dorsal; second anal spine half length of longest ray, which is contained $1\frac{3}{4}$ in head; caudal $1\frac{1}{3}$; ventrals not reaching vent $1\frac{3}{4}$, and pectorals $1\frac{3}{4}$, in length of head.

Allied to *A. puncticulatus* (Poey), but with much larger scales.

MULLIDÆ.

83. Mullus barbatus L. Subsp. **auratus**; subsp. nov. P. (30828.)

One specimen $6\frac{1}{2}$ inches long, from the stomach of a Red Snapper, at Pensacola.

Head $3\frac{3}{4}$; depth 4. D. VII–I, 8; A. II, 6.

Form essentially as in *M. barbatus*, the profile a little less steep, the interorbital space a trifle broader, the maxillary extending exactly to opposite front of eye, its length $2\frac{3}{4}$ in head. Interorbital width $3\frac{1}{2}$ in head; barbels $1\frac{1}{3}$; eye $3\frac{3}{4}$; oblique length of snout $2\frac{3}{5}$. Teeth in lower jaw small; on upper jaw obsolete; on vomer and palatines coarse and granular, forming large patches. Gill rakers slender, a little shorter than pupil.

Dorsal spines slender, compressed, the longest about $1\frac{3}{5}$ in head ($1\frac{1}{2}$ to $1\frac{1}{3}$ in *M. barbatus*); height of soft dorsal half head; caudal as long as head. Pectoral $1\frac{2}{5}$ in head. Ventrals $1\frac{1}{3}$. Scales mostly lost, so that the number in the lateral line cannot be counted.

Color scarlet, becoming crimson where the scales are removed; snout scarlet; side with two distinct longitudinal yellow stripes. Caudal scarlet, first dorsal with an orange band at base and a yellow band higher up; the rest of the fin pale; no black on dorsal fin. Second dorsal mottled scarlet and pale; anal and ventrals plain, pectoral reddish; iris violet, dusky above; sides of head with silvery lustre.

This is the first authentic record of the European surmullet in our waters. Our specimen seems to indicate a third subspecies of *M. barbatus*, differing from subsp. *surmuletus* in the lower fins, and in the replacement of the black band on the spinous dorsal by light yellow; from subsp. *barbatus* it differs in the lower fins, less blunt snout, and in the presence of two yellow lateral bands.

EPHIPPIDÆ.

84. Chætodipterus faber (Brouss.) J. & G.—*Half-moon; Angel-fish; Spade-fish.* P. G. (31044.)

Generally common.

SCIÆNIDÆ.

85. Pogonias chromis (L.) C. & V.—*Drum; Tamboro.* P. G.

Common, a coarse fish of inferior quality, reaching a large size.

Head $3\frac{1}{2}$; depth $2\frac{7}{8}$. D. X–I, 23; A. II, 6. Lat. l. 47 (pores).

86. Sciæna punctata (L.) J. & G.—*Mademoiselle; Silver-fish; Bastard Croaker; Yellow Tail.* P. G.

A very common shore-fish of small size and good quality. It rarely reaches the weight of more than half a pound.

The specimens from the Gulf coast differ from those taken further north in the almost entire absence of the dark punctulations which are so conspicuous in the latter. They seem to be otherwise identical.

Color in life silvery, slightly bluish above, the scales of the opercles and middle of sides with some dusky points. Spinous dorsal light yellowish, dusky at tip. Second dorsal and caudal uniform dull yellow. Anal bright yellow in front, the color fading behind. Ventrals slightly yellowish, their axils orange. Pectorals yellowish above; axil silvery. Inside of mouth pure white; an orange area punctulate with black on inside of opercle. Upper fins all with some punctulations. Head $3\frac{1}{6}$, depth $3\frac{1}{6}$. D. XI–I, 21; A. II, 9. Scales 7–52–11.

87. Scæna ocellata (L.) Gthr.—*Red-fish; Poisson Rouge; Pez Colorado.* P. G. (30845 Pens.; 31914 Galv.)

The most important food-fish of the Texas coast, the amount taken exceeding that of all other species combined. A good food-fish when not too large. It reaches a weight of 35 to 40 pounds, the large specimens being known as Bull Red-fish.

The serratures on the opercle, which are conspicuous in ordinary specimens, wholly disappear with age, the edge of the bone being finally entire and wholly covered by the skin. This change takes place gradually, being complete at a length of about 30 inches.

Color of adults deep brassy yellow above, verging towards orange on the sides; belly white; head bronze, darker above; a band of deeper bronze backward from eye. Young without bronze shades, all of which intensify with age; scales in the young with darker shades forming undulating streaks; these obliterated with age; fins all pale, tinged with reddish, the pectoral most red; second dorsal and caudal somewhat dusky. Mouth white within, lining of opercle black. Caudal ocella varying much in size, sometimes wanting; sometimes two or three or even 8 to 10 or more in number. About 19 out of 20 individuals have the normal single ocella on each side. Iris yellowish.

88. Liostomus xanthurus Lac.—*Chopa Blanca; Spot; Flat Croaker; Pink Croaker.* P. G. (30836.)

Very abundant along the coast. A good pan-fish, but not very important from its small size. The color is rather paler and more silvery than usual in northern specimens, the humeral spot and dark oblique lines less distinctly indicated. Dorsal and caudal light brownish, the tips darker; soft dorsal yellowish tinge; anal yellowish, somewhat dotted; paired fins pale.

D. X–I, 30; A. II, 12. Scales 9–48–13. Head $3\frac{1}{3}$; depth 3.

There is no evidence of the existence of two species of *Liostomus*. *Liostomus obliquus* is the species when well preserved. *Liostomus xanthurus* C. & V. is a faded Museum specimen. *Liostomus xanthurus* Lac. was so named from a confusion of the coloration of the species with that of the "yellow-tail," *Sciæna punctata*.

89. Micropogon undulatus (L.) C. & V.—*Croaker; Ronco.* P. G. (30840.)

Very common; a food-fish of considerable importance, although reaching but a small size.

The three species properly referable to this genus, after the removal of *Genyonemus* Gill, are very closely related, and might not improperly be taken as geographical varieties of one species. They may be thus compared:

a. D. X–I, 28; outer teeth of upper jaw evidently enlarged; snout projecting beyond premaxillaries; scales between front of dorsal and lateral line, in a vertical series 9, in an oblique series 12; in an oblique series from vent upward and forward 18. Head 3; depth 3½ ..... UNDULATUS.

aa. D. X–I, 24; outer teeth of upper jaw scarcely enlarged; snout little projecting; Lat. l. 48 (oblique series; 53 pores). Scales between front of dorsal and lateral line, vertically, 6 or 7; obliquely, 8; 16 in an oblique series from vent. Head, 3⅓; depth, 3½ ..... ECTENES.*

aaa. D. X–I, 20; outer teeth of upper jaw scarcely enlarged; snout somewhat projecting; Lat. l. 42 (49 pores). Scales above lateral line, vertically, 5 or 6; obliquely, 8; 12 in an oblique series from vent. Head 3¼; depth 3⅔ ..... ALTIPINNIS.†

90. Menticirrus nebulosus (Mitch.) Gill.—*Whiting.* P.

One large specimen obtained at Pensacola, where it is said to be not uncommon.

We have carefully compared this specimen with others from the coast of Massachusetts, and unable to detect any differences.

This species has been hitherto supposed to be confined to the North Atlantic coast, from Cape Cod to Cape Hatteras.

This species is very close to *M. alburnus*, but differs constantly, so far as we have seen, in the smaller teeth, higher first dorsal and sharper coloration, a dark lateral shade always extending into the lower lobe of the caudal fin.

91. Menticirrus alburnus‡ (L.) Gill.—*Whiting; Ground Mullet.* G. (30917, 31051.)

(*Umbrina phalona* Girard, U. S. Mex. Bound. Surv. 1859, 13.)

Generally common; a market fish of good quality but of small size.

Color in life, smutty-gray above, with strong reddish and bronze reflections. Sides with obscure traces of oblique bars; a short vertical bar below spinous dorsal; a U-shaped bar from nape and end of spinous dorsal surrounding the bar first mentioned; three or four other bars extending downward and backward behind it; a smutty stripe along each side of belly. Upper fins light yellowish; spinous dorsal and lower lobe of caudal tipped with black. Pectoral reddish, covered with

* *Micropogon ectenes* Jor. and Gilb. Proc. U. S. Nat. Mus. 1818. Mazatlan (Gilb.).

† *Micropogon altipinnis*, Günther, Proc. Zool. Soc. Lond.; Chiapam (*Gthr.*); San José (*Gthr.*); Panama (Gthr. Gilb.).

‡ The rude figure of Catesby (*Alburnus americanus* Catesb. p. 12, t. 12) has usually been referred to this species. In the eleventh edition of the Systema Naturæ, p. 321, this figure is the type of a "*Cyprinus americanus*." If this figure is considered identifiable (which it really is not), this species should be called *Menticirrus americanus*, the name of *Perca alburnus* dating from the twelfth edition.

dark dots, so as to appear almost wholly black. Ventrals and anal creamy orange, somewhat soiled with black. Inside of opercle black.

D. X–I, 24; A. I. 7. Scales, 6–54–11; gill rakers almost obsolete; scales on breast not very small; outer teeth of upper jaw much enlarged.

92. Menticirrus littoralis (Holbr.) Gill.—*Surf Whiting.* P. G. (30815, 30835, 30837, 31046, 31048.)

A common surf species, as abundant as the preceding, but less often brought to market. This species is very different from *M. alburnus*, with which it has been confounded. Its relations are with the two Pacific coast species, *M. undulatus* Grd., and *M. elongatus* Gthr., from the latter of which it is difficult to distinguish it. The following is a detailed description:

Color in life gray above, with some bluish and with very strong bronze reflections; a darker bronze shade along sides on level of pectorals, extending to tail and along cheeks, the belly below this abruptly white. No trace of dark bars. Dorsals light brown; spinous dorsal black at tip, the base narrowly white. Caudal pale, its tips usually black; anal creamy, sometimes dusky at tip. Pectoral whitish, only its upper rays with dark punctulations, especially on the inner side, which is sometimes quite dark. Ventrals pale, punctulate towards their tips, which are white. Lining of gill cavity pale.

Head 3⅙ in length (3⅝ in total); depth 4⅖ (5⅛). D. X–I, 23 (not 27 as stated by Holbrook); A. I, 7. Scales 6–50–11; 54 tubes in lateral line.

Body elongate, the caudal peduncle very slender, its least depth 3¾ in head. Head long, rather broad; the snout long, bluntish, 3 in head, projecting moderately beyond the premaxillaries (for a distance of about one-fifth its length), which project beyond lower jaw. Mouth rather small, wholly inferior, the maxillary reaching little beyond front of eye, 3⅓ in head. Teeth in broad bands, the outer series in upper jaw a very little enlarged (very much smaller than in *M. alburnus*).

Posterior nostril a lanceolate slit, as long as barbel, or about half diameter of eye. Eye small, 5 to 6 in head, about one-fourth narrower than preorbital or interorbital space. Gill rakers about one-third diameter of pupil; about 7 on lower part of arch.

Dorsal spines rather slender and high, the longest about two-thirds length of head. Soft dorsal moderate, its longest rays about equal to snout. Lower lobe of caudal broader than upper, 1⅘ in head. Longest rays of anal a little longer than snout; pectorals 1⅘ in head, reaching slightly beyond tips of ventrals, which are about two in head. Axillary scale one-fourth length of pectoral; scales on breast very small; about 25 in a longitudinal series to front of ventrals, and about 15 in a cross series connecting outer margins of ventrals; 10 scales in a vertical series from vent to lateral line; 15 to 18 in an oblique series forward. No air bladder. Pyloric cœca 3.

The species of this genus are all American. Those known to us may be compared as follows:

a. Mouth comparatively large, the maxillary extending to below the eye; gill-rakers tuberculate or minute.

b. Outer teeth of upper jaw much enlarged, more than half length of posterior nostril; snout protruding well beyond premaxillaries; scales on breast large, regularly arranged.

c. Soft dorsal rather short (rays less than I, 23); coloration plain.

d. Spinous dorsal elevated, its longest spines reaching past front of soft dorsal; snout very prominent, its tip slightly turned upward, projecting beyond premaxillaries for a distance about equal to the large eye; maxillary shortest, 3½ in head; posterior nostril oblong; upper caudal lobe elongate; tip of spinous dorsal black; lower fins pale or somewhat dusky. D. X-I, 22. Pacific coast of tropical America ..... NASUS.*

dd. Spinous dorsal not elevated, the longest spines not reaching soft dorsal; snout bluntish, projecting beyond premaxillaries for about half diameter of eye; maxillary long, 3 in head; posterior nostril nearly round; upper caudal lobe not produced; pectoral large; lower fins mostly black. D. X-I, 18. Pacific coast of tropical America ..... PANAMENSIS.†

cc. Soft dorsal rather long (D. X-I, 24); spinous dorsal moderately elevated, its tip reaching front of second dorsal; snout short, rather sharp, projecting beyond premaxillaries for a distance equal to about half eye; maxillary moderate, 3 in head; posterior nostril broad-ovate; lower caudal lobe longest; pectoral rather large; coloration nearly plain, or with faint oblique dusky bars; pectoral and lining of opercle black. South Atlantic and Gulf coasts of United States ..... ALBURNUS.

bb. Outer teeth of upper jaw moderately enlarged, less than half length of posterior nostril; snout moderately protruding; scales on breast large; spinous dorsal high, the longest spine filamentous (in the adult) reaching past front of second dorsal, usually higher than body below it; gill rakers reduced to minute tubercles. Body always with distinct oblique bands, the anterior V-shaped; a dark lateral band, distinct posteriorly, and extending on lower lobe of caudal; lower fins blackish; lining of opercle mostly pale. D. X-I, 26. Cape Cod to Gulf of Mexico ..... NEBULOSUS.

aa. Mouth comparatively small, the maxillary less than one-third head, barely reaching eye; outer teeth of upper jaw scarcely enlarged; snout little projecting; scales on breast small, irregular; coloration plain, the back and sides sometimes with faint undulating streaks. D. about X-I, 24.

e. Pectorals, ventrals, and anal black; snout bluntish, scarcely projecting; posterior nostril oblong; pectoral large, 1⅓ in head; depth, 4⅓ in length; scales, 9-60-14. Southern California ..... UNDULATUS.

ee. Pectorals, ventrals, and anal pale; lining of gill cavity pale. Snout somewhat projecting; pectorals shortish, 1⅔ in head.

f. Upper lobe of caudal longer than lower; scales about 9-60-13; 25 scales in an oblique series forward from vent to lateral line; axillary scale one-third length of pectoral; posterior nostril short, one-third diameter of orbit; snout very little projecting; gill-rakers very short, 4 or 5 on lower part of arch; depth, 4⅓ in length. Pacific coast of tropical America ..... ELONGATUS.‡

* *Umbrina nasus* Günther, Fish. Centr. Amer. 1869, 426. Mazatlan (Gilb.); Panama (Gthr.; Gilb.).

† *Umbrina panamensis* Steindachner, Ichth. Beitr. iv, 9, 1875. Mazatlan (Gilb.); Panama (Steind.; Gilb.).

‡ *Umbrina elongata* Gthr. Proc. Zool. Soc. Lond. 1864, 148. Mazatlan (Gilb.); Chiapam (Gthr.); Panama (Steind.; Gilb.).

ff. Upper lobe of caudal not longer than lower; scales about 8-50-11; 15 to 18 scales in an oblique series forward from vent to lateral line; axillary scale less than one-fourth pectoral; posterior nostril lanceolate, half as long as eye; snout distinctly projecting; gill-rakers larger than in other species, about 7 on lower part of arch; depth 4⅔ in length. Caudal usually tipped with black. South Atlantic and Gulf coast of United States ..... LITTORALIS.

Of these species, *nebulosus* and *alburnus* are closely related, as are also *littoralis*, *undulatus*, and *elongatus*, which appear to be representatives of one form in three different faunal areas; *nasus* and *panamensis* are better distinguished.

93. Cynoscion maculatum (Mitch.) Gill.—*Speckled Trout; Spotted Trout.* P. G. (30832, 30911, 31047.)

(*Otolithus carolinensis* C. & V.; *Otolithus drummondi* Richardson and Girard.)

One of the most abundant and valuable of the food fishes of the Gulf coast. Among the shore-fishes it ranks next in importance to the "Red-fish" and its flesh is finer in quality. It reaches a weight of about 10 pounds.

Color in life grayish, with very brilliant reflections of violet, green, etc., becoming silvery below; sides of head iridescent. Back above lateral line and behind middle of second dorsal covered with round black spots, somewhat irregular in size and position, most of them smaller than the pupil; a few below lateral line. First dorsal blackish at tip, with some dark spots. Second dorsal yellowish, edged with dusky and with 2 or 3 series of round dark spots. Caudal creamy, edged and broadly tipped with blackish, the base and median parts of the fin with small round dark spots. Anal and ventrals creamy, slightly soiled with blackish. Pectorals light yellowish, immaculate, the axil somewhat dusky. Inside of mouth light orange-yellow. Inside of opercle slightly dusky.

Head 3⅓; depth 5. D. X-I, 25; A. II. 10. Scales 9-78-14; 68 tubes in lateral line.

Northern specimens have the spotted area extending usually farther forward, but do not otherwise differ. The *Otolithus drummondi* of Richardson is the same species, with some slight errors in the description. The anal rays are quite constantly II, 10.

POMACENTRIDÆ.

94. Chromis insolatus (C. & V.) J. & G. P.

A single small specimen "spewed up" by a Red Snapper, at Pensacola.

Steel brown; a curved blue streak between eyes in front; many scales on upper and anterior parts of body each with a blue spot; fins all plain dusky.

D. XIII, 13; A. II, 12. Scales 2⅓-25-6.

95. Chromis enchrysurus sp. nov. P. (30871.)

Several specimens in fine condition, the largest 3¼ inches long, "spewed up" by Red Snappers, at Pensacola.

Allied to *Chromis insolatus* (C. & V.) and *Chromis flavicauda* (Gthr.).

Head 3⅓ in length; depth 2. D. XIII, 12; A. II, 12 (D. XII, 11; A. II, 11, in one specimen). Scales 3–26–9.

Body regularly ovate-oblong, the anterior profile evenly convex. Mouth small, oblique, the jaws equal, the maxillary extending little past front of eye, 3⅓ in head. Snout short, 4⅓ in head. Eye large, 2½ in head. Preorbital entire; preopercle with distinct obtuse serratures or crenations. Teeth slender, conical, in a moderate band, those of the outer series considerably enlarged. Gill-rakers long, not as long as pupil.

Dorsal somewhat emarginate, the longest spine 1½ in head, the longest soft ray about the same; caudal lunate, the upper lobe slightly longer, about as long as head. Anal about as high as soft dorsal, its second spine 1⅔ in head. Ventrals filamentous at tip, longer than head. Pectorals about as long as head. Vertical fins largely covered with small scales.

Color, when fresh, sooty gray, rather dark, a narrow blue stripe from tip of snout obliquely upward and backward across upper part of eye to above front of lateral line, where it ends in blue dots; sides paler posteriorly and below; fins dusky, the distal half of anal, most of soft dorsal, and the whole of caudal and pectorals of a very intense light yellow, deepest on the caudal; ventrals dusky-bluish, slightly tinged with yellow. A small black spot in upper part of axil.

LABRIDÆ.

96. Platyglossus caudalis (Poey) Gthr. P. (30817.)

? Julis caudalis Poey. Mem. Cuba, ii, 213.

? ? Julis pictus Poey. Mem. Cuba ii, 214.

A single fine specimen 6 inches long, taken from the stomach of a Red Snapper, at Pensacola. A second specimen badly injured was also obtained.

Head 3¼ (3⅔); depth 4¼ (5). D. IX–II; A. III, 12. Scales 2–25–6.

Body very slender, compressed, the snout rather pointed, 3⅓ in head. Eye moderate, 5½ in head. Posterior canine large. Dorsal spines low, rather slender, but pungent, lower than the soft rays. Caudal fin convex, its two outermost rays somewhat produced. Pectoral 1⅔ in length of head. Scales on breast small. Head naked.

Color, when fresh, olivaceous above; a row of round sky-blue spots along each side of back; a broad band-like area of orange intermingled with violet spots along sides from lateral line about to level of eye, extending backward about to middle of body; the lower edge of the orange band serrate. Below the orange a band of pale violet, becoming posteriorly deep violet. Still lower on level of lower edge of pectoral a deep yellow band about as wide as a scale, growing narrower and fainter behind. Belly pearly. Head above olivaceous, marked with blue; preorbital and suborbital region scarlet, with three violet-blue stripes, these margined with cherry red. Cheeks below lowest violet stripe translucent yellowish. Opercles bright red, with about 3 oblique violet stripes, the upper forming an oblique blotch behind eye, in the middle of which is a round black ink-like spot; no dark opercular spot; chin pearly. Iris red.

Dorsal light orange, the soft part with three rows of violet spots; caudal orange, with four rows of spots, the orange arranged in one longitudinal, two marginal, and two convergent orange bands, which are connected by reticulations around blue spots. Anal with a basal orange spot on each membrane, then a blue spot, then a broad yellow band, then a narrow blue band, and a terminal band of orange. Ventrals light red. Pectorals pale violet, yellow at base; a bluish oblique band below them. Blue spots of head and posterior parts clear, sky-blue; elsewhere of a violet shade and less bright.

This specimen agrees in many respects with Poey's "*caudalis*." Poey, however, had a deeper fish (depth 4½ in total length), and he makes no mention at all of the broad orange lateral shade so conspicuous in our specimens. It is possible that the latter difference is sexual. Poey's "*pictus*" has the orange band, but the body is too slender (depth 5½ in total), and the coloration is otherwise not quite like that of our specimens.

97. Platyglossus florealis sp. nov. P. (30839.)

Two specimens 3⅔ inches in length were taken with a seine in the Laguna Grande, near Pensacola. They were found in shallow water in masses of *Zostera*.

Head 3⅓ (3⅘); depth 4 (4⅔). D. IX, 11; A. III, 12. Scales 1½–26–8.

Body rather slender, moderately compressed; snout not very sharp, 3½ in head. Eye moderate, 5 in head. Posterior canines small. Dorsal spines rather low, stiff and pungent, lower than soft rays. Caudal truncate, 1⅔ in head. Pectoral 1½ in head. Scales on breast small; head naked.

Coloration in life: ground color olive-brown; a rather dull olive-green stripe from above snout along sides of back to tail, midway between lateral line and dorsal; a brownish area along lateral line; below this a distinct dark brown band from gill-opening to middle of caudal on level of eye, and about as broad as eye, ending in a small dark spot at base of caudal. Below this another light brownish area bounded by a dark bronze stripe on level of pectoral, the belly abruptly pale. Each scale of side with a narrow crescent of deep greenish-blue towards its base. These spots are very distinct, especially anteriorly, giving the whole fish a bluish cast. Sides of head pale orange; a bright blue wavy

streak along preorbital, suborbital, and opercle, turning abruptly downward on the subopercle. A faint blue streak behind eye. Opercle with a deep indigo-black spot bordered by bluish and yellow; tip of opercle yellow; the color bounded by a <-shaped blue line. Lower jaw with two cross stripes of coppery orange, the interspaces white, the tip reddish. A small jet-black spot at base of last ray of soft dorsal.

Dorsal fin light cherry-red, with a row of translucent spots at base; a narrow translucent median band, the tips translucent. Caudal translucent, tinged with red toward the base. Anal with a row of pearly spots, and a cherry-red band, then a narrow pearly band, then a light yellow band, then a light red band, the tips translucent. Pectorals yellowish; ventrals white. Iris scarlet.

This gaily-colored little fish seems to be well distinguished from all thus far known in the West Indies.

TRIGLIDÆ.

98. Prionotus tribulus C. & V. G. (30910, 30201, 31053.)

Common; numerous specimens obtained at Galveston.

Coloration in life: light olive-green, the head and body everywhere reticulated with dark olive-green, in definite patterns, the dark lines on the head conspicuous, arranged in a series of curves and concentric circles; the dark streaks on the body mostly undulating and ascending backward. A diffuse band along side of bright orange. Belly white. Two faint diffuse dark bands downward and forward from soft dorsal, the hindmost ascending on the fin; a fainter band on spinous dorsal.

Spinous dorsal reddish, clouded with darker. A large dark blotch, not ocellated, between fifth and sixth spines. Second dorsal translucent reddish, with darker spots. Anal similar, paler, the spots almost obsolete. Caudal reddish, with three darker bands. Ventrals plain light reddish. Pectorals light clear green on the front side, grayish behind; with about 5 somewhat irregular dark cross-bands, the three median broadest and forked or Y-shaped above. Upper edge of pectorals pale. Pectoral appendages reddish, barred with darker.

Head $2\frac{1}{2}$; depth 5. D. IX–I, 12; A. 11. P. 13–3. Lat. l. 49 (tubes).

99. Prionotus scitulus sp. nov. P.

Prionotus punctatus Jor. & Gilb. Proc. U. S. Nat. Mus. 1878, 373 (not of C. & V.).

A single specimen taken from the stomach of a Red Snapper at Pensacola.

Head $3\frac{1}{3}$ ($4\frac{1}{6}$); depth $6\frac{1}{3}$ (7). D. IX, I, 13; A. 12; L—; Lat. l. ca. 70 (pores), about 60 scales. Length $5\frac{3}{4}$ inches; none larger.

Body much slenderer than in any other species; head small, low, rather pointed. Snout rather long, a little shorter than rest of head, its width between angles of mouth about $2\frac{1}{2}$ in head. Maxillary not reaching front of eye, $2\frac{2}{3}$ in head. Sides of snout finely and evenly serrate; no spinous teeth on preorbital; preopercular spine simple, long, and slender, without tooth at base. Spines on top and posterior part of head about as in *P. palmipes*, but rather sharper, the furrow connecting orbits posteriorly not much marked. Opercular spine small. Eyes large, separated by a narrow concave space, the supraocular ridge prominent, serrate in front. Bands of palatine teeth narrow. Gill-rakers long and slender, as in *Prionotus punctatus*.

Dorsal high, its longest spine $1\frac{1}{4}$ in head. Pectoral scarcely more than $\frac{1}{3}$ length of body, reaching to base of fifth or sixth dorsal ray.

Coloration in life, dark olive above; back and sides covered with numerous round spots of different sizes, and not arranged in series; these spots bronze color in life, becoming brownish after death; spinous dorsal dusky, with lighter streaks; a distinct black spot on upper half of spinous dorsal, between the fourth and fifth spine, this spot being ocellated below and behind; a second black blotch on upper half of first spine and membrane, also ocellated behind; second dorsal and caudal spotted and finely blotched with black; anal largely black, with a pinkish border; pectorals blackish; ventrals pale; branchiostegals pinkish.

This species, formerly erroneously identified by us with *Prionotus punctatus*, differs from the latter in its much slenderer form, in color, in the absence of spinous teeth on snout, and in the short pectorals.

The original types were obtained by us at Beaufort, North Carolina, in 1877. Another specimen (15148) is in the National Museum, collected in West Florida, by Kaiser and Martin.

URANOSCOPIDÆ.

100. Astroscopus anoplus (C. & V.) Bav.—*Dog-fish; Electric Dog-fish.* P. G. (30851, 30899.)

This species is rather common about Galveston, and is not rare about Pensacola. Two young specimens were obtained at each place. The fishermen at Galveston ascribe to it electric powers in life—a trait already noticed by Dr. J. A. Henshall in the closely allied *Astroscopus y-græcum*.

Coloration of young specimens in life: dark olive above, becoming abruptly white beneath, the sides with a darker shade. Back and top of head, as far back as front of soft dorsal and as low as upper edge of pectoral, covered with small, round, light-green spots, none of them as large as pupil, those on top of head light brown. Posterior part of body speckled with blackish dots. First dorsal black except at base; second dorsal plain, with a dark blotch in front; anal and ventrals immaculate; caudal with three black longitudinal stripes, the interspaces pale. Pectoral black at base, its edge pale. Lower jaw and median line of lower side of head yellow; a large oblong black blotch on each side of median line of lower part of head. Lips dusky. D. IV–I, 13; A. 13. Scales scarcely appreciable, visible only posteriorly.

The naked area behind the eyes is much smaller in this species than in *A. y-græcum*, its form being concavo-convex, its length barely twice

that of the snout; the bony Y-shaped plate on top of head is much shorter and broader in *A. anoplus*, concave on the median line, and forked about half its length. The posterior, undivided part of the Y is broader than long. The bony bridge across the occiput is but little shorter than the part of the head which precedes it. In *A. y-græcum* the Y is forked for less than half its length, the posterior part is more than twice as long as broad, and not concave on the median line; the naked area behind the eyes is trapezoidal, longer than broad, and about 4 times the length of the snout. The bony bridge across the occiput is not half the length of the part of the head before it.

The coloration of the *A. y-græcum* is somewhat different. The pale spots on the body are larger; some of them are as large as the pupil, and each surrounded by a narrow ring of black. They extend backward to the end of the soft dorsal, and also cover the lower jaw. The second dorsal is black (the base paler), with two oblique stripes of white; the anal is white with a broad black band; the caudal black with two white bands, the corners also white; the pectoral brownish, with a broad black shade and a narrow edging of white; the two black blotches on the lower parts of the head are present as in *A. anoplus*, but less distinct.

OPISTOGNATHIDÆ.

101. Opisthognathus lonchurus sp. nov. (29671). P. (30864.)

Head not very large, rounded, and blunt anteriorly in profile; snout extremely short, shorter than pupil; eye large, $3\frac{1}{3}$ in head; maxillary $1\frac{1}{3}$ in length of head (in specimen 5 inches long), rather narrow at tip, with a well-developed maxillary bone; lower jaw included; teeth in both jaws cardiform, forming bands, the outer series enlarged, slender; vomer with 5 rather large teeth, forming a semicircle; palatines toothless; gill-rakers slender, of moderate length. Longest anal rays $1\frac{1}{2}$ in head; ventrals long, $1\frac{1}{5}$ in head; pectoral somewhat mutilated, apparently little more than half head.

Dorsal spines very slender, the longest about as long as head, slightly higher than soft rays. Caudal long, the middle rays longest, a little shorter than head. Scales entirely destroyed by the digestive process; head naked.

Head $3\frac{2}{5}$ in length; depth $4\frac{2}{5}$. D. *ca.* 25; A. *ca.* 15.

Color: head light olive, unmarked; rim of upper lip narrowly black; top of head and back rather darker; body apparently nearly plain light olive; caudal plain, with traces of three dark bars; breast white; eye dark.

A single specimen, 5 inches long (No. 29671, U. S. Nat. Mus.), in poor condition (the skin of the body having been digested), taken from the stomach of a Red Snapper, at Pensacola. A second specimen, in the U. S. Nat. Mus. (30712), since forwarded by Mr. Stearns, has the head $3\frac{1}{3}$; depth $3\frac{3}{4}$; lat. l. 67.

BATRACHIDÆ.

102. Batrachus tau (L.) C. & V.—*Sarpo.* P. (30811.)

Very common in grassy lagoons about Pensacola. Our specimens belong to the scarcely tangible var. β. of Günther. The "white" spots on the body and fins are bright olive-yellow in life.

103. Porichthys plectrodon sp. nov. G. (30894.)

Allied to *Porichthys margaritatus* (Rich.), but with the palatine teeth very different.

Head $3\frac{3}{4}$ ($4\frac{1}{4}$); depth $5\frac{2}{5}$ (6). D. II, 37; A. 34.

Body rather elongate, tapering and compressed behind. Head depressed, two-thirds as broad as long and half wider than deep; lower jaw considerably projecting, maxillary reaching to well behind eye, its length $1\frac{3}{4}$ in head. Teeth in single series on jaws, vomer, and palatines; those of upper jaw very small, a few of the anterior and two or three of the lateral teeth somewhat enlarged, the latter strongly hooked forwards. Teeth in lower jaw strong, rather weaker than in *P. margaritatus*; those in the front of the jaw hooked strongly inwards; the lateral teeth, which are larger, hooked backwards and inwards; one or two strong canines on each side of vomer, these curved backwards and outwards. Teeth on palatines distant, few in number (usually 4 or 5); among these are one to three very strong canines (usually, but not always, much larger than canines on vomer), strongly curved forwards and inwards. In *P. margaritatus** and *P. porosissimus*, the palatine teeth are not especially enlarged, subequal and more numerous; the canines on the vomer being much larger than any of the other teeth.

Gill openings extending from upper edge of pectoral to just below lower edge. Pectoral without axillary foramen.

Height of soft dorsal about 3 in head. Length of caudal nearly 2. Height of anal $3\frac{1}{3}$. Length of pectorals $2\frac{3}{5}$; of ventrals $2\frac{2}{3}$.

Color in life light brown above, the top of head much darker and clouded with dark brown; a row of about ten bar-like dark blotches along middle of side, each larger than eye; those anteriorly deeper than long, the others longer than deep. Each of these blotches is usually more or less confluent with a saddle-like dark blotch across the back. A crescent-shaped pale translucent area below the eye; below this a larger blue-black area, irregularly crescent-shaped, covering the preorbital and suborbital region, bounded below and behind by a row of shining mucous pores. On it are about four large pores, and above and behind it, close behind and below eye, is a large shining pore bordered with black. Cheek steel-bluish. Sides of body silvery, becoming golden below. Lower part of head and belly bright golden. A dark stripe along base of dorsal. Soft dorsal with 2 or 3 rows of small round dark olive

*The identity of the Pacific species (*margaritatus* Rich.=*notatus* Grd.) with the Surinam "*porosissimus*" is not yet proven, and is not very probable.

spots, the upper row posteriorly becoming a dark edging to the fin. Caudal dull red, edged with dusky. Anal very pale, edged with blackish. Pectorals light orange, usually with some small dark spots above. Ventrals orange, slightly darker anteriorly.

Numerous series of pores on the body, those of the lateral line accompanied by shining golden bodies, as in other species of the genus. According to fishermen, these bodies are phosphorescent, shining at night; a statement which is probably true, although we have been unable to verify it. Pores on sides of back not shining. Most of the pores, as in other species, accompanied by numerous small cirri or cilia.

The arrangement of the lines of pores and shining bodies is not very different from that found in *P. margaritatus*. It may be thus described in detail.

A series of pores beginning at tip of snout, extending down around preorbital region, bounding the dark subocular blotch and joining almost at a right angle with a series of pores which extends downward from lower posterior corner of eye to angle of mouth. Another series diverges from the first in front of eye, passing close below eye, then upward above cheek, ending in a large pore behind preopercle. A curved series of pores extending backward along opercle, and another parallel with it along suboperele.

Two obscure series from front of eye along top of head, becoming wide apart at the vertex, converging at the nape, then slightly diverging, converging in front of spinous dorsal, then again diverging to pass around the fin, each at last becoming straight at front of soft dorsal, extending close to its base to its last ray, there being about two pores to each ray. Just below this series, at front of soft dorsal on each side, begins a second series, with the pores wider apart and somewhat irregular, ceasing near the middle of the soft dorsal fin.

The lateral line proper next begins above upper posterior angle of preopercle, whence a short branch passes directly upward. Opposite front of soft dorsal, the lateral line is interrupted for a distance a little more than diameter of eye. A short branch arises at this interruption and passes upward and backward at an angle from the end of the anterior part. Thence the lateral line passes straight to base of caudal.

The next series arises just behind axil of pectoral, then curves abruptly downward and backward, becoming straight opposite third ray of anal, thence proceeding to base of caudal, the pores small and close-set, anteriorly bead-like and shining, becoming dull toward the tail. Next comes a double series on each side of base of anal, the two series converging behind and finally coalescing.

Another series begins at the middle of the base of the pectoral in front, curves downward, around the base of the fin, and, proceeding directly backward, ceases opposite vent. A series begins midway between gill opening and ventral and, extending straight backward, ceases opposite base of pectoral. Another begins, on each side, on lower side of head, directly below angle of mouth, the two diverging slightly between ventrals, then converging a little behind ventrals, then abruptly diverging, joining the series last mentioned, on each side, just in front of base of pectoral.

A cross-series of pores extends straight across belly, between vent and anal fin. At each end of this cross-series a series of pores turns abruptly forward, the two meeting in an acute angle on the belly just in front of a vertical from base of pectorals. Finally, three parallel series on each side of lower parts of head meet in front, the two anterior in obtuse curves, the posterior in an acute angle. The anterior series along the mandible ends at the corner of the mouth. The next just behind the mandible ends just below the corner of the mouth. The next passes along the branchiostegal region, ending at the gill opening. Mandible with two large foramina. A series of dark-colored pores along each side of tongue.

This species is not rare about Galveston, where many specimens, the largest 8 inches long, were obtained with the seine, in water of moderate depth. It seems to be unknown to fishermen at Pensacola.

GOBIESOCIDÆ.

104. Gobiesox virgatulus sp. nov. P. (30861.)

Three specimens, the longest about $1\frac{1}{4}$ inches in length, taken among ballast rocks in Pensacola Bay.

Head $2\frac{3}{4}$ ($3\frac{2}{5}$); width of head $3\frac{1}{4}$; depth 6 (7). D. 10; A. 8.

Body rather slender, the head low and rather broad, broadly rounded anteriorly; eyes very small, about 4 in head, their diameter two-thirds to three-fourths the broad, slightly convex interorbital space. Cheeks prominent; opercle ending in a sharp spine. Cleft of mouth extending to below front of orbit; lower jaw somewhat shorter than upper.

Teeth of upper jaw in a narrow band of about two series; four teeth of the outer series a little larger than the rest, somewhat canine-like. Middle teeth of lower jaw incisor-like and partly horizontal, their edges entire or somewhat concave. Ventral disk considerably shorter than head. Distance from root of caudal to front of dorsal $2\frac{4}{5}$ in length. Pectoral short, about $2\frac{2}{3}$ in head.

Color in life olivaceous, with numerous paler spots; the whole body covered with rather faint, wavy longitudinal stripes or lines of a light orange-brown color, about as wide as the interspaces, much as in some species of *Liparis;* skin everywhere with dark punctulations. Caudal dusky, slightly barred with pale, its tip abruptly yellowish. Dorsal and anal dusky, somewhat barred. Body sometimes with traces of darker cross-shades.

This species may be identical with *Gobiesox nudus* of Günther, but the name *nudus* cannot fairly be retained, as the original *Cyclopterus nudus* L. was an East Indian species, very different from this.

GOBIIDÆ.

105. Lepidogobius gulosus (Girard) J. & G. P. (30844.)

Three specimens obtained in the "Laguna Grande" at Pensacola, the longest 2¾ inches in length.

Coloration in life light, grayish olive, with rather sharply-defined markings of darker brown; head with a pale bluish stripe from behind the angle of the mouth upward and forward parallel with the gape to below the front of eye, then turning abruptly backward across suborbital region to upper edge of gill opening; another pale streak from snout along lower part of eye; between this and the first streak a dusky area; below the first-mentioned streak a dusky region on cheeks; opercle with an oblique blackish bar; top of head with dark marblings surrounded by paler reticulations; back with a series of black cross-blotches, mostly separated on the median line; two narrow vertical dark bars behind pectoral; middle line of side posteriorly with longitudinally oblong black blotches; besides these numerous other blotches not regularly arranged. First dorsal with two or three oblique black bands; second dorsal pale, with about four series of black dots; caudal spotted with black, pectoral yellowish, ventral black, its center yellowish; anal pale; lower side of head pale; jaws dusky.

Head 3¼ (4½ in total); depth 5 (6). D. VI–15; A. 16; Lat. l. about 42.

Body elongate, moderately compressed. Head long and large, low, rather sharp in profile. Eyes large, placed high and close together, 4 in head. Snout short, 4½ in head. Mouth large, very oblique, the lower jaw strongly projecting, the maxillary extending to below middle of pupil, its length 2½ in head.

Teeth in few series, those of the outer row very long, slender, and curved, those of the lower jaw longest.

Gill membranes not continued forward above opercle. Scales small, cycloid, imbedded. Head, nape, and breast scaleless; scales of anterior part of body not well developed.

Dorsal spines slender, the tips of the longest somewhat filamentous, although short, the longest about half head. Soft rays a little higher than the spines. Soft dorsal and anal unusually long. Caudal pointed, about as long as head. Pectorals about 1¼ in head, their upper rays not "silk-like." Ventrals about as long as pectorals, their insertion directly below front of pectorals.

106. Gobius lyricus (Girard) J. & G. G. (30897.)

A single specimen about 3½ inches long, taken with a dip-net in a brackish pool at Galveston.

Subgenus *Euctenogobius* Gill.

Color in life dark olive, with 4 or 5 irregular confluent blackish cross-bands, besides dark blotches and irregular markings. Head marbled with darker, the jaws, opercles, and branchiostegals blackish. First dorsal mostly dusky translucent, somewhat barred. Second dorsal and anal plain dusky. Caudal dark blue, with two longitudinal stripes of bright red. Pectoral finely barred or reticulated with blackish and pale. Head and belly yellowish. Female specimens probably duller and paler.

Head 4⅓ (5⅔); depth 4⅔ (6). D. VI–11; A. I, 10. Lat. l. 27.

Body rather elongate, moderately compressed. Head rather short, the profile very obtuse, descending abruptly from before the front of the eye to the snout. Eyes small, placed high, about as long as snout, and about 4½ in head. Mouth nearly horizontal, much below level of eye; the maxillary extending to beyond pupil, 2⅔ in head; jaws subequal; teeth strong, in one series in each jaw; in the lower jaw about 4 shortish, canine-like teeth behind the other teeth; anterior teeth of lower jaw small; of upper jaw rather large.

Gill opening not continued forward above opercle.

First dorsal with two or three spines filamentous, the longest reaching past the middle of the second dorsal, which is of moderate height and similar to the anal; caudal long and pointed, one-fourth longer than the head. Pectoral as long as head, about reaching front of anal. Upper rays of pectorals not silk-like. Ventrals somewhat shorter than head, their insertion below front of pectorals.

Scales large, rough, those on nape, pectoral region, and belly reduced in size; head naked.

Gobius würdemanni Girard is possibly identical with this species, although the scales are said to be smaller, and the teeth much smaller than in *G. lyricus*. The original types of *G. lyricus*, as of *G. würdemanni*, came from Brazos Santiago, Tex. The types of the latter are now lost.

107. Gobius boleosoma sp. nov. P. (30860.)

Subgenus *Coryphopterus* Gill.

Color in life: Male deep olive green, mottled with darker; middle of side with 4 or 5 vague darker blotches. A jet-black spot above gill opening, on side of back. Head mottled, dusky below; usually a dark bar below eye. Dorsals tipped with bright yellowish, each crossed by numerous narrow, somewhat oblique, interrupted bars or series of spots, these being of a rich reddish brown color. Caudal barred with black, its upper edge tinged with orange. Anal nearly plain, with a slight orange tinge. Ventrals bluish-black, their edges whitish.

Female paler and duller in color, more mottled, the black spot above gill opening obsolete or nearly so; a dark spot at base of caudal. Upper fins barred, as in the male. Lower fins mostly pale, tinged with orange.

Head 4 (5 in total); depth 4½ (5¾). D. VI–12; A. I, 11. Lat. l. about 33.

Body slender, subfusiform, little compressed. Head moderate, not very blunt, the anterior profile somewhat evenly decurved, the snout not very short, scarcely shorter than the large eye. Mouth not very large, horizontal, the lower jaw included, the maxillary extending slightly beyond front of pupil; its length about 3 in head. Teeth small, slender, in narrow bands, those of the outer series longer than the others. Eyes placed high, about 4 in head; interorbital space not wider than pupil.

Scales moderate, ctenoid; those on nape and belly not much reduced in size.

Gill openings not continued forward above opercle.

First dorsal with the spines slender but rather firm, none of them filamentous, the longest about three-fifths head. Second dorsal and anal rather large. Caudal long, pointed, slightly longer than head. Pectorals large, slightly longer than head, none of the upper rays silk-like. Ventrals slightly shorter than head, inserted below axil of pectorals.

Many specimens of this species, the largest about 2 inches in length, were obtained in the Laguna Grande at Pensacola. It lurks in sea wrack on muddy bottoms in very shallow water (6 to 12 inches). In form, size, coloration, and movements, this little fish bears a remarkable resemblance to the percoid, *Boleosoma olmstedi*.

108. Gobius soporator C. & V. P. (30822.)

(*Gobius catulus* Grd.; *Gobius mapo* Poey; *Gobius carolinensis* Gill.)

Exceedingly abundant about the wharves at Pensacola, lurking under stones in ballast heaps, etc. It reaches a length of about 5 inches.

Color in life very deep olive-green, the back and sides obscurely barred and much marbled with different shades of olive-green; cheeks with the dark markings forming reticulations around pale spots. Whole under part of head blackish in the males; yellowish in the females.

First dorsal with an oblique median shade of blackish, the base in front and the distal part light orange. Second dorsal dusky at base with some spots, its margin light orange. Caudal reddish, with dusky cross-lines or spots. Anal and ventral dusky, yellowish at base in the female. Pectoral olivaceous, yellowish at base, reddish at tip; two dark spots on base of pectoral.

Head 3½ (4 in total); depth 4 (5). D. VI, 10; A. I. 9. Lat. l. 30 to 38; 12 rows of scales from first dorsal downward and backward to anal. Scales on nape extremely small. Scales on sides firm, ctenoid.

Form robust. Head rather blunt and heavy, the snout less abruptly decurved than in *G. lyricus*. Mouth moderate, the jaws equal, the maxillary reaching about to front of pupil, 2⅔ in head. Teeth in moderate bands, the outer series somewhat enlarged. Cheeks full, tumid. Eyes moderate, placed rather high, much broader than the interorbital space.

Dorsal spines slender, the first longer than the other, but not filamentous, 1⅔ in head; caudal rounded, 1⅓ in head; upper rays of pectorals silk-like, the fin somewhat longer than ventral, 1¼ in head.

109. Gobiosoma alepidotum (Bloch & Schn.) Grd. P. (30854.)

(*Gobiosoma molestum* Grd.)

Rather common about Pensacola. Numerous specimens taken with the seine in the Laguna Grande.

Color in life light olive, closely punctulate with darker under the lens; sides of body with broad dusky shades which alternate with narrow paler bars, which are sometimes chain-like. A longitudinal series of small linear dark spots along the middle of side of the body; a dark space above and in front of base of pectoral; sometimes a dark area below eye. Dorsals, anal, and ventrals blackish, usually without distinct markings, sometimes faintly barred with reddish; pectorals pale, dusky, and speckled at base.

Head 3⅔; depth 4. D. VII, 13; A. 10.

We are unable to distinguish our specimens from *G. alepidotum* of the Atlantic coast.

110. Ioglossus calliurus Bean MSS. P.

Body very elongate, slender, much compressed, of equal depth throughout; head compressed, without osseous crest; mouth very oblique; the lower jaw strongly projecting; premaxillaries in front on the level with pupil; maxillary extending to opposite front of pupil, its length 2¾ in head; upper jaw with a narrow band of about two series of conical cardiform teeth; those of the outer row much larger than the others; behind these are two small conical curved canines; lower jaw with a single row of smaller teeth, behind which are about 4 canines directed somewhat backward; the posterior pair largest and strongly curved; no teeth on vomer or palatines. Tongue narrow, pointed. Eye large, nearly twice length of snout, 3½ in head, its diameter considerably more than depth of cheek, about half more than interorbital width; opercles unarmed. Pseudobranchiæ present. Gill openings wide, extending forwards below, the membranes attached mesially to the very narrow isthmus, across which they do not form a fold. Gill-rakers long and slender.

Dorsal fins separated by a short interval, the first of very slender somewhat filamentous spines, the longest about as long as head; second dorsal little more than half as high as first, apparently nearly uniform, separated from the caudal by an interval nearly half length of head; caudal lanceolate, its middle rays filamentous, about half the length of rest of body; anal rather high, similar to soft dorsal. Ventrals I, 4, inserted very slightly in advance of base of pectorals, the two fins very close together, but apparently quite separate and without basal fold of skin; the fin little longer than head, the inner rays filamentous. Pectoral with broad base, about 1¼ in head. Anal papilla very short, midway between tip of snout and base of caudal.

Body with very small, non-imbricate, imbedded scales, these a little larger and imbricate on the tail; cheeks with imbedded cycloid scales. Scales very weakly ctenoid, most of them appearing cycloid. No lateral line.

Head 5 in length; depth 7 to 7½. D. VI-22; A. 1, 21.

Color: light olive, top of first dorsal dusky; middle of caudal dusky (blue), with paler (perhaps red) edgings.

Two specimens of this remarkable species, the largest 4½ inches long, taken from stomachs of the Red Snapper at Pensacola.

BLENNIIDÆ.

111. Chasmodes saburræ Sp. nov. P. (30824.)

Allied to *Chasmodes bosquianus*, but with the mouth smaller, the form less elongate.

Head 3½ to 3¾; depth 3¼ to 3¾. D. XII, 17; A. II, 18.

Body rather deep and compressed, less elongate than in *C. bosquianus*; the back somewhat arched. Head comparatively short, much shorter than in *C. bosquianus*, not one-fourth longer than deep; profile forming a nearly even curve from the base of the dorsal to the tip of the snout, which is not blunt, although less acute than in other species of the genus.

Mouth low, nearly horizontal, the maxillary reaching to near the posterior margin of the pupil, its length 2⅓ to 2¾ in head (2 or less in *C. bosquianus*), lower jaw included; teeth rather short, equal; toothless posterior part of lower jaw occupying scarcely more than half the length of its side; oblique length of snout 3½ in head. Eye large, 5 in head, half wider than the interorbital space. Lower edge of gill-opening opposite base of third ray of pectoral, the height of the slit 4¼ to 5 in head. Lateral line extending as far as tip of pectoral. A minute cirrus (sometimes obsolete), not so long as pupil, above each eye, and a similar one over each nostril.

Dorsal fin continuous, the spines slender, but little lower than the soft rays, the longest of the latter being 1½ in head. Last ray of dorsal joined to base of caudal; anal free from caudal. Caudal 1⅓ in head. First two rays of anal short, in the males thickened and fleshy at tip, the short anal papilla close in front of them. Pectorals a little shorter than head; ventrals 1¾ in head.

Females (in spirits) with about 8 irregular blackish cross-bars extending on the dorsal fin, everywhere freckled with pale spots; a bar below eye, and two or three across the under side of head; fins all sharply barred with blackish, in fine pattern; the cross-bars on pectorals and ventrals usually very distinct.

Male in life: deep olivaceous, with traces of darker bars, and marbled with light and dark; a series of round greenish spots along middle of sides posteriorly, besides other series which form narrow undulating greenish lines converging backwards; a dark stripe downward and one forward from eye; lower side of head mostly dusky.

Dorsal fin dusky or greenish, the spinous part with a dark shade or one or two dark blotches near the base, and with a median longitudinal band of orange; usually a dusky blotch above this band between first and second spines, the margin of the fin somewhat dusky. Some specimens with the outer part of both dorsals and the top of head dusted with black spots; others with these spots obsolete; soft dorsal and caudal light orange, barred with light greenish; anal dull orange, with an obscure blackish median band, the exserted tips of the rays abruptly whitish. Pectorals dusky olive, strongly tinged with orange. Ventrals blackish, orange at tip.

The life colors of the female were not observed.

This species is very abundant in Pensacola Bay, where 14 specimens, the largest about 4 inches in length, were obtained. Some of these were taken with a seine in masses of *Zostera* in the Laguna Grande; others were caught with a pin-hook from the wharves, where it abounds among the ballast rocks (*saburra*) on which the wharves are built.

112. Isesthes* ionthas sp. nov. P. (30856.)

Head 4 (4⅜); depth 3⅓ (4½). D. XII, 13, or XII, 14; A. II, 13, or II, 14.

Body rather deep, moderately compressed, the back little elevated. Head short, blunt, but less so than in *I. punctatus*; the profile prominent above the eye, thence descending abruptly but not vertically to the tip of the snout; oblique length of snout 4 in head.

Mouth small, low, its cleft largely anterior, the short maxillary scarcely reaching past the front of the eye, 4 in head. Eyes large, placed high, 5 in head, the interorbital space about half their diameter. Orbital cirrus low, scarcely larger than nasal cirrus, which is about equal to diameter of pupil. Teeth moderate, equal; no posterior canines. Gill-opening extending downward to a point a little below middle of base of pectoral, the height of the slit 3 in head. Lateral line not reaching tip of pectoral.

Dorsal fin continuous, the spines low and not very stiff, slenderer than in *I. punctatus*, the longest spines a little lower than the soft rays, which are about 1⅓ in head. Caudal free from anal, slightly connected with dorsal; a little shorter than head; pectoral about as long as head; ventrals shorter than head.

Color clear olive-green, with only traces of darker bars; body everywhere densely freckled with small round blackish spots, smaller than the pupil; on the sides and lower part of head these spots are reduced to close-set dots; two dark lines, separated by a pale area, downward from eye; a vertical curved blackish line behind eye, in front of which is a golden area. Vertical fins all plain olive-green, their edges dusky; tips of anal rays pale; paired fins dusky-olive; lower parts of head tinged with golden, sometimes with dusky cross-bars; cirri green.

Four specimens, the largest about 2½ inches long, were obtained with hook and line from the wharves at Pensacola.

The small size of the orbital cirrus and the freckled coloration readily distinguish this species from its congeners.

* *Isesthes* J. & G. Syn. Fish. N. A. 757: type *Blennius gentilis* Grd.

113. Isaethes scrutator sp. nov. P. G. (30850, Pensacola.)

Head 4 ($4\frac{3}{10}$); depth $3\frac{3}{4}$ ($4\frac{1}{2}$). D. XII, 14; A. II, 16.

Body rather deep, compressed, the back not elevated; head short, very blunt, almost as deep as long, the profile abruptly descending before eye, the snout about one-fourth length of head. Mouth very small, anterior, the maxillary extending to opposite front of eye, $3\frac{1}{3}$ in head; teeth subequal, without canines. Orbital cirri very long, reaching when depressed about to the front of dorsal, their length more than half head in Pensacola specimen, in the other somewhat shorter; a short branch near its middle. Nasal barbel minute. Eye large, much broader than the concave interorbital space, about $4\frac{1}{2}$ in head. Lower edge of gill-opening a little below middle of base of pectoral, the depth of the slit $2\frac{1}{2}$ in head.

Dorsal fin scarcely emarginate, the spines rather stiff, lower than the soft rays, the longest spine 2 in head. Caudal slightly connected at base with dorsal, $1\frac{1}{8}$ in head. Pectoral about as long as head, reaching past front of anal. Ventrals $1\frac{2}{5}$ in head.

Lateral line extending to base of 8th spine, not to tip of pectoral.

Color in life deep olive-green, almost immaculate, or with faint traces of darker vertical bars; a golden blotch behind eye, behind which is a dusky crescent; two dark bars downward from eye, separated by a yellowish area. Fins all dusky greenish, nearly or quite immaculate. Front of spinous dorsal blackish. Colors of female, if different, unknown.

One fine specimen, 3 inches in length, taken with hook and line from the wharf at Pensacola. Another, which had been a long time in alcohol, and is discolored and somewhat shrivelled, was presented by Dr. August Galny. It was taken in Galveston Bay.

114. Blennius stearnsi sp. nov. P. (29669.)

Head, $3\frac{1}{5}$ ($4\frac{2}{3}$ in total); depth, $4\frac{2}{3}$ ($5\frac{2}{3}$). D. XI, 18; A. II, 21.

Body much elongate, compressed, tapering regularly behind; anterior profile moderately decurved; snout short and blunt; mouth large, oblique, the jaws even; maxillary reaching slightly beyond middle of orbit, $2\frac{1}{4}$ times in head; teeth in the front of the jaw only, occupying on each side a space equal to half length of maxillary; teeth $\frac{2}{2}\frac{4}{4}$, the lateral one on each side much enlarged and canine-like, rather short but strongly curved; canine in upper jaw, equaling about half diameter of pupil; eye moderate, equaling snout, $4\frac{1}{3}$ in head; interorbital space very narrow, not as wide as pupil; upper posterior rim of orbit with a long, slender filament, forked at base, its length equaling distance from tip of snout to posterior rim of orbit; no filament at the nape; gill membranes somewhat united to the isthmus in front, but forming a broad fold across it posteriorly, the gill openings of the two sides therefore continuous below.

Dorsal rather high; no notch between spines and soft portions, the membrane of last ray not reaching base of caudal; spines of nearly uniform height, all very slender and flexible, the tips almost filamentous; highest spine half length of head; highest soft ray $1\frac{3}{5}$ in head; anal lower than dorsal, its longest ray very slightly less than one-half length of head; length of caudal peduncle more than half its height, about equaling diameter of orbit; caudal about equal to pectoral, $1\frac{1}{3}$ in head; ventrals long, the inner ray much the longest, $1\frac{1}{5}$ in head, not quite reaching vent.

Color, light greenish-olive, somewhat mottled; sides with irregular dark bars formed of spots, these extending on the fin; skin everywhere finely punctate; dorsal dark olive, the spinous part darker at tip; anal blackish, with paler edge; ventrals dusky; pectorals and caudal olive.

Three specimens, the largest 3 inches long (No. 29669, U. S. Nat. Mus.), taken from the stomach of a Red Snapper, at Pensacola.

OPHIDIID.Æ.

115. Ophidium graëllsi Poey. P. (30868.)

Very light olive, somewhat punctate above, slightly silvery below; fins without trace of dark edging (but being mutilated they may have been dark-edged in life).

Head $4\frac{2}{3}$ in length, depth about 7. Head small, the profile not very obtuse; snout $4\frac{2}{3}$ in head; eye $3\frac{1}{4}$, more than twice the narrow interorbital space; mouth oblique, the maxillary reaching to posterior border of pupil, 2 in head; lower jaw slightly included; teeth small, in narrow bands in the jaws, the outer series in upper jaw somewhat enlarged; vomerine and palatine teeth small, subequal; head naked; snout spineless; opercle without spine; no evident pseudobranchiæ; gill-rakers rather long and strong, 4 below angle of arch; occiput nearly midway between origin of dorsal and front of eye. Air-bladder long and slender, occupying nearly the whole length of abdominal cavity, tapering backward.

Two specimens, one of which is in good condition and about 4 inches long, were taken from the stomach of a Red Snapper, at Pensacola. The type of *graëllsi* differed from the specimens before us in having a shorter head (more than 5 times in the length), and a larger maxillary (reaching posterior border of eye). But as the typical specimen of *graëllsi* was 8 inches long, the difference is probably due to increased size.

116. Genypterus omostigma sp. nov. P. (29670.)

Body comparatively short, highest at occiput; thence tapering rapidly to tip of tail; upper profile of head very convex; snout blunt; mouth horizontal, the lower jaw included; maxillary not quite reaching posterior border of orbit; teeth in jaws uniform, strongly incurved, in rather broad bands; a single series of small teeth in vomer; those on palatines minute; maxillary 1[illegible] in head; eye large, 3 in head, much larger than snout, equalling twice interorbital width; opercle terminating in a strong, compressed spine, the length of which is about two-thirds diameter of

pupil; gill-rakers very small, 4 below on anterior arch. Longest ventral filament half length of head; the shorter three-quarters length of longer. Distance from origin of dorsal to tip of snout 3⅓ in total length; distance from origin of anal to snout 2⅕ in total length. Scales minute, imbedded. Pseudobranchiæ not evident. Air-bladder short, thick, with a large posterior foramen.

Head 4⅓ in length; depth about 6.

Color light olive-green, silvery on belly, cheeks, and lower side of head; sides above with a few irregular, large, scattered, dark blotches; about 9 of these along base of dorsal fin; an intensely black, round blotch on scapular region, rather larger than pupil; dorsal with black blotches; anal largely black; upper half of eye black, lower half bright silvery.

A single specimen, 3½ inches long (No. 29670 U. S. Nat. Mus.), taken from the stomach of a Red Snapper, at Pensacola.

As here understood the genus *Genypterus* differs from *Ophidium* in the presence of a spine on the opercle, a character apparently of more importance than that drawn from the dentition of the palatines. In the latter respect *G. omostigma* agrees more nearly with *Ophidium*.

PLEURONECTIDÆ.

117. Paralichthys dentatus (L.) J. & G.=*Flounder*. P.: G. (31028.)

A common market-fish at Galveston, New Orleans, and Pensacola. Our specimens agree with others from Washington market and other northern localities.

The width of the interorbital space increases with age. In specimens 16 inches long, it is wider than the eye, and equal to the length of the snout, without the premaxillary. In young specimens it is proportionately much narrower.

D. 88; A. 71. Gill-rakers narrowly triangular, 3 to 4 times as high as broad; the mouth large, the maxillary reaching past eye, a little more than half head.

The genus *Pseudorhombus* Bleeker is in all respects identical with the prior *Paralichthys* Grd. *Ancylopsetta*, *Uropsetta*, and *Chænopsetta* Gill, as well as *Hippoglossina* Steindachner and *Xystreurys* J. & G. are inseparable from *Paralichthys*.

118. Paralichthys albigutta sp. nov. P. (30818.)

Pseudorhombus dentatus ("*albigutta*") Goode & Bean, Proc. U. S. Nat. Mus. 1879, 125. (Specimen No. 4887, U. S. Nat. Mus.)

Body elongate, irregularly elliptical, the snout protruding, owing to angulation of profile above front of upper orbit; caudal peduncle short and high, its length two-fifths the height, which equals two-fifths length of head; head large, 3⅓ in length; mouth large; maxillary reaching beyond lower eye, half length of head; teeth long, slender, conical; those in lower jaw distant, 7 in number on each side, regularly and rapidly decreasing in size towards angle of mouth; in front of upper

jaw are 3 or 4 canine-like teeth on each side, similar to those in lower jaw, but rather smaller; the lateral teeth all equally minute; interorbital space narrow, scaled posteriorly, not flat, the ridge of upper orbit prominent posteriorly; interorbital width 2½ to 3 in eye; lower eye slightly in advance of the upper, 5¾ in head; gill-rakers moderate, broad, with 3 or 4 coarse serratures on inner margin; 10 rakers below angle, the longest 2½ in orbit.

Fins all low; dorsal beginning slightly in advance of upper eye, the first two rays a little turned to blind or left side, the anterior rays not elevated or exserted; dorsal highest at beginning of last fourth of fin, the longest ray 2⅔ in head. Anal similar to dorsal; distance from its origin to snout 2⅕ in length of body; the highest ray 2¾ in head. Caudal rounded, 1⅓ in head; pectoral long and slender, half head; ventrals long, reaching beyond front of anal, slightly less than one-third head.

Scales rather small, becoming somewhat larger on caudal peduncle; lateral line with a short, high, somewhat oblique, arch in front, the anterior end of arch much above axis of body; width of arch about 3⅓ in straight portion of lateral line; scales all smooth and imbedded; minute accessory scales very numerous.

Head 3⅓ in length, depth 2⅔. D. 76 to 79; A. 59 to 61. Lat. l. about 90 (pores); about 60 oblique series behind curve of lateral line.

Color (in specimen from Pensacola) dark greenish, mottled with darker, and with many very small pale spots; fins all colored like the body. A specimen from Beaufort, N. C., is nearly uniform dark brown.

The types of the present species (No. 30818 U. S. Nat. Mus.) are two specimens, 7 to 8 inches long, obtained in the Laguna Grande, at Pensacola. A third specimen is known from Beaufort, N. C., and a few small specimens from Pensacola, in addition to the one mentioned above. There is also a small specimen (4887), which has been a long time in the National Museum, where it has received from unknown hands, the manuscript name "*Chænopsetta albigutta*." This specific name we here adopt as our own.

119. Paralichthys squamilentus sp. nov. P. (30862.)

Sinistral. Body very deep, closely compressed, the greatest height at about the middle of the length; caudal peduncle very short, its length one-third its height, which is 2⅔ in head; profile evenly arched, angulated at front of upper eye, the snout thus projecting; head short and high, the greatest height at occiput equalling the length, which is contained 3⅔ times in length of body; snout 4⅔ in head. Mouth large, very oblique, the lower jaw included; mandible with a sharp compressed knob at symphysis, its length 1⅔ in head; maxillary narrow, reaching beyond pupil, but not quite to posterior margin of lower eye, its length very slightly more than half head; teeth in lower jaw of moderate size, the longest rather less than diameter of pupil, the largest next the symphysis, thence decreasing rapidly towards corner of mouth; the teeth are distant, few in number, 8 on each side; upper jaw with two or three rather large teeth on each side in front, these smaller than those in lower

jaw; lateral teeth minute; an inconspicuous blunt tubercle on snout, in front of upper eye; interorbital space a narrow scaleless bony ridge, slightly concave anteriorly; interorbital width scarcely more than half diameter of pupil; upper eye slightly in advance of lower, its diameter about one-fifth head; gill rakers $\frac{8}{8}$, comparatively slender, compressed, the inner edge with a few distinct strong teeth; the longest raker nearly half diameter of eye.

Dorsals low, beginning over front of upper eye, the anterior rays not produced nor filamentous, but with free tips; the highest rays are at beginning of posterior third of fin, their length $2\frac{1}{3}$ in head; length of first rays $4\frac{1}{2}$ in head.

Anal spine weak; the fin similar to dorsal, but higher, the highest ray $2\frac{1}{3}$ in head; ventrals reaching front of anal, about one-third head; pectoral of colored side $2\frac{1}{3}$, of right side $2\frac{1}{2}$, in head, caudal about $1\frac{2}{3}$ in head.

Scales on head and body very small, cycloid, closely adherent, without free posterior edge; lateral line with a very short, high curve anteriorly, the width of which is contained $4\frac{1}{3}$ times in length of straight posterior part; snout, jaws, and preopercle scaleless, head otherwise scaly.

Head $3\frac{2}{3}$ in length; depth 2. D. 78; A. 59. Lat. l. 123 (pores).

Color (in spirits): very light grayish, with traces of several irregularly arranged, faintly ocellated, darker spots; lips dusky; fins all mottled with colors of body.

Two specimens, each about 5 inches long (No. 30862, U. S. Nat. Mus.), were collected at Pensacola.

120. Hemirhombus pætulus Bean MSS. P.

Body elliptic-ovate, strongly compressed, not very deep; the anterior profile regularly decurved until just above the snout, where it forms an angle, the rather short snout thus abruptly projecting; mouth rather large, considerably arched; maxillary extending to below middle of lower eye, $2\frac{2}{3}$ in head; teeth in lower jaw in a single series; upper jaw with two distinct rows, those of outer series in front, enlarged, 2 to 4 of them forming small canines. Eyes large, the lower slightly longer than snout, about 4 in head, its front in advance of the upper eye, especially in adults, where half of it is thus in advance; interorbital space broad, concave, in old specimens as broad or broader than least diameter of orbit; the concavity caused by the prominent ocular ridges which converge backwards, the lower turning upward at an angle to join the other. Gill-rakers short, flattish, and stout, the longest about one-fourth diameter of orbit; the rakers are similar on all the arches, growing gradually shorter on the posterior ones.

Dorsal beginning over angle of snout, its first rays slightly turned to blind side, the longest rays $2\frac{1}{4}$ in head. Caudal short, rounded, $1\frac{1}{2}$ in head. Anal without spine, a little lower than dorsal. Left ventral $3\frac{1}{2}$ in head. Pectoral of left side with two filamentous rays, its length from $1\frac{1}{4}$ to nearly 2 times that of head; pectoral of blind side short, about $2\frac{1}{2}$ in head.

Scales small, thin, weakly ciliate, with many smaller scales intermingled; about 7 series of scales on cheeks; lateral line straight, slightly raised anteriorly.

Head $2\frac{2}{3}$ in length ($4\frac{2}{3}$ in total); depth $2\frac{2}{3}$ ($2\frac{7}{8}$). D. 81; A. 63. Lat. l. 53 (pores on blind side).

Light yellowish-brown, with irregular blackish blotches, these most distinct along middle of sides; fins all grayish, mottled and spotted with black, the pectoral of left side distinctly barred; blind side white, immaculate.

Several specimens, only one of which was perfect, were taken from stomachs of the Red Snapper at Pensacola. The individual here described is 7 inches long, some of the imperfect specimens being nearly a foot long. As usual in the genus *Hemirhombus*, the adults show longer pectoral, wider interorbital space, and the upper eye farther back.

121. Etropus crossotus J. & G. N. O. G. (30980.)

One specimen found in the New Orleans market, it having been taken in Lake Pontchartrain. Three others were obtained at Galveston. We have compared these carefully with the original types of the species from Mazatlan and with others from Panama, and are unable to detect any difference whatever. The wide range thus shown for this species is remarkable.

122. Achirus lineatus (L.) Cuv. Subsp. **browni** (Gthr.).—*Sole.* P. G. (30847, 30909, 31036.)

Common; numerous specimens from Pensacola and Galveston. The Gulf form of this species ("*browni*") seems to differ from Northern specimens only in coloration, the dark bands being broader and the blind side wholly unmarked.

Color in life light brown, with 7 or 8 narrow black bands edged with brownish; these bands rather irregular and about as broad as the eye; between these bands irregular dark cloudings; the head spotted with blackish, fins with dark spots, the membranes largely black, the rays pale. D. 54; A. 40.

123. Aphoristia plagiusa (L.) J. & G. P. (30855.)

Abundant about Pensacola. Numerous small specimens taken in the Laguna Grande. The West Indian *Aphoristia ornata* (Lac.) Kaup has not yet been distinguished from the present species.

TETRODONTIDÆ.

124. Lagocephalus lævigatus (L.) Gill. G.

One specimen obtained at Galveston.

125. Tetrodon turgidus Mitch. Subsp. nephelus, Goode & Bean MSS.—*Blower-fish.* P. G.

Very abundant both at Galveston and Pensacola.

126. Chilomycterus geometricus (Bl. & Schn.) Kaup. G.

Common about Galveston.

BALISTIDÆ.

127. Alutera sp. incog. P. G. (30849.)

Rather rare; a young specimen seen at Galveston. Two very small ones collected by Mr. Stearns at Pensacola.

D. I.–30; A. about 30; dorsal spine somewhat barbed; body elongate; lower jaw projecting; no pelvic spine.

128. Balistes capriscus L.—*Leather Jacket.* P.

One specimen obtained at Pensacola, where it is not uncommon.

OSTRACIIDÆ.

129. Ostracium quadricorne L. P. G.

Not numerous; one specimen obtained at Galveston and another at Pensacola.

ANTENNARIIDÆ.

130. Pterophrynoides histrio (L.) Gill. G.

Not uncommon about Galveston, where three specimens were seen.

MALTHEIDÆ.

131. Malthe vespertilio (L.) Cuv. G.

One specimen obtained at Galveston, presented by Dr. A. Galny. Snout 8 in length to base of caudal.

The following species had not been recorded as occurring on the Gulf coast of the United States previous to the time when the present collection was made. Several of them were, however, already in the National Museum. Those in italics are described as new in the present paper; those marked with an asterisk have been previously recorded from points on the Atlantic coast of the United States.

Isurus dekayi.*
Carcharias platyodon.*
Scoliodon terræ-novæ.*
Sphyrna tiburo.*
Clupea pseudohispanica.
Synodus intermedius.
Fundulus ocellaris.
Ophichthys macrurus.
Ophichthys chrysops.
Myrophis lumbricus.
Conger caudicula.
Exocœtus hillianus.
Siphostoma floridæ.
Siphostoma zatropis.
Hippocampus zosteræ.
Hippocampus stylifer.
Scomber? grex.*
Caranx trachurus.*

Nomeus gronovii.
Serranus trifurcus.*
Stenotomus caprinus.
Diabasis aurolineatus.
Apogon maculatus.
Apogon *alutus.*
Mullus barbatus *auratus.*
Menticirrus nebulosus.*
Chromis insolatus.
Chromis enchrysurus.
Platyglossus caudalis.
Platyglossus florealis.
Astroscopus anoplus.*
Opisthognathus lonchurus.
Porichthys plectrodon.
Gobiesox virgatulus.
Gobius boleosoma.
Ioglossus calliurus.
Chasmodes saburræ.
Isesthes ionthas.
Isesthes scrutator.
Blennius stearnsi.
Genypterus omostigma.
Ophidium graëllsi.
Paralichthys albigutta.
Paralichthys squamilentus.
Hemirhombus pætulus.
Etropus crossotus.
Aphoristia plagiusa.

INDIANA UNIVERSITY, *May* 15, 1882.

A REVIEW OF THE SYNGNATHINÆ OF THE UNITED STATES, WITH A DESCRIPTION OF ONE NEW SPECIES.

By JOSEPH SWAIN.

The number of species of Pipe-fishes on our coasts has been uncertain, owing to the fact that the fishes have not been carefully studied in large collections from their various localities. The writer has endeavored to go over the group critically, to ascertain the number of species and to find the limit of variation in the characters of each species. Nearly all the specimens studied by me have been collected by Professors D. S. Jordan and C. H. Gilbert; some of them belong to the United States National Museum, the others to the museum of Indiana University.

The writer wishes to express his great obligations to Professor Jordan for the use of his collection and library, and for many valuable suggestions.

ANALYSIS OF SPECIES.

a. Top of head strongly carinated.

b. Breast shields not covered by soft skin; lower jaw slightly included; opercle with a prominent ridge; snout short; D. 23, covering 1+4 rings; rings 18+30; belly concave; twelve irregular brown cross-bands on body (*Corythroichthys* Kaup) ..... ZATROPIS, 1.

bb. Breast shields covered by soft skin; lower jaw included; D. 41; rings 19+39. (*Dermatostetus* Gill) ..... PUNCTIPINNE, 2.