4.—A REVIEW OF THE SPAROID FISHES OF AMERICA AND EUROPE.

By David Starr Jordan and Bert Fesler.

In the present paper is given a review of the genera and species of *Sparidæ* (porgies, snappers, grunts, etc.) found in the waters of America and Europe. The family of *Sparidæ* is here provisionally accepted with the limitations as given in the "Synopsis of the Fishes of North America" (Jordan & Gilbert, 1883). It is recognized as containing those perciform fishes which have maxillary and ventral sheaths and which lack the peculiarities of certain other groups. In this sense the family would contain the *Sparidæ* and *Pristipomatidæ* of Günther or the *Sparidæ*, *Hæmulidæ* (*Pristipomatidæ*), *Lutjanidæ*, and *Pimelepteridæ*, of Dr. Gill. While it is evident that the group as here accepted is a somewhat heterogeneous one, it is still doubtful what division it should undergo in order to represent most faithfully the relations of its constituent parts. For the present, therefore, we may leave the group as defined by Jordan & Gilbert:

Body oblong, or more or less elevated, covered with moderate-sized, adherent scales, which are more or less strongly ctenoid or almost cycloid. Lateral line well developed, concurrent with the back, not extending on the caudal fin. Head large, the crests on the skull usually largely developed. No suborbital stay; mouth moderate or large, usually terminal, low, and horizontal. Premaxillaries protractile; maxillary without supplemental bone, for most of its length slipping under the edge of the preorbital, which forms a more or less distinct sheath; preorbital usually, but not always, broad; teeth various and variously placed; lower pharyngeals separate; gills, four, a large slit behind the fourth; pseudobranchiæ large; gill-rakers moderate; gill membranes separate, free from the isthmus; preopercle serrate or entire; opercle without spines; sides of head usually scaly; dorsal fin single, continuous, or deeply notched, sometimes divided into two fins, the spines usually strong, depressible in a groove; the spines heteracanthous, that is, alternating, the one stronger on the right side, the other on the left; the spines 10 to 18 in number; anal fin similar to the soft dorsal, and with 3 spines; ventral fins thoracic, the rays I, 5, with a more or less distinct scale-like appendage at base; caudal fin usually more or less concave behind; air bladder present, usually simple; pyloric cæca few or many; vertebræ usually 10+14=24, 16+18=34 in one subfamily.

The family comprises about 55 genera and some 450 species, chiefly inhabiting the shores of warm regions. All of them are valued as food. They are known by a great variety of names, many of them being variations of the Greek πάγρος, which becomes Pargus, Pargo, Porgie, Pogy, etc. The names Snapper and Grunt are also applied to many species. The group is closely related to the *Serranidæ* on the one hand, the genus *Xenistius* being very close to the Serranoid genus *Kuhlia;* on the other hand, *Scorpis*, *Kyphosus*, etc., approach the *Chætodontidæ*.

The material on which the present paper is based is primarily that contained in the collection of the University of Indiana. All the material in the Museum of Comparative Zoölogy has also been examined, and much of that in the United States National Museum, as well as the collections of the Leland Stanford Junior University. A large share of the material in the British Museum and in the Museum at Paris has also been carefully compared.

The work of preparing this review was begun in 1888, but the junior author having been called away from Bloomington its completion was deferred. Later, increased executive duties on the part of both authors rendered its completion difficult, and it has been thought best to publish it in its present unfinished condition rather than to wait for a time of leisure sufficient for its completion. It is hoped that it may serve as a basis for further study in the important group of which it treats. In several of the genera a detailed synonymy of the species is not attempted, only an outline being given. For purposes of comparison, the European genera are included, and a list of European species in each genus is appended. The names of genera not found in America are inclosed in brackets in the following analysis.

The *Sparidæ* of America and Europe seem to fall naturally into twelve well-marked subfamilies, which may be thus compared:

ANALYSIS OF SUBFAMILIES OF SPARIDÆ.

I. Carnivorous species; intestinal canal of moderate length; teeth in the jaws not all incisor-like; vertebræ usually 10+15.

a. Spines of premaxillary not extending to the occiput; the mouth moderately protractile.

b. Vomer with teeth.

c. Teeth in jaws unequal, some of them more or less canine-like. (No distinct* tubercles from the cranium for the articulation of the epipharyngeal bones; enlarged apophyses for the articulation of palatine and preorbital bones; anterior four vertebræ without parapophyses; maxillary long, formed essentially as in the *Serranidæ*.)

d. Nostrils remote from each other; the anterior tubular, near the end of the snout; vomerine teeth coarse, molar; teeth in jaws large, the lateral teeth molar; (skull as in *Lutjanina*).. HOPLOPAGRINÆ, I.

dd. Nostrils near together, placed just before eye, the anterior not tubular; vomerine teeth villiform, the patch ⋀, ↑, or ◊ shaped; teeth in jaws all acute; no incisors or molars..... LUTJANINÆ, II.

*See Gill, Proc. U. S. Nat. Mus. 1884, 351.

cc. Teeth in jaws very small, equal; vomerine teeth minute, in a ◊-shaped patch; dorsal fin deeply divided; skull with the temporal crest very low, running straight forward to the supraorbital ridge. XENICHTHYINÆ, III.

bb. Vomer without teeth; palatines and tongue toothless.

d. Teeth on sides of jaws not molar; maxillaries formed essentially as in the *Serranidæ.*

e. Teeth subequal, or those of the outer series more or less enlarged; no strong canines; preopercle more or less serrate, rarely entire; air bladder not constricted.....HÆMULINÆ, IV.

ee. Teeth very unequal, one or both jaws with strong canines; preopercle entire; dorsal continuous.....DENTICINÆ, V.

dd. Teeth on sides of jaws molar; maxillaries peculiar in form and in articulation, unlike those of the *Serranidæ.*

f. Anterior teeth conical, or else more or less incisor-like; preopercle entire; dorsal fin continuous; preorbital broad...SPARINÆ, VI.

ff. Anterior teeth as well as lateral teeth molar-like; preopercle denticulate; dorsal fin divided into two; preorbital narrow. BORIDIINÆ, VII.

aa. Spines of premaxillary extending backward to the occiput, so that the mouth is excessively protractile, as in the genus *Gerres;* teeth in jaws small or wanting; vomer with minute teeth or none; dorsal fin continuous or deeply notched; preorbital narrow; preopercle entire.....MÆNINÆ, VIII.

II. Herbivorous species; intestinal canal elongate; anterior teeth in jaws incisor-like; no molars or canines; premaxillaries moderately protractile.

g. Lower rays of pectorals branched like the upper; air bladder usually with two long horns; vertebræ 24 to 27; dorsal spines, 10 to 14.

h. Pyloric cæca few; teeth fixed; vertical fins not scaly; no teeth on vomer.....SCATHARINÆ, IX.

hh. Pyloric cæca very numerous.

i. Soft part of dorsal and anal fins naked or partly scaled; head more or less naked; teeth in broad bands, all freely movable, none on vomer.....GIRELLINÆ, X.

ii. Soft parts of vertical fins closely scaly; teeth more or less fixed, usually present on vomer.....KYPHOSINÆ, XI.

gg. Lower rays of pectorals simple; vertebræ in increased number (about 34); dorsal fin long; the anterior part with 15 to 17 spines, the posterior with 18 to 20 soft rays; anterior teeth incisor-like; vomer with or without teeth; scales very small; pyloric cæca 2 to 4.....APLODACTYLINÆ, XII.

Of these subfamilies, the *Hoplopagrinæ*, *Xenichthyinæ*, and *Boridiinæ*, are exclusively American. The *Denticinæ* and *Scatharinæ* are confined to the Old World.

ANALYSIS OF EUROPEAN AND AMERICAN GENERA OF SPARIDÆ.

Subfamily I.—HOPLOPAGRINÆ.

(*Sparidæ* with the anterior nostrils tubular, at the end of the snout.)

Anterior nostril remote from the other, close to the premaxillary, in the end of a barbel or tube; vomer with a few molar teeth; teeth of jaws coarse and blunt, the lateral teeth molar; dorsal spines continuous with the soft rays, which are scaly at base; intestinal canal short; skull and general anatomy essentially as in *Lutjanus*. One genus, in the eastern Pacific.

a. Vomer, with about three coarse molar teeth; dorsal spines 10; scales large; gill-rakers few; tongue and palatines toothless; lower pharyngeals narrow, with small conical teeth.....HOPLOPAGRUS, 1.

Subfamily II.—LUTJANINÆ.

(*Sparidæ* with pointed teeth only, some of them canine-like, and with villiform teeth on the vomer.)

Nostrils normal; teeth in jaws all pointed, some of these teeth larger than others, forming more or less distinct canines; vomer and palatines with villiform teeth; lower pharyngeals narrow, with slender teeth; no "distinct tubercles from the cranium for the articulation with the upper pharyngeals; enlarged apophyses for articulation with the palatines and preorbitals; anterior vertebræ without parapophyses." (*Gill.*) Scales large; dorsal fin single or divided; intestinal canal short, with few cæca.

Species numerous in all tropical seas, the vast majority of them referable to the typical genus, *Lutjanus*. Several of them occur at considerable depths, and one (*Verilus sordidus*) is a true deep-water fish. The fishes of the group present some analogies to the *Serranidæ*.

a. Interorbital area not flat nor separated from the occipital region, the median and lateral crests procurrent on it, and the frontal narrowed forward; dorsal fin continuous, the spines not separated by a notch from the soft rays.

b. Prefrontals, with the articular facets arising from diverging V-shaped ridges; basi-sphenoid, with an anterior lobiform extension; soft dorsal and anal scaly; dorsal spines 10 or 11 (in American species); tongue with teeth (at least in adult specimens).

c. Fronto-occipital crest ceasing anteriorly far from front of frontal; prefrontal with posterior areas impressed, long and cribriform; no pterygoid teeth; caudal fin lunate; gill-rakers rather few, shortish .....LUTJANUS, 2.

cc. Fronto-occipital crest continued on ethmoidal projection; prefrontals with posterior areas short and excavated above and in front; pterygoid teeth present (in the adult) in a narrow band; caudal fin very deeply forked; gill-rakers numerous, rather long .....OCYURUS, 3.

bb. Prefrontals with the articular facets developed from simple tubercles and not V-shaped; basi-sphenoid not lobigerous; canines small; soft rays of dorsal 10 or 11.

d. Prefrontals with the posterior are ascribriform; pterygoid with a broad patch of teeth (in adult); hyoid bones and tongue with teeth; canines very small or obsolete; dorsal spines 12 (or 13); soft dorsal and anal somewhat scaled; top of head scaled to before middle of eye; gill-rakers numerous .....RHOMBOPLITES, 4.

dd. Prefrontals with the posterior areas solid and somewhat tumid; pterygoids, hyoid bone, and tongue toothless; dorsal spines 10; soft dorsal and anal scaleless.....APSILUS, 5.

aa. Interorbital area flat, separated by a transverse line of demarcation from the occipital, by which the median as well as the lateral crests are limited; frontals wide in front; tongue and pterygoids toothless; soft rays of dorsal 10 or 11.

e. Dorsal fin continuous; frontals not cavernous; supraorbital margin crenate; periotic region much swollen outwards and with the bones thin and polished; preorbital moderate; frontals behind, with funnel-shaped foramina; soft dorsal and anal scaleless; last rays of dorsal and anal produced.....APRION, 6.

ee. Dorsal nearly or quite divided into two fins by a deep notch; eyes very large; preorbital very narrow.

f. Frontals not cavernous, simply normally perforate; supraorbital margins crenate; periotic region little convex and with the bones thick, unpolished; prefrontals behind, with funnel-shaped foramina; body comparatively elongate; head naked above and on snout; soft dorsal and anal naked; peritoneum and lining of gill-cavity pale; caudal deeply forked; color crimson.....ETELIS, 7.

ff. Frontals cavernous (like those of *Sciænoids*), with longitudinal, osseous bars, leaving interspaces in front of transverse ridge and on each side near the front; supraorbital margins smooth; prefrontals behind, with simple foramina for olfactory nerves; body comparatively short and deep; head scaly above and on jaws and snout; soft dorsal and anal scaly at base; peritoneum and lining of gill-cavity black; caudal lunate. Deep-water species, blackish-purple in color.....VERILUS, 8.

Subfamily III.—XENICHTHYINÆ.

(*Sparidæ*, with minute subequal teeth on jaws and vomer; none on palatines; and with the upper jaw moderately protractile.)

Body compressed, covered with small, thin, ctenoid, silvery scales; top of head, cheeks, opercles, part of preorbital and crown scaly; mouth small, oblique, with small recurved teeth in jaws; preorbital narrow; a rhomboid patch of small teeth on vomer; few teeth or none on the tongue and palatines; gill-rakers long and slender; dorsal fins nearly separate, the anterior of slender spines; the soft rays scaly. Intestinal canal short; the pyloric cæca not examined. Skull not studied, the crests conspicuous, the temporal running forward to join the supraoccipital.

Shore fishes, the species few, confined to the eastern Pacific, where three genera are known. They show many resemblances to the *Serranidæ*, especially to the genus *Kuhlia*.

a. Dorsal rays, X or XI–I, 12 or 13, the spinous part of the fin at least half longer than soft part; anal rays, III, 10 or 11.

b. Dorsal fins entirely separated, interval between them four-fifths of eye; the spinous dorsal half longer than soft; nostrils small, close together. XENOCYS, 9.

bb. Dorsal fins connected at base, the spinous part about double length of soft part.....XENISTIUS, 10.

aa. Dorsal rays, XI–I, 18 or 19, the soft part longer than the spinous part; anal rays about III, 18.....XENICHTHYS, 11.

Subfamily IV.—HÆMULINÆ.

(*Sparidæ* with the teeth all pointed, none on vomer or palatines; without strong canines, the premaxillaries not greatly protractile, the maxillaries serranine, and the air bladder simple.)

Body generally oblong, compressed, covered with large or small scales; jaws with bands of teeth, the outer series of which are often enlarged, but not so as to form specialized canines; no teeth on vomer, palatines, or tongue; preopercle usually serrate, the serræ rarely obsolete; dorsal fin continuous. Intestinal canal short, with few pyloric cœca.

Shore fishes of the warm seas, the majority of the numerous species American. The fishes of this group present numerous resemblances to the *Sciænidæ*, in which family they were placed by Cuvier

a. Chin with a central groove behind the symphysis of the lower jaw.

b. Mouth more or less wide, the lips scarlet in life posteriorly; soft parts of vertical fins densely scaly to their margins.....HÆMULON, 12.

bb. Mouth more or less narrow; soft fins naked or with scales on their basal parts.

c. Anal fin short, its rays III,7 to III,10; dorsal fin more or less emarginate, its spines rather robust.

d. Body ovate, the back elevated; depth greater than length of the head; outer teeth of upper jaw enlarged; lips thick; second anal spine strong; soft rays of dorsal and anal scaly at base..ANISOTREMUS, 13.

dd. Body oblong, the depth usually less than length of head; lips not very thick.

e. Preopercle very sharply serrate, the serræ at angle much enlarged, those below angle turned forward; outer teeth in both jaws considerably enlarged; soft rays of dorsal and anal more or less scaly; second anal spine enlarged .....CONODON, 14.

ee. Preopercle finely serrate, the serræ at the angle scarcely enlarged, those below not antrorse; teeth subequal, or the outer in upper jaw somewhat enlarged; gill-rakers very short and weak....POMADASIS, 15.

cc. Anal fin long and low, its rays III,10 to III,13; dorsal fin low, scarcely emarginate; anal spines small; preopercle finely serrate or entire; outer teeth of jaws scarcely enlarged; gill-rakers moderate, rather slender .....ORTHOPRISTIS, 16.

aa. Chin with pores but with no central groove at the symphysis; soft rays of vertical fins naked or partly scaled; preopercle finely serrate.

f. Anterior profile parabolic or nearly straight; teeth small, the outer usually more or less enlarged; gill-rakers slender and comparatively long. (Appearance of *Orthopristis*.)

g. Anal fin long, with 10 to 13 soft rays; dorsal fin deeply notched; soft dorsal and anal naked, with no distinct sheath at base.

ISACIA, 17.

gg. Anal fin short, with seven soft rays; dorsal fin low and scarcely emarginate; soft dorsal and anal more or less densely scaly.

[PARAPRISTIPOMA, 18.]

ff. Anterior profile concave above the eye; snout gibbous; outer teeth in both jaws enlarged and blunt (appearance of *Anisotremus*); gill-rakers small and slender.....GENYATREMUS, 19.

Subfamily V.—Denticinæ.

(*Sparidæ* with canines in one or both jaws and with no incisors nor molars nor teeth on the vomer.)

Body oblong; jaws with conical teeth only, some of them, at least in upper jaw, enlarged and canine-like; no teeth on vomer, palatines, or tongue; upper jaw moderately protractile; dorsal continuous, its soft rays naked; intestine short, with few pyloric cæca; preopercle entire; preorbital broad. Genera 6 or 7; species numerous, chiefly of the seas of the Old World, the group apparently forming a transition from the *Lutjaninæ* to the *Sparinæ*.

a. Dorsal spines 11 or 12 (rarely 10), scales rather small, those on cheek in more than 3 rows; those in lateral line about 60; mouth large, the lower jaw projecting.....[Dentex, 20.]

aa. Dorsal spines 10; scales rather large, those on cheek usually in 3 rows; those in the lateral line about 50; mouth moderate, the jaw subequal, dorsal or caudal fins often filamentous.....Nemipterus, 21.

Subfamily VI.—Sparinae.

(*Sparidæ* with the anterior teeth conical or incisor-like, the lateral teeth molar.)

Body oblong or elevated, with rather large scales; mouth small, the premaxillary little protractile; front of jaws with conical or incisor-like teeth, side of jaws with two or more series of rounded molars; no teeth on vomer, palatines, or tongue; maxillary short, peculiar in form and in articulation; dorsal fin continuous; posterior nostril largest, and more or less oblong or slit-like. Intestinal canal short, with few pyloric cæca.

Shore fishes of the tropical seas, especially abundant in the West Indies and in the Mediterranean.

a. Second interhæmal bone enlarged, hollowed anteriorly, or pen-shaped, receiving the posterior end of the air bladder in its anterior groove; posterior nostril slit-like; cheeks scaly.

b. Front teeth narrow, compressed, forming lanceolate incisors; the first spine-bearing interneural with an antrorse spine; temporal crest obsolete; lateral crest nowhere coalescing with the *supraoccipital* crest; interorbital area flattish, with two low ridges; a small foramen in each of these above front of pupil; interorbital area much contracted anteriorly; a strongly projecting prefrontal process which makes an acute angle with the supraorbital.....Stenotomus, 22.

bb. Front teeth conical or canine-like; first spine-bearing interneural without antrorse spine; temporal crest very thin and high, joining the lateral crest which forms part of the margin of orbit above middle of eye, both crests coalescing with the supraoccipital in the cavernous anterior part of the interorbital area; interorbital area somewhat contracted anteriorly; prefrontal process very strong, making an obtuse angle with the supraorbital; this process forming a conspicuous knob above the long posterior nostril.....Calamus, 23.

aa. Second interhæmal spine normal, not "pen-shaped;" cheeks scaly.

c. Front teeth conic, not compressed; no incisors; occipital crest coalescent with the temporal crests; no antrorse spine on first interneural; dorsal spines usually 11 to 13.

d. Anterior teeth in both jaws strong, decidedly canine-like; body more or less deep and compressed.....Sparus, 24.

dd. Anterior teeth in both jaws cardiform and not canine-like; body oblong or elongate.....[Pagellus, 25.]

cc. Front teeth incisor-like; no canines.

e. Incisors broad; molars in 2 to 4 series in each jaw.

f. First spine-bearing interneural with an antrorse spine in front.

g. Supraoccipital and temporal crests nowhere coalescent, the interorbital area not swollen; frontal bone in the interorbital area thin, concave in transverse section; temporal crest low, separated from supraoccipital crest by a flattish area which extends forward on each side of supraoccipital crest and to groove of premaxillary spines. (Incisors conspicuously notched.) ..... LAGODON, 26.

gg. Supraoccipital and temporal crests coalescent anteriorly, both disappearing in the gibbous interorbital area; frontal bone between eyes transversely convex and more or less honeycombed; temporal crest separated from occipital crest by an excavated area, bounded anteriorly by the lateral crest, which merges into the supraoccipital above eye. (Incisors entire or with a shallow notch.) ARCHOSARGUS, 27.

ff. First spine-bearing interneural without antrorse spine above; skull essentially as in *Archosargus*, the frontal bone more cavernous. DIPLODUS, 28.

ee. Incisors narrow; molars in a single series in each jaw; no antrorse interneural spine; snout produced ..... [CHARAX, 29.]

Subfamily VII.—BORIDIINÆ.

(*Sparidæ* with molar teeth only, none on the vomer or palatines.)

Body rather elongate, covered with moderate scales; mouth small; each jaw with two or three rows of coarse molar teeth; no teeth on vomer, palatines, or tongue; nostrils roundish, subequal near eye; dorsal fin divided almost to base, the spines high; preopercle serrulate. A single genus found on the coast of Brazil.

a. Short snout; preorbital narrow; dorsal spines, 12; anal fin small; caudal forked. BORIDIA, 30.

Subfamily VIII.—MÆNINÆ.

(*Sparidæ* with the premaxillaries greatly protractile, their spines extending backward to the occiput.)

Body oblong or elongate, covered with moderate or small ciliated scales; mouth moderate or small, extremely protractile, the spines of the premaxillaries extending backward to the occiput; teeth small or wanting; dorsal continuous or divided, the spines very slender; preopercle entire; intestine short, with few pyloric cæca.

Shore fishes, chiefly of the Old World. In the form of the mouth they present analogies to the *Gerridæ*.

a. Jaws with teeth; dorsal spines very feeble.

b. Vomer with minute teeth; body oblong, compressed; dorsal fin continuous, its rays XI, 11 ..... [MÆNA, 31.]

bb. Vomer without teeth.

c. Dorsal fin with its outline nearly continuous, its rays XI, 11; body compressed; scales moderate, 60 to 70 ..... [SPICARA, 32.]

cc. Dorsal fin divided to base, its rays XIII, 9; body subcylindrical; scales very small (about 90) ..... [CENTRACANTHUS, 33.]

aa. Jaws toothless; dorsal fins, 2; the spines very slender, about 13 in number; body elongate; lower pharyngeals with cardiform teeth. ERYTHRICHTHYS, 34.

Subfamily IX.—SCATHARINÆ.

(Herbivorous *Sparidæ* with fixed incisor teeth in the front of the jaws only; no molars, no teeth on the vomer or palatines; the pyloric cæca few in number and the vertical fins not scaly.)

Body oblong or elevated, with scales of moderate or rather small size. Mouth moderate, with immovable incisor teeth in the front of the jaws, no molar teeth, and with no teeth on vomer, palatines, or tongue; lower rays of pectoral branched; vertical fins naked; intestinal canal elongate, with few pyloric cæca. Air bladder usually with two posterior horns.

Herbivorous shore fishes, the numerous species nearly all confined to the waters of the eastern Atlantic.

a. Pyloric cæca few (about 4); teeth fixed; cheeks and opercles scaly; vertical fins naked.

b. Incisor teeth broad, in a single series, with no cardiform teeth behind them.

c. Incisor teeth broad, notched at tip.

d. Incisor teeth with no other teeth behind them.

e. Body elongate, subcylindrical; dorsal spines 14 or 15, eyes large. [BOX, 35.]

ee. Body oblong, compressed; dorsal spines 11; eyes small...[BOOPS, 36.]

dd. Incisor teeth with a band of small granular teeth behind them; a series of pointed teeth on sides of jaws; body oblong, ovate, compressed; dorsal rays XI,14 .....[OBLADA, 37.]

cc. Incisor teeth lanceolate, with no other teeth behind them; body oblong, compressed; dorsal rays XI,11.....[SCATHARUS, 38.]

bb. Incisors narrow, lanceolate, with a band of cardiform teeth behind them; body oblong, ovate, compressed; dorsal spines 10 or 11. [SPONDYLIOSOMA, 39.]

Subfamily X.—GIRELLINÆ.

(Herbivorous *Sparidæ* with a band of movable incisor teeth in front of each jaw; no molars; few teeth if any on palatines; the opercles scaleless; the pyloric cæca very numerous and the dorsal not closely scaled.)

Body oblong, with scales of moderate or small size; mouth moderate, with movable incisor teeth in a band in the front of each jaw; no teeth on vomer or tongue, sometimes a few teeth on palatines; all rays of pectoral branched; dorsal and anal scaly at base. Intestinal canal elongate, with many pyloric cæca.

Herbivorous shore fishes, found only in the Pacific Ocean.

a. Incisors all tricuspid.

b. Dorsal spines 14 or 15; each jaw with a series of flat, movable, tricuspid incisors, behind which is a broad band of similar smaller ones; dorsal continuous, its spines low.....GIRELLA, 40.

bb. Dorsal spines 12 or 13; "in both jaws series of flat tricuspid teeth, behind which is a band of similar teeth, less developed and replacing the former;" soft dorsal and anal elevated.....DOYDIXODON, 41.

Subfamily XI.—KYPHOSINÆ.

(Herbivorous *Sparidæ*, with incisor-like teeth in the jaws, no molar teeth, and with the soft rays of vertical fins densely scaly; intestinal canal long with many pyloric cœca.)

Body oblong or ovate, compressed, covered with small scales; similar scales enveloping soft parts of vertical fins and more or less encroaching on the head; mouth small, with the anterior teeth more or less incisor-like; no molars; villiform teeth on palatines and usually on vomer and tongue; preorbital narrow. Intestinal canal very long, with numerous pyloric cœca.

Herbivorous shore fishes, chiefly of the Pacific Ocean.

a. Top of head as far back as posterior margin of eyes naked; incisor teeth narrow, equal, rounded, with no smaller teeth behind them; no teeth on vomer or tongue; spinous dorsal much longer than soft dorsal; soft anal higher and shorter than soft dorsal.....HERMOSILLA, 42.

aa. Top of head as well as sides and jaws closely scaled; broad bands of teeth behind the incisors; villiform teeth on vomer, palatines, and tongue; dorsal spines low; incisor teeth lanceolate.

b. Incisor teeth strong, with horizontal, backward-projecting roots; soft dorsal and anal not elevated .....KYPHOSUS, 43.

bb. Incisor teeth very narrow, without evident roots.

c. Anal fin short, 3¾ in length of body, its rays III, 19; dorsal spines gradually increasing in height to the sixth, then decreasing backward; soft dorsal and anal not falcate; preopercle slightly serrate; teeth narrow but evidently compressed.....MEDIALUNA, 44.

cc. Anal fin long, 2½ in length of body, its rays about III, 25; dorsal spines graduated, increasing in height to the last; soft dorsal and anal not falcate; teeth cylindrical (?).....CÆSIOSOMA, 45.

Subfamily XII.—APLODACTYLINÆ.

(Herbivorous *Sparidæ*, with the vertebræ and dorsal rays in increased number, the lower pectoral rays simple, not branched; jaws with flat incisor teeth in front, and no molar teeth; the fins separate.)

Body oblong, compressed, with very small scales; cheeks and opercles scaly; mouth small, little protractile; jaws with one or more series of flat incisors, which are usually 3 to 5 cuspid; a band of small cardiform teeth behind these in the upper jaw; teeth sometimes present on the vomer; opercles unarmed; cheek and opercles scaly; six lower rays of pectoral simple; dorsal fins separate, both very long, the first of 15 to 18 spines, the second of 18 to 21 soft rays; anal fin short; vertical fins scaly at base; intestines long, with 2 to 4 pyloric cœca; vertebræ in increased number (said to be 16+18=34 in *Aplodactylus arctidens*).

Species few, inhabiting the South Temperate zone of the Pacific Ocean, the increased number of vertebræ apparently according with their dwelling in cooler waters. The species are referred to a single genus, which resembles *Girella* in the form of the head and in dentition, but differs in the technical characters mentioned above.

a. Pectoral with 6 simple rays; dorsal spines 15 to 17.....APLODACTYLUS, 46.

Subfamily I.—HOPLOPAGRINÆ.

I. HOPLOPAGRUS.

Hoplopagrus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 253 (*Güntheri*).

Type: *Hoplopagrus güntheri* Gill.

Etymology: ὅπλον, singular of ὅπλα, arms, armor; πάγρος, porgy.

One species of this remarkable generic type is known. With a close resemblance in nearly all respects to *L. caxis*, and other ordinary *Lutjani*, it strikingly differs in the structure of the nostrils and in the dentition from all other fishes of this type.

ANALYSIS OF SPECIES OF HOPLOPAGRUS.

a. Body oblong-ovate, short, deep, and compressed, the back arched, the body abruptly contracted to the base of the short caudal peduncle; anterior profile slightly and evenly convex. Snout rather long and pointed, its length 2⅕ in head; mouth small, the maxillary scarcely reaching to front of orbit, its length 2¾ to 3 in head; teeth in jaws arranged as in the *Lutjani*, but coarse and blunt, the lateral teeth of both jaws rounded and molar-like, more blunt in large examples; upper jaw with about 2 coarse, rather long canines; vomer with about 3 to 5 coarse molar teeth; palatines and tongue toothless; lower jaw rather weak, included; anterior nostril at the extreme front of the snout, close to the premaxillary, in the extremity of a barbel-like tube which hangs down above the mouth and is nearly as long as the eye; posterior nostril a rather long and narrow oblique slit, near the front of the eye; eye small, near the middle of the length of the head, 4⅛ in head (young); interorbital space rather broad and convex, its width 4⅛ in head; preorbital broad, its least width 3⅛ to 4⅛ in head; vertical limb of preopercle oblique, sharply serrate, the teeth rather fine above, coarse at the angle; emargination of preopercle sharp and deep, more conspicuous than in most species of *Lutjanus*, the knob of interopercle conspicuous; gill-rakers few and short, about 7 developed on lower part of anterior arch, besides several rudiments; opercle without spinous projections; scapular scale serrate. Temporal crest of skull very short, coalescing with the orbital rim. Scales rather small, regularly arranged, those above lateral line in series which are throughout parallel with the lateral line; those below in horizontal series; temporal region with a band of one or two series of large scales; cheeks with about 7 rows of scales; top of head naked. Dorsal spines rather low and strong, the fin somewhat deeply emarginate; soft dorsal high, angular, and pointed in outline, the last ray not two-fifths the height of the middle ones, which are 2 in head; caudal short, feebly lunate, the upper lobe 1¾ in head; anal high and pointed, the middle rays reaching base of caudal, a little more than half length of head; anal spines strong, the second longer and stronger than third, 2¾ in head; pectoral long, 3 in body; ventral 1½. Color olive brown, body with about six rather conspicuous narrow whitish crossbands, extending a little obliquely backward, and broadest below, irregular in number and width; a round, dusky blotch near base of last rays of soft dorsal; fins mostly dusky olive, the pectorals pale, ventrals and anal darkest; top of head with some small dark spots. Head, 2¾ in length; depth, 2⅕. D. x, 14; A. iii, 9. Scales 6–47–16..... GÜNTHERI, 1.

1. HOPLOPAGRUS GÜNTHERI. (Pargo.)

*Hoplopagrus günther*i Gill, Proc. Ac. Nat. Sci. Phila. 1862, 253 (Cape San Lucas); Steindachner, Ichth. Beiträge, VI, 1878, 1 (Altata); Jordan & Gilbert, Bull. U. S. Fish. Comm. 1882, 107, 112 (Mazatlan, Punta Arenas); Jordan & Swain, Proc. U. S. N. M. 1884, 429 (Mazatlan); Evermann & Jenkins, Proc. U. S. N. M. 1891, 145 (Guaymas).

Habitat: Pacific coast of tropical America, from Guaymas to Panama.

Etymology: Named for Dr. Albert Günther.

This remarkable species is a common food-fish of Mazatlan, where it is known as the "*pargo.*" The specimens examined by us are from Mazatlan and Guaymas. Dr. Gill has very properly considered it the type of a distinct subfamily, *Hoplopagrinæ*. Its peculiarities are certainly stronger than those of the other genera associated with *Lutjanus*, although in the structure of the cranium itself it does not materially differ from *Lutjanus*.

Subfamily II.—LUTJANINÆ.

II. LUTJANUS.

Lutjanus Bloch, Ichthyologia, IV, 107, 1790 (*lutjanus*).
Dipterodon Lacépède, Hist. Nat. Poiss., IV, 167, 1803 (*plumieri=synagris*, etc.).
Diacope Cuv. & Val., Hist. Nat. Poiss., II, 410, 1828 (*seba*, etc.) (preoccupied in *Lepidoptera*).
Mesoprion Cuv. & Val., Hist. Nat. Poiss., 441, II, 1828 (*unimaculatus*, etc.).
Genyoroge Cantor, Malayan Fishes, 1850, 12 (*notata*).
Neomænis Girard, U. S. Mex. Bound. Surv., 1859, 18 (*emarginatus=griseus*).
†**Proamblys** Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*nigra=macolor*).
Hypolites Gill, l. c., 236 (*retrospinis*).
Evoplites Gill, l. c., 236 (*pomacanthus=*young of *L. kasmira*).
†**Macolor** Bleeker, Poiss. Amboin. Nederl. Tidsc. Dierkunde, 277, 1867 (*macolor*).
Rabirubia Jordan & Fesler, subg. nov. (*inermis*).
Raizero Jordan & Fesler, subg. nov. (*aratus*).

Type: *Lutjanus lutjanus* Bloch, an East Indian species.

Etymology: From *Ikan Lutjang*, a Japanese or Malayan name of the species.

This is a very large genus, the most extensive in the family, even after the separation as distinct genera of numerous aberrant forms. Perhaps the group may admit of further subdivision, but this can not be carried out without a wider knowledge of it than we now possess. The peculiar notching of the preopercle on which the genus *Genyoroge* has been based is certainly a character of minor importance, as it disappears by degrees in different species. Most European writers have called this genus *Mesoprion*, after Cuvier. This is an unnecessary violation of the law of priority, as *Lutjanus* and *Dipterodon* are both prior to *Mesoprion.*

ANALYSIS OF AMERICAN SPECIES OF LUTJANUS.

a. Top of head covered with scales, these extending forward at least as far as middle of eye.

b. Preopercle with a sharp deep notch, into which fits a knob from the interopercle; temporal crest not confluent with orbital rim, but nearly or quite confluent with supraoccipital crest in front (*L. kasmira*); lower limb of preopercle coarsely serrate; scales above lateral line in very oblique series. (*Evoplites* Gill.)

c. Body rather elongate, the depth 3 in length; profile to nape nearly straight; snout pointed, $3\frac{1}{4}$ in head; supraoccipital crest low; preorbital moderate, $6\frac{2}{3}$ in head; mouth moderate; the jaws subequal, the maxillary reaching front of pupil, $2\frac{2}{3}$ in head; both jaws with a narrow band of villiform teeth, outside of which are moderate canines; tongue toothless; vomer with a Λ-shaped band of teeth and with no backward prolongation on median line. Gill-rakers short and slender, 10 developed. Eye large, 4 in head; nostrils small, well separated, the posterior oblong; preopercle strongly serrate above the notch. Scales rather small, (7) 9–54–17, the rows above lateral line very oblique, nowhere parallel with the lateral line, 7 or 8 rows on cheeks, anterior largest, one row on interopercle; top of head scaled as far forward as front of pupil; 10 rows of scales between eye and suprascapula; soft dorsal and anal scaly. Dorsal spines low and strong, the fourth spine longest, 3 in head; soft dorsal rounded, the longest ray $4\frac{1}{2}$ in head; anal moderate, its free edge straight, the second spine longest, $2\frac{2}{3}$ in head; pectorals long, $1\frac{1}{3}$ in head. Color golden brown with 5 sky-blue longitudinal stripes, each broadly and sharply margined with dark blue; the whole band as broad anteriorly as the interspaces, growing narrower behind the dark-blue border, nearly as wide on each side as the median pale-blue band. A faint median blue streak from occiput to front of dorsal, then a band of three blue streaks as above stated, from occiput above eye to ninth dorsal spine; second from upper edge of eye to middle of soft dorsal; third from middle of eye to last ray of dorsal; fourth from upper jaw along lower eye to middle of base of caudal peduncle, when it ends abruptly; fifth from end of maxillary to above last ray of anal; fins all pale, the dorsal partly edged with black; no black lateral spot. Head $2\frac{2}{3}$ in length; depth, 3; D. x, 14; A. III, 8. Scales, 9-54-17..... VIRIDIS, 2.

aa. Top of head naked as far back as the nape.

d. Preopercle with a sharp, deep notch, into which fits a knob from the interopercle. (*Genyoroge* Cantor.)

e. Body elongate; snout pointed, about 3 in head; eye $4\frac{1}{2}$; maxillary extending to opposite middle of eye; both jaws with strong, unequal canines; tongue with teeth; preopercle with a deep and narrow slit into which the process of the interopercle fits; anterior profile of head nearly straight; preorbital broad; dorsal spines low, strong, the fourth 3 in head; second anal spine shorter and stronger than third, soft dorsal and anal rounded; caudal lunate, pectoral falcate, $1\frac{3}{4}$ in head. Body bluish gray, silvery gray below; 11 to 14 faint silvery cross streaks; anal, caudal, tips of ventrals, and upper part of dorsal blue-black; pectoral greenish, with a dark spot at its base. Head, 3; depth, $3\frac{1}{2}$, D. x, 15; A. III, 8. Scales, 8–46–15. (*Steindachner.*)..... CANINUS, 3.

dd. Preopercle with its vertical limb entire, or with a broad, shallow emargination only.

f. Dorsal spines normally 10.

g. Anal rays III, 7 to III, 9; lower limb of preopercle with the serræ small or wanting. (*Dipterodon* Lacépède.)

h. Soft dorsal normally with 14 rays (dorsal rays rarely X, 13).

i. Anal fin rounded, its middle rays less than half length of head; no black lateral spot.

j. Developed gill-rakers 7 to 9, usually with few rudiments, if any; preorbital deep; caudal lunate; shallow-water species, olivaceous in color, more or less marked by crossbands when young, often with a blue streak along the preorbital.

k. Vomerine teeth forming a ⋀ or ⋀ shaped patch, the backward prolongation on median line very short or wanting; scales above lateral line in oblique series, which are not throughout parallel with lateral line; body comparatively elongate, the depth 3 to 3½ in length; upper and lower canines very strong, lower considerably stronger than in other species; mouth very large; vertical fins dusky; size very large.

l. Maxillary 2⅞ in head; preorbital 5½ in head; maxillary reaching nearly or quite to middle of eye, 2⅞ to 2½ in head; base of pectoral dusky; head, 2⅔ in length; depth, 3⅔. D. X, 14; A. III, 8. Scales, 6–48–13. NOVEMFASCIATUS, 4.

ll. Maxillary 2⅔ in head; preorbital 4¾ in head; maxillary reaching past middle of eye, about 2½ in head; usually a black spot or shade at base of pectoral; head, 2⅔; depth, 3; D. X, 14; A. III, 8. Scales, 7–50–12 ..... CYANOPTERUS, 5.

kk. Vomerine teeth forming an anchor-shaped patch, with a distinct backward prolongation on the median line; second anal spine longer and stronger than third; upper canines strong; lower moderate or small.

m. Scales above lateral line arranged in series which are not throughout parallel with lateral line, being oblique and irregular, at least below the second dorsal.

n. Body comparatively elongate, the depth 2¾ to 3 in length; snout rather pointed; mouth large, 2½ in head; soft dorsal, anal, and caudal blackish, tinged with wine color, always becoming dusky in spirits; body dark greenish, more or less reddish below; blue streak on preorbital disappearing early; specimens from deep water with more or less red. Head, 2¾; depth, 2⅞. D. X, 14; A. III, 8. Scales, 7–50–12 ..... GRISEUS, 6.

nn. Body comparatively deep, depth about 2½ in length; snout long and pointed; mouth rather small, maxillary about 3 in head; soft dorsal, anal, and caudal orange or yellow, becoming pale in spirits.

o. Scales moderate, about nine in an oblique series from first dorsal to lateral line; about 55 vertical series above lateral line between gill-opening and base of caudal; lateral line with more than 40 pores; a whitish area below eye; blue streak along suborbital region, usually not disappearing with age; head, 2¼; depth, 2¼. D. X, 14; A. III, 8. Scales, 9–56–15 ..... JOCÚ, 7.

oo. Scales unusually large; 5 or 6 in an oblique series from first dorsal to lateral line; about 45 vertical series above lateral line between gill-opening and base of caudal; lateral line with less than 40 pores; blue streak on suborbital region not permanent; head, 2½; depth, 2½. D. x, 14; A. iii, 8. Scales, 6–44–13.... CANIS, 8.

mm. Scales above lateral line in horizontal series which are throughout more or less distinctly parallel with the lateral line; snout long and pointed, 3 in head; pectoral fin long, 1¼ in head; color brownish, with faint silvery streaks along rows of scales on sides, a pale-blue streak along suborbital and preorbital; fins yellowish. Head, 2⅞; depth, 2⅞; D. x, 14; A. iii, 18. Scales, 5–45–12..... ARGENTIVENTRIS, 9.

jj. Developed gill-rakers more numerous, about 10, with several rudiments before them (in *L. buccanella*; not examined in *L. lutjanoides*).

p. (Caudal deeply forked; mouth small, maxillary reaching posterior nostril; preopercle slightly notched, little serrate; canines strong; tongue with teeth; soft dorsal and anal rounded; pectoral pointed, 4½ in total length; color brownish-green, with 6 brown crossbands; a broad greenish stripe from opercle to base of caudal. D. x, 14; A. iii, 8.) (*Poey.*) (Hybrid probably of *chrysurus-jocu.*)

LUTJANOIDES, 10.

pp. Caudal moderately forked; mouth large, maxillary reaching anterior edge of eye, 2⅔ in head; preopercle serrate, the serræ strong on angle; canines medium; vomerine teeth in an anchor-shaped patch; eye large; the base and axil of pectoral with a jet-black blotch; scales moderate, about 8 in oblique series from the lateral line to the first dorsal spine, about 63 vertical rows above lateral line; second anal spine long, about 2⅔ in head. Color crimson; caudal peduncle and caudal fin largely yellow; iris orange-red; no lateral blotch. Head, 2½; depth, 2⅔. D. x, 14. A. iii, 8. Scales, 8–63–15.

BUCCANELLA, 11.

ii. Anal fin angulated, its median rays produced, the longest in adult at least half head; body rather robust; upper canines rather long; lower small; color more or less red, the young with a black lateral blotch.

q. Scales above the lateral line arranged in series which are not throughout parallel with the lateral line; side with a black blotch, which usually disappears with age; anal fin bright red.

r. Teeth on vomer in an anchor-shaped patch, with a median backward prolongation; lingual teeth well developed; snout rather pointed; maxillary reaching edge of pupil, $2\frac{1}{2}$ in head; caudal edged with black.

s. Iris golden-yellow in life. Scales rather small, 9-52-10, about 50 pores in the lateral line; body rather slender, the depth $2\frac{1}{2}$ in length; second anal spine about $3\frac{1}{2}$ in head; gill-rakers 9 below angle; eye large, $4\frac{1}{4}$ in head in adult; preorbital $5\frac{1}{4}$ in head. Head, $2\frac{2}{5}$ in length. D. x, 14; A. iii, 9. Color bright rose-red, with golden streaks..... VIVANUS, 12.

ss. Iris rose-red. Scales rather large, 8-46-14; body robust, the depth $2\frac{2}{5}$ in length; second anal spine about 4 in head; gill-rakers about 8 below angle; eye moderate, $5\frac{1}{2}$ to 6 in head in adult; preorbital 5. Head, $2\frac{3}{4}$. D. x, 14; A. iii, 9. Color rose-red, nearly uniform; size large. AYA, 13.

rr. Teeth in vomer in a $\wedge$-shaped patch, without distinct prolongation on the median line; lingual teeth very few or none; snout rather pointed; maxillary reaching edge of eye, $2\frac{2}{3}$ in head; scales rather small, 10–67–17; about fifty pores in lateral line; color, greenish above, rosy below; a small but distinct lateral blotch; young with oblique blue streaks above; fins mostly brick-red, especially the anal; a pearly streak below eye. Head, $2\frac{2}{5}$; depth, $2\frac{3}{4}$. D. x, 14; A. iii, 8. Scales, 10–67–17.. ANALIS, 14.

qq. Scales above the lateral line arranged in series which are more or less distinctly parallel throughout with the lateral line; no black lateral blotch; scales rather large; 5 or 6 between first dorsal spine and lateral line; lateral line with 47 pores; vomerine teeth in a ⋀-shaped patch; lingual teeth well developed; maxillary reaching front of pupil, 2¾ in head; color red, dusky above; a blue streak on suborbital; anal and ventral fins dusky. Head, 2¾; depth, 3. D. x, 14; A. iii, 7. Scales, 5-47-11.
COLORADO, 15.

hh. Soft dorsal with 12 rays (rarely 13); body oblong, the back not greatly elevated; upper canines moderate, lower small or obsolete; scales above lateral line in very oblique series; anal fin low, its outline rounded.

t. Mouth moderate; maxillary 2⅞ to 2¾ in head.

u. Caudal not deeply forked; gill-rakers rather few (8 or 9 besides rudiments).

v. Pectoral short, 1⅞ in head; teeth on vomer in an anchor-shaped patch; color olivaceous, no black lateral blotch; lower jaw included. Head, 2¾; depth, 3. D. x, 12; A. iii, 8. Scales 8-51-x. (Hybrid *griseus-synagris*?) ..... BRACHYPTERUS, 16.

vv. Pectoral long, more than two-thirds length of head; color chiefly red; a large black lateral blotch; lower jaw slightly projecting.

w. Vomerine teeth in an anchor-shaped patch, with a distinct backward prolongation on median line; color red; back and sides with rows of dark bluish-gray spots following the series of scales; similar spots on sides of head; fins reddish. Head, 2¾; depth, 2¾. D. x, 12; A. iii, 8. Scales, 7-53-15..... GUTTATUS, 17.

ww. Vomerine teeth in a ⋀ or ⋀ shaped patch, the prolongation on median line very short or wanting; color rosy greenish above, sides of head and body with numerous longitudinal stripes of golden yellow; soft dorsal and caudal red; lower fins yellow. Head, 2⅞; depth, 2¾. D. x, 12; A. iii, 8. Scales, 8-60-15.
SYNAGRIS, 18.

uu. Caudal deeply forked; the gill-rakers rather numerous, about 10 on lower part of the anterior arch; teeth on vomer in an anchor-shaped patch; body rather elongate, compressed; lower jaw projecting or not; eye small; scales small; the lateral line with about 50 pores; anal spines graduated. Color reddish, with horizontal yellow streaks; no black lateral blotch. Head, 3; depth, 3. D. x, 13; A. iii, 9. Scales 9-53-15. (Hybrid *synagris-chrysurus?*).

AMBIGUUS, 19.

tt. Mouth large; maxillary 2⅔ in head; teeth on vomer in an anchor-shaped patch; lower jaw strongly projecting; body rather elongate, strongly compressed; eye very large, red; scales rather small, the lateral line with about 50 pores; caudal little forked; second and third anal spines subequal. Color dark brown; pale below, flushed with red; fins mostly red; a large black lateral blotch. Head, 2½; depth, 2⅔. D. x, 12; A. iii, 8. Scales, 9-62-14.

MAHOGONI, 20.

gg. Anal rays iii, 10 to iii, 11. (*Rabirubia* Jordan & Fesler.) Body slender; snout pointed; mouth moderate, the maxillary extending beyond the anterior edge of orbit; canines moderate; teeth on tongue well developed; vomerine patch of teeth anchor-shaped, with a sharp backward prolongation; scales above lateral line in very oblique series; pectoral fins short; caudal deeply forked; anal spines very small; color dusky, each scale with a shining silvery spot. Head, 3; depth, 3¼. D. x, 13; A. iii, 11. Lat. l., 50 ..... INERMIS, 21.

ff. Dorsal spines 11; body elongate; scales large, those above lateral line in about four series, which are fully parallel with the lateral line. (*Raizero* Jordan & Fesler.) Soft dorsal and anal low; vomerine teeth in a ∧-shaped patch; lingual teeth present; gill-rakers few; color, brown, with distinct silvery stripes along the rows of scales, young with silvery crossbars; lower fins dusky. Head, 3; depth, 3⅓. D. xi, 12; A. iii, 7. Scales 5-45-12 ..... ARATUS, 22.

2. LUTJANUS VIRIDIS.

Diacope viridis Valenciennes, Voyage de la Vénus, 1845, 303, pl. 1, f. 2 (very bad) (Galapagos Islands).
Genyoroge viridis, Günther, I, 180 (copied).
Lutjanus viridis, Jordan, Proceedings U. S. National Museum 1888, 330 (Tres Marias).

Habitat: Galapagos, Tres Marias, and Revillagigedos islands.

Etymology: *Viridis*, green, a very inappropriate name, as the species is brown with blue stripes.

This interesting species is a near ally of *Lutjanus kasmira* (Forskål) (=*L. bengalensis* Bloch). It belongs to the subgenus *Evoplites*, a group well represented in the East Indies, but with no other American allies. A single specimen was obtained by Alphonse Forrer, from the Tres Marias Islands, near Mazatlan. Several others have been since taken by Dr. C. H. Gilbert at the Revillagigedos Islands, where it is very abundant.

Lutjanus kasmira (from Swatow, China) differs from *Lutjanus viridis* in the following respects: Body deeper (depth $2\frac{2}{3}$); scales smaller (8) 12–62–22; the back more elevated and the profile steeper; snout, 3 in head; preorbital, 6; maxillary, $2\frac{3}{5}$; second anal spine, $3\frac{1}{6}$; lower lateral band wanting; a vague dark lateral blotch present, larger than eye; bands less sharply defined than in *L. viridis*, the pale-blue median streak in each band twice as wide as the dark border, the whole band narrower, its width one-third to one-fourth that of the golden-brown interspaces; no median dorsal streak.

3. LUTJANUS CANINUS.

? *Mesoprion pargus* Cuv. & Val., II, 473, 1828 (Puerto Rico).
Genyoroge canina Steindachner, Ichthyol. Notizen, IX, 18, 1869 (Lagos, Brazil).

Habitat: Brazilian fauna.

Etymology: *Caninus*, doglike, a reference to the canine teeth.

Steindachner's description of *Genyoroge canina* agrees in all respects with the young of *Lutjanus cyanopterus*, except that the preopercle in *L. caninus* is said to have the deep emargination found in *L. viridis* and in the group called *Genyoroge*. We accept it provisionally as a distinct species, solely on this character. The scanty description of *M. pargus* probably refers to a specimen of *L. cyanopterus*, but the statement "le tuberosité de son interopercule est assez prononcé" suggests *L. caninus*. The type, probably a dried skin, we have failed to find in the museum in Paris.

4. LUTJANUS NOVEMFASCIATUS. (Pargo Prieto.)

Lutjanus novemfasciatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 251 (Cape San Lucas, very young); Jordan & Gilbert, Proc. U. S. N. M. 1881; *ibid*, l. c., 1882, 360 and 365 (Cape San Lucas, Panama); *ibid*, Bull. U. S. F. C. 1882, 107, 110, 112 (Mazatlan, Panama, Punta Arenas); Jordan & Swain, l. c., 1884, 443; Evermann & Jenkins, Proc. U. S. N. M. 1891, 146 (Guaymas).

Mesoprion pacificus Bocourt, Ann. Sci. Nat. Paris, p. 223, 1868 (Tanesco, Pacific coast of Guatemala).

Lutjanus pacificus, Vaillant & Bocourt, Mission Scientifique au Mexique, 1881 (?), 123, pl. (?) III, f. 2.

Lutjanus prieto Jordan & Gilbert, Proc. U. S. N. M. 1881, 232, 338, 353, 355 (San Blas, Mazatlan); Jordan & Gilbert, l. c., 1882, 360, 361 (Cape San Lucas).

Habitat: Pacific coast of tropical America.

Etymology: *Novem*, nine; *fasciatus*, banded, a character seen only in the very young.

This large fish is the Pacific representative of *Lutjanus cyanopterus*, to which it bears a strong resemblance. In fact, except for the slightly smaller mouth of *L. novemfasciatus*, the two species are scarcely distinguishable. It is generally common on the Pacific coast of tropical America, and at Mazatlan it is known as *pargo prieto*. It was first described from very young specimens, which bear little resemblance to the adult, although comparisons of specimens have assured us of their identity. The nine crossbands, which suggested the inappropriate specific name of *novemfasciatus*, are characteristic only of the very young. The name *Mesoprion pacificus* was overlooked by Jordan and Gilbert, who published the first satisfactory account of the species under the name of *Lutjanus prieto*.

5. LUTJANUS CYANOPTERUS. (Cubera.)

Mesoprion cyanopterus Cuv. & Val., II, 472, 1828 (Brazil); Jordan, Proc. U. S. N. M. 1886, 534 (examination of type).

Lutjanus cyanopterus, Jordan & Swain, l. c., 534.

? *Mesoprion pargus* Cuv. & Val , II, 473, 1828 (Puerto Rico).

Mesoprion cynodon Poey, Repertorio, II, 268, 1868; Poey, Proc. Ac. Nat. Sci. Phila. 1863, 185 (Cuba; not of Cuv. & Val.).

Lutjanus cynodon Poey, Synopsis, 1868, 294.

Lutjanus cubera Poey, Ann. Lyc. Nat. Hist. N. Y., 75, 1871 (Cuba); Poey, Enumeratio, 1875, 27; Jordan & Swain, l. c., 442 (Havana).

Lutjanus dentatus (A. Duméril), Vaillant & Bocourt, Miss. Sci. au Mex., 1881, 125 (Brazil); Jordan, l. c. (examination of type)

Habitat: Pacific coast of tropical America.

Etymology: κυάνεος, blue; πτερόν, fin.

This species is common in the markets of Havana, where it is known as *cubera*. It grows to a very considerable size, and specimens of less than 5 pounds weight are very rare in the markets. But one specimen was obtained by Prof. Jordan, no others small enough to be readily preserved in alcohol being seen. A specimen from Carthagena, United States of Colombia, is in the museum at Cambridge. The species seems to have an indifferent reputation as a food-fish, being often unwhole-

some. It has always a ragged appearance in the market, its scales being less firmly attached than those of other species.

This species is very closely related to *L. griseus*, but so far as we have seen the two may always be distinguished by the difference in form of the vomerine patch of teeth and by the development of the canines of the lower jaw. These are larger in *L. cyanopterus* than in any other American species. This species is almost identical with *L. novemfasciatus* of the Pacific coast, the somewhat larger mouth being the most marked point of difference. The dusky area or spot at base of pectoral is more distinct in the Atlantic form. The *dentatus* of Duméril and the *cyanopterus* of Cuvier and Valenciennes are identical with *L. cubera* Poey. This is shown by the examination of the original types. *M. pargus* C. & V. is probably the same, as is possibly *Genyoroge canina* Steindachner.

6. LUTJANUS GRISEUS.

(Gray Snapper; Mangrove Snapper; Caballerote; Lawyer.)

Turdus pinnis branchialibus carens (Mangrove snapper), Catesby, Hist. Carolina, 1743, tab. 9.

Caballerote Parra, Deser. Dif. Piezas, Hist. Nat., 1787, taf. 25, f. 1.

Labrus griseus Linnæus, Syst. Nat., x, 1758, 283 (after Catesby); Linnæus, Syst. Nat., xii, 1766, 474; Gmelin, Syst. Nat., 1788, 1283 (copied); Bloch & Schneider, Systema Ichthyol., 1801, 268 (copied).

Lutjanus griseus, Jordan, Proc. U. S. N. M. 1884 (identification of Catesby's figure); Jordan & Swain, l. c., 439.

Sparus tetracanthus Bloch, Ichthyol., pl. 279, 1790 (on a drawing by Plumier).

Cichla tetracantha, Bloch & Schneider, Syst. Ichth., 1801, 338 (copied).

Anthias caballerote Bloch & Schneider, Syst. Ichth., 1801, 310 (after Parra).

Mesoprion caballerote Poey, Repertorio, ii, 1868, 157; Poey, Proc. Acad. Nat. Sci. Phila. 1863, 187 (Cuba).

Lutjanus caballerote, Poey, Synopsis, 293, 1868; Poey, Enumeratio, 1875, 26; Poey, Bull. U. S. F. C. 1882, 118 (Key West); Jordan & Gilbert, Syn. Fish. N. A., 1883, 921; Jordan, Bull. U. S. F. C. 1884 (Key West); Jordan, Proc. U. S. N. M. 1884, 126 (Key West).

Bodianus rivanet Lacépède, iv, pl. 4, f. 3, 1803 (Martinique; on a drawing by Plumier).

Mesoprion griseus, Cuv. & Val., Hist. Nat. Poiss., ii, 18-8, 469 (San Domingo); Guichenot, Ramon de la Sagra, Hist. Cuba, 26 (Cuba); Günther, i, 194, 1859, (Cuba, Jamaica, Puerto Cabello, British Guiana).

Lutjanus griseus, Cope, Trans. Am. Philos. Soc. 1871, 470 (St. Kitt's).

Lobotes emarginatus Baird & Girard, 9th Smithsonian Rept. 1855, 332 (Beesley Point, New Jersey).

Neomænis emarginatus, Gill, Proc. Ac. Nat. Sci. Phila. 1861, 94 (Beesley Point).

Lutjanus caxis, Gill, Rept. U. S. F. C. 1872–73, 806; Goode, Bull. U. S. N. M. 1879, 137 (West Florida); Jordan, *op. cit.*, 1880, 19 (Indian River, Florida); Bean, *op. cit.*, 1880, 96 (Bermuda); Jordan & Gilbert, Syn. Fish. N. A., 1883, 578 (not *Sparus caxis* Bloch & Schneider).

Lutjanus stearnsi Goode & Bean, Proc. U. S. N. M. 1878, 179 (Pensacola); Jordan & Gilbert, Syn. Fish. N. A., 1883, 519 (copied); Bean & Dresel, Proc. U. S. N. M. 1884, 163 (Jamaica).

Habitat: New Jersey to Florida and Brazil.

Etymology: *Griseus*, gray.

This species is very common along our South Atlantic and Gulf coasts and occasionally strays northward as far as New Jersey, being the northernmost in its range of any member of the genus in the Atlantic. It is everywhere known as the "gray snapper." In Florida and the Bahamas, where the coasts are lined by mangrove bushes, among which the young of this species abound, the name "mangrove snapper" comes into use. The name "lawyer" is also occasionally heard, in allusion to the skill shown by the species in eluding nets. To the Spanish fishermen of Cuba and Key West the species is, as in the time of Parra, known as *caballerote*. It inhabits waters of varying depths, large specimens being often found very near the shore, while others may be taken in waters of considerable depth, in company with *Lutjanus aya*. These latter individuals are much redder than those found in shoal water; their color is paler and the body is in general a trifle less elongate. Such correspond to the form named *Lutjanus stearnsi*.

The synonymy of this species is considerable. It is evidently the *Caballerote* of Parra, as Professor Poey has shown, and therefore the *Anthias caballerote* of Bloch & Schneider. Earlier than this comes *Labrus griseus* L., based on the Mangrove Snapper of Catesby, a rough and inaccurate figure, but still resembling this species, and like the *Caballerote* identifiable by the persistent vernacular name. *Sparus tetracanthus* appears to be the same, as also *Bodianus vivanet*. *Mesoprion griseus* Cuv. & Val. is identified by Poey with *Lutjanus caxis*, but to us the description resembles much more the present species, which has thus twice received the specific name of *griseus*. *Lobotes emarginatus* is based on a young specimen of *Lutjanus griseus*, afterwards made the type of the genus *Neomænis*.

The identification by Poey of *Lutjanus caxis* with *Mesoprion griseus* has led American writers to suppose this species to be the true *Lutjanus caxis*, an error only recently corrected. The true *L. caxis*, the *cají* of the Havana markets, has not yet been seen north of Key West.

Lutjanus stearnsi, described from Pensacola, we are unable to separate from ordinary deep-water specimens of *L. griseus*. So far as we can see, the gradation is perfect. This identity has been already recognized by Dr. Bean.

Dr. Günther identifies with his *Mesoprion griseus* one or two species described by Cuvier and Valenciennes from the west coast of Africa. It is impossible from the brief descriptions to settle this question, and the confusion in the synonymy given by Dr. Günther shows that his material was insufficient to form any definite opinions.

This species is closely allied to *L. caxis* on the one hand, and to *L. cyanopterus* on the other; the former is deeper and differently colored, as already stated; the latter is similar in form and color, but has the dentition of lower jaw and vomer different. *L. griseus* rarely exceeds 6 or 8 pounds in weight. Specimens are in the Museum at Cambridge from Gonaives, Haiti, Maranhão, and the Bermudas.

7. LUTJANUS JOCÚ. (Dog Snapper; Jocú.)

Jocú Parra, Descr. Dif. Piezas, Hist. Nat., I, 1787, tab. 25, f. 2 (Cuba).

Anthias jocú Bloch & Schneider, Syst. Ichthy., 310, 1801 (based on Parra).

Mesoprion jocú, Cuv. & Val., II, 466, 1828 (Antilles, Martinique); Poey, Repertorio, 268, 1867 (Cuba).

Lutjanus jocú, Poey, Synopsis, 292, 1868 (Cuba); Poey, Enumeratio, 26, 1873; Vaillant & Bocourt, Miss. Sci. au Mex., IV, 1881, ? 129, pl. V, f. 19, synonymy much confused; Jordan, Proc. U. S. N. M. 1884, 125 (Key West); Jordan & Swain, l. c., 435; Jordan, Proc. U. S. N. M. 1890, 319 (Bahia); Jordan, l. c., 1889, 648 (St. Lucia).

Mesoprion litura Cuv. & Val., II, 467, 1828 (Cayenne, St. Thomas); Jordan, l. c., 1886, 524 (examination of type).

Mesoprion cynodon, Günther, I, 194, 1859 (San Domingo, Jamaica; not of Cuv. & Val.; excl. syn.).

Habitat: West Indies, north to Florida Keys, south to Bahia.

Etymology: From Cuban name *jocú*.

This species is about equally abundant with *L. caxis* about Florida Keys and Cuba. The English-speaking fishermen call it "dog snapper," the Spanish "*jocú*." The fishermen usually distinguish the *jocú* by the presence of a pale area below the eye, but the only certain distinction lies in the size of the scales. These are much smaller in *L. jocú* than in *L. caxis*. *Mesoprion litura* Cuv. & Val. is this species, as is also apparently *Mesoprion cynodon* Günther. In the synonymy of the latter species several distinct species are confounded, as also by Vaillant & Bocourt under the name *Lutjanus jocú*.

Specimens of *L. jocú* from Bahia and Maranhão are in the museum at Cambridge.

8. LUTJANUS CAXIS. (Schoolmaster; Cají.)

? Perca marina pinnis branchialibus carens (Schoolmaster), Catesby, Hist. Carolina etc., 1743, tab. 41 (Bahamas; figure very poor, the pectoral fins omitted; may be *L. jocú*).

Caxis Parra, Descr. Dif. Piezas, Hist. Nat., 1787, tab. 8, f. 2 (Havana).

? Perca apoda (Forster, Catal. of Anim., 21, MS. 1774; printed 1844), Walbaum, Artedi, Piscium, 1792, 351 (based on the Schoolmaster of Catesby).

Sparus caxis Bloch & Schneider, Ichthyol., 1801, 284 (after Parra).

Mesoprion caxis, Poey, Repertorio, II, 269, 1868.

Lutjanus caxis, Poey, Synopsis, 1868, 293 (Cuba); Poey, Enumeratio, 1875, 25; Jordan, Proc. U. S. N. M. 1884, 125 (Key West), (not of several American writers); Jordan & Swain, l. c., 435 (Key West, Havana); Jordan, l. c., 1889, 648 (St. Lucia); Jordan, l. c., 1890, 319 (Bahia).

Bodianus striatus Bloch & Schneider, Syst. Ichth., 1801, 335, tab. LXV (West Indies; misprinted *albostriatus*, p. 237; called *B. fasciatus* on plate).

Lutjanus acutirostris Desmarest, Prem. Déc. Ichthyol., 12, tab. 3, 1823 (Cuba).

Mesoprion cynodon, Cuv. & Val., II, 465, 1828 (Martinique, San Domingo); Bocourt, Ann. Nat. Hist., Paris, 1868, 224; Jordan, Proc. U. S. N. M. 1886, 534 (examination of type).

Mesoprion linea Cuv. & Val., II, 468, 1828 (Cuba, San Domingo); Jordan, l. c.

Mesoprion flavescens Cuv. & Val., II, 472, 1828 (Martinique); Jordan, l. c.

Mesoprion albostriatus Peters, Berliner Monatsberichte, 1865, 111 (on the type of Bloch & Schneider).

Habitat: West Indies, north to Key West, south to Bahia.

Etymology: The plural of the Cuban name, *cají*, formerly spelled *caxí*.

This species is very abundant in the markets of Havana, where it is still known as *cají* (in old Spanish *caxí*, of which "*caxis*" is a plural form). This persistence of the common name is the only certain basis of identification of Parra's *Caxis*. It is almost equally common at Key West, where, as in Catesby's time, it is known as the "schoolmaster." The latter name is, however, indifferently applied by the fishermen to *Lutjanus jocú* also.

There seems to be little doubt, in spite of the difference in color, which seems to be the fault of the printer, that the *acutirostris* of Duméril is *L. caxis*. We have examined the original types of *cynodon*, *linea*, and *flavescens*, which are identical with *L. caxis*.

Peters adopts Schneider's name *albostriatus* (apparently originally a mere slip of the pen for *striatus*), "because another species has been lately named *Mesoprion striatus*." Peters identified Schneider's type with "*Mesoprion linea* C. & V."

This species is closely allied to *L. griseus* and still more nearly to *L. jocú*. The latter is very similar in form and coloration, but has decidedly smaller scales. The former is more elongate, and has the vertical fins always dark, while in *caxis* and *jocú* yellowish colors predominate.

Specimens of *L. caxis* are in the museum at Cambridge from Cuba, Sombrero, and Jérémie, Haiti. A specimen from Pernambuco is more elongate (depth $2\frac{3}{5}$ in length), and the lower teeth a little stronger.

We provisionally reject the name *apoda*, although older than *caxis*, because it may have been intended either for this species or *jocú*, while the bad figure must have been drawn from memory by Catesby. Not one fisherman in ten in the Florida Keys can distinguish the "schoolmaster" from the "dog snapper." The fishermen of Cuba are, however, more skillful in separating their *cají* from the *jocú*.

9. LUTJANUS ARGENTIVENTRIS. (Pargo Amarillo.)

Mesoprion argentiventris Peters, Berlin. Monatsber., 1869, 704 (Mazatlan).

Lutjanus argentiventris, Jordan, Proc. Ac. Nat. Sci. Phila. 1883, 285 (Mazatlan); Jordan & Swain, l. c., 434 (Mazatlan, Panama); Evermann & Jenkins, Proc. U. S. N. M. 1891, 146 (Guaymas).

Mesoprion griseus, Günther, Fishes Central America, 1863, 385 (name only; not of Cuv. & Val.).

Lutjanus argentivittatus, Jordan & Gilbert, Proc. U. S. N. M. 1881, 354; Jordan & Gilbert, Bull. U. S. F. C. 1882, 107, 110 (Mazatlan, Panama); Jordan & Gilbert, Proc. U. S. N. M. 1882, 625 (Panama), (*lapsus calami* for *argentiventris*).

Habitat: Pacific coast of tropical America.

Etymology: *Argenteus*, silvery; *venter*, belly.

This species, the *pargo amarillo* of the Mazatlan fishermen, is generally common on the Pacific coast of Mexico and Central America. It bears considerable resemblance to *L. caxis*, *jocú*, and *griseus*, but is distinct from all of these.

Our specimens are from Mazatlan and Guaymas. Specimens from Panama are in the museum at Cambridge.

10. LUTJANUS LUTJANOIDES.

Ocyurus lutjanoides Poey, Ann. Lyc. Nat. Hist., IX, 319, 1871 (Cuba).
Lutjanus lutjanoides Poey, Enumeratio, 1875, 30; Jordan & Swain, l. c.

Habitat: Cuba. One specimen known.

Etymology: *Lutjanus*: ειδος, form.

This species is known to us only from the description of Poey, who has suggested the possibility of its being a hybrid between *O. chrysurus* and *L. caxis*. It is not unlikely that it is a hybrid, but its smaller scales suggest its relationship to *L. jocú* rather than to *L. caxis*.

11. LUTJANUS BUCCANELLA. (Sesí de lo Alto; Oreille Noire.)

Mesoprion buccanella Cuv. & Val., II, 1828, 455 (Martinique); Guichenot, Ramon de la Sagra, Cuba, 23 (Cuba); Günther, I, 198 (Cuba, Jamaica).
Lutjanus buccanella, Poey, Synopsis, 1868, 295; Poey, Enumeratio, 27; Jordan & Swain, l. c.; Jordan, l. c., 1889, 648 (St. Lucia).
Mesoprion caudanotatus Poey, Memorias, I, 440, about 1858, tab. 3, f. 2 (Cuba, young); Poey, Repert., II, 158, 1868.

Habitat: West Indies.

Etymology: *Boucanelle*, a name used in Martinique.

This small and strongly marked species is common in the deeper waters about Havana, and is known in the markets as *sesí* or *sesí de lo alto*. A specimen was taken by the *Albatross* at St. Lucia. The synonymy of the species offers no difficulty. A young specimen was once described by Poey as a distinct species under the name of *Mesoprion caudanotatus*, but its identity with *L. buccanella* is unquestionable.

12. LUTJANUS VIVANUS. (Pargo de lo Alto; Silk Snapper.)

Mesoprion vivanus Cuv. & Val., II, 454, 1828 (Martinique); Jordan, Proc. Ac. Nat. Sci. Phila. 1883, 286; Jordan, Proc. U. S. N. M. 1886 (examination of types) (not *Lutjanus vivanus* Jordan & Swain).
Lutjanus vivanus, Jordan, l. c., 1889, 648 (St. Lucia).
Mesoprion aya Cuv. & Val., II, 1828, 457 (San Domingo); Guichenot, Ramon de la Sagra, Hist. Cuba, 24 (Cuba); Günther, I, 198, 1859 (Jamaica); Poey, Repertorio Pisc. Cubens., I, 1867, 267 (probably not *Bodianus aya* Bloch).
Mesoprion profundus Poey, Memorias, II, 150, 1860 (Cuba); Poey, Repertorio, II, 1868, 157; Poey, Synopsis, 1868, 294.
Lutjanus profundus Poey, Enumeratio, 1875, 28; Jordan & Swain, l. c.
Lutjanus purpureus Poey, Enumeratio Pisc. Cubens., 1875, 29 (name taken from *Mesoprion purpureus* Cuv. & Val., II, 471, 1828; the name *purpureus* evidently a slip of the pen for *aya*).
Lutjanus torridus Cope, Trans. Am. Philos. Soc., 468, 1869 (St. Kitts).

Habitat: West Indies.

Etymology: From the French name *vivanet*, used at Martinique, probably allied to *vivax*, "lively."

This handsome species is rather common in the markets of Havana, where it is known as the *pargo de lo alto*. When fresh it may always be known by the bright yellow color of the eye, a color which does not entirely fade in spirits. It is evidently the *Mesoprion aya* of Cuvier & Valenciennes, but it is apparently not the original *Bodianus aya* of Bloch, as the latter species is said by Marcgrave and Bloch to have the iris red.

Poey recognizes, under the name of *Lutjanus purpureus*, a second species, which differs from *L. profundus* only in having small scales very close to the eye. This seems to be a character of little importance on which to recognize a distinct species.

The name *purpureus* is credited to Cuvier, but, in the single place (vol. II, p. 457) where the name occurs, *purpureus* is evidently a mere slip of the pen for *aya*. Probably it was originally a manuscript name, for which the latter name, from Bloch, was taken.

Lutjanus torridus, loosely described and poorly figured by Prof. Cope, seems to be this species rather than the red snapper, as it has been formerly identified by us. We have examined Cope's type in the Museum of the Academy at Philadelphia. It is 11 inches long and in poor condition, but it probably belongs to *L. vivanus* rather than to *L. aya*.

In the review of this genus by Jordan and Swain, the close relations of *L vivanus* with *L. aya* were not apprehended. The two species are in fact very similar in structural characters, *L. vivanus* being distinguished chiefly by the slenderer body, smaller scales, longer anal spines, more numerous gill-rakers, and larger eye, the iris of which is always bright yellow. The types of *Mesoprion vivanus* must be referred to the present species rather than to *L. aya*, unless, a very improbable supposition, they represent still another species not yet recognized. We are therefore obliged to adopt for the "*pargo de lo alto*" the name of *L. vivanus*, rather than the appropriate one of *L. profundus* given to it by Prof. Poey.

13. LUTJANUS AYA.

(Red Snapper; Pargo Colorado; Pargo Guachinango.)

Acara aya Marcgrave, Hist. Brasil., 167, 168, 1648.

Bodianus aya Bloch, Ichthyol., taf. 227, 1790 (based on Marcgrave); Lacépède, IV, 286, 287, 1803 (copied).

Lutjanus aya, Goode, Bull. U. S. N. M., V, 1876, 55 (Bermudas); Jordan, Man. Vert., ed. 5, 1888, 139.

Bodianus ruber Bloch & Schneider, Syst. Ichthy., 1801, 330 (based on Marcgrave).

Lutjanus vivanus, Jordan & Swain, l. c., 453 (not type).

Mesoprion campechanus Poey, Mem., II, 149, 1860 (Cuba).

Lutjanus campechianus Poey, Syn., 294, 1868 (Cuba); Poey, Ann. Lyc. Nat. Hist. N. Y., 317, 1870 (Cuba); Poey, Enumeratio, 29, 1875 (Cuba); Poey, Bull. U. S. F. C. 1882, 118 (Key West); Jordan & Gilbert, Syn. Fish. N. A., 1883, 921 (copied); Jordan, Proc. U. S. N. M. 1884, 125 (Key West).

Lutjanus blackfordi Goode & Bean, Proc. U. S. N. M. 1878, 176 (Pensacola); Goode, Proc. U. S. N. M. 1879, 114 (St. Johns River); Goode & Bean, *op. cit.*, 1879, 137, 156 (Pensacola); Bean, *op. cit.*, 1880, 96; Goode & Bean, *op. cit.*, 1882, 238; Jordan & Gilbert, *op. cit.*, 1882, 275 (Pensacola); Jordan & Gilbert, Syn. Fish. N. A., 1883, 549; and of Goode & Bean and recent American writers generally.

Habitat: Long Island to Brazil; especially abundant in the Gulf of Mexico.

Etymology: From the Portuguese name, *Acara aya*.

This species, the most valuable food-fish of the genus in the waters of the United States, is very abundant in rather deep water in rocky places around the Florida coast. At Pensacola it is taken in great numbers. It is one of the most important food-fishes of our southern coasts. About Key West it is also taken in large numbers, but only in the deep waters, and it is taken thence alive in the wells of the fishing smacks to the markets of Havana. On the American coast it is known everywhere as "red snapper," or to the Spaniards as *pargo colorado*. In Havana it bears the name of *pargo guachinango*, "Mexican snapper," because it is brought to that city from the Mexican coast. According to Poey it is comparatively rare in Cuban waters, although daily seen in the markets. Specimens are in the museum at Cambridge, from Rio Janeiro; these seem to be entirely similar to the red snapper of our markets; in some of these the stomach is wrong side out, indicating that they came from deep water.

The synonymy is somewhat complicated, and some doubt exists as to the proper specific name. We identify the names *aya* and *ruber*, based on the *Acara aya* of Marcgrave, as belonging to the common red snapper. This is said to be a red *Lutjanus*, 3 feet in length, and with a red circle around its iris; it is therefore far more likely to have been this species than the small *Lutjanus vivanus*, with which it has been identified by Cuvier. As this species occurs on the Brazilian coast, and as it corresponds to Marcgrave's and Bloch's descriptions, there is not much doubt as to its identity, the more so as it is probable that all the large *Lutjani* of our waters are now known.

The type of *Mesoprion campechanus* examined by us at Havana is a stuffed skin of a young fish apparently belonging to this species. In this specimen the eye is larger than it should be in a red snapper of that size, it being, as Poey has correctly stated, 4 in head. This large size is, however, probably due to the shrinkage of the orbit in drying. Poey also counts "65 scales above the lateral line and 53 below," a larger number than others count in this species. This difference is doubtless dependent on the method of counting.

The type of *Lutjanus blackfordi* is of course the present species, and the first good description of the species is that published by Goode & Bean under this name. We are forced, however, to adhere to our original view, that the name *campechanus* certainly belongs to the same fish, and the still older name *aya* is as well authenticated as the names given by Bloch are likely to be. We can not therefore make use of the name *blackfordi* as the specific name of the red snapper.

14. LUTJANUS ANALIS. (Mutton-fish; Pargo; Pargo Criollo.)

Anthias quartus rondeleti (Mutton-fish), Catesby, Nat. Hist. Carolina, 1743.

Mesoprion analis Cuv. & Val., II, 452, 1828 (San Domingo); Poey, Memorias, II, 146, 1860, tab. 13, fig. 9 (Cuba); Poey, Repertorio, I, 266, 1867 (Cuba); Poey, Synopsis, 294, 1868 (Cuba).

Lutjanus analis, Poey, Enumeratio, 1875, 29 (Cuba); Jordan, Proc. U. S. N. M. 1884, 125 (Key West); Vaillant & Bocourt, Miss. Sci. au Mexique, 1881, 119, pl. v; Jordan & Swain, l. c.; Jordan, l. c., 1889, 648 (St. Lucia); Jordan, l. c., 1890, 319 (Bahia).

Mesoprion sobra Cuv. & Val., II, 453, 1828 (Martinique); Guichenot, in Ramon de la Sagra, Hist. Cuba, Poiss., 22; Günther, I, 209.

Mesoprion isodon Cuv. & Val., IX, 443, 1833 (San Domingo).

Mesoprion isodon, Günther, I, 1859, 206 (copied).

Mesoprion vivanus Günther, I, 263, 1859 (Jamaica, Bahia; not of Cuv. & Val.).

Lutjanus vivanus, Cope, Trans. Am. Philos. Soc., 1869, 470 (New Providence, St. Croix).

?*Mesoprion rosaceus* Poey, Ann. Lyc. Nat. Hist. N. Y., IX, 317, 1870 (Cuba).

?*Lutjanus rosaceus* Poey, Enumeratio, 1875, 30.

Habitat: Pensacola to Brazil.

Etymology: *Analis*, from the elevated anal fin.

This species is rather common at Key West, where, as elsewhere in the West Indies, it is known as mutton-fish. At Havana it is the *pargo* (*par excellence*) or *pargo criollo*. It is perhaps the most important food-fish of the Havana markets, being always abundant and its flesh always healthful. It reaches a large size, and its flesh is fairly flavored, although not very delicate.

The names *analis* and *sobra* of Cuvier & Valenciennes seem to belong to this species without question. *Mesoprion isodon* is identified by Vaillant with *L. analis* on comparison of typical examples. *Lutjanus rosaceus* is described as a distinct species from a large specimen 27½ inches in length. The only tangible distinction which we find in the long description is that the eye is one-sixth the length of the head, while in *L. analis* of the same size the eye is 8½ in the head. We

hesitate to admit *L. rosaceus* as distinct from *L. analis*. The larger eye and redder coloration perhaps indicate a specimen from deeper water than usual.

Specimens of this species are in the museum at Cambridge from Nassau, Rio Janeiro, and Rio Grande do Norte.

15. LUTJANUS COLORADO. (Pargo Colorado.)

Lutjanus colorado Jordan & Gilbert, Proc. U. S. N. M. 1881, 338, 351, 355 (Mazatlan); Jordan & Gilbert, Bull. U. S. N. M. 1882, 107, 110 (Mazatlan, Panama); Jordan & Swain, l. c.; Evermann & Jenkins, Proc. U. S. N. M. 1891, 147 (Guaymas).

Habitat: Guaymas to Panama.

Etymology: Spanish, *colorado*, red (colored), in allusion to the common name *pargo colorado*.

16. LUTJANUS BRACHYPTERUS.

Lutjanus brachypterus Cope, Trans. Am. Phil. Soc. 1871, 470 (New Providence); Jordan and Swain, l. c., 447 (description of type).

Habitat: Bahama Islands.

Etymology: βραχύς, short; πτερόν, fin.

Of this species, a single specimen only is known. It is allied to *L. griseus*, although apparently distinct from that species and from all others known to us. In its technical characters it approaches most closely to *L. synagris*, near which species it is convenient to place it in our analytical key. If we suppose the type of *L. ambiguus* to be a hybrid, *synagris-chrysurus*, we may suspect *L. brachypterus* to represent a hybrid of *griseus* and *synagris*. The evidence in the latter case is less striking than in the former.

17. LUTJANUS GUTTATUS. (Flamenco.)

Mesoprion guttatus Steindachner, Ichthyol. Notizen, IX, 18, 1869, taf. VIII (Mazatlan).
Lutjanus guttatus, Jordan & Gilbert, Proc. U. S. N. M. 1881, 354; Jordan & Gilbert, *op. cit.*, 1882, 625 (Panama); Jordan & Gilbert, Bull. U. S. F. C. 1882, 107, 110 (Mazatlan, Panama); Jordan & Swain, l. c.; Evermann & Jenkins, Proc. U. S. N. M. 1891, 147 (Guaymas); Jordan, l. c., 1889, 181 (Panama).

Habitat: Guaymas to Panama.

Etymology: *Guttatus*, spotted.

This species represents *Lutjanus synagris* on the Pacific coast. It is a common food-fish at Guaymas, Mazatlan, and Panama.

18. LUTJANUS SYNAGRIS. (Lane Snapper; Biajaiba.)

Salpa purpurescens variegata (Lane Snapper), Catesby, Hist. Nat. Carol. 1743, tab. 17.

Sparus synagris Linnæus, Syst. Nat., x, 280, 1758 (after Catesby); Linnæus, *op. cit.*, xii, 470; Gmelin, Syst. Nat., 1788, 1275; Bloch & Schneider, Syst. Icth., 1801, 274 (copied).

Lutjanus synagris, Poey, Enumeratio, 1875, 27 (Cuba); Poey, Bull. U. S. F. C. 1882, 118 (Key West); Jordan & Gilbert, Syn. Fish. N. A., 1883, 922; Jordan, Bull. U. S. F. C. 1884 (Key West); Jordan, Proc. U. S. N. M. 1884, 125 (Key West); Jordan & Swain, l. c.; Jordan, l. c., 1889, 648 (St. Lucia); Jordan, l. c., 1890, 319 (Bahia).

Sparus vermicularis Bloch & Schneider, Syst. Ichth., 1801, 275 (on a drawing by Plumier).

Lutjanus aubricti Desmarest, Prém. Dec. Ichth., 17, 1823, pl. 2 (Cuba); Vaillant & Bocourt, Miss. Sci. Mex., 1881 (?), 126 (Jamaica, Hayti, Cuba, Montevideo).

Mesoprion uninotatus Cuv. & Val., II, 449, 1828 (San Domingo, Martinique); Agassiz, Spix, Pisc. Brasil., 1829, pl. 65; Castelnau, Anim. Nouv. ou rares Amér. Sud, 4; Guichenot, Ramon de la Sagra, Cuba, 21; Günther, I, 202, 1859 (Cuba, Puerto Cabello, San Domingo, Jamaica, Bahia).

Lutjanus uninotatus, Poey, Synopsis, 1868, 294; Cope, Trans. Am. Philos. Soc. 1871, 470 (St. Martin's).

Habitat: Florida Keys to Aspinwall and Brazil.

Etymology: *συναγρίς*, an old name of *Dentex dentex*, a species which this one was thought to resemble.

This species is very common almost everywhere from Tampa to Brazil. It reaches but a small size, rarely exceeding a foot, and it inhabits chiefly shallow waters. It is known about the Florida Keys and Bahamas as "lane snapper," and in Cuba as "*biajaiba*." In Havana it is one of the most common food-fishes, in abundance not exceeded by any other species. Its strongly marked coloration renders its recognition from descriptions easy, and little doubt exists in its extensive synonymy.

There is no doubt whatever as to the species intended by the lane snapper of Catesby. The name *synagris* of Linnæus is, therefore, without doubt the one which should be retained for the species.

Specimens of *L. synagris* are in the Museum at Cambridge, from Gonaives and Jérémie, Haiti, Porto Seguro, Havana, Ceara, Rio Janeiro, Maranhão, and Victoria.

19. LUTJANUS AMBIGUUS.

Mesoprion ambiguus Poey, Memorias Cuba, II, 152, 1860, tab. 12, f. 4; tab. 13, f. 18 (Cuba); Poey, Synopsis, 295.

Lutjanus ambiguus Poey, Enumeratio, 1875, 30; Jordan and Swain, l. c.

Habitat: Cuba.

Etymology: *Ambiguus*, uncertain.

This species is very well distinguished from *Lutjanus synagris* and from *Ocyurus chrysurus*; but it presents such a singular blending of the characters of the two as to lend much probability to Poey's conjecture that it is a hybrid of *Lutjanus synagris* with *Ocyurus chrysurus*. Two specimens are known, the one sent by Poey to the U. S. National

Museum and described in the paper of Jordan & Swain; the other, sent by Poey to the Museum at Cambridge, is very similar, with well-forked caudal and numerous gill-rakers. The lower jaw is, however, scarcely projecting, and the pectoral short, $1\frac{2}{5}$ in head.

20. LUTJANUS MAHOGONI. (Ojanco.)

Mesoprion mahogoni Cuv. & Val., II, 447, 1828 (Martinique); Günther, I, 203 (copied); Jordan, Proc. U. S. N. M. 1886 (examination of type).

Lutjanus mahogoni, Jordan & Swain, l. c.

Mesoprion ricardi Cuv. & Val., II, 447, 1828 (Martinique); Jordan, l. c. (exam. of type).

Mesoprion ojanco Poey, Memorias, II, 150, tab. 13, f. 10, 1860 (Cuba); Poey, Synopsis, 295, 1868.

Lutjanus ojanco Poey, Enumeratio, 1875, 28 (Cuba).

Habitat: West Indies.

Etymology: *Mahogoni*, the English mahogany, from the brown coloration.

This species is rather common in the markets of Havana, where it is known as *ojanco*, in allusion to the large eye. It does not reach a large size. This is, of course, the species described by Poey under the name of *Lutjanus ojanco*. The types of *M. mahogoni* and *M. ricardi*, examined by us in Paris, are the same as Poey's species.

21. LUTJANUS INERMIS.

Mesoprion inermis Peters, Berliner Monatsber., 1869, 705 (Mazatlan).

Lutjanus inermis Jordan, Proc. Ac. Nat. Sci. Phila. 1883, 285 (Mazatlan); Jordan & Swain, l. c., 459; Jordan & Bollman, l. c., 1889, 181 (Panama).

Habitat: Mazatlan to Panama.

Etymology: *Inermis*, unarmed.

Only two specimens known; one is in the Museum at Berlin and is said to have come from Mazatlan; the other was taken by the *Albatross* at Panama. It is quite unlike any other American species. It is perhaps related to *Lutjanus mitchilli*, a species lately described by Dr. Günther, from Madras.

22. LUTJANUS ARATUS. (Pargo Raizero.)

Mesoprion aratus Günther, Proc. Zoöl. Soc. Lon. 1864, 145 (Panama, Chiapas); Vaillant & Bocourt, Miss. Sci. au Mexique, 1881, 122 (Chorera, near Panama).

Lutjanus aratus, Jordan & Gilbert, Proc. U. S. N. M. 1881, 355; Jordan & Gilbert, *op. cit.*, 1882, 625 (Panama); Jordan & Gilbert, Bull. U. S. F. C. 1882, 107, 110, 112 (Mazatlan, Panama, Punta Arenas); Jordan & Swain, l. c., 460.

Habitat: Pacific coast of tropical America.

Etymology: *Aratus*, plowed, from its striped coloration.

This species, the "*pargo raizero*" of the Mazatlan fishermen, is generally common on the Pacific coast and reaches a considerable size. It bears little resemblance to any other American species, its squamation resembling that of *Hæmulon maculicauda*. Specimens from Panama are in the museum at Cambridge.

III. OCYURUS.

Ocyurus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*chrysurus*).

Type: *Sparus chrysurus* Bloch.

Etymology: ὠκύς, swift; οὐρά tail.

The skull of the single species now referred to *Ocyurus* deviates so far from that of the ordinary *Lutjanus* that its separation as a distinct genus seems to be fully justified. The species shows numerous minor peculiarities, as the peculiar form of the body, the large caudal fin, the small head, as well as an increased number of gill-rakers and the presence (in the adult) of pterygoid teeth.

ANALYSIS OF SPECIES OF OCYURUS.

a. Gill-rakers long and numerous, about 20 developed on lower part of arch; mouth small; lower jaw projecting; canines small, in upper jaw only; body elliptical, elongate, with very slender caudal peduncle; caudal fin deeply forked, longer than head; eye small; occipital keel high; preorbital narrow; teeth on vomer in an anchor-shaped patch; adult with a narrow band of teeth on pterygoids; scales small, those above lateral line in very oblique series; soft dorsal and anal low; anal spines weak; olivaceous, somewhat rosy-tinged; a broad yellow lateral band, with yellowish blotches above it and some yellow streaks below it; caudal deep yellow; other fins mostly yellow. Head, 3¼ in length; depth, 3. D. x, 13; A. III, 8 or 9. Scales 8–65–16.....CHRYSURUS, 23.

23. OCYURUS CHRYSURUS. (Yellow-tail; Rabirubia.)

Acara pitamba Marcgrave, Hist. Brasil., 1648, 155.

Rabirubia Parra, Descr. Dif. Piezas, Hist. Nat., pl. 20, f. 1, 1787 (Cuba).

Sparus chrysurus Bloch, Ichthyol., taf. 262, 1790 (after Marcgrave); Lacépède, Hist. Nat. Poiss., IV, 115, 1803 (copied).

Grammistes chrysurus, Bloch & Schneider, Syst. Ichth., 1801, 187 (copied).

Mesoprion chrysurus, Cuv. & Val., II, 459, 1828 (Martinique); Guichenot, Ramon de la Sagra, Hist. Cuba, 24, about 1850 (Cuba); Günther, I, 186, 1859 (Puerto Cabello, Jamaica, Trinidad).

Ocyurus chrysurus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 236 (name only); Poey, Synopsis, 295, 1868; Cope, Trans. Am. Philos. Soc., 1871, 468 (St. Martins, New Providence, St. Croix); Poey, Enumeratio, 1875, 40 (Cuba); Poey, Bull. U. S. F. C. 1882, 118 (Key West); Jordan & Swain, l. c.; Jordan, l. c., 1890, 319 (Bahia).

Lutjanus chrysurus, Vaillant, Miss. Sci. au Mexique, 1875, 133, pl. v; Jordan & Gilbert, Syn. Fish. N. A., 1883, 921; Jordan, Proc. U. S. N. M. 1884, 125 (Key West).

Anthias rabirubia Bloch & Schneider, Syst. Ichth., 1801, 309 (after Parra).

Sparus semiluna Lacépède, Hist. Nat. Poiss., IV, 141, 1803 (on a copy of a drawing by Plumier).

Mesoprion aurovittatus Agassiz, Spix, Pisc. Brasil., pl. 66, 1829 (Brazil).

Ocyurus aurovittatus, Poey, Syn. Pisc. Cubens., 1868, 295; Poey, Enumeratio, 31 (Cuba).

Ocyurus melanurus, Goode, Proc. U. S. N. M. 1879, 114 (name only; after *Perca melanura* L., which is a *Hæmulon* and not a *Lutjanus*).

Lutjanus melanurus, Jordan & Gilbert, Syn. Fish. N. A., 1883, 548.

Ocyurus rijgersmæi Cope, Trans. Am. Phil. Soc. 1871, 468 (St. Kitts).

Habitat: Atlantic coast of tropical America, southern Florida to Brazil.

Etymology: *χρυσός*, gold; *οὐρά*, tail.

This species is very abundant at Key West, where it is known as "yellow-tail." In Cuba it is perhaps, next to *L. analis* and *L. synagris*, the commonest of the snappers. It is there known as the *rabirubia*.

The synonymy of this species offers little difficulty. The earlier names, *chrysurus*, *rabirubia*, *semiluna*, seem to admit of no doubt. *Aurovittatus* is admitted as a distinct species by Poey, who has seen it but once, and distinguishes it by the absence of yellow spots on the back. Without further evidence we can not regard the claims of *aurovittatus* to distinction as worthy of consideration. The use of the name *melanurus* for this species by Dr. Goode is certainly an error. There can be no reasonable doubt of the pertinence of *Perca melanura* L. to *Hæmulon melanurum* (*dorsale* Poey). We have examined the specimens from St. Kitts, described by Prof. Cope under the name of *Ocyurus rijgersmœi*. These without much doubt are simply brightly-colored adults of this species.

Specimens of this common species are in the museum at Cambridge, from Rio Grande del Norte, Rio Janeiro, Ceará, Porto Seguro, and Nassau. It is evident from the collections made by Agassiz in Brazil that the *Lutjanine* fishes of that region are identical with those of the West Indian fauna.

IV. RHOMBOPLITES.

Rhomboplites Gill, Proc. Ac. Nat. Sci. Phila. 1862, 237 (*aurorubens*).

Type: *Centropristis aurorubens* Cuv. & Val.

Etymology: *ῥόμβος*, rhomb; *ὁπλίτης*, armed; from the form of the vomerine patch of teeth.

This genus is closely allied to *Lutjanus*, but the cranial peculiarities and extension of the villiform teeth over the pterygoid and hyoid bones seem to warrant generic separation. The form of the vomerine patch of teeth is also somewhat peculiar. But one species is known.

ANALYSIS OF SPECIES OF RHOMBOPLITES.

a. Eye large, 3½ to 4 in head; scales small, 10–72–19; gill-rakers numerous, about 18 below angle; dorsal spines twelve, high and slender; vomerine teeth arranged in a ◇-like patch; lower jaw projecting; preorbital narrow; caudal rather deeply forked; color vermilion red, with sinuous golden streaks; fins red; iris red. Head, 3⅓; depth, 3½. Scales, 10–72–19. D. XII, 11; A. III, 8. AURORUBENS, 24.

24. RHOMBOPLITES AURORUBENS. (Cagon de lo Alto.)

Centropristis aurorubens Cuv. & Val., Hist. Nat. Poiss., III, 45 (Brazil, Martinique, San Domingo); Storer, Synopsis, 1846, 288 (copied).

Mesoprion aurorubens, Günther, I, 207, 1859 (Jamaica).

Rhomboplites aurorubens Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236; Goode & Bean, Proc. U. S. N. M. 1879, 136 (Charleston, Pensacola); Bean, Proc. U. S. N. M. 1880, 96 (Charleston); Jordan, Proc. U. S. N. M. 1881 (Pensacola); Jordan & Swain, l. c.; Jordan, l. c., 1890, 319 (Bahia).

Lutjanus aurorubens, Vaillant & Bocourt, Miss. Sci. au Mexique, 1875; Jordan & Gilbert, Syn. Fish. N. A., 1883, 519.

Mesoprion elegans Poey, Memorias, II, 153, 1860 (Cuba.)

Rhomboplites elegans, Poey, Repertorio, II, 158,-1868; Poey, Synopsis, 1868, 295; Poey, Enumeratio, 1875, 31.

Aprion ariommus Jordan & Gilbert, Proc. U. S. N. M. 1883, 142 (Pensacola).

Habitat: West Indies, north to Charleston, south to Rio Janeiro.

Etymology: *Aureus*, golden; *rubens*, reddish.

This species is not uncommon in deep waters as far north as Charleston and Pensacola. It is not unfrequently seen in the markets of Havana, where it is known as *cagon* or *cagon de lo alto*. Specimens from Pensacola and Havana are fully identical. Specimens from the coast of Carolina are somewhat deeper than those from Cuba, and with the yellow streaks more pronounced, becoming dark brown in spirits. One of these, in the U. S. National Museum, has 13 dorsal spines. It is not, however, otherwise essentially different.

We see no reason to doubt that this species is the original *Centropristis aurorubens* of Cuv. & Val. We therefore adopt the earlier name instead of the name *elegans*, given to it by Poey. The young specimens taken from the stomachs of red snappers at Pensacola, and described by Jordan & Gilbert as *Aprion ariommus*, seem to be the young of this species. The pterygoid teeth are undeveloped, and covered by skin in young examples.

Specimens of *Rhomboplites aurorubens* are in the museum at Cambridge from Maranhão and Rio Janeiro.

V. APSILUS.

Apsilus Cuv. & Val., Hist. Nat. Poiss., VI, 1830, 548 (*fuscus*).

Tropidinius (Gill MSS.), Poey, Synopsis Pisc. Cub., 1868, 296 (*arnillo = dentatus*).

Type: *Apsilus fuscus* Cuv. & Val.

Etymology: α privative; $\psi\iota\lambda\acute{o}\varsigma$, bare or bald; the meaning not evident.

This very distinct species has essentially the cranial structure of *Lutjanus*, with the scaleless fins, peculiar squamation, and dentition of *Aprion*. We have examined the East Indian species, *Apsilus fuscus*, and find it generically identical with the American species, which must therefore be placed in *Apsilus*, leaving *Tropidinius* as a synonym.

ANALYSIS OF AMERICAN SPECIES OF APSILUS.

a. Body rather deep (depth, $2\frac{2}{3}$ in length); head large, 3 in body. D. x, 10; A, iii, 8; scales small, regularly arranged, 8–60–16; those above lateral line in series parallel with the lateral line; gill-rakers numerous, about 17 on lower part of arch; mouth rather small, the canines moderate; tongue toothless; vomerine teeth in a $\wedge$-shaped patch; preorbital narrow; caudal well forked; anal spines graduated; last rays of anal slightly produced, the lobes pointed; color, dusky violet, without distinct markings.....DENTATUS, 25.

25. APSILUS DENTATUS. (Arnillo.)

Apsilus dentatus Guichenot, in Ramon de la Sagra, Hist. Cuba, Poiss., 29, pl. 1, f. 2, 1845 (Havana).
Mesoprion dentatus, Günther, I, 188, 1859 (Jamaica).
Tropidinius dentatus, Jordan & Swain, l. c.
Mesoprion arnillo Poey, Mem. II, 154, 1860 (Cuba).
Tropidinius arnillo, (Gill MSS.), Poey, Synopsis, 296, 1868 (Cuba); Poey, Enumeratio, 30, 1875.
Lutjanus arnillus, Cope, Trans. Am. Philos. Soc. 1869, 470 (St. Croix).

Habitat: West Indies.

Etymology: *Dentatus*, toothed.

This beautiful little fish is rather common in the markets of Havana, where it is known as *arnillo*. The name *dentatus* is set aside by Poey in favor of his later name *arnillo*, because the species is a *Lutjanus* rather than an *Apsilus*, and all the *Lutjani* are dentate. Such reasons are not sufficient to warrant interference with the law of priority. The species, however, is a genuine *Apsilus*, and has perhaps stronger teeth than its congener *fuscus*.

VI. APRION.

Aprion Cuv. & Val., Hist. Nat. Poiss., VI, 1830, 543 (*virescens*).
† **Chætopterus** Temminck & Schlegel, Fauna Japonica, Poiss., 78, 1850 (*dubius*).
Pristipomoides Bleeker, Natuurk. Tijdschr. Nederl. Ind., 1852, III, 574 (*typus*).
Platyinius Gill, Proc. Ac. Nat. Sci. Phila. 1863, 237 (*vorax*=*macrophthalmus*).
† **Sparopsis** Kner, Fische Mus. Godeffroy, 1868, 303 (*elongatus*).

Type: *Aprion virescens* Cuv. &. Val.

Etymology: α privative; $\pi\rho\acute{\iota}\omega\nu$, a saw.

The superficial characters separating *Aprion* from *Lutjanus* are not very important, but the structure of the upper part of the cranium (in the species examined, *macrophthalmus* and *virescens*) differs widely from that of *Lutjanus*, *Ocyurus*, *Rhomboplites*, and *Apsilus*, closely resembling that of *Etelis*, with which genus *Aprion* has very near affinities.

The American species (*macrophthalmus*) has been made by Dr. Gill the type of a genus *Platyinius*, regarded as distinct from *Aprion*. An examination of *Aprion virescens* shows that our species has the same form of the skull, differing chiefly in the specific characters of deeper body, weaker teeth, and narrower preorbital. It is strange that so excellent a naturalist as Dr. Klunzinger should regard *Aprion* merely as a subgenus under *Centropristis* (Fische des Rothen Meers, p. 16).

ANALYSIS OF AMERICAN SPECIES OF APRION.

a. Body oblong-elliptical, the depth 3 in length; scales large, regularly arranged, 7–60–15, those above lateral line in series parallel with the lateral line; gill-rakers numerous, about 17 on lower part of arch; mouth rather small, the canines feeble; tongue toothless; opercle ending in an evident spine; preopercle serrate on angle; vomerine teeth in a Λ-shaped patch; caudal well forked; anal spines graduated; last ray of dorsal and anal produced; D. x, 11; A, III, 8. Head, 3; Color, rose-red, with some pearly markings.....MACROPHTHALMUS, 26.

26. APRION MACROPHTHALMUS. (Voraz.)

Centropristis macrophthalmus Müller & Troschel, in Schomb. Hist. Barbadoes, 666, 1848 (young).

Elastoma macrophthalmus, Cope, Trans. Am. Philos. Soc. 1869, 468 (St. Martins, New Providence, St. Croix).

Aprion macrophthalmus, Jordan & Swain, l. c.

Mesoprion vorax Poey, Mem. II, 151, 1860 (Cuba).

Platyinius vorax, Gill, Proc. Acad. Nat. Sci. Phila. 1863, 237 (generic diagnosis); Poey, Synopsis, 292, 1868; Poey, Enumeratio, 31, 1875.

Habitat: West Indies.

Etymology: *μακρός*, large; *ὀφθαλμός*, eye.

This species is rather common in the markets of Havana, where it is known as *voraz*, by which the specific name *vorax* has been suggested.

According to Poey the *Centropristis macrophthalmus* of Müller & Troschel was based on the young of this species; if so, the latter name has the right of priority. This species agrees closely with the descriptions of *Aprion filamentosus* (Cuv. & Val.) from the islands east of Africa, but it would be premature to unite two species from such widely separated localities without an actual comparison of specimens. Dr. Klunzinger regards the two species as identical. According to his account, however, *A. filamentosus* is a slenderer fish, the depth $4\frac{1}{2}$ in the total length ($3\frac{3}{4}$ in *A. macrophthalmus*), and the scales are 7–55–14, the caudal more deeply forked, the lobes 3 times the middle rays ($2\frac{2}{5}$ times in ours).

VII. ETELIS.

Etelis Cuv. & Val., Hist. Nat. Poiss., II, 127, 1828 (*carbunculus*).
Elastoma Swainson, Nat. Hist. Fishes, II, 168, 202, 1839 (*oculatus*).
Hesperanthias Lowe, Fishes of Madeira, 1843, 14 (*oculatus*).
Macrops Duméril, Ichth. Analytique, 1856, 279 (*oculatus*).
Etelis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 447.

Type: *Etelis carbunculus* Cuv. & Val.

Etymology: *Etelis*, a name used by Aristotle for some fish not recognizable.

The synonymy and relations of this interesting genus have been well discussed by Dr. Gill in the paper above cited. In spite of the difference in the form of its dorsal, the relations of *Etelis* with *Aprion* are very close. The skulls in the two are almost identical, as has already been noticed by Poey and Gill.

ANALYSIS OF AMERICAN SPECIES OF ETELIS.

a. Body elongate, fusiform; caudal peduncle long, slender; profile convex on snout, thence straightish to occiput; the nape low, not keeled; snout short, rather pointed, $3\frac{2}{3}$ in head; eye very large, 3 in head; preorbital very narrow, its least width 14 in head; mouth moderate, oblique, the lower jaw projecting; maxillary reaching middle of eye, $2\frac{1}{10}$ in head, its surface scaly; two canines of upper jaw very sharp and projecting forward and downward; canines of lower jaw not differentiated; tongue without teeth; vomer with a narrow ∧-shaped patch of teeth; gill-rakers long and slender; opercle ending in an evident spine; maxillary with about 12 scales; region behind eye well scaled; top of head and snout naked; lower jaw with a few imbedded scales; base of soft dorsal and anal scaleless; dorsal spines rather high and strong, the longest spine 2 in head, the spines thence becoming almost regularly and gradually shorter to last spine, which is little longer than first spine; margin of soft dorsal straight, the rays 3 in head, the last ray slightly elongate; anal similar to soft dorsal; its last ray considerably produced; anal spines slender and graduated; caudal very deeply forked, the upper lobe the longer, its length four times length of middle rays; upper lobe almost filamentous, longer than head; pectorals falciform, reaching almost to anal, $1\frac{1}{3}$ in head. Color in life, brilliant rose-red; bases of the scales deeper and belly abruptly paler rosy; mouth reddish within; lining of gill-cavity reddish; fins all rosy; spinous dorsal and caudal bright red, the other fins paler. Head, $3\frac{1}{4}$; depth, $3\frac{1}{4}$. D. x, 11; A. iii, 8. Scales, 5-53-12; 50 pores. OCULATUS, 27.

27. ETELIS OCULATUS. (Cachucho.)

Serranus oculatus Cuv. & Val., II, 1828, 266 (Martinique).
Elastoma oculatus, Swainson, Nat. Hist. Fishes, II, 168, 202, 1839 (generic diagnosis).
Hesperanthias oculatus, Lowe, Fishes Madeira, 1843, 14 (generic description).
Centropristis oculatus, Müller & Troschel, in Schomb. Hist. Barbadoes, 666, 1848.
Anthias oculatus, Günther, I, 92, 1859 (Jamaica, Madeira).
Etelis oculatus, Gill, Proc. Ac. Nat. Sci. Phila. 1862, 447 (Cuba); Poey, Synopsis, 292, 1868 (Cuba); Poey, Enumeratio, 31, 1875; Jordan & Swain, l. c.
Macrops oculatus, Duméril, Ichth. Analytique, 1856, 279 (*fide* Gill).

Habitat: West Indies.

Etymology: *Oculatus*, furnished with eyes; a reference to its large eyes.

This very beautiful species is abundant in the markets of Havana, where it is known as *cachucho*. It is found in rather deep water, with such forms as *Lutjanus vivanus*, *buccanella*, *mahogoni*, *Rhomboplites aurorubens*, *Aprion macrophthalmus*, and *Apsilus dentatus*. These fishes are a little lower down in the bathymetric scale than *Lutjanus aya*, which in turn inhabits deeper water than the other *Lutjani*. In still deeper water is found *Verilus sordidus*, which is a true deep-water fish. The *cachucho* reaches a length of 2 feet or more, and is esteemed as a food-fish. The synonymy of the species offers no complications, although its generic relations have been often misunderstood. This and some other Cuban *Lutjaninæ* bear considerable resemblance to certain Japanese types, but it is improper to regard them as specifically identical with their Asiatic representatives until specimens have been fully compared.

VIII. VERILUS.

Verilus Poey, Memorias de Cuba, II, 125, 1860 (*sordidus*).

Type: *Verilus sordidus* Poey.

Etymology: "Veril, a Spanish word meaning 'haut de fond coupé à pic,' apparently an allusion to the form of the teeth. 'Ne vous mettez pas en peine sur l'origine du nom, les meilleurs, ne sont pas les plus étymologiques, par cela même qu'ils ont une signification rarement exclusive.'" (*Poey.*)

The genus is technically close to *Etelis*, although the single known species is very different from *Etelis oculatus*. The cavernous character of the skull is the most striking feature of the genus *Verilus*.

ANALYSIS OF SPECIES OF VERILUS.

a. Body oblong, compressed, rather robust; caudal peduncle short and thick; head large; profile almost straight from snout to origin of spinous dorsal, and not at all steep; snout very short and blunt, 4 in head; eye very large, 2⅞ in head; interorbital space flat, its width 4⅝ in head; occipital keel very low; preorbital very narrow, 7 in eye, nearly 20 in head; maxillary reaching middle of eye, 2 in head; mouth large, oblique, the lower jaw projecting; upper jaw with two moderate canines in front; lower jaw with two or three small canines directed nearly horizontally backward; vomer with a narrowly ∧-shaped patch of teeth; tongue and pterygoids without teeth; gill-rakers numerous, their length almost half diameter of eye, x + 17; preopercle with posterior margin weak and flexible, almost entire, becoming somewhat serrate at the angle and on lower limb; scales large; the rows horizontal below the lateral line; those above rather irregular, the series running upward and backward; head scaly everywhere, the scales generally smaller than on body; base of soft dorsal and anal somewhat scaly; spinous and soft dorsals entirely separate; first spine 4½ in second, which is 2⅔ in head, the spines thence becoming gradually shorter to ninth spine, which about equals length of first spine; last rays of dorsal and anal not produced; anal similar to soft dorsal, its margin rather more concave; anal spines moderate, the third slightly longer than second; caudal fin short, broad, moderately forked, the upper lobe longer, its length scarcely twice that of middle rays; pectorals long, reaching to origin of anal, 1⅓ in head; pseudobranchiæ very evident. Color dusky gray, slightly paler below; tips of spinous dorsal and ventrals jet black, the fins otherwise colored as the body; posterior edge of caudal dusky; lining of gill-cavity, peritoneum, and posterior part of mouth jet black. Head, 2⅔; depth, 3. D. IX, 10; A. III, 7. Scales, 4–43–9; 41 pores.....SORDIDUS, 28.

28. VERILUS SORDIDUS. (Escolar Chino.)

Verilus sordidus Poey, Memorias, II, 125, 1860, tab. 12, f. 6 (Cuba); Poey, Repertorio, II, 157, 1867; Poey, Synopsis, 291, 1868; Poey, Enumeratio, 32, 1875.

Habitat: About Cuba in deep water.

Etymology: *Sordidus*, sordid, from the dull color, in contrast with the brightness of *Etelis oculatus*.

This species is rarely taken in deep water off the coast of Cuba. It is known to the fishermen as *Escolar chino*. It has never been seen elsewhere. The specimen before us was obtained in the Havana market.

Subfamily III.—XENICHTHYINÆ.

IX. XENOCYS.

Xenocys Jordan & Bollman, Proc. U. S. N. M. 1889, 160 (*jessiæ*).

Type: *Xenocys jessiæ* Jordan & Bollman.

Etymology: ξένος, strange; ὠκύς, swift.

This genus is closely related to *Xenistius*. The single species inhabits rocky shores in the eastern Pacific and is a fish of remarkably graceful form.

ANALYSIS OF SPECIES OF XENOCYS.

a. Body elliptical, compressed; mouth moderate, the lower jaw projecting, the broad maxillary reaching nearly to the middle of pupil, 2¼ in head; eye large, its length less than snout, 3½ in head; preorbital narrow, 2⅝ in eye, entire; teeth very small, the bands wider than in *Xenistius californiensis;* those on vomer in a Λ-shaped patch; nostrils minute, close together, the anterior round, the posterior oblong; preopercle with fine serræ, the lower bluntish; opercle without spines; gill-rakers long and slender, x+23; cheeks and top of head with small scales; lower jaw and snout with rudimentary scales; maxillary naked; scales on body small, firm, ctenoid; dorsal fins wholly separate, the spines slender and pungent, the fourth half of head; soft dorsal longer than anal, its base ⅔ of an eye's diameter shorter than spinous dorsal; third anal spine longest, 4 in head; soft parts of vertical fins covered with small scales; caudal deeply forked, its peduncle slender, the upper lobe 1½ in head; pectorals long, pointed, 1⅔ in head; color grayish black, silvery below, with 7 distinct straight parallel stripes on back and sides, extending forward on top and sides of head; fins dusky, except the ventrals. Head, 3½ in length; depth 2⅔. D. x-i, 13; A. iii, 11. Scales, 8-51-15.....JESSIÆ, 29.

29. XENOCYS JESSIÆ.

Xenocys jessiæ Jordan & Bollman, Proc. U. S. N. M. 1889, 160 (Charles Island).

Habitat: Galapagos Islands.

Etymology: Named for Mrs. Jessie Knight Jordan.

This species is known from numerous specimens (41166, U. S. N. M.), the longest 8½ inches long, taken by the *Albatross* at Charles Island, one of the Galapagos.

X. XENISTIUS.

Xenistius Jordan & Gilbert, Syn. Fish. N. A., 1883, 920 (*californiensis*).

Type: *Xenichthys californiensis* Steindachner.

Etymology: ξένος, strange; ἱστίον, sail, dorsal fin.

This genus contains, so far as known, but a single species. It is closely related to *Xenichthys*, but it is remarkably distinguished by the relative development of the vertical fins.

ANALYSIS OF SPECIES OF XENISTIUS.

a. Body oblong-elliptical, the back a little elevated; head compressed; mouth moderate, terminal, very oblique, the lower jaw strongly protruding; maxillary narrow, reaching front of pupil, 2½ in head; eye large, 3¼ to 3½ in head, the eye smaller and the bones of the head firmer than in *Xenichthys;* teeth small, sharp, in very narrow bands, those on vomer in a ∧-shaped patch, but so small as to be scarcely appreciable; preopercle with fine sharp serræ; nostrils small, round; gill-rakers long and slender, x + 15 to 20; scales small, firm; dorsal fins almost separated; spines slender but pungent; third dorsal spine longest, 1¾ in head, the others gradually shortened; soft dorsal and anal similar to each other, short, shorter than spinous dorsal, the anterior rays much higher than in the species of *Xenichthys;* first soft ray of anal 3 in head; soft dorsal and anal scaly; pectoral fins rather long, 1⅓ in head, not reaching vent; color bluish above, silvery below; continuous dusky stripes on upper part of body, 3 above lateral line, 3 or 4 below; upper fins dusky, lower mostly pale. Head, 3 in length; depth, 3. D. XI–I, 12; A. III, 10; lat. l., 52 ..... CALIFORNIENSIS, 30.

30. XENISTIUS CALIFORNIENSIS.

Xenichthys californiensis Steindachner, Ichth. Beitr., III, 3, 1875 (San Diego); Streets, Bull. Nat. Mus., VII, 49, 1877 (Cerros Island); Jordan & Gilbert, Proc. U. S. N. M. 1881, 278 (Cerros Island); Jordan & Gilbert, Bull. U. S. F. C. 1881, 326 (Cerros Island); Jordan & Gilbert, Syn. Fish. N. A., 1883, 547 (Cerros Island).

Xenistius californiensis, Jordan & Gilbert, Syn. Fish. N. A., 1883, 920 (generic diagnosis); Evermann & Jenkins, Proc. U. S. N. M. 1891, 144 (Guaymas).

Habitat: Coast of lower California, from San Diego to Guaymas.

Etymology: From California.

This interesting little fish seems to be rather rare along the coast of lower California, and more abundant in the Gulf. One of our specimens was taken at San Diego by Mrs. Rosa Smith Eigenmann, the other by Jenkins and Evermann at Guaymas. The species described from San Salvador as *Xenichthys xenurus* by Jordan & Gilbert (Proc. U. S. N. M. 1881, 454) is a species of *Kuhlia*, a genus of *Serranidæ*.

XI. XENICHTHYS.

Xenichthys Gill, Proc. Acad. Nat. Sci. Phila. 1863, 82 (*xanti*).

Type: *Xenichthys xanti* Gill.

Etymology: ξένος, strange; ἰχθύς, fish.

This genus contains two species from the eastern Pacific. It shows a remarkable combination of characters, well justifying the name *Xenichthys*. The genus is certainly allied to *Pomadasis*, in spite of its resemblance to the Serranoid genus *Kuhlia*.

ANALYSIS OF SPECIES OF XENICHTHYS.

a. Pectoral fin falcate, about as long as the head and reaching to front of anal fin; eye very large, 2¾ in head; snout broad and flat; mouth oblique, the maxillary 2¾ in head; teeth quite small, those on vomer scarcely developed; none on palatines or tongue; lower jaw much projecting; preopercle very finely serrulate; gill-rakers slender and rather long, x+17; nostrils small, oblong; the longest ⅔ pupil; body compressed, the back somewhat elevated; longest dorsal spine not half length of head; soft dorsal and anal low, covered with small scales; caudal forked; anal spines short, graduated, the second stouter; first soft ray of anal less than ⅓ head; head, 3 in length; depth, 3. D. XI–I, 17, or 18; A. III, 17. Scales, 56. Color, steel-blue above, silvery below.....AGASSIZII, 31.

aa. Pectoral fin short, 1⅓ in head, not reaching nearly to the vent; eye very large, 3 in head; mouth oblique, the dentition much as in *X. agassizii;* occasionally very small teeth on vomer; none on palatines or tongue; preopercle with weak, sharp serræ on its vertical limb; gill-rakers moderate, the longest half diameter of pupil. Form of the preceding; third dorsal spine longest, 1⅓ in head; soft dorsal and anal low, covered with small scales; caudal forked; anal spines small, graduated. Head, 3 in length; depth, 3. D. XI–I, 18; A. III, 17, Scales, 10–54–14. Color, bluish-gray, silvery below; upper parts with 7 or 8 faint blackish streaks along the rows of scales; mouth yellow within in life; fins yellowish, with scattered black specks, the edges of most of them dusky; young with two dark longitudinal streaks and a faint spot at base of caudal.....XANTI, 32.

31. XENICHTHYS AGASSIZII.

Xenichthys agassizii Steindachner, Ichth. Beitr., III, 6, 1875 (Galapagos Islands); Jordan & Gilbert, Bull. U. S. F. C. 1881, 326 (copied).

Habitat: Galapagos Islands.

Etymology: Named for Louis Agassiz.

Our specimen of this species is one of the original types, received by us from the Museum of Comparative Zoölogy. It is very close to the next species, differing chiefly in the length of the pectoral.

32. XENICHTHYS XANTI.

Xenichthys xanti Gill, Proc. Ac. Nat. Sci. Phila. 1863, 82 (Cape San Lucas, description erroneous); Jordan & Gilbert, Bull. U. S. F. C. 1881, 326 (copied); Jordan & Gilbert, Proc. U. S. N. M. 1882, 360 (types of *X. xanti*); Jordan & Bollman, l. c., 1889, 181 (Panama).

Xenichthys xenops Jordan & Gilbert, Bull. U. S. F. C. 1882, 325 (Panama).

Habitat: Pacific coast of tropical America, from Cape San Lucas to Panama.

Etymology: Named for John Xantus.

This species is rather abundant at Panama, where numerous specimens were obtained by Prof. Gilbert. The original types of *X. xanti* are young examples of the same species. In the original description the dorsal rays were wrongly counted as XI–I, 14, the scales of the lateral line described as different from the others, but no difference of any importance exists.

Subfamily IV.—HÆMULINÆ.

XII. HÆMULON.

Diabasis * Desmarest, Première Décade Ichthyologique, 1823, 34 (*parra; flavolineatus;* not of Hoffmannsegg, Coleoptera, 1819).
Hæmulon Cuvier, Règne Animal, ed. 2, 1829 (*elegans*, etc.).
Orthostœchus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 255 (*maculicauda*).
Hæmylum (Scudder MSS.) Putnam, Bull. M. C. Z., 1863, 12 (*elegans*, etc.).
Diabasis (Scudder MSS.) Putnam, l. c. (*album*; name only).
Anarmostus (Scudder MSS.) Putnam, l. c. (name only; *flavolineatum*, etc.).
Bathystoma (Scudder MSS.) Putnam, l. c. (name only; *jeniguano*, etc.).
Brachygenys (Scudder MSS.) Poey, Synopsis Piscium Cubensium, 1868, 319 (name only; *tæniatum*).
Lythrulon Jordan & Swain, Proc. U. S. N. M. 1884, 287 (*flavoguttatum*).
Hæmulon Cuv. & Val., Günther, Gill, Poey, Goode, etc.
Diabasis Bennett, Bleeker et auct.

Type: *Hæmulon elegans* Cuvier=*Sparus sciurus* Shaw.

Etymology: αἷμα, blood; οὐλον, the singular of οὐλα, the gums.

All the species of *Hæmulon* are American. The genus is very closely related to *Pomadasis* Lacépède (=*Pristipoma* Cuv.), the only tangible points of difference being the large mouth with curved gape and the closely scaled soft dorsal and anal fins. All the species have more or less of orange on the inside of the mouth, a trait of coloration not found in *Pomadasis*. The amount of redness is greatest in those species having the largest mouth. It is true that certain species of *Pomadasis* (*humilis*, etc.) have the mouth larger than in certain species of *Hæmulon* (*chrysargyreum*). It is also true that while the soft dorsal and anal in many of the species referred to *Pomadasis* are free from scales, in certain of the subgenera or genera related to the latter genus (*Brachydeuterus*, *Anisotremus*) these fins are hardly less scaly than in *Hæmulon*. It is probably also true that certain species of *Hæmulon* (*chrysargyreum*) are more closely related to species of the section *Brachydeuterus* (*axillaris*, *nitidus*, *leuciscus*) than this section is to some other species usually placed in the same genus. There is no doubt, however, that the species of *Hæmulon* form a natural group, and no writer since Desmarest and Cuvier has questioned the right of this group to generic rank. It has been generally conceded that the group will not admit of further subdivision. The most aberrant of the species (*maculicauda*) was, in 1862, recognized by Dr. Gill as the type of a distinct genus, *Orthostœchus*, distinguished by the arrangement of its scales. In 1862 these fishes were the subject of an elaborate study by Mr. Samuel H. Scudder. Nothing has, however, been published by this writer, our

* Le poisson que je viens de décrire me paraît, selon les principes de classification ichthyologique de M. Cuvier, devoir former un genre à part. Je lui donne le nom de *Diabasis*, Διάβασις (*transitio*), pour indiquer ses rapports, d'une part, avec les *Acanthopterygiens* des genres Lutjan et Pristipome, et de l'autre avec les poissons placés dans la famille des Squamipennes. (Desmarest.)

knowledge of his conclusions being limited to a nominal list published by Prof. F. W. Putnam (Bulletin Mus. Comp. Zool., 1863, 12).

In this list four generic names are recognized, two of them new, but not defined, and hence not requiring notice. The species are thus grouped:

Hæmylum, *formosum* (*plumieri*), *elegans*, *arara* (*plumieri*).
Diabasis, *albus*.
Anarmostus, *flavolineatus*, *serratus* (*parra*).
Bathystoma, *melanurum* (*aurolineatum*), *chrysopterum* (*rimator*).

Later, another genus, *Brachygenys*, likewise left undefined, was proposed by Mr. Scudder for *tæniatum* Poey. It is mentioned by Poey (Syn. Pisc. Cubens., 1868, p. 319). We are unable to see any distinction whatever for the groups called *Hæmulon*, *Diabasis*, and *Anarmostus*, and think that if these be recognized as genera most of the remaining species should be elevated to the same rank. *Bathystoma* and *Brachygenys* are better differentiated, but neither in our opinion should be regarded as a distinct genus. No advantage is likely to come from such minute generic subdivision. Most writers have adopted for this genus the very appropriate name of *Hæmulon*, given to it by Cuvier in 1829. This name is not strictly correct in its form, and it has been sometimes, with a greater approach to classical exactness, written *Hæmulum*, which is an abridgment of the full form, *Hæmatulum*. By a curious blunder several purists have written *Hæmylum*, which is much worse than *Hæmulon*. The name is expressly stated by Cuvier to be derived from αἷμα, blood, and οὖλον, the singular of οὖλα, the gums.

The name *Diabasis* of Desmarest (1823) has priority over *Hæmulon*, and has been substituted for the latter by Bennett, Bleeker, and others. This name is, however, preoccupied in Coleoptera by the genus *Diabasis*, Hoffmannsegg, 1819. There appears, therefore, no doubt of the propriety of the retention of the name *Hæmulon*. *Hæmulon sciurus* (Shaw) (*elegans* Cuvier), the first species mentioned by Cuvier, may be regarded as the type of the genus. Twenty species of *Hæmulon* are recognized by us as probably valid. These we arrange in five sections or subgenera, with the names *Hæmulon*, *Bathystoma*, *Brachygenys*, *Lythrulon*, and *Orthostœchus*. Of these, *Hæmulon* contains most of the species and exhibits a greater range of variation than the others. The young fishes in this group differ in proportions considerably from the adults. Besides the changes usual in other fishes, we may observe that in *Hæmulon* the young have the snout proportionally much shorter, so that the maxillary, although also much shorter in proportion, extends further back in comparison with the eye. Nearly all the species have, when young, two more or less sharply defined, dark, longitudinal stripes along the side, one or more along the top of the head, and a dark spot at the base of the caudal. These markings persist longer in some species than in others, but traces of them, at least, may be found in the young of nearly all the species of *Hæmulon*,

Anisotremus, and *Pomadasis*. In a few species these markings persist during life. The species are all essentially alike in respect to the pores at the chin, the height and form of the soft dorsal, the form of the nostrils, the squamation of the fins, the direction of the lateral line, etc. These common characters are, therefore, not mentioned in the following descriptions. The peritoneum is black in all species examined.

In the descriptions below the scales above the lateral line are counted vertically from the first dorsal spine to the lateral line; those below the lateral line from the first anal spine obliquely upward and forward to the lateral line. The scales in a longitudinal series are, as here given, the number of vertical rows above the lateral line from head to base of caudal. This number is practically the same in all species of the genus, the variations above or below 50 being very slight. The number of oblique series of scales or of pores in the lateral line is in all cases about 10 fewer, or about 40.

ANALYSIS OF SPECIES OF HÆMULON.

a. Scales above lateral line arranged in very oblique series, not parallel with the lateral line.

b. Jaws subequal, or the lower included; mouth little oblique; gill-rakers comparatively few and short.

c. Dorsal spines 12 (sometimes 11 in *H. scudderi*); scales large; gill-rakers few and small (10 to 14 on lower part of anterior arch); frontal foramen a single or divided slit at the base of the high supra-occipital crest in front.

d. Mouth moderate or large, its cleft more than ⅓ length of head; back more or less elevated; second anal spine strong, notably longer than third. (*Hæmulon.*)

e. Scales below lateral line anteriorly not especially enlarged.

f. Scales above lateral line anteriorly not much enlarged.

g. Maxillary 2⅛ to 2¾ in head, not reaching center of eye (in adult).

h. Back and sides without yellow or blue stripes; each scale above with a median blackish spot, these forming undulating lines (spots rarely obsolete in adult, obscure or wanting in young); maxillary 2¼ to 2¾ in head.

i. Scales in a vertical row from first dorsal spine to lateral line 7 or 8 (9 in oblique series).

j. Mouth rather small, maxillary scarcely reaching to front of eye; back elevated; preorbital very deep, its least breadth greater than length of eye in adult, 4⅛ to 4⅜ in head in young; second anal spine not reaching to tip of last ray; snout long and pointed, 2¼ to 2⅜ in head.

k. Sides with about six dark vertical bars; sides of head with blackish spots like those of body; dorsal spines not graduated; 2d anal spine when depressed not reaching tip of last spine. Head, 3; depth, 2⅞. Scales, 7-51-14. D. XII, 17; A. III, 9.....SEXFASCIATUM, 33.

kk. Sides without dark bars; head unspotted; dorsal spines graduated; second anal spine, when depressed, reaching beyond tip of last spine. Head, 3; depth, $2\frac{2}{3}$. D. XII, 16; A. III, 7. Scales, 7 (or 8)–46 to 48–16....ALBUM, 34.

jj Mouth rather large, maxillary reaching front of pupil; back little elevated; preorbital rather narrow, its least width 5 in head; second anal spine reaching tip of last ray; snout rather long and pointed, $2\frac{1}{3}$ in head; back and sides with 4 or 5 black longitudinal streaks, which disappear only in very old examples. Head, $2\frac{2}{3}$; depth, $2\frac{3}{4}$. D. XII, 16; A. III, 8. Scales, 7–51–13.
MACROSTOMA, 35.

ii. Scales in a vertical row from first dorsal spine to the lateral line, five or six.

l. Series of scales from scapular scale extending backward to front of soft dorsal; snout rather long and pointed; mouth small; the maxillary $2\frac{2}{3}$ to 3 in head; dorsal rays XII, 16; pectoral fins long, $\frac{2}{3}$ length of head; black spots on sides coalescing in continuous stripes. Head, $2\frac{1}{3}$; depth, $2\frac{2}{3}$. Scales, 5–44–10. D. XII, 16; A. III, 8.....BONARIENSE, 36.

ll. Series of scales from scapular scale not extending farther backward than the middle of spinous dorsal; snout shorter, not very acute; mouth larger, the maxillary about $2\frac{1}{3}$ in head; premaxillary spine about 3 in head; dark spots on scales not coalescent.

m. Depth of body about $2\frac{2}{3}$ in length; pectoral fins short, less than $\frac{2}{3}$ length of head; scales above lateral line scarcely enlarged. Head, 3; depth, $2\frac{2}{3}$. Scales, 6–50–14. D. XII, 14; A. III, 7.....PARRA, 37.

mm. Depth of body $2\frac{1}{3}$ in length; pectoral fins long, more than $\frac{2}{3}$ length of head; scales above lateral line somewhat enlarged (in adult). Head, $3\frac{1}{3}$; depth, $2\frac{1}{4}$. Scales, 5–49–13. D. XI, XII–16, 15; A. III, 7.....SCUDDERI, 38.

hh. Back and sides with distinct, horizontal, yellow stripes, fading, but not disappearing, in spirits; no black spots anywhere; vertical fins usually dusky yellow; scales of sides slightly enlarged; maxillary $2\frac{1}{3}$ in head, reaching front of pupil; body not very deep; snout short, not $\frac{1}{3}$ length of head; second anal spine when depressed reaching tip of last ray, its length about half head. Head, 3; depth, $2\frac{1}{3}$. Scales, 7–55–14. D. XII, 16; A. III, 8.....CARBONARIUM, 39.

gg. Maxillary nearly or quite half length of head, reaching center of eye in adult; no black spots or stripes anywhere in the adult (except under angle of preopercle).

n. Back and sides with rows of round silvery spots, one on each scale, these forming streaks which follow the direction of the rows of scales; ground color light olive-brown; anal high; a black blotch at base of caudal; fins all yellow; body rather elongate, the depth nearly 3 in length; the snout pointed; maxillary about $2\frac{1}{3}$ in head; second anal spine $2\frac{1}{3}$ in head. Head, 3; depth, $2\frac{5}{6}$. Scales, 7–50–14. D. XII, 16; A. III, 8.
SCHRANKI, 40.

nn. Back and sides with continuous yellow stripes, which are horizontal and do not everywhere follow the direction of the rows of scales; ground color bluish-gray; back with a well-defined blackish area from first dorsal spine to base of caudal, this color covering most of soft dorsal and middle of caudal lobes; body rather elongate, the depth 3 in length; snout moderate; second anal spine $2\frac{3}{4}$ in head. Head, 3; depth, 3. Scales, 8–56–17. D. XII, 16; A. III, 8.
MELANURUM, 41.

nnn. Back and sides of head and body with continuous blue stripes, horizontal, and not everywhere following the rows of scales; ground color bright yellow; fins yellow, the caudal dusky at base; snout moderate; teeth strong, the anterior canine-like; second anal spine $2\frac{1}{2}$ in head; depth, $2\frac{3}{8}$ in length. Head, $2\frac{2}{3}$; depth, $2\frac{3}{8}$. Scales, 7–53–14. D. XII, 16; A. III, 8.....SCIURUS, 42.

ff. Scales above lateral line anteriorly much larger than the other scales; sides of head with bright blue stripes, which extend for a short distance only on body; body without distinct markings; mouth very large, its cleft more than half head (in adult); premaxillary spine $2\frac{1}{2}$ in head; anterior profile somewhat concave, the snout sharp, projecting; anal rather high, its second spine $2\frac{1}{2}$ in head. Head, $2\frac{3}{8}$; depth, $2\frac{3}{8}$. Scales, 5–50–17. D. XII, 16; A. III, 8.....PLUMIERI, 43.

ee. Scales below lateral line anteriorly much enlarged; head, back, and sides with continuous bright yellow stripes, those below following the direction of the scales, and therefore extremely undulating for the most part; body with two longitudinal black lines, the lower running from snout to base of caudal, ending in a black spot, the upper commencing in front of nostrils and separated from preceding by a pale band, extending backwards to posterior end of soft dorsal;

region in front of dorsal with black median line; other short black lines on head; black spot at angle of preopercle purplish-silvery in spirits; fins yellow; posterior teeth canine-like; body rather deep; snout short; mouth not large, the maxillary 2⅓ in head; anal high, its second spine 2 in head. Head, 3; depth, 2¾. Scales, 6-50-11. D. XII, 14; A. III, 8.
FLAVOLINEATUM, 44.

dd. Mouth small, its cleft less than ⅓ length of head; body rather elongate; second anal spine small; back and sides with longitudinal yellow stripes; teeth weak; gill-rakers rather few and small; snout very short, 2⅔ in head; frontal foramina separate and placed some distance in front of the very low supraoccipital crest; premaxillary spine very short, 4½ in head. (*Brachygenys* Scudder.)

o. Body elongate; the back not elevated, the depth 3⅓ to 3⅔ in body; eye very large, 3 in head; maxillary 3 to 3½ in head, reaching little, if any, past front of eye; anal moderate, its spines small, the second 2½ in head; fins all yellow; the caudal dusky in adult. Head, 3⅓; depth, 3⅔. Scales, 7-52-13. D. XII, 14; A. III, 9.
CHRYSARGYREUM, 45.

oo. Dorsal spines 13; anal fin low; preorbital low; gill-rakers in moderate or rather large numbers, 12 to 18 on lower part of arch; lower jaw not projecting; mouth little oblique; body comparatively elongate, the depth 2¾ to 3½ in length: body with longitudinal yellowish stripes; scales rather small; frontal foramina long divided slits in front of supraoccipital crest; size small. (*Bathystoma* Scudder.)

p. Mouth large, the maxillary reaching middle of eye, its length about half head; gill-rakers rather short and few; scales moderate, 50 to 55 in the lateral line; second anal spine scarcely larger or longer than third, 2¾ or more in head.

q. Body oblong, the back moderately elevated, the depth 2¾ to 3 in length. Head, 2⅔; depth, 2⅚. Scales, 8-51-13. D. XIII, 15; A. III, 8.....RIMATOR, 46.

qq. Body subfusiform, the back little elevated, the depth 3⅛ to 3½ in length. Head, 3; depth, 3⅔. Scales, 8-51-13. D. XIII, 15; A. III, 8.....AUROLINEATUM, 47.

pp. Mouth rather small, the maxillary not reaching to opposite middle of eye; its length not quite half head; gill-rakers numerous, rather long; scales small, about 70 in lateral line; second anal spine notably longer and larger than third; body more elongate than in other species, depth about 3½ in length. Head, 3½; depth, 3½. D. XIII, 13; A. III, 7. Scales, 7–70–18.

STRIATUM, 48.

bb. Lower jaw projecting beyond upper; snout very short; gill-rakers comparatively long and slender, about 22 on lower part of anterior arch; frontal foramina two short slits close together just in front of the high supraoccipital crest. (*Lythrulon* Jordan & Swain.)

r. Mouth small, very oblique, the maxillary reaching pupil, 2½ in head; head short, 3⅜ to 3⅝ in length; body rather deep; anal fin very low, its longest ray, when depressed, not nearly reaching middle of last ray; second anal spine little longer than third; scales of back and sides each with a pearly spot, these forming undulating streaks; dark blotch at base of caudal. Head, 3⅜; depth, 3⅛. Scales, 5-50-14. D. XII–XIII, 15; A. III, 9.

FLAVIGUTTATUM, 49.

aa. Scales above lateral line arranged in longitudinal series, which are throughout parallel with the lateral line; dorsal spines 13 (or 14); frontal foramina narrowly oval, wholly separate, some distance in front of the low supraoccipital crest; premaxillary spine short, 3⅛ in head; lower jaw projecting. (*Orthostœchus* Gill.)

s. Body oblong, the depth about 3 in length; snout short, 3½ in head; mouth small, the maxillary scarcely reaching front of pupil; eye large, 3⅜ in head; fins low; second anal spine little stronger or longer than third, 2⅔ in head; fourth dorsal spine 2; sides with alternate stripes of dark brown and light grayish, the latter formed by a light pale spot on the center of each scale; a dark blotch at base of caudal; vertical fins, gray. Head, 3⅛; depth, 2⅔. Scales, 5–51–11. D. XIII (XIV), 15; A. III, 10.

MACULICAUDA, 50.

33. HÆMULON SEXFASCIATUM.

Hæmulon sexfasciatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 254 (Cape San Lucas); Steindachner, Ichth. Beitr., III, 1875 (Panama).

Hæmulon sexfasciatum, Jordan & Swain, l. c., 288; Evermann & Jenkins, Proc. U. S. N. M. 1891, 153 (Guaymas).

Diabasis sexfasciatus, Jordan & Gilbert, Bull. U. S. F. C. 1881 (324), 1882 (107, 110) (Mazatlan, Panama); Jordan & Gilbert, Proc. U. S. N. M. 1882, 361, 372, 626 (Cape San Lucas, Colima, Panama); Jordan, Proc. Ac. Nat. Sci. Phila. 1883, 286 (on Peters's type of *maculosum*).

Hæmulon maculosum Peters, Berliner Monatsberichte, 1869, 705 (Mazatlan).

Habitat: Pacific coast of tropical America, Guaymas to Panama.

Etymology: *Sex*, six; *fasciatus*, banded.

This species is the Pacific coast representative of *Hæmulon album*, from which it differs strikingly in its coloration. It reaches a similarly very large size, specimens upwards of two feet in length having been obtained at Mazatlan by Prof. Gilbert. It is generally common along the Pacific coast of tropical America. We have examined the types both of *Hæmulon sexfasciatum* and *Hæmulon maculosum*. There is no doubt of their identity. The very young examples, types of the former species, show the crossbands of the adult, but not the spots on the head.

Specimens are in the museum at Cambridge, from Acapulco.

34. HÆMULON ALBUM. (Margate-fish; Jalláo; Margaret Grunt.)

Perca marina gibbosa (Margate-fish) Catesby, Nat. Hist. Car., p. 2, pl. 2, 1742 (Bahamas).

Perca gibbosa Walbaum, Artedi Pisc., 1792, 348 (after Catesby), (not *Perca gibbosa* L.).

Calliodon gibbosus, Bloch & Schneider, Syst. Ichth., 1801, 312 (name and part of description from Catesby; excl. syn. pars).

Hæmulon gibbosum, Jordan, Proc. U. S. N. M. 1884, 126 (Key West); Bean & Dresel, Proc. U. S. N. M. 1884, 158 (Jamaica); Jordan & Swain, l. c., 290.

Hæmulon album Cuv. & Val., V, 241, 1830 (St. Thomas); Poey, Repertorio, I, 310, 1867; Poey, Syn. Pisc. Cubens., 1868, 312 (Cuba, Key West); Poey, Enum. Pisc. Cubens., 1875, 45; Günther, I, 311, 1859 (Jamaica); Poey, Bull. U. S. F. C. 1882, 118 (Key West).

Diabasis albus, Putnam, Bull. M. C. Z., 1863, 12 (name only); Jordan & Gilbert, Syn. Fish. N. A., 924, 1883 (copied).

Hæmulon microphthalmum Günther, I, 306, 1859 (America).

Hæmulon chrysopterum Goode, Bull. U. S. N. M., V, 1876, 53 (excl. syn.).

Habitat: West Indies, Florida Keys to Brazil.

Etymology: *Albus*, white.

Hæmulon album reaches a length of two feet or more, and is an important food-fish both at Key West and Havana. English-speaking fishermen everywhere call it margate-fish, while the Spanish call it *jalláo*. Specimens are in the museum at Cambridge from Havana, Nassau, and St. Thomas.

In all the species of *Hæmulon*, Cuban specimens are decidedly more dusky than those from Key West. In several species, however, certain Cuban specimens are much paler than the average even of Key West

examples. This is true notably of *sciurus*, *carbonarium*, and *parra*. The pale form of *sciurus* has even received a different specific name (*multilineatum*), but we have no doubt that these differences depend on the character of the water or the bottom, and not on difference of species.

This is evidently the *Hæmulon album* of Cuvier and Valenciennes. Günther's *H. microphthalmum* belongs to the same species. The margate-fish of Catesby, erroneously referred by Linnæus to his *Perca chrysoptera* (*Pristipoma fulvomaculatum*), and by Cuvier to his *Hæmulon chrysopterum* (*rimator*), evidently belongs here. The *Calliodon gibbosus* of Bloch and Schneider is based on the figure of Catesby, which, together with the *Perca chrysoptera* L., is quoted in the synonymy. Still older is the name *Perca gibbosus* of Walbaum, likewise based on Catesby's margate-fish. But the name *Perca gibbosa* is preoccupied, having been used by Linnæus for the common sunfish, *Lepomis gibbosus*. The name *Hæmulon album* should therefore be retained.

35. HÆMULON MACROSTOMA.

Hæmulon macrostoma Günther, I, 308, 1859 (Jamaica); Jordan & Swain, l. c., 289 (copied).

Hæmulon fremebundum Goode & Bean, Proc. U. S. N. M. 1879, 340 (Clearwater Harbor, Florida; young); Bean & Dresel, Proc. U. S. N. M. 1884, 159 (Jamaica); Jordan & Swain, l. c., 297 (Key West).

Diabasis fremebundus, Jordan & Gilbert, Syn. Fish. N. A., 1883, 553 (copied); Bean, Cat. Fishes Exh. London, 1883, 57 (Garden Key, Florida).

Habitat: West Indies, north to Florida.

Etymology: μακρός, long; στόμα, mouth.

Besides the specimens examined by Jordan & Swain (Clearwater Harbor, Key West, Jamaica) we have examined specimens in the museum at Cambridge from Florida and St. Thomas. The large specimen from St. Thomas, a foot in length, is perfectly unicolor, only some of the upper scales having darker centers. After careful consideration we have decided that *H. macrostoma* Günther and *H. fremebundum* Goode & Bean must be identical, although there are one or two slight discrepancies in Günther's description.

36. HÆMULON BONARIENSE. (Black Grunt; Ronco Prieto.)

Hæmulon bonariense Cuv. & Val., V, 1830, 254 (Buenos Ayres).

Hæmulon canna Cuv. & Val., Hist. Nat. Poiss., V, 233, 1830 (Martinique); Günther, I, 311, 1859 (Jamaica, Puerto Cabello); Poey, Repertorio, I, 1867, 309 (not of Agassiz, 1829).

Hæmulon notatum Poey, Memorias, II, 179, 1860 (Cuba); Poey, Synopsis, 317; Poey, Enumeratio, 46.

Hæmulon retrocurrens Poey, Rep. Pisc. Cub., II, 236, 461, 1868 (Cuba).

Hæmulon continuum Poey, Enum. Pisc. Cub., 1875, 46 (Cuba); Poey, Anales Soc. Hist. Nat., Madrid, 1881, 210 (Puerto Rico).

Hæmulon parræ, Jordan & Swain, l. c., 292 (not *Diabasis parra* Desmarest).

Habitat: West Indies, south to Buenos Ayres.

Etymology: From Buenos Ayres.

This specimen is known to us from several specimens in the U. S. National Museum, from different points in the West Indies, and from the types of *H. bonariense* and *H. canna* Cuv. & Val. in the museum at Paris. Two specimens sent by Poey from Havana are in the museum at Cambridge. One of these (10576) is the type of *Hæmulon notatum* Poey. It is closely allied to *H. parra*, differing in the color, in the larger size of the scales and the differences in their arrangement, and in the longer snout and smaller mouth.

The synonymy of this species and the next is badly entangled, and we are not sure that we have correctly distributed it all. Our fish seems to correspond to the *Hæmulon notatum, continuum*, and *retrocurrens* of Poey. The other names of Poey (*acutum, albidum*, and *serratum*) seem to refer rather to the next species. The name *H. canna*, having been first used for *H. parra*, should give place to *Hæmulon bonariense*.

37. HÆMULON PARRA.

(Sailor's Choice; Ronco Blanco; Ronco Prieto; Bastard Margaret.)

Hæmulon caudimacula Cuvier, Règne Animal, ed. 2, 1829 (on *Uribaco* Maregrave and *Diabase de Parra* Desmarest); Cuv. & Val, v, 236, 1830 (Bahia, Cuba); Günther, I, 1859, 313 (copied); Poey, Repertorio, I, 1867, 310; Jordan & Gilbert, Bull. U. S. F. C. 1881, 322 (redescription of original type).

Hæmulon canna Agassiz, Spix, Pisc. Brasil., 1829, p. 130, pl. 69 (not of Cuv. & Val.) (Brazil).

Hæmulon chromis (Broussonet MSS.) Cuv. & Val., v, 242, 1830 (Jamaica); Günther, Cat. Fish. Brit. Mus., I, 310 (Bahia, Jamaica).

Diabasis chromis, Jordan & Gilbert, Syn. Fish. N. A., 1883, 924 (Garden Key); Bean, Cat. Fish. Exh. London, 1883, 58 (Garden Key).

Diabasis parra Desmarest, Prem. Décade Ichthyol., 30, tab. 2, f. 2, 1823 (Havana).

Hæmulon parra, Jordan, l. c., 1889, 648 (St. Lucia); Jordan, l. c., 1890, 319 (Bahia).

Hæmulon acutum Poey, Memorias de Cuba, II, 180, 354, 1860 (Cuba); Poey, Synopsis, 315, 1868; Poey, Enumeratio, 45, 1875; Bean & Dresel, Proc. U. S. N. M. 1884, 158 (Jamaica); Jordan & Swain, l. c., 294.

Hæmulon albidum Poey, Memorias, II, 181, 1860 (Cuba); Poey, Synopsis, 316; Poey, Enumeratio, 46.

Hæmulon serratum Poey, Memorias, II, 181, 1860 (Cuba); Poey, Synopsis, 317; Poey, Enumeratio, 46; Poey, Anal. Hist. Nat. Madrid, 1881, 201 (Puerto Rico).

Anarmostus serratus, Putnam, Bull. M. C. Z., 12, 1863 (name only).

Hæmulon parræ, Jordan, Bull. U. S. F. C. 1884; Jordan, Proc. U. S. N. M., 1884, 126 (Key West).

Hæmulon parræ Castelnau, Anim. Nouv. ou Rar. Amer. du Sud, 10, 1855 (Bahia).

? *Hæmulon brevirostrum* Günther, Fishes Centr. Amer., 1869, 419 (in part, specimen from Puerto Cabello).

Habitat: West Indies; southern Florida to Brazil.

Etymology: Named for Don Antonio Parra, who first wrote on the natural history of Cuba.

This species is common at Key West, where it is known as "sailor's choice." It is not very often brought into the market, on account of its rather small size. The young are abundant along the shores, in number inferior only to *H. plumieri* and *H. rimator*. At Havana it is still more common, being brought into the market in large numbers

every day. The darker specimens are called by the fisherman *Ronco prieto*, the paler ones *Ronco blanco*. While in Havana, Professor Jordan took especial pains to select specimens representing every variety of form and coloration in this species. In the very large collection secured we find specimens answering fairly to Poey's *serratum*, *albidum*, *acutum*, as well as other specimens variously intermediate. A type of *Hæmulon acutum* sent by Poey to the U. S. National Museum is identical with this species, as is also the type of *H. chromis* Cuv. & Val., preserved in the Museum at Paris. The original type of Desmarest's *Diabasis parra* is still preserved in the Museum at Paris. It belongs to the present species, for which it is the oldest name.

38. HÆMULON SCUDDERI. (Mojarra Prieta.)

Hæmulon scudderi Gill, Proc. Ac. Nat. Sci. Phila. 1862, 253 (Cape San Lucas); Steindachner, Ichth. Beitr., III, 18, 1875; Jordan & Swain, l. c., 296; Jenkins & Evermann, l. c. (Guaymas); Jordan & Bollman, l. c., 1889, 181(Panama).

Diabasis scudderi Jordan & Gilbert, Bull. U. S. F. C. 1881 (324), 1882 (107, 110) (Mazatlan, Panama); Jordan & Gilbert, Proc. U. S. N. M. 1882, 361, 626 (Cape San Lucas, Panama).

Hæmulon brevirostrum Günther, Fishes Centr. Amer., 1869, 418 (Panama).

Hæmulon undecimale Steindachner, Ichth. Beitr. III, 1875, 11 (Acapulco, Panama).

Habitat: Pacific coast of tropical America, Guaymas to Panama.

Etymology: Named for Samuel H. Scudder.

This species is the Pacific representative of *Hæmulon parra*. It reaches a similar size, is equally abundant, and passes through a similar range of variations and coloration. Most of the species collected by Prof. Gilbert at Mazatlan and Panama have 11 dorsal spines and correspond to the *Hæmulon undecimale* of Steindachner. Two or three of them have, however, 12 dorsal spines, as in the original types of *H. scudderi* and *H. brevirostrum*. We are unable to detect any other difference of importance among these specimens, and refer all to *H. scudderi*, regarding it as a species with the number of spines indifferently 11 or 12. No other species of *Hæmulon* ever has fewer spines than 12. If these should finally prove to be specifically distinct, the form with 11 spines should stand as *Hæmulon undecimale*, that with 12 spines as *Hæmulon scudderi*.

Specimens are in the museum at Cambridge from Lower California, Acapulco, and Panama. The three specimens from Acapulco have D. XII, those from Panama (types of *H. undecimale*) have D. XI.

39. HÆMULON CARBONARIUM. (Ronco Carbonero.)

Hæmulon carbonarium Poey, Memorias de Cuba, II, 176, 1860 (Cuba); Poey, Synopsis, 1868, 318; Poey, Enumeratio, 44, 1875; Jordan & Swain, l. c., 298; Jordan, l. c., 1890, 319 (Bahia).

Habitat: West Indies, south to Brazil.

Etymology: *Carbonarius*, coaly, an allusion to the common name.

This species is common at Havana, where it is known as *ronco carbonero*. It reaches a length of about 10 inches. We have examined

specimens from St. Croix and Bermuda in the British Museum, where they are labeled *Hæmulon macrostoma*. In the museums at Washington, Cambridge, and Bloomington are specimens from Havana and Bahia.

40. HÆMULON SCHRANKI.

Hæmulon schranki Agassiz, Spix, Pisc. Brasil., 1829, 121, pl. 69 (Brazil); Evermann & Jenkins, Proc. U. S. N. M. 1891, 153 (Guaymas); Jordan, l. c., 1889, 648 (St. Lucia); Jordan, l. c., 1890, 319 (Bahia).

? *Hæmulon similis* Castelnau, Anim. Nouv. ou Rares, 1855, 11? (Bahia).

Hæmulon caudimacula Steind., Ichth. Beitrage, III, 15, 1875 (Acapulco, Rio Janeiro, Rio Grande do Sul, Maranhão; not of Cuv. & Val.).

Diabasis steindachneri Jordan & Gilbert, Bull. U. S. F. C. 1881, 322 (Mazatlan, Panama); Jordan & Gilbert, Bull. U. S. F. C. 1882, 107, 110 (Panama, Mazatlan); Jordan & Gilbert, Proc. U. S. N. M. 1882, 361, 372 (Cape San Lucas, Colima).

Hæmulon steindachneri, Jordan & Swain, l. c., 299.

Hæmylon flaviguttatum Bean, Proc. U. S. N. M. 1880, 96 (Colima; no description; not of Gill).

Habitat: Pacific coast of tropical America; coast of Brazil, north to St. Lucia.

Etymology: Named for Schrank, an early naturalist.

A species of small size, generally common on the Pacific coast of tropical America. It also occurs in abundance on the southeast coast of Brazil, and a specimen before us was taken by the *Albatross* at St. Lucia. We have examined numerous specimens from Brazil in the Museum of Comparative Zoölogy (from Rio Janeiro, Rio Grand do Sul, Para, Maranhão, and Acapulco); on comparing these with Pacific coast examples we can find no difference; the Brazilian fish seems to be the original of the poorly figured *Hæmulon schranki* of Agassiz; the Pacific coast form is *H. steindachneri*.

41. HÆMULON MELANURUM. (Jenígua na.)

Perca marina cauda nigra (Black-tail), Catesby, Hist. Car., tab. 7, f. 2, 1743 (Bahamas).

Perca melanura Linnæus, Syst. Nat., X, 292, 1758; XII, 486, 1766 (based on Catesby's figure); Gmelin, Syst. Nat., 1788, 1319.

Bathystoma melanurum, Putnam, Bull. M. C. Z., 1863, 12 (name only).

Hæmulon melanurum, Cope, Trans. Am. Phil. Soc. 1871, 471 (New Providence, St. Martins, St. Croix); Jordan & Swain, l. c., 300.

Hæmulon dorsale Poey, Memorias, II, 179, 1860 (Cuba); Synopsis, 1868, 308; Enumeratio, 1875, 44).

Habitat: West Indies.

Etymology: μέλας, black; οὐρά, tail.

This species is rather common at Havana, where it is known as *Jeníguana*. It reaches a length of about a foot. There seems to be no doubt of its identity with the "black-tail" of Catesby, on which is based the *Perca melanura* of Linnæus. Specimens are in the museum at Cambridge from Havana, St. Thomas, Sombrero, and Nassau.

42. HÆMULON SCIURUS. (Yellow Grunt; Ronco Amarillo.)

Anthias formosus Bloch, Ichthyol., taf. 323, 1790 (Antilles); Bloch & Schneider, Syst. Ichthyol., 1801, 305. (*Not Perca formosa* L., with which it is identified; the latter is *Diplectrum formosum*.)

Sparus sciurus Shaw, General Zoölogy, IV, 1803, pl. 64 (based on the description and figure of Bloch).

Hæmulon sciurus, Jordan, Proc. U. S. N. M. 1884, 126 (Key West); Jordan & Swain, l. c., 301.

Hæmulon elegans Cuvier, Règne Animal, 1829 (no description; on the figure of Bloch); Cuv. & Val., V, 227, 1830; Günther, I, 1859, 306 (Jamaica); Putnam, Bull. M. C. Z., 1863, 12 (name only); Poey, Repertorio, I, 309, 1867; Cope, Trans. Am. Phil. Soc. 1871, 471 (St. Croix).

Diabasis elegans, Jordan & Gilbert, Syn. Fish. N. A., 923 (specimen from Aspinwall); Bean, Cat. Fish. Exh. London, 1883, 58 (Key West).

Diabasis obliquatus Bennett, Zoölogical Journal, London, V, 1835, 90 (Jamaica).

Hæmulon luteum Poey, Memorias, II, 174, 354, 1860 (Cuba); Poey, Synopsis, 317; Poey, Enumeratio, 44; Poey, Anales Hist. Nat., Madrid, 1881, 201 (Puerto Rico).

Hæmulon multilineatum Poey, Memorias, II, 178, 1860 (Cuba); Poey, Synopsis, 318; Poey, Enumeratio, 44.

Hæmulon hians Haly, Ann. Nat. Hist., 1875, XV, 268 (Bahia).

Habitat: West Indies; Florida Keys to Brazil.

Etymology: *Sciurus*, squirrel, from the grunting noise. The species was confounded by Shaw with the squirrel-fish, *Holocentrus ascensionis*.

This species is common both at Key West and Havana, and is known as the "yellow grunt" or "*ronco amarillo*." It is sometimes called the "boar grunt" by fishermen, who imagine it to be the male of *H. plumieri*. It was first noticed by Bloch, who called it *Anthias formosus*, identifying it incorrectly with *Perca formosa* of Linnæus. Shaw, who still supposed it to be *Perca formosa* of Linnæus, changed this name arbitrarily to *Sparus sciurus*. A fair description and figure are given, taken, we believe, from Bloch. In our opinion the name *sciurus* should be retained for the species, although so far as Shaw was concerned its introduction was a piece of meddling impertinence. Shaw's synonymy includes the Linnæan fish, and the name *sciurus* is taken from the common name (squirrel-fish) of the latter. The species which he had in mind, is, however, the present one, and it had before him received no tenable specific name. This confusion was first detected by Cuvier, who, however, failed to discriminate between the Linnæan type (*Serranus formosus*) and the figure of Catesby (representing *Hæmulon plumieri*), referred by Linnæus to the same species. Cuvier called the species *elegans*. Later Poey, on the basis of inaccuracies in coloration in a plate representing *H. elegans*, has considered the Cuban fish as distinct under the name of *luteum*, while a pale variety discussed above has been called *multilineatum*. There is no doubt that both of these names should be regarded as synonyms of *elegans*. The *Diabasis obliquatus* of Bennett is much more like this species than any other of the genus yet known. We think that it belongs here, though the blue stripes are represented as more oblique and more numerous than we have ever seen them. Specimens are in the museum at Cambridge from Havana, Porto Seguro, St. Thomas, Bermuda, and Puerto Rico.

43. HÆMULON PLUMIERI.

(Common Grunt; Ronco Ronco; Ronco Ararà.)

Guabi coara brasiliensibus Marcgrave, Hist. Bras., 1648, 163 (Brazil).

Perca marina capite striato (the Grunt), Catesby, Hist. Carolina, etc., tab. 6, 1743 (Bahamas, etc.).

Labrus plumieri Lacépède, Hist. Nat. Poiss., III, 480, 1802, pl. 2, f. 2 (on a copy of a drawing by Plumier, identified with this species by Cuvier).

Diabasis plumieri, Jordan & Gilbert, Proc. U. S. N. M. 1882, 603 (Charleston); ibid., Syn. Fish. N. A., 1883, 971; Bean, Cat. Fish. Exh. London, 1883, 58 (Key West).

Hæmulon plumieri, Jordan, Proc. U. S. N. M. 1884, 126 (Key West); Jordan & Swain, l. c., 303; Jordan, l. c., 1889, 648 (St. Lucia); Jordan, l. c., 1890, 319 (Bahia).

Hæmulon formosum Cuvier, Règne Animal, 1829; Cuv. & Val., V, 1830, 230 (Martinique); Günther, I, 305, 1859 (Pernambuco, Jamaica); De Kay, New York Fauna, 1842, 86 (?New York); Cope, Trans. Am. Phil. Soc. 1871, 470 (St. Croix, New Providence) (not *Perca formosa* L.).

Hæmylum formosum, Putnam, Bull. M. C. Z., 1863, 12 (name only).

Diabasis formosus, Jordan & Gilbert, Proc. U. S. N. M. 1882, 276 (Pensacola); Jordan & Gilbert, Synopsis Fishes N. A., 553.

Hæmulon arcuatum Cuv. & Val., IX, 481, 1833 (Charleston); Holbrook, Ichth. S. Car., 1860, 124, pl. XVII (Charleston); Goode, Proc. U. S. N. M. 1879, 113 (St. Augustine; no descr.); Bean & Dresel, Proc. U. S. N. M. 1884, 158 (Jamaica).

Hæmulon ararà Poey, Memorias, II, 1860, 177 (Cuba); Poey, Synopsis, 1868, 318; Poey, Enumeratio, 1875, 45.

Hæmylum ararà, Putnam, Bull. M. C. Z., 1863, 12 (name only).

Hæmulon subarcuatum Poey, Memorias, II, 1860, 419 (Cuba); Poey, Synopsis, 1868, 318; Poey, Enumeratio, 1875, 45.

Habitat: West Indies; Carolina to Brazil.

Etymology: For Father Plumier, an early naturalist who sent drawings of the fishes of Martinique to the museums of Europe.

This species is the "grunt" par excellence of our South Atlantic coast. It is not rare in West Florida and on the Carolina coast, while at Key West it is the most abundant food-fish, the amount taken during the year exceeding that of all other shore species combined. At Havana it is proportionally less common, though still the most abundant of its genus. It does not usually exceed a foot in length, although individuals 18 inches long are sometimes taken. These large grunts have the back and nape more elevated and correspond to Cuvier's *H. arcuatum*. This species was well represented by Catesby, but Linnæus has referred Catesby's figures to the synonymy of his *Perca formosa*, which is a *Diplectrum*. From this mistake it has come that the name *formosum* has been transferred from *Diplectrum formosum* to *Hæmulon*. This is inadmissible. The oldest name actually given this species is *Labrus plumieri* Lacépède; this name is based on a rough copy of a drawing by Plumier. Cuvier, who had examined this drawing, referred it to the present species, so there seems no doubt that the name *plumieri* belongs here. Poey's *H. subarcuatum* seems to be a color variety of his *H. ararà*, which is the ordinary *plumieri*. Specimens are in the Museum at Cambridge from Tortugas, Havana, Jérémie, Hayti, St. Thomas, Maranhão, Bahia, Rio Janeiro, and Rio Grande do Norte.

44. HÆMULON FLAVOLINEATUM.

(French Grunt; Open-mouth Grunt; Ronco Condenado.)

Diabasis flavolineatus Desmarest, Prem. Décade Ichth., 1823, 35, pl. 2, f. 1; Desmarest, Dictionnaire Classique, v, 235, about 1825, tab. 98, f. 1 (Cuba).

Anarmostus flavolineatus, Putnam, Bull. M. C. Z., 1863, 12 (name only).

Hæmulon flavolineatum, Poey, Repertorio, i, 309, 1867; Poey, Synopsis, 318; Poey, Enumeratio, 45; Jordan, Proc. U. S. N. M. 1881, 126 (Key West); Jordan & Swain, l. c., 305; Jordan, l. c., 1889, 648 (St. Lucia).

Hæmulon heterodon Cuvier, Règne Animal, ed. 2, 1829 (*Diabase rayée* of Desmarest); Cuv. & Val., v, 1830, 255 (Martinique); Poey, Repertorio, i, 1867, 309.

Hæmulon xanthopteron Cuv. & Val., v, 1830, 254 (Martinique).

Hæmulon xanthopterum, Günther, i, 312, 1859 (Martinique, Jamaica, Trinidad, Puerto Cabello).

Hæmulum xanthopterum, Cope, Trans. Am. Philos. Soc. 1871, 471 (St. Croix).

Hæmylum xanthopterum, Bean, Proc. U. S. N. M. 1880, 96 (Bermuda; no description).

Habitat: West Indies; Florida Keys and Bermudas to Brazil.

Etymology: *Flavus*, yellow; *lineatus*, marked with lines.

This species is rather rare at Key West, where it is known as the "French grunt" or "open-mouth grunt." In Havana, it is more common, and is called "*ronco condenado*." It reaches a length of nearly a foot. Its peculiar coloration and large lateral scales render it one of the most easily recognizable of the species. The young show two dark lateral stripes like the young of *H. parra*, *rimator*, etc. There is no doubt as to the name to be retained for this species, the name *flavolineatus* of Desmarest having clear priority over the names of species described by Cuvier, the description and figure given by him being very good. In the first description of the genus *Hæmulon*, the *Diabasis flavolineatus* is expressly mentioned by Cuvier as one of the species to be referred to the genus. The other names of the species are less certain. *H. heterodon* Cuv. certainly belongs here, and probably *H. xanthopteron* also. Specimens are in the Museum at Cambridge from Havana, Tortugas, Jérémie, Hayti, Bermudas, Bahamas, Amelia Island, Florida, Barbados.

45. HÆMULON CHRYSARGYREUM.

Hæmulon chrysargyreum Günther, i, 314, 1859 (Trinidad); Günther, Shore Fishes, Challenger, 7 (Fernando Noronha); Jordan & Swain, l. c. (copied); Jordan, l. c., 1889, 648 (St. Lucia).

Hæmulon tæniatum Poey, Memorias, ii, 182, 1860 (Cuba); Poey, Syn. Pisc. Cub., 319; Jordan, Proc. U. S. N. M. 1884, 126 (Key West); Jordan & Swain, l. c., 307.

Brachygenys tæniata, Poey, Enum. Pisc. Cub., 1875, 47.

Habitat: West Indies; southern Florida to Brazil.

Etymology: χρυσός, gold; ἀργύρεος, silvery.

This little fish, the smallest of the genus, is abundant both at Key West and Havana. None of the specimens seen exceed six inches in length. This species approaches more closely than any other to the genus *Pomadasis*. It differs from the others in the less development of the cavernous structure of the skull, the foramina on the frontal region being inconspicuous. The specimens called *tæniatum* are identical

with the types of *H. chrysargyreum*, the former name having been given to the young. Specimens are in the Museum at Cambridge from Havana and St. Thomas. In the British Museum, we have seen examples from Trinidad (types), St. Croix, and Fernando de Noronha.

46. HÆMULON RIMATOR. (Tom-tate; Redmouth Grunt; Cæsar.)

Hæmulon chrysopteron, Cuv. & Val., V, 1830, 240 (brought by Milbert from New York; erroneously identified with *Perca chrysoptera* L., which is an *Orthopristis*); DeKay, New York Fauna, Fishes, 1842, 85, pl. VII, f. 22 (New York market); Holbrook, Ichth. S. Car., 121, 1860 (Charleston).

Hæmulon chrysopterum, Günther, I, 313, 1859 (Jamaica; Trinidad).

Bathystoma chrysopterum, Putnam, Bull. M. C. Z., 13, 1863 (name only).

Diabasis chrysopterus, Jordan & Gilbert, Syn. Fish. N. A., 1883, 553; Bean, Cat. Fish. London Exh., 1883, 58 (Pensacola).

Hæmulon quadrilineatum, Holbrook, Ichth. S. Car., 1860, 195 (Charleston; not of Cuv. & Val.).

Hæmulon ? caudimacula, Poey, Syn. Pisc. Cub., 1875, 47 (Cuba; not of Cuv. & Val.).

Hæmulon parræ, Poey, Enum. Pisc. Cub., 1875, 47 (not *Diabasis parræ* Desm.).

Diabasis aurolineatus, Jordan & Gilbert, Proc. U. S. N. M. 1882, 276, 307 (Pensacola); *ibid*, 1882, 602 (Charleston); Jordan & Gilbert, Syn. Fish. N. A., 973, 1883; Bean, Cat. Fishes London Exh., 1883, 58 (Pensacola); Jordan, Proc. U. S. N. M. 1884, 126 (Key West; not *Hæmulon aurolineatum* Cuv. & Val.).

Hæmulon rimator (Jordan & Swain, MS.), Bean, Proc. U. S. N. M. 1884, 158 (Jamaica); Jordan & Swain, l. c., 308.

Habitat: West Indies; North Carolina to Trinidad; apparently more abundant on our South Atlantic coast than southward.

Etymology: *Rimator*, inquirer.

This species is very common about Charleston, where it is one of the most abundant food-fishes. About Pensacola and Key West the adult are less numerous, but at the latter place the young swarm everywhere about the wharves and shores. At Key West it is known as "Tom-tate." From its small size (rarely a foot in length) it is held in low esteem, and is not often brought into the market. It was not observed by Prof. Jordan at Havana. A specimen in our collection, sent by Prof. S. E. Meek from the New York market, is said to be from North Carolina.

The synonymy of this species has been much confused, although most of the confusion has been unnecessary. The name *chrysopterum* has been generally applied to the present species. This name comes from the *Perca chrysoptera* of Linnæus. This *Perca chrysoptera* was based on a specimen sent from Charleston by Dr. Garden. This specimen is still preserved in London, and it belongs, according to Dr. Bean, who has examined it, to the species called by Cuvier *Pristipoma fulvomaculatum*. This species should therefore be known as *Orthopristis chrysopterus*. With this *Perca chrysoptera* Linnæus wrongly associates the margate-fish of Catesby, which is *Hæmulon album*. Cuvier has identified both Catesby's fish and the Linnæan *Perca chrysoptera* with the present species, which he calls *Hæmulon chrysopteron*. It is evident

from the above that the name *chrysopterum* can not properly be retained for this or any other species of *Hæmulon*. The name *aurolineatum* has been applied by Jordan & Gilbert to this species, but erroneously, as is shown beyond. Jordan & Swain have therefore given the species a new name, as none of those by which it has been called (*chrysopterum*, *aurolineatum*, *caudimacula*, *parræ*) were originally intended for it. The name *Hæmulon rimator* is given in allusion to the inquisitive habits shown by the young of this species. They swarm about the wharves and are a nuisance to the fishermen, nibbling off the bait.

Both *Hæmulon rimator* and *H. plumieri* have been recorded from "New York," but no good evidence exists that either species passes to the northward of Cape Hatteras. None of the others range far north of the Tropic of Cancer.

47. HÆMULON AUROLINEATUM. (Jeníguano.)

Hæmulon aurolineatum Cuv. & Val., Hist. Nat. Poiss., 1830, v, 237 (Brazil, San Domingo); Günther, I, 318 (Pernambuco); ?Cope, Trans. Am. Philos. Soc. 1871, 471 (St. Martins, name only); Jordan & Swain, l. c., 310; Jordan, l. c., 1889, 648 (St. Lucia); Jordan, l. c., 1890, 319 (Bahia).

Hæmulon jeníguano Poey, Memorias, II, 183, 1860 (Cuba); Poey, Synopsis, 319; Poey, Enumeratio, 47.

Bathystoma jeníguarno, Putnam, Bull. M. C. Z., 1863, 12 (name only).

Diabasis jeníguano, Jordan & Gilbert, Syn. Fish. N. A., 925, 1883 (Garden Key); Bean, Cat. Fish. London Exh., 1883, 58 (Garden Key).

Habitat: West Indies; Florida Keys to Brazil.

Etymology: *Aurum*, gold; *lineatus*, striped.

This little fish is very abundant at Havana, where it is often brought into the market. It is smaller in size than any other of the genus except *H. chrysargyreum*. It has been taken at Garden Key, Florida, but was not observed at Key West by Prof. Jordan. In its relations it is extremely close to *H. rimator*. It is more slender and fusiform in outline, and its coloration is usually of a deeper yellow, otherwise we are unable to point out any differences of importance.

We have adopted the name *aurolineatum* for this species, and not for *H. rimator*, on the strength of the following account of the typical specimen of *Hæmulon aurolineatum* received from Dr. H. E. Sauvage, of the museum at Paris:

Hæmulon aurolineatum, Brazil, Delalande, type. Length of the body, 0.220 m.; height of body, 0.055 m.; length of the head, 0.60 m. Height of the body contained nearly four times in the total length, and three and one-half without the caudal.

As the description of Cuvier & Valenciennes agrees in other respects equally well with either species, the above measurements leave no doubt of the identity of their type with *H. jeníguano*. *Hæmulon rimator*, young or old, is never so slender as the above measurements would indicate.

Specimens are in the museum at Cambridge from Havana, Rio Janeiro, Ceará, Maranhão, San Francisco, St. Thomas, and Porto Seguro. Among those from Cuba is Poey's type of *H. jeníguano*.

48. HÆMULON STRIATUM. (White Grunt.)

? *Capeuna brasiliensibus* Marcgrave, Hist., etc., Brasil., I, 1648, 155.
Perca striata Linnæus, Syst. Nat., ed. X, 1758, 233 (North America), and the copyists.
Hæmulon striatum Jordan, l. c., 1889, 648 (St. Lucia).
? *Grammistes trivittatus* Bloch & Schneider, Syst. Ichth., 1801, 188 (on the description of Marcgrave).
Diabasis trivittatus, Jordan & Gilbert, Syn. Fish. N. A., 1883, 554 (erroneously ascribed, after Holbrook, to the Carolina fauna).
? *Serranus capeuna* Lichtenstein, Abhandl. Berlin Akad., 1821, 288 (on the description of Marcgrave).
? *Hæmulon capeuna*, Cuvier, Règne Animal, 1829 (no description; after Marcgrave).
Hæmylum capeuna, Goode, Bull. U. S. N. M., V, 1876, 53 (Bermuda).
Hæmulon quadrilineatum Cuv. & Val., V, 1830, 238, pl. 120 (San Domingo); Günther, I, 316, 1859 (copied); Poey, Repertorio, I, 310, 1867; II, 161; Poey, Synopsis, 1868, 319 (Cuba); Poey, Enum. Pisc. Cub., 1875, 47; Cope, Trans. Am. Philos. Soc. 1871, 471 (St. Croix); Jordan & Swain, l. c., 311.
Hæmulon quinquelineatum, Poey, Memorias, II, 419, 1860 (Cuba).

Habitat: Bermudas to Brazil.

Etymology: *Striatus*, striped.

This is probably the species indicated by Linnæus under the name *Perca striata*. The number (13) of dorsal spines and the comparison with *P. melanura* render it certain that this species, *H. rimator*, or *H. aurolineatum* was intended. Of these, only the present species has the second anal spine especially strong ("*validissimus*"), and to this species the name *striatum* should apparently be referred.

The following is Linnæus's account:

"Striata, 22. *P. pinnis dorsalibus unitis, cauda bifida, corpore striato.*
"*D.* $\frac{13}{22}$. *P.* 15. *V.* $\frac{1}{5}$. *A.* $\frac{3}{11}$. *C.* 17.
"*Habitat in America septentrionali. Mus. de Geer. Opercula subserrata. Radius secundus analis validissimus. Cauda nigra non est, qua differt a P. melanura.*"

Specimens are in the museum at Cambridge from Havana and Bermuda.

49. HÆMULON FLAVIGUTTATUM.

Hæmulon flaviguttatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 254 (Cape San Lucas).
Hæmulon flariguttatum Steind., Ichth. Beitr., III, 14, 1875 (Mazatlan, Acapulco, Altata, Panama); Streets, Bull. U. S. N. M., VII, 79, 1877 (Lower California); Jordan & Swain, l. c., 314; Evermann & Jenkins, Proc. U. S. N. M. 1891, 152 (Guaymas).
Diabasis flaviguttatus, Jordan & Gilbert, Bull. U. S. F. C. 1881 (324), 1882 (107, 110), (Mazatlan, Panama); Jordan & Gilbert, Proc. U. S. N. M. 1882, 361, 381, 626 (Cape San Lucas, Panama).
Hæmulon margaritiferum Günther, Proc. Zoöl, Soc. 1864, 147; Günther, Fishes Centr. Amer., 1869, 419, pl. LXV, fig. 2 (Panama).

Habitat: Pacific coast of tropical America, Guaymas to Panama.

Etymology: *Flavus*, yellow; *guttatus*, spotted.

This species is generally common along the Pacific coast of tropical America. It has no analogue among the Atlantic species. On account of the peculiarities of the form of the body, the snout, the mouth, and

the vertical fins, and especially the increased development of the gill-rakers, we may regard it as the type of a distinct subgenus, which has been called *Lythrulon*. The cranium shows no special peculiarity except the shortness of the snout and the development of the high supraoccipital crest. Specimens are in the Cambridge museum from Acapulco. Our specimens were collected at Guaymas by Evermann & Jenkins.

50. HÆMULON MACULICAUDA. (Roncador Raiado.)

Orthostœchus maculicauda Gill, Proc. Ac. Nat. Sci. Phila. 1862, 255 (Cape San Lucas).
Hæmulon maculicauda, Steind., Ichth. Beitr., III, 14, 1875 (Mazatlan, Acapulco); Jordan & Swain, l. c., 315; Evermann & Jenkins, Proc. U. S. N. M. 1891, 152 (Guaymas).
Diabasis maculicauda, Jordan & Gilbert, Bull. U. S. F. C. 1881, 325, 1882, 110 (Panama); Jordan & Gilbert, Proc. U. S. N. M. 1882, 362, 372, 626 (Cape San Lucas, Panama, Colima).
Hæmulon mazatlanum Steindachner, Ichth. Notizen, VIII, 12, taf. VI, 1869 (Mazatlan).

Habitat: Pacific coast of tropical America, Guaymas to Panama.

Etymology: *Macula*, spot; *cauda*, tail.

This small species is rather common on the Pacific coast of tropical America. Its peculiar squamation, rendered more noticeable by the corresponding features of coloration, give it an appearance quite distinct in this genus. The snout is shorter than usual and the number of dorsal spines is increased. In other respects it departs less from the usual type than do *H. flaviguttatum* and *H. striatum*. The cranium differs little from the ordinary *Hæmulon* type. The specimens in the museum at Cambridge are from Acapulco. The specimens before us were collected at Guaymas by Evermann & Jenkins.

XIII. ANISOTREMUS.

Anisotremus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 107 (*virginicus*).
Genytremus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 256 (*bilineatus*).
Paraconodon Bleeker, Archiv. Neerl., XI, 272, 1876 (*pacifici*).

Type: *Sparus virginicus* Linnæus.

Etymology: ἄνισος, unequal; τρῆμα, aperture, from the pores at the chin.

This genus, like *Hæmulon*, to which it is closely related, contains numerous species, all of them restricted to the shores of tropical America. All the species undergo considerable change in form with age, and all of them are valued as food-fishes. The young are marked with two or three blackish lengthwise stripes. These disappear with age, quickest in the brightly colored species, and persist for a long time in species like *surinamensis* and *interruptus*, which agree in coloration with *Hæmulon parra* and related species.

Only a skeleton of the synonymy of this genus is here given.

ANALYSIS OF SPECIES OF ANISOTREMUS.

a. Scales above lateral line in series parallel with the lateral line.

b. Dorsal spines rather low, the longest not more than half length of head; second anal spine about half head.

c. Pectorals much shorter than head, not reaching tips of ventrals; dorsal rays XI, 13, the spines comparatively slender, the longest half head; eye more than twice as wide as the narrow preorbital. Body compressed, considerably elevated, the greatest height below the fifth dorsal spine; profile rounded from base of first dorsal spine to the nape, concave over the eyes, descending abruptly down the snout; interorbital area twice orbit; snout thick and obtuse; teeth villiform in both jaws, with an outer series of conical teeth; preopercle serrate, strongly on angle; a posterior notch in opercle between two obtuse and feeble points; soft dorsal about as high as spinous; second anal spine long and strong; caudal emarginate. Color dusky-grayish, with four irregular crossbands, which grow faint with age; scales silvery with purple reflections; membrane between the scales brown; fins blackish. Head, $3\frac{1}{3}$; depth, $2\frac{2}{5}$ to $2\frac{3}{4}$; D. XI, 13; A. III, 10. Scales, 7–47–13; second anal spine, 2 in head; fifth dorsal spine, 2; pectoral, $4\frac{1}{2}$.....PACIFICI, 51.

cc. Pectorals a little longer than head, about reaching anal fin; dorsal rays XII, 16, the spines short and stout, the longest $2\frac{1}{3}$ in head; eye $3\frac{1}{3}$, about one-fourth wider than the broad preorbital. Body ovate, compressed, the back rather strongly arched; anterior profile, rather steep and straightish, slightly depressed above eyes and at the nape; snout very short, blunt and thick; mouth very small, the maxillary not quite reaching to front of eye; lower jaw included; teeth cardiform, in broad bands, the outer series enlarged, but smaller than in *A. pacifici*; preopercle rather weakly serrate; gill-rakers short and weak, about 10 below angle; dorsal fin low, rather deeply emarginate, the soft rays more than two-thirds height of longest spines; anal rather low, its margin perfectly straight; second anal spine very robust; caudal moderately forked. Color grayish silvery; a faint dark bar from front of dorsal to level of base of pectorals; lower parts of sides with indistinct darker streaks; vertical fins and pectorals dusky yellowish; distal half of ventrals and base of anal blackish. Head, $3\frac{1}{3}$; depth, $2\frac{1}{3}$; D. XII, 16; A. III, 9; scales, 6–52–13; eye, $3\frac{1}{2}$; snout, 3; preorbital, $2\frac{2}{3}$; maxillary, $3\frac{1}{4}$; second anal spine, 2; fourth dorsal spine, $2\frac{1}{2}$; pectoral, 3; gill-rakers, X+10.....CÆSIUS, 52.

bb. Dorsal spines very high, the longest $1\frac{2}{3}$ in head; second anal spine very long, about $1\frac{2}{3}$ in head; pectorals much shorter than head; interorbital area much less than width of orbit; snout obtuse, not much longer than eye; cleft of mouth small, the maxillary extending to front of eye; dorsal and anal spines exceedingly strong, the third dorsal spine the longest; snout naked, the remainder of the head being scaly; each ray of the soft fins accompanied by a series of minute scales, covering the caudal; caudal fin slightly emarginate. Color grayish-silvery, with five jet-black crossbands in the adult; fins blackish. Head, 3; depth, 2; D. XII, 16; A. III, 9; scales, 8–48–15; second anal spine, $1\frac{2}{3}$; third dorsal spine, $1\frac{2}{3}$.....DOVII, 53.

aa. Scales above lateral line arranged in oblique series which are not parallel with the lateral line.

d. Scales comparatively large, less than nine in a vertical series between first dorsal spine and the lateral line; coloration olivaceous, the adult nearly plain, the young with two or more dusky lateral stripes which disappear with age; fins blackish.

e. Scales 5, 6-52-15 (lateral line with 49 pores); scales above lateral line on anterior part of body more or less enlarged, especially in the adult; young specimens with two black horizontal stripes, one of these from eye to a point just before the base of caudal, where it is interrupted, a round black spot following at base of caudal; another stripe above this and parallel with it; scales of anterior part of back more or less distinctly marked with black spots, one on each scale, these spots not confluent. Body oblong-elliptical, the back elevated, the profile strongly convex at nape, becoming straighter anteriorly; interorbital area a little more than eye; mouth short, the maxillary extending to anterior edge of eye; outside teeth of jaws conical, notably longer and stronger than the others; preopercle evenly serrate on vertical edge, weaker at angle; dorsal and anal spines strong, second anal stronger and a little longer than the highest dorsal spine, about half head; soft dorsal lower, about one-third head; pectoral falcate, as long as head; caudal forked. Head, 3; depth, 2½; D. XII, 16; A. III, 8 or 9; scales, 5 to 6-52-12 to 15; eye, 4; snout, 2⅔; second anal spine, 1⅔; fourth dorsal spine, 2; pectoral, 1 ..... SURINAMENSIS, 54.

ee. Scales 7, 8-46-15 (lateral line with 54 pores), scales above lateral line anteriorly not especially enlarged; all specimens examined with three or four black lateral stripes, one from eye to near base of caudal, where it ceases abruptly, giving place to a round caudal spot as in the young of *A. surinamensis*, also a stripe from scapular scale to last dorsal ray, forming two spots on back of caudal peduncle (this stripe wanting in *A. surinamensis*); above this, one or two other stripes parallel with it; opercular membrane black. Anterior profile considerably steeper than in *A. surinamensis*. In all other respects, in specimens of the same age, this species seems to agree with *A. surinamensis*. Head, 3; depth, 2⅓; D. XII, 16; A. III, 8; eye, 2⅔; snout, 4½; preorbital, 4; pectoral, 1..... BICOLOR, 55.

dd. Scales rather small, more than 9 in a vertical series between the first dorsal spine and the lateral line.

f. Body not striped longitudinally with yellow or blue; preorbital narrow; gill-rakers, x+13.

g. Anterior part of body without jet-black vertical bar; axil jet-black, the spot encroaching on base of pectoral; a round black spot on base of last rays of dorsal and anal; body dark gray, with obscure darker streaks; fins pale, edge of opercle dusky; pectoral long, 1⅒ in head, reaching front of anal. Body ovate, the back elevated, the profile from the tip of the short blunt snout to the last dorsal ray evenly rounded; lower profile straighter, angulated at end of base of anal; mouth moderate; teeth in broad bands, the outer in both jaws longer, close-set, slender and sharp; preopercle rather finely and not sharply serrate; dorsal fin divided almost to base, the tenth spine no longer than first; second anal spine stronger and a little longer than third, lower than soft rays; caudal forked. Head, 3; depth, 2⅓; D. XI, 14; A. III, 13; scales, 9 or 10-51-x; eye, 4; snout, 4; preorbital=pupil; maxillary, 3⅓; pectoral, 1⅒; gill-rakers, x+13 ..... SCAPULARIS, 56.

gg. Anterior part of body with a jet-black vertical bar which extends from between the fifth and seventh dorsal spines to opposite the lower edge of the pectoral; edge of opercle and base of pectoral black; pectoral longer than head. Body elongate-ovate, the back elevated, the anterior profile straightish to nape, thence regularly convex; lower profile straight, angulated at anal; mouth small; teeth setiform, arranged in broad bands, becoming shorter behind, longer and stronger in front; dorsal fin deeply notched, the tenth spine twice as long as first; second anal spine much stronger and almost twice as long as third, higher than soft rays; caudal forked. Head, $3\frac{1}{4}$; depth, $2\frac{3}{8}$; D. XII, 16 or 15; A. III, 11; scales, 11–62–21; eye, $4\frac{1}{2}$; snout, 3; preorbital, $5\frac{1}{4}$; maxillary, $3\frac{3}{8}$; second anal spine, $2\frac{1}{4}$; fourth dorsal, $2\frac{1}{10}$; pectoral, seven-eighths; gill-rakers, X+13.
DAVIDSONII, 57.

ff. Body with longitudinal stripes of blue or yellow or both; young with a black blotch at base of caudal; preorbital broad; gill-rakers, X+16.

h. Anterior part of body with two broad dark crossbars, the one from the nape obliquely forward through eye, the other from front of dorsal downward; behind these a series of horizontal stripes alternately yellow and blue; pectoral longer than head; second anal and fourth dorsal spines nearly equal.

i. Blue stripes on sides about six in number, very distinct, not nearly as wide as a scale; sharply edged with darker blue; their width about one-third that of the olive interspaces; additional blue stripes in the interspaces faint and few; vertical bands of head and shoulder brown. Body ovate, the back much elevated, the anterior profile steep, convex on snout, straightish over eye, nape very convex to base of third dorsal spine; mouth moderate, the maxillary extending to anterior edge of eye; jaws subequal; teeth arranged in bands, the outer much enlarged; about 10 gill-rakers, besides rudiments, below angle; dorsal fin high, slightly emarginate; spines slender, the highest slightly shorter and weaker than the second anal spine, which is more than half head; caudal lunate. Head, $3\frac{1}{4}$; depth, $2\frac{1}{10}$; D. XII, 16; A. III, 10. Scales, 10–56–17; eye, $3\frac{1}{2}$; snout, $2\frac{7}{8}$; preorbital, 4; maxillary, $3\frac{1}{4}$; second anal spine, $1\frac{3}{4}$; fourth dorsal spine, $1\frac{7}{8}$; pectoral, $\frac{7}{8}$; gill-rakers, X+16.....TÆNIATUS, 58.

ii. Blue stripes on side as broad as a scale, each more than two-thirds the width of the golden-yellow interspaces, and each very faintly edged with darker; vertical bands on head and shoulder jet black. Body ovate, the back very much elevated, the anterior profile steep, slightly convex along snout and over eye, very much arched at nape; mouth small, the maxillary extending to anterior nostril; jaws subequal; outer row of teeth enlarged; about six gill-rakers, besides rudiments, below angle; dorsal fin low, emarginate, spines slender, the highest about equal in length to second anal spine, which is less than half head; caudal forked. Head, $3\frac{3}{8}$; depth, $2\frac{1}{10}$; D. XII, 17; A. III, 10, 11; scales, 11–56–17; eye, $4\frac{1}{8}$; snout, $2\frac{1}{2}$; preorbital, 4; maxillary, $3\frac{1}{4}$; second anal spine, $2\frac{1}{10}$; third dorsal spine, $2\frac{1}{10}$; pectoral, $\frac{7}{8}$; gill-rakers, X+16.
VIRGINICUS, 59.

[Allied to *Anisotremus virginicus* is another species, which, on account of the imperfect description, should not be placed in the analysis.
CATHARINÆ, 60.]

hh. (Anterior part of body without dark crossbars, the body sometimes plain yellowish, the back usually violet, with 4 or 5 yellow lines; silvery below; snout short, not longer than width of eye; dorsal fin very deeply notched, with feeble spines; second and third anal spines equal in length; body a little more oblong than in *surinamensis*. D. XII, 13; A. III, 9. (*Cuv. & Val.*)..SERRULA, 61.

51. ANISOTREMUS PACIFICI.

Conodon pacifici Günther, Proc. Zoöl. Soc. London, 1864, 147 (Chiapas).
Pomadasis pacifici, Jordan & Gilbert, Proc. U. S. N. M. 1881, 385 (Panama).

Habitat: Pacific coast of Central America.

Etymology: From Pacific (Ocean).

This small, plain-colored species is rather common about Panama.

52. ANISOTREMUS CÆSIUS.

Pomadasys cæsius Jordan & Gilbert, Proc. U. S. N. M. 1881, 383 (Mazatlan).

Habitat: Pacific coast of Mexico.

Etymology: *Cæsius*, silver-gray.

This species is known from the three types taken in the harbor of Mazatlan and from a specimen at Cambridge from Acapulco.

53. ANISOTREMUS DOVII.

Pristipoma dovii Günther, Proc. Zoöl. Soc. London, 1864, 23 (Panama).
Pomasasis dovii, Jordan & Gilbert, Proc. U. S. N. M. 1881, 386 (Mazatlan, Panama).

Habitat: Pacific coast of tropical America.

Etymology: Named for Capt. John M. Dow.

This strongly-marked and handsome species is not rare on the Pacific coast of tropical America.

54. ANISOTREMUS SURINAMENSIS. (Pompon.)

Lutjanus surinamensis Bloch, Ichthyol., pl. 253, 1791 (Surinam).
Pristipoma surinamense, Cuv. & Val., V, 273, 1830 (same type).
Holocentrus gibbosus Lacépède, Hist. Nat. Poiss., IV, 344, 1803 (same type).
Pristipoma bilineatum, Cuv. & Val., Hist. Nat. Poiss., V, 271, 1830 (Martinique).
Anisotremus bilineatus, Jordan, Proc. U. S. N. M. 1890, 319 (Bahia); Jordan & Bollmann, l. c., 1889, 181 (Indefatigable Island).
Pristipoma melanopterum Cuv. & Val., l. c., 273 (Brazil).
Hæmulon obtusum Poey, Memorias, II, 1860, 182 (Havana).
Hæmulon labridum Poey, Memorias, II, 1860, 419 (Cuba).
Genytremus interruptus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 256 (Cape San Lucas).
Pristipoma fürthi Steind., Ichth. Beiträge, V, 4, 1876 (Panama).
Pomadasys bilineatus and *fürthi*, Jordan & Gilbert, Proc. U. S. N. M. 1881, 385 (West Indies, Peru, Brazil, Magdalena Bay, Cape San Lucas, Gulf of California, Mazatlan, Panama, Galapagos Islands).

Habitat: Both coasts of tropical America, north to Cuba and Magdalena Bay.

Etymology: From Surinam.

This species is the most widely distributed of any of the genus. It reaches a larger size than the others and is subject to a considerable variation in form. Pacific Coast examples usually have the scales

above the lateral line a little larger than usual in Atlantic specimens, but this difference can not be depended on and is variable. Should a tangible variety ever prove appreciable, the name *interruptus* should be retained for the West Coast form. Specimens are in the Museum of Comparative Zoölogy, from Havana (type of *Anisotremus obtusus* Poey), from Bahia, Rio Janeiro, Galapagos Islands, Panama, and Magdalena Bay. The largest of these is about 2 feet in length. The Galapagos specimens are darkest in color and with the snout rather sharper. Those from the Galapagos and from Rio Janeiro have the scales above the lateral line a little less enlarged, 9 in an oblique series, downward and backward from first dorsal spine (7 in Panama specimen, 8 in specimen from Magdalena Bay).

Lutjanus surinamensis Bloch is a dried and discolored specimen, which could have belonged to no other known species. Although 14 dorsal spines are figured and the body represented as marked with dark crossbands, we have no doubt of its identity, and therefore substitute the name *surinamensis* for *bilineatus*.

55. ANISOTREMUS BICOLOR. (Maria-Prieta.)

Pristipoma bicolor Castelnau, Anim. Nouv. ou Rares Amér. du Sud, 1850, 8, pl. 2, f. 2 (Bahia).

Anisotremus bicolor, Jordan, Proc. U. S. N. M. 1890, 319 (Bahia).

? *Pristipoma trilineatum* Poey, Memorias, II, 313, 1860 (Havana).

Pristipoma brasiliense Steindachner, Sitzungsb. k. Akad. Wiss. Wien, 1863, p. 1013 (Bahia).

Habitat: Coast of Brazil.

Etymology: *Bicolor*, two-colored.

This species is known to us from several specimens from the coast of Brazil (Bahia, Rio Grande do Norte, and Ceará), preserved in the museum at Cambridge, and from one taken by the *Albatross* at Bahia. It is very close to *A. surinamensis*, but has slightly larger scales and a somewhat different coloration, as well as a steeper and more gibbous front. *Anisotremus trilineatus* Poey may be the young of this species, but of this we are not sure.

56. ANISOTREMUS SCAPULARIS.

Pristipoma scapulare Tschudi, Fauna, Peruana, 1844, 12 (Huacho).

Diagramma melanospilum Kner, Sitzungsb. k. Akad. Wissenschaft, 1867, 4 (west coast of South America).

Pristipoma notatum Peters, Berl. Monatsb., 1869, 706 ("angeblich aus Mazatlan").

Pomadasys modestus, Jordan, Proc. Ac. Nat. Sci. Phila. 1883, 286 (probably not of Tschudi).

Habitat: Coast of Peru.

Etymology: *Scapula*, shoulder, from the shoulder spot.

Of this species, one specimen, 4865, from Callao, is in the museum at Cambridge. Others examined by us are in the museum at Berlin. It has the central pore at the chin, the failure to find which led Kner to place the species in *Diagramma*. It seems to be identical with Peters's type of *P. notatum*, preserved in the museum at Berlin, though it dis-

agrees with Peters's description, the dorsal rays being XII, 15, not XVIII–I, 15, as stated by Peters. This species is probably the one poorly described by Tschudi under the name of *Pristipoma scapulare*. It is well distinguished by the color mark, which has suggested the names *scapularis*, *melanospilus*, and *notatus*.

57. ANISOTREMUS DAVIDSONI.

Pristipoma davidsoni Steind., Ichthyol. Beiträge, III, 6, 1875 (San Diego); Jordan & Gilbert, Proc. U. S. N. M. 1881, 385 (Catalina Island, San Diego).

Habitat: Coast of southern California.

Etymology: Named for Prof. George Davidson, of San Francisco.

This well-defined species is not rare about San Diego and neighboring islands. It has not been taken elsewhere.

58. ANISOTREMUS TÆNIATUS.

Anisotremus tæniatus Gill, Proc. U. S. N. M. 1861, 107 (Panama).

Habitat: The Pacific coast of tropical America, Magdalena Bay to Panama.

Etymology: ταινία, a ribbon; *tæniatus*, striped.

This species, the most brilliantly colored of the genus, is common on the Pacific coast of tropical America, where it replaces the closely allied *Anisotremus virginicus*. The differences between the two species, though slight, seem to be constant. Steindachner records the species from Magdalena Bay. Our specimens are from Mazatlan and Panama.

59. ANISOTREMUS VIRGINICUS. (Catalineta; Porkfish.)

Guatucupa juba Maregrave, Hist. Brasil., 1648, 148 (Brazil).
Acara pinima Maregrave, 1648, 152 (Brazil).
Sparus virginicus Linnæus, Syst. Nat., X, 281, 1758.
Pristipoma virginicum Günther, I, 288 (Jamaica).
Pomadasys virginicus Jordan & Gilbert, Proc. U. S. N. M. 1881, 385.
Anisotremus virginicus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 107; Jordan, Proc. U. S. N. M. 1890, 319 (Bahia).
Sparus vittatus Bloch, Ichthyol., taf. 263, fig. 2, 1791 (after Maregrave, *Acara pinima*).
Perca juba Bloch, l. c., taf. 308, fig. 2, 1791 (after Maregrave).
Grammistes mauritii Bloch & Schneider, Syst. Ichthyol., 185, 1801 (after *Sparus vittatus*).
? *Pristipoma catharinæ* Cuv. & Val., V, 269, 1830.
Pristipoma rodo Cuv. & Val., V, 274, 1830.
Pristipoma acara pinima Castelnau, Anim. Nouv. ou Rares, 1856, 8.

Habitat: West Indies, Florida Keys to Brazil.

Etymology: Virginia, but the species does not reach thus far to the northward.

This well-known species is the commonest of the genus in the West Indies and is the only one which extends its range to the coast of Florida.

60. ANISOTREMUS CATHARINÆ.

Pristipoma catharinæ Cuv. & Val., v, 269, 1830 (Île Sainte Catherine du Brésil).

Habitat: Coast of Brazil.

Etymology: From the island of Santa Catarina.

This imperfectly known species probably belongs to *Anisotremus* and it is apparently nearest to *A. virginicus*, possibly identical with it. The following is a condensation of the account given by Cuvier & Valenciennes:

Body deep, much elevated at the nape; depth, 3 in total length with caudal; mouth, small; pores at chin, very small; dorsal notched, its spines long and strong; caudal emarginate; second anal spine longer than third, which is as long as first soft ray; ventrals longer than the short pectorals. Coloration nearly plain; sides with faint streaks. D. XII, 14; A. III, 10.

A drawing sent us by our friend, M. Alexandre Thominot, of the Museum at Paris, shows the general form of *A. virginicus*, the spines in the fins notably strong, especially the third and fourth of the dorsal and the second of the anal. M. Thominot says:

Nous ne possédons dans la collection du muséum qu'un exemplaire type du *Pristipoma catharinæ* de Cuv. & Val. Il porte le no. 1365ª et vient du Brésil par MM. Lesson & Garnot. Voici ce que nous trouvons:

D. $\frac{12}{15}$, P. $\frac{1}{16}$, V. $\frac{1}{5}$, A. $\frac{3}{11}$, C. 17.

Rayons épineux dorsaux robustes; le 1er est le plus court, le 3me le plus long. Tête contenue 3¾ à 3⅘ fois dans la longueur totale; le diamètre de l'œil = la longueur du nez; préopercule fortement denteló dans sa hauteur, râteaux branchiaux manquant d'un côté et en très mauvais état à l'opposé; pores du menton, vu le mauvais état de cette partie, sont presque incertains; hauteur du corps par une ligne perpendiculaire menée de la base du 3me rayon épineux de la dorsale au milieu des ventrales = à peu près le $\frac{1}{3}$ de l'étendue totale du sujet; caudale en croissant; je ne dis rien des pectorales, lesquelles ont le bout des rayons incomplet; les ventrales arrivent presque au cloaque.

This will probably prove to be a young example of *Anisotremus virginicus* in bad condition.

61. ANISOTREMUS SERRULA. (Tête-de-Roche.)

Pristipoma serrula Cuv. & Val., v, 272, 1830 (Martinique).
Pristipoma auratum Cuv. & Val., l. c., 272 (Martinique).
Pristipoma spleniatum Poey, Memorias, II, 1860, 187 (Havana).

Habitat: West Indies.

Etymology: *Serrula*, a little saw, a translation of the French name "Petite-Scie," used at Martinique.

This species we have not seen. We place *spleniatus* in the synonymy of *serrula* with some doubt, as it may have been based on the young of *virginicus*. Except for the presence of the groove at the chin, as implied in the description of Cuvier and Valenciennes, we might suppose this species to be identical with *Genyatremus luteus*.

XIV. CONODON.

Conodon Cuv. & Val., Hist. Nat. Poissons, v, 156, 1830 (*antillanus* = *nobilis*).

Type: *Conodon antillanus* Cuv. & Val. = *Perca nobilis* L.

Etymology: κῶνος, cone; ὀδών, tooth.

This genus contains two closely related species, both from tropical America. The genus is close to *Pomadasis*, from which it is separated by the enlarged outer teeth and by the armature of the preopercle.

ANALYSIS OF SPECIES OF CONODON.

a. Back distinctly elevated and compressed, the depth about equal to length of head, 3⅓ in body; dorsal fins low, fourth and longest spine 1¾ in head, longest dorsal ray 2¼ in head; second anal spine not 2 in head; second dorsal spine about one-half length of third; teeth of outer series enlarged, stout; preorbital at its least width more than half diameter of eye; D. XI, I, 13; A. III, 7; scales 6-55-13. Color silvery, darker above, with 8 dark bars which extend on sides below level of pectoral; sides with light-yellowish streaks in life...NOBILIS, 62.

aa. Back not elevated, the depth equal to length of head, 3⅓ in body; dorsal fin higher than in *nobilis*, fourth and longest spine 2⅓ in head, longest dorsal ray 3 in head; second anal spine 2 in head; second dorsal spine about one-third length of third; teeth of outer series slightly enlarged, slender; preorbital at its least width less than half diameter of eye; D. XI, I, 12; A. III, 7. Scales, 6-53-15. Color silvery, darker above with dark bars on sides which do not extend to level of pectoral.....SERRIFER, 63.

62. CONODON NOBILIS.

Perca nobilis Linnæus, Syst. Nat, ed. x, 1758, 191 (North America).
Sciæna plumieri Bloch, Ichthyol., VI, 66, taf. 306, 1791 (Martinique).
Conodon plumieri, Günther, I, 304.
Sciæna coro Bloch, l. c., pl. 307, f. 2 (after *Coro-coro*, Marcgrave).
Cheilodipterus chrysopterus Lacépède, Hist. Nat. Poiss., III, 542, pl. 33, f. 1.
Conodon antillanus Cuv. & Val., V, 156, 1830.
Pristipoma coro Cuv. & Val., V, 266, 1830.

Habitat: West Indies, coast of Texas to Brazil.

Etymology: *Nobilis*, noble.

This species is not rare in the West Indies and is more common on the coast of Brazil. It has been once taken on the coast of Texas and is probably a species inhabiting sandy shores. The name *nobilis*, in all probability intended for this species, has priority over any other, although less doubt attaches to the name *plumieri*.

63. CONODON SERRIFER.

Conodon plumieri, Streets, Bull. U. S. N. M., VII, 50, 1877 (Boca Soledad, Lower California; not of Cuv. & Val.).
Conodon serrifer Jordan & Gilbert, Proc. U. S. N. M. 1882, 351 (same specimens).

Habitat: Pacific coast of Mexico.

Etymology: *Serra*, saw; *fero*, I bear.

This species is still known only from the original types, three specimens (17546, U. S. N. M.), taken by Dr. Streets at Boca Soledad on the Pacific coast of Lower California. It is close to *C. nobilis*, but slenderer, and somewhat different in armature.

XV. POMADASIS.

Pomadasis Lacépède, Hist. Nat. Poiss., IV, 1803, 516 (*argenteus*).
Les Pristipomes Cuvier, Règne Animal, ed. 1, 1817, 279 (*hasta*, etc.).
Pristipoma Cuvier, Règne Animal, ed. 2, 1829 (*hasta*, etc.).
Brachydeuterus * Gill, Proc. Ac. Nat. Sci. Phila. 1862, 17 (*auritus*).
Pseudopristipoma Sauvage, Bull. Sci. Philom., IV, 220, 1880 (*leucurum*).
Hæmulopsis Steind., Ichthyologische Notizen, VIII, 1869, 9 (*corvinæforme*).

Type: *Sciæna argentea* Forskål.

Etymology: πῶμα, operculum; δασύς, rough, hence more correctly written *Pomadasys*.

This genus is composed of small shore fishes, some of its representatives being found in most tropical seas. The three principal types, or subgenera, are all represented in American waters. The Pacific coast species of this genus are well known, but those of the Atlantic need further study and comparison. Several of the species enter fresh waters, and perhaps belong to the brackish-water fauna. Numerous species are found on the west coast of Africa and about the Cape Verde Islands, but so far as known none enter European waters.

ANALYSIS OF AMERICAN SPECIES OF POMADASIS.

a. Anal spine strong, the second much longer and stronger than the third; soft dorsal and anal nearly or quite naked.

b. Teeth in upper jaw in villiform bands, those in front more or less enlarged, acute (*Pomadasis*).

c. Dorsal spines, XII; preorbital broad.

d. Mouth large, maxillary reaching to anterior third of eye, about $2\frac{2}{3}$ in head.

e. Scales rather small, 8-56-20. Body elongate-elliptical, compressed, somewhat elevated at nape; anterior profile straight from nape to end of snout; snout produced, blunt, rounded; preopercle and suprascapular scale coarsely serrated; dorsal fin deeply notched; dorsal spines low, the longest about $2\frac{2}{3}$ in head; soft dorsal short, its base contained about $2\frac{1}{3}$ times in base of spinous portion; second anal spine very long and strong, about $1\frac{2}{3}$ in head; soft dorsal and anal slightly scaly at base; pectoral short, not reaching vent. Coloration uniform. Head, $2\frac{1}{3}$, depth, $3\frac{1}{2}$; scales 8-56-20; D. XII, 12; A. III, 7; eye, 5; preorbital, $6\frac{1}{3}$; snout, $3\frac{1}{4}$; maxillary $2\frac{2}{3}$; pectoral, 5 in body; fourth dorsal spine, $2\frac{2}{3}$; second anal spine, $1\frac{2}{3}$; soft dorsal, $2\frac{1}{3}$ in spinous ..... HUMILIS, 64.

ee. (Scales still smaller, 65 in a longitudinal series; body elongate, the depth $4\frac{1}{3}$ in total length with caudal; head nearly 4; eye, 4 in head; maxillary extending a little beyond front of eye; anal spines strong, the second $\frac{2}{3}$ the depth of body. Color nearly plain, silvery below. D. XII, 12; A. III, 7.) (*Poey*) ..... PRODUCTUS, 65.

* Erroneously supposed to be a genus of *Sciænidæ*, its typical species having been placed by Cuvier in *Larimus*.

dd. Mouth small, the maxillary not reaching to anterior edge of orbit, about 3⅓ in head; pectorals long, 1⅓ in head; scales large, 6–48–14. Body ovate-elongate, compressed, considerably elevated at nape; anterior profile straight or slightly concave from nape to point of snout; snout sharp and pointed; preopercle and suprascapular scale coarsely serrate; dorsal fin very deeply notched; dorsal spines long and strong, the longest about 2 in head; soft dorsal short; its base contained about 2⅙ times in base of spinous portion; second dorsal spine very long and strong, about 2 in head; soft dorsal and anal with a single row of a few scales behind each ray near the base; pectoral long, reaching a little beyond the vent, about 3⅓ in body. Coloration in spirits dusky, with a metallic luster above, lighter below; about four dusky transverse bands extending to level of pectoral. Head, 2⅔; depth, 2⅔; scales, 6–48–14; D. XII, 13; A. III, 7; eye, 4½; preorbital, 4⅔; snout, 2⅞; maxillary, 3⅓; pectoral, 3⅓ in body; fourth dorsal spine, 2 in head; second anal spine, 2; soft dorsal, 2⅙ in spinous.....MACRACANTHUS, 66.

cc. Dorsal spines, XIII; preorbital narrow.

f. Body moderately elongate, the depth 2⅔ to 3 in length.

g. Snout pointed, 3⅔ in head. Body elongate, compressed, the back elevated, high at the nape, the anterior profile rather irregular, varying with age; a more or less distinct frontal depression above eye in old specimens; mouth small, the maxillary barely extending to the anterior edge of orbit; lower jaw included; preopercle coarsely serrate, the teeth wide apart; teeth small, the outer scarcely enlarged; scales rather large, 6–54–16, those above the lateral line parallel; dorsal fin moderately notched; second anal spine very strong and long, reaching past tips of all the rays; pectoral short, caudal slightly lunate. Color rather plain, about 3 or 4 ill-defined longitudinal dark stripes along sides, one from point of snout to middle of base of caudal. Head, 3; depth 2⅔ to 3⅓; scales 6–54–16; D. XIII, 11–12; A. III–6, 7; eye, 3⅓ to 5; preorbital, 4 to 8; snout, 2⅓ to 3⅔; maxillary, 3 to 4; pectoral, 1⅙ to 1½; fourth dorsal spine, 1⅔ to 2¼; second anal spine, 1⅓ to 2; soft dorsal, 2 in spinous .....CROCRO, 67.

gg. Snout longer, moderately pointed, about 3 in head; body elongate, ovate, compressed, the back elevated, depth about 3 in length; pectorals rather long, 1⅓ in head; anterior profile steep and convex over snout, depressed above eye, becoming slightly convex at nape; top of head with a slight depression; mouth small, the maxillary barely reaching to the anterior edge of eye; preorbital very narrow; teeth arranged in narrow, thickly-set bands, those in front a little broader; preopercle and scapula strongly serrate, the serræ wide apart at angle; eye very large, about 3 in head; soft dorsal and anal slightly scaly at base; dorsal fin only moderately notched, the soft part much shorter and lower than the spinous portion; dorsal spines very high and stout; second anal spine very long and strong; pectoral long; caudal slightly lunate. Color uniformly

silver gray, the base of each scale slightly darker. Head, 3; depth, 3; scales, 7-49-12; D. XIII, XIV-12; A. III, 7; eye, 3½; preorbital, 5½; snout, 3; maxillary, 3⅔; pectoral, 1½; fourth dorsal spine, 1½; second anal spine, 1⅔; soft dorsal, 2⅔ in spinous.....BRANICKI, 68.

ff. Body very long and low, compressed, the back little elevated, the depth about 3⅔ in length; pectorals shortish, 1⅓ in head. Second anal spine very long, 1½ in head; anterior profile irregular, straightish over snout, slightly convex above eye, occiput concave, convex at nape; mouth moderate, the maxillary reaching to front of pupil; preopercle and scapula very coarsely serrated, teeth at angle of preopercle almost spiny; eye large; base of soft dorsal and anal naked or slightly scaly; dorsal fin only slightly notched, the soft part about half as long as spiny portion; dorsal spines very strong; second anal spine very long, reaching beyond tips of last rays; pectoral short; caudal truncate. Color of body metallic grayish-golden with indistinct streaks and bands; belly lighter, fins dusky. Head, 3 to 3½; depth, 3½ to 3¾; scales, 6-54-14; D. XIII, 11 or 12; A. III, 6-7; eye, 3½; preorbital, 5½ to 8; snout, 3⅔; maxillary, 3; pectoral, 1⅓; fourth dorsal spine, 1⅓ to 2; second anal spine, 1½; soft dorsal, 2 in spinous.....RAMOSUS, 69.

bb. Teeth in upper jaw in broad villiform bands, not differentiated. (*Pseudopristipoma* Sauvage.)

h. Third dorsal spine produced, much longer than the others, about half length of head; second anal spine somewhat shorter; profile convex; scales nearly smooth; pectoral fin very long, as long as head; preopercle weakly serrate. Color silvery; lower fins white; a distinct dark blotch on opercle and a fainter one on sides below spinous dorsal. Body rather robust.....PANAMENSIS, 70.

aa. Anal spines small or moderate, the second little if any longer or stronger than third; anal lower than the soft rays; soft dorsal and anal largely covered with small scales; body oblong, not elevated; scales above lateral line parallel with the back. Color grayish, with light and dark stripes along rows of scales, these sometimes obscure. Scales large, about 6 in a vertical row between first dorsal spine and lateral line, 45 to 55 in the lateral line; dorsal spines, 12. (*Brachydeuterus* Gill.)

i. Pectoral fin long, nearly equal to head; preorbital broad, about as wide as eye.

j. Axillary blotch large, black, encroaching on the rays of the pectoral fin; pectoral fin nearly as long as head; body rather robust, the back elevated, the profile even; dorsal deeply notched; second anal spine short and stout, 3½ to 4 in head; fins unspotted; body with faint dark crossbands; back and sides with dark stripes formed by dark spots along the rows of scales. Head, 3⅓; depth, 3½; D. XII, 16; A. III, 9; scales 6-50-10 .....AXILLARIS, 71.

ii. Pectoral fin short, much shorter than head; anal spines very small.

k. Preorbital narrow, not so broad as eye; the second anal spine shorter than the third; a large blackish rounded blotch, nearly as large as eye, behind the suprascapula at the origin of the lateral line. Body rather elongate, the mouth small, the maxillary not quite reaching front of eye. *Head, 4 in length*; depth, 3½; eye, 3¾; snout, 3; pectoral, 1⅛; fourth dorsal spine, 2 in head; second anal spine, nearly 4; D. XII, 15; A. III, 8; scales, 6-52-10. Silvery, darker above, *with dark streaks along the rows of scales*; scapular blotch conspicuous. ..... NITIDUS, 72.

kk. Preorbital broad, not narrower than eye; anal spines stoutish, the second little if any shorter than third; *no dark blotch on scapular region.*

l. Maxillary reaching front of eye, 3½ in head; sides of back with distinct dark streaks along the rows of scales; head, 3¼ *to* 3⅜ *in length*; *depth*, 3⅛ *to* 4; eye, 4½ in head; snout, 2⅞ to 3½; pectoral, 1⅛; fourth dorsal spine, 2 to 2½ in head; second anal spine, 3; upper lobe of caudal longer. D. XII, 15; A. III, 7; scales, *5-50-11*. *Color olivaceous*, silvery below; the dark streaks conspicuous along the rows of scales ..... CORVINÆFORMIS, 73.

ll. Maxillary not reaching front of eye; sides with *indistinct dark streaks or none*; body rather elongate; coloration nearly plain; anal spines not graduated, the second stoutish and scarcely shorter than third; preorbital very deep, *wider than eye*; *pectorals short*, much shorter than head; color silvery, young with traces of dark crossbands and dark lengthwise streaks; maxillary not reaching eye; dorsal deeply notched. Head, 3 in length; depth, 3; D. XII, 15 *or* 16; A. III, 8; scales, 6-52-12; preorbital, 3½ to 4 in head; fourth dorsal spine, 1¾; maxillary, 3½ to 3⅞ in head; snout, 2⅞ to 2⅝ in head.

m. Body *moderately elongate, the depth* 3 *in length*; anterior profile somewhat convex; preorbital, 3½ in head, a little more than eye; anal spines moderate, the second 2¾ to 3 in head. ..... LEUCISCUS, 74.

mm. Body more slender, the depth 3⅓ in length; anterior profile straight; preorbital 4 in head, a little less than eye; anal spines smaller, the second 3⅞ to 4 in head.

ELONGATUS, 75.

64. POMADASIS HUMILIS.

Pristipoma humile Kner & Steindachner, Sitzgber. Akad. Wiss. (Münch.), 1863, 222 (Rio Bayano, near Panama).

Habitat: Pacific coast of Central America, often or always in fresh waters.

Etymology: *Humilis*, humble.

This species is known from a few specimens, all taken from the Rio Bayano, near Panama. The two examined by us (30957) were taken by Capt. John M. Dow. In the same bottle was a specimen of *Joturus pichardi* (type of *Joturus stipes*), which is a strictly fresh-water species.

65. POMADASIS PRODUCTUS.

Pristipoma productum Poey, Memorias, II, 1860, 186 (Havana).

Habitat: West Indies.

Etymology: *Productus*, produced, from the long snout.

This species, which seems closely allied to *P. humilis*, is known only from Poey's descriptions. From *P. ramosus* it differs, if the descriptions can be trusted, in having but 12 dorsal spines.

66. POMADASIS MACRACANTHUS.

Pristipoma macracanthum Günther, Proc. Zoöl. Soc. Lond. 1864, 146 (Chiapas).

Habitat: Pacific coast of tropical America.

Etymology: μακρός, long; ἄκανθα, spine.

This species is generally common along the west coast of Mexico and Central America. The specimens examined by us are from Panama, Mazatlan, Chiapas, and Punta Arenas. The East Indian *Pomadasis hasta*, the type of *Pristipoma*, is allied to *P. macracanthus*, but has the back and the dorsal fin spotted, somewhat as in *P. suillus*.

67. POMADASIS CROCRO.

Pristipoma crocro Cuv. & Val., Hist. Nat. Poiss., V, 264, 1830.
Pristipoma cultriferum Poey, Memorias, II, 1860, 185.
Pomadasys approximans Bean & Dresel, Proc. U. S. N. M. 1884, 160 (Jamaica).

Habitat: West Indies, Cuba to Brazil.

Etymology: *Crocro*, the vernacular name at Martinique.

This species is generally common in the West Indies, especially on sandy coasts. The specimens examined by us are from Cuba (type of *Pristipoma cultriferum* Poey, in the museum at Cambridge), and from São Matheus, Itabapuana, and Cannarivieras, in Brazil.

68. POMADASIS BRANICKI.

Pristipoma branicki Steindachner, Denkschr. kaiserl. Akad. Wiss. Wien, XII, 28, 1879 (Tumbez, Peru).

Habitat: Pacific coast of tropical America.

Etymology: A personal name.

This small species closely resembles *P. crocro* and *P. ramosus*. It is generally common on the sandy coasts of tropical America on the Pacific side. The specimens seen by us are from Mazatlan, Panama, Rio Zanatenco, and Chiapas.

69. POMADASIS RAMOSUS.

Pristipoma ramosum Poey, Memorias, II, 1860, 186 (Havana).
Pristipoma boucardi Steindachner, Ich. Notizen, IX, 1, 1869 (Gulf of Mexico).

Habitat: West Indies, south to Brazil.

Etymology: *Ramosus*, branched, the soft rays of the ventrals being much branched.

Of this species we have examined a specimen 6 inches long (418, M. C. Z.) from Hayti. A number of specimens in the Museum of Comparative Zoölogy agree with this one, except that the anal spine is shorter, 2 in head; these bear an unpublished MSS. name given by Dr. Steindachner, but we are not prepared to separate them from *P. boucardi;* they are 10615, M. C. Z., São Matheus, the largest a foot in length, collected by Hartt & Copeland, and 2421, M. C. Z., from Rio Una, collected by Antonio de Lacerda. *Pristipoma boucardi* Steindachner seems to us identical with the specimen from Hayti. It is probable that this is the same as *P. ramosus* Poey, but the description of Poey is not very full.

70. POMADASIS PANAMENSIS.

Pristipoma panamensis Steindachner, Ich. Beiträge, III, 8, 1875 (Panama).

Habitat: Pacific coast of tropical America.

Etymology: From Panama.

This well-marked species is generally common on the Pacific coast of tropical America. Those examined by us are from Panama and Mazatlan.

71. POMADASIS AXILLARIS.

Pristipoma axillare Steindachner, Ich. Notizen, VIII, 7, 1869 (Mazatlan).
Pomadasis axillaris, Evermann & Jenkins, Proc. U. S. N. M. 1891, 151 (Guaymas).

Habitat: Pacific coast of Mexico.

Etymology: *Axillaris*, from the black axillary spot.

This species is known only from about Mazatlan, where it was found to be rather common by Dr. Gilbert, and from Guaymas, where it was obtained by Evermann & Jenkins. One of the specimens of *Pristipoma "leuciscus"* obtained in Lower California by Dr. Streets belongs to this species, the other to *P. nitidus.*

72. POMADASIS NITIDUS.

Pristipoma nitidum Steindachner, Ich. Notizen, VIII, 5, 1869 (Mazatlan).

Habitat: Pacific coast of tropical America.

Etymology: *Nitidus*, shining.

This small species has been taken at Mazatlan, Panama, and in the Gulf of California.

73. POMADASIS CORVINÆFORMIS.

Hæmulon corvinæforme Steindachner, Ich. Notizen, VII, 16, 1868 (Santos, Brazil).

Habitat: Coast of Brazil.

Etymology: *Corvina*, a genus of *Sciænidæ; forma*, shape.

This species has been taken a few times on the coast of Brazil. The specimen examined by us (4539, M. C. Z.) was collected by Agassiz at Rio Grande do Sul.

74. POMADASIS LEUCISCUS.

Pristipoma leuciscus Günther, Proc. Zool. Soc. London 1864, 147 (San Jose de Nicaragua, Chiapas).

Habitat: Pacific coast of tropical America.

Etymology: *Leuciscus*, a chub or shiner, from λευκός, white.

This species is not rare on the Pacific coast of Mexico. The specimens examined by us are from Mazatlan and Panama.

75. POMADASIS ELONGATUS.

Pristipoma leuciscus, var. *elongatus* Steindachner, Neue und seltene Fische aus dem k. k. Museum, 1879, 30, 52, Taf. 9, f. 2 (Tumbez, west coast of South America).

Habitat: Pacific coast of tropical America.

Etymology: *Elongatus*, elongate.

This species occurs with *P. leuciscus*, and so far as our experience goes it is the more common of the two. The differences between them are very slight. *Elongatus* is more slender, with straight profile, the preorbital broader, and the anal spines somewhat smaller, the third hardly as long as the second. In all other respects the two are identical and, at the best, *P. elongatus* must be regarded as a doubtful species. Possibly it is the male of *P. leuciscus*, but such sexual differences, or in fact any sexual differences, are unusual in the family.

XVI. ORTHOPRISTIS.

Orthopristis Girard, U. S. Mex. Bound. Survey, 1859, 15 (*duplex=chrysopterus*)
Microlepidotus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 255 (*inornatus*).
Pristocantharus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256 (*cantharinus*).
Isaciella Jordan & Fesler, subg. nov. (*brevipinnis*).

Type: *Orthopristis duplex* Girard=*Perca chrysoptera* Linnæus.

Etymology: ὀρθός, straight; πρίστις, used for πρίστης, a saw, in reference to the evenly serrated preopercle.

This genus contains a considerable number of species differing from *Pomadasis* by the long anal fin, the smaller scales, and by the less development of the dorsal spines. Nearly all the species are American. The group is divided into three subgenera, the extremes of which differ considerably from each other.

For the sake of comparison, we introduce the single representative of this genus found in the waters of Europe.

ANALYSIS OF SPECIES OF ORTHOPRISTIS.

a. Dorsal spines, XII or XIII.

b. Soft dorsal and anal scaleless; mouth small; temporal crest, which arises from behind the eye, very low and inconspicuous, the upper edge below base of the high supraoccipital crest, which originates over the pupil (examined in *poeyi, chrysopterus, chalceus,* and *ruber*).....[ORTHOPRISTIS.]

c. Preorbital narrow, more than 5 in head; second anal spine much stronger than third and about the same length, less than 3 in head and about equal in length to first anal ray; scales large, 7–49–13. Body compressed, the back moderately elevated; anterior profile a little concave and depressed above eye; preopercle finely and sharply serrate; gill-rakers short and slender; snout short, rather sharp, equal to maxillary; eye large; jaws subequal, with the outer teeth scarcely enlarged. Scales arranged above in series which are oblique only to second third of dorsal, behind that point horizontal. Dorsal fin low, but divided nearly to base; spines slender, the last one not half first soft ray, which is low but larger than the others; anal low, with concave margin; pectoral long; caudal forked, upper lobe longer. Color, grayish above, silvery below; dark opercular edging conspicuous; no distinct markings. Head, 3⅓; depth, 3⅜; D. XII, 15; A. III, 11; scales, 7–49–13; maxillary, 3⅓; eye, 3⅓; preorbital, 5⅓; pectoral, 1; snout, 3⅓; spinous dorsal, 2; second anal spine, 2⅓; base soft dorsal in spinous, 1⅞ .....BENNETTI, 76.

cc. Preorbital broad, less than 5 in head; second anal spine about as stout as third, more than 3 in head, not as long as first ray; scales small; anterior profile not concave.

d. Anal, III, 10 or 11; snout short and sharp, more than 3 in head; eye large, about 4 in head. Form and general appearance of *chrysopterus;* body oblong, compressed, the back elevated, the profile steep and nearly straight; convex at the nape; preopercle finely and sharply serrate; teeth small, outer above a little enlarged.

e. Lower jaw included; soft dorsal with 14 rays; scales large, 8–54–15; gill-rakers very short and slender, X + 15; pectoral short, 1⅓ in head; maxillary not reaching to eye. Dorsal nearly continuous, the soft dorsal low, with convex outlines; anal rounded, not very low; second spine as long and as large as third, much shorter than soft rays; caudal moderate, the upper lobe longer. Color, bluish above, silvery below; a brownish spot on center of each scale above, these forming streaks much as in *lethopristis,* those above the lateral line less continuous and a little more wavy than in *lethopristis*; the young with two faint longitudinal dusky streaks on each side of back; both dorsals with rows of brownish spots. Head, 3⅓; depth, 2⅔; D. XII, 14; A. III, 10; scales, 8–54–15; maxillary, 3⅓; eye, 4; preorbital, 4; pectoral, 1⅓; snout, 3½; spinous dorsal, 2⅓; second anal spine, 3½; anal ray, 2⅓; base soft dorsal in spinous, 1½...RUBER, 77.

ee. Jaws subequal; soft dorsal 15–16; scales small, 9–58–18; gill-rakers very short and small, X + 12; pectoral falcate, long, equal to head; maxillary reaching to eye. Outline of dorsal straight, no notch; spines low and slender; soft dorsal low and equal; anal rather higher and shorter, the spines graduated; edge of fin convex; caudal moderately forked, the upper lobe longer. Color paler than in *lethopristis;* pale chalky-bluish streaks along the edges of the rows of scales; a pale streak below base of dorsal; fins rather pale, the soft dorsal mottled with darker. Head, 3½; depth, 2⅝; D. XII or XIII, 15 or 16; A. III, 10 or 11; scales, 9–58–18; maxillary, 3⅓; eye, 4⅓; preorbital, 4½; pectoral, 1½; snout, 2⅔; spinous dorsal 2⅓; second anal spine, 4; anal rays, 2⅔; base soft dorsal in spinous, 1¼ .....CHALCHUS, 78.

dd. Anal rays, III, 12 or 13; snout long and sharp, less than 3 in head; eye small, about 5 in head. Jaws equal, with a narrow band of slender teeth, the outer above a little larger; maxillary not reaching to eye; preopercle very slightly serrate above, the serræ blunt, obsolete below; gill-rakers short and slender, x + 12. Scales small; the crown, cheeks, and pieces of the gill-cover covered with small scales; snout in advance of the nostrils, suborbitals and lower jaw naked; dorsal and anal spines inclosed in a deep scaly sheath. Outline of dorsal slightly notched; anal rather high; pectoral shortish; caudal well-forked.

f. Second anal spine shorter than third, more than 5 times in head.

g. Body ovate-elliptical, much elevated at shoulders, depth less than 3 in body; scales comparatively small, 10–60–19; dorsal rays, 16. Color metallic brownish-olive above, changing to yellowish on belly; indistinct golden streaks along rows of scales; yellowish and bluish blotches on fin membranes. Head, 3⅛; depth, 2⅝; D. XII or XIII, 16; A. III, 12 or 13; scales, 10–60–19; maxillary, 3⅛; eye, 5; preorbital, 3⅜; pectoral, 1¼; snout, 2⅞; spinous dorsal, 2⅞; second anal spine, 5½; anal rays, 3; base soft dorsal in spinous, 1¼.

CHRYSOPTERUS, 79.

gg. Body elongate-elliptical, slightly elevated at shoulders; depth, 3¼ in body; scales comparatively large, 8–60–16; dorsal rays, 15. Color metallic grayish-blue above, yellowish below; faint lighter streaks following the rows of scales; blotches on fin membranes. Head, 3¼; depth, 3¼; D. XII, 15; A. III, 12; scales 8–60–16; maxillary, 3⅜; eye, 5; preorbital, 3⅝; pectoral, 1¼; snout, 2⅜; spinous dorsal, 3; second anal spine, 5⅜; anal rays, 3; base soft dorsal in spinous, 1⅜ ..... POEYI, 80.

ff. Second anal spine about as long as third, less than 5 times in head; mouth small, maxillary 4 in head; snout short, 2⅞ in head; spinous dorsal high, 2½ in head. Body oblong, the back elevated, less so than in *chalceus*; the profile convex at the nape, depressed above eye, thence perfectly straight to the tip of snout. Color brownish gray above, soiled silvery below; upper parts with eight diffuse crossbands as wide as the interspaces, extending to below middle of sides; membrane of opercle dark, some dark streaks following rows of scales; dorsal with some dull orange and some pale round spots as in *chrysopterus*. Head, 3⅛; depth, 2⅝; D. XII or XIII, 15–16; A. III, 12; scales 9–60–18; maxillary, 4; eye, 4⅛; preorbital, 4; pectoral, 1; snout, 2⅞; spinous dorsal, 2½; second anal spine, 4; anal rays, 2⅝; base soft dorsal in spinous, 1¼.

CANTHARINUS, 81.

bb. Soft dorsal and anal covered with small scales. (*Isaciella* Jordan & Fesler.)

h. Preopercle entire; preorbital broad, 4⅛ in head; mouth rather large, maxillary shorter than snout. Body rather elongate, in form intermediate between *brevipinnis* and *chalceus;* back elevated and compressed, especially anteriorly; profile regularly rounded; mouth larger than in other species of *Orthopristis;* teeth small, the outer above longer, slender, and close-set; maxillary not reaching to opposite front of eye; gill-rakers of moderate length, a little shorter than pupil, x+14; snout long, moderately sharp; eye moderate; jaws subequal; scales large; some series of scales on soft dorsal and anal, a row close behind each ray.

Dorsal fin rather deeply notched; spines low and slender; soft dorsal low, highest toward the front; anal long and rather low, with straight free border; anal spines graduated, the third scarcely half height of first ray; pectoral falcate, rather long; caudal deeply forked. Color dark gray, not silvery; center of each scale dark, these spots forming continuous streaks along the rows of scales; those below the lateral line rather less distinct; fins rather dark; opercular membrane and axil dusky. Head, 3¼; depth, 3; D. XII, 14; A. III, 11; scales, 8-65-15; maxillary, 3; eye, 4⅜; preorbital, 3¾; pectoral, 1 1/10; snout, 2⅝; spinous dorsal, 2⅞; second anal spine, 6½; anal rays, 3⅛; base soft dorsal in spinous, 1¼.

LETHOPRISTIS, 82.

hh. Preopercle weakly serrate; preorbital very narrow, 6⅛ in head; mouth small, maxillary longer than snout. Body rather fusiform, somewhat compressed, the back elevated, anterior profile steep, convex; mouth with narrow bands of brush-like teeth, the outer above slender, close-set, and a little enlarged; maxillary reaching to anterior edge of eye; gill-rakers short and slender, x + 16; snout short, blunt; eye large; lower jaw included. Scales small, extending from preorbital to fork of caudal, covering base of pectoral ventrals, soft dorsal, and anal; base of each scale at base of trunk and posterior part of head, with minute scales; dorsal and anal fins inclosed in low scaly sheath. Dorsal fin slightly notched, last spine 1⅛ in first ray; spinous dorsal low, spines slender; soft dorsal and anal low, third anal spine longest; pectoral sharp, falcate; caudal long, deeply forked. Color light-bluish gray, with brownish gray stripes following the rows of scales. Head, 3⅜; depth, 3; dorsal, XIII, 16; A. III, 13 or 12; scales, 10-65-20; maxillary, 3½; eye, 4⅛; preorbital, 6⅛; pectoral, 1; snout, 3⅛; spinous dorsal, 2½; second anal spine, 5⅛; anal rays, 3⅜; base soft dorsal in spinous, 1½.

BREVIPINNIS, 83.

aa. Dorsal spines, XIV; scales very small; skull very broad and rounded, interorbital area wider than length of snout; preorbital very narrow; the temporal crest, which rises above the pupil, rather high, its top above middle of height of supraoccipital crest, which originates over front of pupil. (*Microlepidotus* Gill.)

i. Body rather elongate, slightly compressed, back moderately elevated, profile convex from nape to snout; mouth large, with numerous bristly teeth, curved inward, larger in front; maxillary reaching to anterior edge of eye; preopercle sharply serrate; gill-rakers short, x + 17; snout bluntish, equal to maxillary; eye very large; jaws subequal. Scales very small, extending from nostril to fork of caudal, covering base of pectoral, ventrals, last two rays of soft dorsal, and preorbital to level of pupil; dorsal and anal fins included in a deep, scaly sheath; dorsal fin deeply notched, last spine 1½ in first ray; spinous dorsal high; spines slender; soft dorsal very low; anal slightly higher than soft dorsal, second spine longest; pectoral sharp, falcate; caudal sharp. Color, bluish-gray, with lighter longitudinal streaks. Head, 3½; depth, 3½; D. XIV, 15; A. III, 12; scales, 9-72-20; maxillary, 3½; eye, 4⅜; preorbital, 7½; pectoral, 1 1/10; snout, 3⅛; spinous dorsal, 2⅛; second anal spine, 6; anal rays, 3⅜; base soft dorsal in spinous, 1½.

INORNATUS, 84.

76. ORTHOPRISTIS BENNETTI.

Pristipoma bennetti Lowe, Trans. Zoöl. Soc., II, 176 (Madeira Islands).
Pristipoma ronchus Valenciennes, Barker & Webb, Hist. Nat. Îles Canaries (Canary Islands).

Habitat: South coast of Spain and islands of the eastern Atlantic.

Etymology: For Mr. E. T. Bennett.

This species is common about the islands of the eastern Atlantic, and Steindachner mentions having taken four on the south coast of Spain. It has larger scales than the other species of *Orthopristis*. The specimens examined by us were sent from the museum at Vienna to the Museum of Comparative Zoölogy.

77. ORTHOPRISTIS RUBER.

Pristipoma rubrum Cuv. & Val., V, 1830, 283 (Brazil).
Pristipoma lineatum Cuv. & Val., V, 1830, 287 (Brazil).

Habitat: Coast of Brazil.

Etymology: *Ruber*, red, which the fish is not.

The species is probably not rare on the coast of Brazil. Our specimens (4538, M. C. Z.) were obtained at Rio Janeiro by Prof. Agassiz.

78. ORTHOPRISTIS CHALCEUS.

Pristipoma chalceum Günther, Proc. Zoöl. Soc. Lond. 1864, 146 (Panama.)
Pristipoma kneri Steindachner, Ich. Notizen, VIII, 1869, 3 (Mazatlan).
Orthopristis chalceus, Evermann & Jenkins, Proc. U. S. N. M. 1891, 149 (Guaymas).

Habitat: Pacific coast of tropical America.

Etymology: *Chalceus*, brazen.

This species is common on the Pacific coast of Mexico and Central America; everywhere the most abundant of the genus. Our specimens are from Mazatlan, Panama, and the Gulf of California. Others were taken by the *Albatross* at Panama, and about Chatham, Charles and Albemarle islands, in the Galapagos.

79. ORTHOPRISTIS CHRYSOPTERUS. (Pigfish.)

Perca chrysoptera Linnæus, Syst. Nat, ed. XII, 485, 1766 (Charleston).
Labrus fulvomaculatus Mitchill, Trans. Lit. and Phil. Soc. N. Y., 406, 1814 (New York).
Pristipoma fulvomaculatum of many authors.
Pristipoma fasciatum Cuv. & Val., V, 285, 1830 (New York).
Orthopristis duplex Girard, U. S. Mex. Bound. Survey, 1859, 15 (Indianola and Brazos Santiago, Texas).

Habitat: South Atlantic and Gulf coasts of the United States.

Etymology: χρυσός, gold; πτερόν, fin.

This common food-fish is abundant along the sandy shores of the eastern United States, from Long Island to the mouth of the Rio Grande.

80. ORTHOPRISTIS POEYI.

Orthopristis poeyi (Scudder MSS.) Poey, Synopsis, 1868, 312 (Havana).

Habitat: West Indies.

Etymology: Named for Prof. Felipe Poey.

Of this species we have examined several specimens, all from Havana. The species is very close to *Orthopristis chrysopterus*, but the body is more slender and the scales are rather longer.

81. ORTHOPRISTIS CANTHARINUS.

Pristipoma cantharinum Jenyns, Voyage Beagle, Fish., 49, 1842 (Galapagos Islands). *Hæmulon modestum* Tschudi, Fauna Peruana, 11, 1844 (Peru).

Habitat: Pacific coast of tropical America.

Etymology: From *Cantharus* (=*Spondyliosoma*), a genus of sparoid fishes, which this remotely resembles.

This species is known to us from two examples, each about a foot long (4648, M. C. Z.), from the Galapagos Islands. Another, supposed to be of the same species, is in the U. S. National Museum from Guaymas. The scanty description of *Hæmulon modestum* Tschudi, a species said to be rare along the coast of Peru, agrees in all respects so far as it goes and is probably the same species. It could not be *Orthopristis chalceus*, *Orthopristis brevipinnis*, or *Isacia conceptionis*, as these species have the second anal spine quite small.

82. ORTHOPRISTIS LETHOPRISTIS.

Orthopristis lethopristis Jordan & Fesler, Proc. Ac. Nat. Sci. Phila. 1889, 36 (Galapagos Islands).

Habitat: Galapagos Archipelago.

Etymology: λήθομαι, to forget; πρίστις, used for πρίστης, a saw; a reference to the entire preopercle.

This species is known from the original type (26947, M. C. Z.), 15 inches long, from the Galapagos Islands.

83. ORTHOPRISTIS BREVIPINNIS.

Pristipoma brevipinne Steindachner, Ichth. Notizen, VIII, 1869, 10 (Mazatlan).

Habitat: Pacific coast of tropical America.

Etymology: *Brevis*, short; *pinna*, fin.

This species and the preceding form a transition from *Microlepidotus* to typical *Orthopristis*. From their resemblance to *Isacia conceptionis*, we have suggested for them the subgeneric name of *Isaciella*.

84. ORTHOPRISTIS INORNATUS.

Microlepidotus inornatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256 (Cape San Lucas).
Orthopristis inornatus, Evermann & Jenkins, Proc. U. S. N. M. 1891, 148 (Guaymas).

Habitat: Gulf of California.

Etymology: *Inornatus*, not adorned.

This interesting species is known only from the Gulf of California. The specimens examined by us are from Cape San Lucas and Guaymas. The subgenus *Microlepidotus*, which it represents, is a well-marked group, perhaps worthy of recognition as a distinct genus.

XVII. ISACIA.

Isacia Jordan & Fesler, gen. nov. (*conceptionis*).

Type: *Pristipoma conceptione* Cuv. & Val.

Etymology: From *Isaki*, a Japanese name of *Parapristipoma trilineatum* (=*Pristipoma japonicum* Cuv. & Val.).

We separate from the genus *Parapristipoma* an American species (*conceptione*), which differs from the type of *Pristipoma* much as *Orthopristis* does from *Pomadasis*. The anal fin is very long in this species, and it lacks the peculiar sheath of scales found in *Parapristipoma*. The gill-rakers are well developed in both groups, but the outline of the dorsal is in *Isacia* more as in *Pomadasis*. Although this species has been referred to *Pristipoma*, it lacks the symphyseal groove.

ANALYSIS OF SPECIES OF ISACIA.

a. Dorsal fin deeply notched; anal fin long; caudal fin forked.

b. Dorsal spines 13 or 14, the soft dorsal about half as long as spinous portion; lower jaw projecting. Body oblong-elliptical, moderately compressed; anterior profile nearly straight, a little depressed above eye; snout short and sharp; mouth small, oblique; teeth small, arranged in bands, the outer above a little enlarged; preorbital narrow; preopercle finely serrate; gill-rakers long and slender, x+22; scales above the lateral line arranged in very oblique series; those below horizontal; soft fins, naked; dorsal spines slender and rather high; soft dorsal rather low; anal spines small, graduated, second spine about half as long as first ray; pectoral about as long as head; caudal moderately forked. Color bluish-silvery below, a dark streak along each row of scales below the lateral line, these being horizontal and parallel; some scales above lateral line having pale centers, these making scattered paler spots; axil dusky. Head, 3½; depth, 2¾; D. XIII–XIV, 12 to 14; A. III, 13; scales, 10–65–16; eye, 4⅛; snout, 4¼; maxillary, 3⅛; pectoral, 1⅘; third dorsal spine, 2; second anal spine, 6; soft dorsal, 1⅛ in spinous.....CONCEPTIONIS, 85.

85. ISACIA CONCEPTIONIS

Pristipoma conceptione Cuv. & Val., v, 268, 1830 (Chile).

Habitat: Coast of Chile and Peru.

Etymology: From Concepcion in Chile.

This species is an ally of *Orthopristis brevipinnis*. As, however, it lacks the central groove at the symphysis, it can not be referred to the same genus. The specimens seen by us are from Mexillones in Peru and from Caldera and Paraca in Chile. One specimen has 14 dorsal spines, the others 13.

XVIII. PARAPRISTIPOMA.

Parapristipoma Bleeker, Archives Néerlandaises, VIII, 1872 (*trilineatum*).

Type: *Perca trilineata* Thunberg, from Japan.

Etymology: παρά, near; *Pristipoma;* the genus being intermediate between *Pomadasis* and *Plectorhynchus.*

We follow Bleeker in referring to this genus the species *viridense* (*octolineatum*), which is certainly very closely allied to *Parapristipoma trilineatum.* Along with this we place the second European species, *mediterraneum*, which, although having something in common with the type of *Plectorhynchus*, is nearer *Parapristipoma* than to *Plectorhynchus chætodonoides.* The genus called *Plectorhynchus* (=*Diagramma* Cuvier) contains some 40 species, all confined to the eastern Pacific and the Indian Ocean. The species of *Parapristipoma* have comparatively long and slender gill-rakers, a character overlooked by Bleeker. The extension of the scales at the bases of dorsal and anal is also characteristic, as is also the scaliness of the lower jaw and suborbital bones. As this genus has received little attention, we give the following:

ANALYSIS OF EUROPEAN SPECIES OF PARAPRISTIPOMA.

a. Dorsal fin low and nearly continuous; anal short and high; dorsal and anal both with a scaly sheath at base; caudal fin lunate; gill-rakers long and slender; scales small.

b. Soft dorsal nearly as long as spinous part; dorsal spines twelve; lower jaw included. Body elliptical, stout, dorsal and ventral outlines nearly straight, anterior profile steep and straightish, much convex at nape; snout long and sharp; teeth arranged in broad bands, the outer above scarcely enlarged; eye large; preopercle sharply serrate; gill-rakers long and slender, x+21; scales small, about 64 pores in the lateral line; soft dorsal and anal scaled at base; dorsal fin low, fifth and sixth spines longest, the others subequal; anal deeply sheathed, soft part high and pointed, the second spine long and slender, not quite equal to third; pectoral pointed; caudal shallow-forked. Color, grayish brown, with two or three faint longitudinal lines along the sides; edge of fins dusky. Head, 3½; depth, 2⅔; D. XII, 17; A. III, 8 to 10; eye, 3½; snout, 3; maxillary, 3⅓; pectoral, 1⅙; fifth dorsal spine, 2⅔; second anal spine, 2⅔; soft dorsal, 1⅙ in spinous. Scales, 65–70.....MEDITERRANEUM, 86.

bb. (Soft dorsal about two-thirds length of spinous part; dorsal spines 13; pectoral fin short, 1¼ in head; lower jaw projecting. Body rather stout, the back moderately elevated, the depth about equal to length of head, 3 in body; mouth moderate, the maxillary reaching past front of eye; eye, 3¼ in head, the eye much wider than the narrow preorbital and lower than snout; dorsal fin continuous, the spines rather low and slender; second anal spine rather long and strong; about equal to third and rather shorter than the soft rays; preopercle sharply serrate; soft dorsal and anal scaly; D. XIII, 14; A. III, 7; scales small, 12–57–23. Coloration olivaceous, with four narrow sky-blue longitudinal streaks on each side of back, the lowest and broadest at level of eye; traces of a fifth streak on cheek; fins blotched with dark. Sometimes nearly plain olivaceous, with the fins dark-edged.) (*Steindachner.*)

VIRIDENSE, 87.

86. PARAPRISTIPOMA MEDITERRANEUM.

Diagramma mediterraneum Guichenot, Expl. Algerie, 45, pl. 3, 1850 (Algiers).

Habitat: Western Mediterranean.

Etymology: From Mediterranean Sea.

This species is not uncommon in the eastern Mediterranean. The specimen examined by us (22429, M. C. Z.) is from Cadiz in Spain.

87. PARAPRISTIPOMA VIRIDENSE. (Burro; Corvinato.)

Pristipoma viridense Cuv. & Val., v, 287, 1830 (Cape Verde Islands).
Pristipoma octolineatum Cuv. & Val., ix, 487, 1833 (Cape Verde Islands).

Habitat: Northwest coast of Africa; south coast of Spain and the neighboring islands.

Etymology: From Cape Verde—*viridis*, green.

This species is known to us from descriptions. According to Steindachner it is rare on the coast of Spain (Cadiz and San Lucar de Barrameda) and common on the Canary Islands, especially about Teneriffe. Steindachner suggests that the name *viridense*, given to plainly colored specimens, and that of *octolineatum*, given to those with blue stripes, belong to the same species, as occasional individuals are found in which the blue stripes are wanting. Günther counts 80 scales in *viridense*, and Steindachner but 55 to 57 in *octolineatum*. In the latter case only the scales having pores in the lateral line are counted, in the former the number of cross rows. Dr. Günther records the species from St. Vincent; probably St. Vincent of the Cape Verde Islands is meant,* not the St. Vincent of the Lesser Antilles. According to Steindachner, this species lacks the median groove at the chin, and, as already noticed by Bleeker, it is closely related to the Japanese species, *trilineatum*, which is the type of the genus *Parapristipoma*.

* In confirmation of this opinion, I have the following note from my friend, Dr. G. A. Boulenger, of the British Museum:

"You are perfectly right, and I had independently arrived at the same opinion as yourself with regard to 'St. Vincent: McGillivray.' You will find specimens of the West African *Tarentola delalandi* from St. Vincent, Cape Verde, Macgillivray, mentioned in my Catalogue of Lizards, vol. 1, p. 199."

XIX. GENYATREMUS.

Genyatremus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256 (*cavifrons*).

Type: *Diagramma cavifrons* Cuv. & Val. = *Lutjanus luteus* Bloch.

Etymology: γένυς, chin; *a*, privative; τρῆμα, aperture.

This genus contains a single American species, an *Anisotremus* without central pore at the chin. From *Plectorhynchus*, it differs much as *Anisotremus* differs from *Orthopristis* and *Pomadasis*.

ANALYSIS OF SPECIES OF GENYATREMUS.

a. Body ovate, compressed, the back much elevated, the depth a little less than half body; anterior profile evenly convex at nape, gradually becoming concave to front of eye, where it rapidly descends straightish to point of snout; interorbital area flat, about equal to eye; occipital crest arising opposite middle of pupil, its base rising on the highly arched frontals considerably above top of the low temporal crest. Head small; snout blunt and short; mouth moderate, the maxillary reaching past anterior edge of orbit; anterior nostril oblong, much larger than posterior; preorbital very narrow, about one-fourth as wide as eye; eye large, 3 in head; preopercle strongly serrate on angle, the serræ gradually becoming weaker on both limbs; gill-rakers weak, about 7 below angle, besides rudiments. Dorsal fin high, the fifth spine longest, the last spine slightly longer than the preceding one and about two-thirds as long as the first ray; anal fin lower than soft dorsal, the second spine longer and stronger than third; pectorals short; caudal subtruncate. Scales small, not parallel with the lateral line, arranged obliquely above and horizontally below, largest below the lateral line; vertical fins scaleless; scapular scale very evident, about three times as long as broad; lateral line not following outline of back, wavy below the soft dorsal. Color in spirits uniform golden, with numerous longitudinal stripes of a brighter color following the rows of scales below the lateral line. Head, 3⅓; depth, 2¼; D. XIII, 12; A. III, 11; scales, 11–52–19.....LUTEUS, 88.

88. GENYATREMUS LUTEUS.

Lutianus luteus Bloch, Ichthyologia, taf. 247, 1791 (Martinique, on a drawing by Plumier).

Grammistes hepatus Bloch & Schneider, Syst. Ichth., 1801, 187 (after Bloch).

Diagramma cavifrons Cuv. & Val., V, 1830, 290, pl. 123 (Rio Janeiro).

†*Pristipoma serrula* Cuv. & Val., V, 272 (Martinique).

†*Pristipoma auratum* Cuv. & Val., l. c., 272 (Martinique).

Habitat: Lesser Antilles to Brazil.

Etymology: *Luteus*, yellow.

This species seems to be not rare on the coast of Brazil and the Lesser Antilles, probably on sandy coasts. It has not been found in Cuba. There is not much doubt that the *Lutianus luteus* of Bloch was intended for this species, although in the drawing of Plumier, from which it was taken, the fin rays are very inexactly indicated.

Subfamily V.—DENTICINÆ.

XX. DENTEX.

Dentex Cuvier, Règne Animal, ed. I, 1817, 273 (*dentex*).
Polysteganus Klunzinger, Fische des Rothen Meeres, 1870, 763 (*hufar*).
Synagris Bleeker, Systema Percarum Revisum, 1875, 278 (*dentex*; after *Synagris* Klein, not *Synagris* Günther.)

Type: *Sparus dentex* Linnæus.

Etymology: *Dens*, tooth; *dentex*, with large teeth.

This genus contains numerous species found on the coast of the Old World, none of them in America. The species found in Europe are:

89. **DENTEX MACROPHTHALMUS** (Bloch). (**Goggle-eye**; **Cachucho.**) Mediterranean Sea and neighboring waters.

90. **DENTEX DENTEX** (Linnæus). (**Dentao**; **Denton.**) Shores of southern Europe and northern Africa; common.

91. **DENTEX MAROCCANUS** (Cuv. & Val.). Southern Spain and Morocco.

92. **DENTEX FILOSUS** (Valenciennes). Algiers and southward; not yet recorded from the European side of the Mediterranean.

XXI. NEMIPTERUS.

Nemipterus Swainson, Nat. Hist. Fishes, etc., II, 1839, 223 (*filamentosus*).
Synagris Günther, Cat. Fish. Brit. Mus., I, 1859, 373 (*furcosus*; not *Synagris* Bleeker).
Dentex Bleeker, Systema Percarum Revisum, 1875, 278 (*filamentosus*).

Type: *Dentex furcosus* Cuv. & Val.

Etymology: νῆμα, thread; πτερόν, fin.

This genus contains some twenty species, very closely allied to the species of *Dentex*, from which genus it is not quite certain how they should be separated. All are Asiatic, except one, which is very imperfectly known and may be a true *Dentex*. The name *Nemipterus* has priority over *Synagris* for this group.

ANALYSIS OF AMERICAN SPECIES OF NEMIPTERUS.

a. First dorsal spine, upper lobe of caudal, and first ray of ventral produced in long filaments; depth, 3¼ in total length, with caudal; head, 4; D. x, 9; A. III, 7; color red. (*Cuv. & Val.*).....MACRONÉMUS, 93.

93. NEMIPTERUS MACRONEMUS.

Dentex filamentosus Cuv. & Val., VI, 254, pl. 155, 1830 (Surinam; not *Cantharus filamentosus* Rüppell, also a *Nemipterus*).
Synagris macronemus Günther, I, 380 (after Cuvier).

Habitat: Surinam.

Etymology: μακρός, long; νῆμα, thread.

This species is known only from the description of the original type, a young specimen said to have been sent by Diepering from Surinam,

but which not unlikely came from the East Indies. *Nemipterus macronemus* agrees very closely with *Nemipterus nematophorus* Günther, from Sumâtra. According to Bleeker the chief differences are these, that in *macronemus* but one dorsal spine is filamentous, in *nematophorus* two; in *macronemus* the fins are more pointed. All these are doubtful characters and it is probable that *Nemipterus macronemus* came from Sumatra rather than from Surinam.

Subfamily VI.—SPARINÆ.

XXII. STENOTOMUS.

Stenotomus Gill, Canadian Naturalist, August, 1865 (*argyrops*).

Type: *Sparus argyrops* Linnæus = *Sparus chrysops* Linnæus.

Etymology: στενός, narrow; τομός, cutting; from the narrow incisors.

This genus contains, so far as known, three species, all American; one lives in rather deep water and differs considerably from the others. The genus is close to *Calamus*, from which the flattened incisors mainly distinguish it.

ANALYSIS OF SPECIES OF STENOTOMUS.

a. First dorsal spine as long as eye, the second about as long as third, which is about 2 in head; temporal crest obsolete; frontal bones not gibbous or porous; antrorse spine attached to the fourth interneural by a downward projecting spur about twice as long as the spine.

b. Body elongate-ovate, the depth gradually decreasing from first dorsal spine to caudal peduncle; anterior profile not steep, nape slightly convex, a slight depression above and behind eye, convex over snout; pectoral about as long as head, 3⅛ in body; scaly sheath at base of soft dorsal and anal inconspicuous; snout long and pointed, 2 in head; eye large, less than width of preorbital, about 3¾ in head; interorbital area very convex; six strong conical teeth in front of upper jaw and eight in lower; molar teeth coarser and larger than in *S. chrysops;* scales on cheek reaching to top of eye, the upper rows less distinct than the lower, the anterior row of about 20 scales; caudal fin moderately forked, the middle ray about 2¼ in longest ray. Color nearly plain dull-silvery, with golden longitudinal streaks following the rows of scales; axil dusky; ventrals dark. Head, 3; depth, 2⅛; D. XII, 12; A. XIII, 11; scales, 8-54-15.....ACULEATUS, 94.

bb. Body ovate-elliptical, the depth about the same from the first dorsal spine to the eleventh; anterior profile steep, nape convex, a strong depression above and in front of eye, straightish over snout; pectoral less than head, about 3½ in body; a scaly sheath very conspicuous at base of soft dorsal and anal fins; temporal crest obsolete; supraoccipital crest continuous with the frontal bones; snout short, 2½ in head; eye small, narrower than the preorbital, about 4¼ in head; incisor teeth very narrow, almost conical; molars in two rows above; scales on cheek extending above the upper margin of eye, the anterior row composed of about 20 scales; caudal fin forked, the middle ray about 4 in longest ray. Color brownish, somewhat silvery below, everywhere with bright reflections, but without distinct markings in the adult; soft parts of vertical fins mottled with dark in adult; young faintly barred; axil dusky. Head, 3⅓; depth, 2 1/7; D. XII, 12; A. III, 11; scales, 8-50-16.....CHRYSOPS, 95.

aa. First and second dorsal spines very short, their length about 3 in eye; third, fourth, and fifth more or less filamentous, the third longer than head. Temporal crest rudimentary, persisting in a swelling on the basal portion of the supraoccipital; antrorse spine attached directly to the interneural; no downward projecting part evident. Body subovate, the back anteriorly much elevated, the depth about half the length to base of caudal; anterior profile steep and straightish, convex on nape and above eye; supraoccipital crest making a sharp angle over eye with a porous gibbous portion of the frontal bones; snout short, about 2 in head; eye large, a little less than width of preorbital, about 3¼ in head; anterior teeth of jaws small, in a close-set band, the outer series a little enlarged, compressed and lanceolate, much as in *S. chrysops;* molars in two rows; dorsal spines very broad and flat; scales on the anterior part of body much enlarged; anterior row of scales on cheek much enlarged, extending to level of pupil, about 12 scales in the first series; scaly sheath at base of soft dorsal and anal very conspicuous; pectoral a little longer than head, 2⅞ in body; caudal fin little forked, the middle ray about 1⅓ in longest ray. Color light olive; silvery below; the young with faint, very narrow darker bars. Head, 3⅓; depth, 2; D. XII, 12; A. III, 12. Scales 5–50–15.....CAPRINUS, 96.

94. STENOTOMUS ACULEATUS. (Southern Porgy.)

Chrysophrys aculeata Cuv. & Val., VI, 137, 1830 (Charleston).

Habitat: South Atlantic and Gulf coasts of the United States.

Etymology: *Aculeatus*, spined.

This species closely resembles the northern scup, which it more or less replaces southward. Our specimens are from Charleston.

95. STENOTOMUS CHRYSOPS. (Scup; Porgy; Scuppaug.)

Sparus chrysops Linnæus, Syst. Nat., ed. XII, 1766, 471 (Charleston).
Sparus argyrops Linnæus, Syst. Nat., ed. XII, 1766, 471 (Charleston; young).
Sparus xanthurus Lacépède, Hist. Nat., Poiss., IV, 120, 1803 (after *argyrops*).
Labrus versicolor Mitchill, Trans. Lit. & Phil. Soc., I, 464, 1815.
Sargus ambassis Günther, I, 449, 1859.

Habitat: Atlantic coast of the United States from Cape Cod to South Carolina.

Etymology: χρυσός, gold; ὤψ, eye.

This species is one of the commonest food-fishes of our Atlantic coast. According to Dr. Bean, who has examined Linnæus' original types, both *chrysops* and *argyrops* were based on examples of this species.

96. STENOTOMUS CAPRINUS.

Stenotomus caprinus Bean, Proc. U. S. N. M. 1882 (Snapper Banks, Pensacola).

Habitat: Deep waters off the west coast of Florida.

Etymology: *Caprinus*, like a goat, the species having been sent in under the name of "goat-head porgy," which was a misunderstanding of the name of "jolt-head porgy," which is *Calamus bajonado.*

This species is as yet known only from numerous examples taken from the stomachs of snappers (*Lutjanus*) and groupers (*Epinephelus*) on the Florida snapper banks.

XXIII. CALAMUS.

(Pez de Pluma.)

Calamus Swainson, Nat. Hist. Fishes, II, 1839, 222 (*calamus*).
Grammateus Poey, Ann. Lyc. Nat. Hist. N. Y., 1872, 182 (*microps*).

Type: *Pagellus calamus* Cuv. & Val.

Etymology: *Calamus*, a quill or reed, from the quill-like interhæmal.

This genus contains a number of species, all American, all very closely related, and valued as food-fishes. The best-known species are described in detail by Jordan & Gilbert, Proc. U. S. N. M. 1883, p. 14 *et seq.*

ANALYSIS OF SPECIES OF CALAMUS.

a. Scales comparatively small, 8, 9–54 to 58–18, 19;* about 6 vertical rows of scales on base of preopercle, with about 12 scales entering into the formation of the lower margin; species of large size, with the preorbital deep, the pectoral fin long, and the outer teeth strong.

b. Body very deep, the back elevated, the depth in adult half the length to base of caudal; outer teeth about $\frac{10\text{-}12}{12\text{-}10}$ in number, the outer one on each side in one or both jaws sometimes enlarged, canine-like, sometimes directed forwards, especially in the adult.

c. Preorbital with reticulations of the bluish ground color around bronze spots; canines of upper jaw usually vertical, but sometimes, especially in old examples, directed more or less horizontally forwards; body deeper than in other species, depth $1\frac{3}{10}$ to $2\frac{1}{4}$; anterior profile not very steep, slightly curved; depth of preorbital less than half head; eye large, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head; dorsal spines strong, the longest $2\frac{1}{3}$ to $2\frac{1}{2}$ in head; pectorals a little more than one-third body. Color silvery, the base and center of each scale golden, the edge bluish, these colors forming distinct streaks; a deep-violet streak below eye, not extending on eye or opercle; preorbital dull violet, this color forming reticulations around brassy spots; axil golden, with a violet bar; ventrals more or less dusky. Head, $3\frac{1}{3}$; depth, 2; scales, 8–56–18; D. XII, 12; A. III, 10 ..... CALAMUS, 97.

cc. Preorbital region, snout, cheek, and opercles brassy, crossed by horizontal, wavy, non-reticulating lines of violet blue, brightest on preorbital and snout; a sky-blue blotch behind eye over the opercle, extending a short distance on body; outer canines of upper jaw directed horizontally forward, except in the very young, these teeth longer than in *C. calamus;* anterior profile nearly straight and very steep to the nape, then strongly convex; depth of preorbital a little more than half head; pectoral 3 in body. Color silvery, each scale with a violet spot above and orange spots below; sides with dark crossbands in life, which disappear at death; ventrals chiefly yellow; axil slightly dusky. Head, $3\frac{1}{4}$; depth, 2; scales, 8–58–18; D. XII, 12; A. III, 10 ... PRORIDENS, 98.

bb. Body more elongate, the depth $2\frac{1}{5}$ to $2\frac{2}{3}$ in length.

*Scales above the lateral line are counted from the base of the first dorsal spine, those below the lateral line from the base of the first anal spine.

d. [Upper jaw with a strong antrorse canine on each side, as in *C. proridens;* preorbital with blue, wavy stripes; eye small; preorbital deep; cheeks with 6 rows of scales; dorsal high; pectoral reaching front of anal; cheeks with blue flexuous lines, anastomosed and forming rivulations; spinous dorsal edged with black; depth of body, $2\frac{3}{4}$ in length to base of caudal.] (*Guichenot.*)

PENNATULA, 99.

dd. Upper jaw without antrorse canines, the anterior teeth strong, $\frac{4-6}{6-8}$ one on each side of upper jaw more or less enlarged; body rather oblong, the snout long and pointed, the anterior profile forming a nearly even curve to front of dorsal; depth, $2\frac{1}{6}$ to $2\frac{3}{4}$ in length to base of caudal; eye about $3\frac{1}{4}$ to 5 in head; preorbital less than half head, about $\frac{1}{3}$; dorsal spines slender, the highest $2\frac{1}{3}$ to $2\frac{2}{3}$ in head; pectorals $2\frac{1}{4}$ in body. Color, dull brassy, with little blue; a faint-blue stripe below eye; preorbital dull coppery, usually plain, sometimes faintly veined with bluish; axils yellowish; ventrals scarcely dusky. Young, as in other species, with dark crossbands. Head, $3\frac{1}{7}$; depth, $2\frac{1}{6}$; scales, 8-56-19; D. XII, 12; A. III, 10 ..... BAJONADO, 100.

aa. Scales comparatively large, 6, 7–15 to 52–13, 14; about 5 vertical rows of scales on base of preopercle with about 9 scales entering into the formation of the lower margin; no antrorse canines.

e. Pectoral fins long, about 3 in body.

f. Scales of moderate size, 50 to 52 in the lateral line; body very deep, the back elevated, depth about $2\frac{1}{3}$ to base of caudal; longest dorsal spine about half head.

g. Canines short and strong, about $\frac{6-8}{6-8}$; preorbital narrow, its least width $2\frac{1}{2}$ to $2\frac{2}{3}$ in head; snout short, $1\frac{2}{3}$ to 2 in head; mouth small, maxillary about $2\frac{2}{3}$ in head; eye moderate, about $4\frac{1}{2}$ in head in adult; pectoral about $2\frac{1}{2}$ in body. Body much compressed, the back considerably elevated, the anterior profile steep and regularly convex from base of first dorsal spine to point of snout. Color brassy olive, with darker crossbands and few violet marks; preorbital plain brownish; an inky axillary spot; ventrals dusky. Head, $3\frac{1}{3}$; depth, $2\frac{1}{6}$. Scales, 6–50–13. D. XII, 11; A. III, 10 ..... BRACHYSOMUS, 101.

gg. Canines moderate, about $\frac{8-10}{10}$; preorbital broad, its least width about $2\frac{1}{4}$ in head; mouth moderate, maxillary about $2\frac{1}{3}$ in head; eye moderate, about $3\frac{2}{3}$ in head; pectoral about $2\frac{2}{3}$ in body. Body moderately compressed, rather elongate, the back only moderately elevated, the anterior profile convex to eye, thence straight to point of snout. Color smutty silvery, with dark crossbands; blotches on the fins; no black axillary spot. Head, $3\frac{1}{4}$; depth, $2\frac{1}{3}$; scales, 7–51–14; D. XII, 12; A. III, 10. ..... LEUCOSTEUS, 102.

ff. Scales large, about 46 (45 to 48) in lateral line; body rather elongate, the depth about $2\frac{1}{4}$ in body; longest dorsal spine about $2\frac{1}{3}$ in head.

h. Canines small, about $\frac{1}{12}$; eye large, about 3 in head; preorbital narrow, about equal to eye; mouth small, the maxillary about $2\frac{1}{2}$ in head; dorsal spines, XI. (Dorsal outline forming a comparatively regular arch, the back being elevated, the anterior profile steep and nearly straight. Color plumbeous gray, with a blue spot on each scale, preorbital with blue streaks; a blue streak below eye; a blue point in the axil; fins pale.) (*Poey.*) Head, $3\frac{1}{16}$; depth, $2\frac{1}{3}$; scales (?); D. XI?; A. III?..... MACRORS, 103.

hh. Canines moderate, $\frac{8}{10}$, the outer on each side sometimes enlarged; eye rather small, about $4\frac{1}{8}$ in head in adult; preorbital very deep, about $2\frac{1}{8}$ to $2\frac{3}{8}$ in head; mouth large, the maxillary about $2\frac{1}{8}$ to $2\frac{3}{8}$ in head; dorsal spines, XII. Body rather oblong, the back not strongly arched, the anterior profile rather evenly curved, less convex than in *C. arctifrons;* head narrowed above, the occipital crest as high as eye. Color dull silvery, faintly banded; preorbital plain; axils dusky; ventrals pale; edge of opercle dusky. Head, 3 to $3\frac{1}{8}$; depth, $2\frac{1}{4}$. Scales, 6–46–14; D. XII, 12; A. III, 10. TAURINUS, 104.

ee. Pectoral fin short, about $3\frac{1}{2}$ in body.

i. Dorsal outline forming a comparatively regular arch, the anterior profile from the snout to the base of the spinous dorsal evenly convex; the back elevated, the depth in the adult about $2\frac{1}{8}$ in length; eye small, $3\frac{3}{4}$ to $4\frac{1}{4}$ in head; canines subequal, $\frac{8}{10}$; preorbital not very deep, $2\frac{1}{2}$ to 3 in head; pectoral shortish, $3\frac{1}{4}$ in body; longest dorsal spine $2\frac{1}{8}$ in head. Color, dull silvery, with pearly spots on scales of back; preorbital bluish, plain or with pearly markings, without blue stripes; a faint pale streak below eye; axil with a small inky black spot; ventrals blackish; dark crossbars on body, usually persistent. Head, $3\frac{1}{3}$; depth, $2\frac{1}{6}$; scales, 6–48–13; D. XII, 12; A. III, 10.....PENNA, 105.

ii. Dorsal outline not forming a regular arch, the anterior profile straight from base of spinous dorsal to nape, where a rather sharp angle is formed, thence straightish above eye, the snout convex; body rather elongate, the depth about $2\frac{1}{2}$ in length.

j. Preorbital deep, its depth $2\frac{1}{4}$ in head, and nearly twice diameter of eye, which is 4 to 5 in head; pectoral $3\frac{3}{4}$ in body; longest dorsal spine, $2\frac{1}{2}$ in head; canine teeth, $\frac{8}{10}$. Body oblong, the back little elevated, not nearly so much as in *C. penna,* the anterior profile unevenly curved, very convex before eye; head narrow above; back nearly straight along base of spinous dorsal. Color olivaceous, with dark bars or spots, the centers of many scales pearly; six yellowish spots along the lateral line; preorbital brownish, usually with dashes of golden yellow; membrane of opercle orange; fins mostly barred or spotted; ventrals pale, faintly barred. Head, $3\frac{1}{4}$; depth, $2\frac{3}{4}$; scales, 6–48–13; D. XII, 12; A. III, 10 .....ARCTIFRONS, 106.

jj. Preorbital not deep, its depth $2\frac{1}{2}$ in head; pectoral short, $1\frac{5}{8}$ in head; dorsal fins low, the longest spine about 3 in head; canines $\frac{8}{8}$, moderate, equal. Body little elevated, the anterior profile rather strongly convex, the curve continuous from snout to middle of dorsal. Color olivaceous, with darker crossbands; preorbital plain; a dark axillary spot; a blue subocular band; ventrals dark. Head, $3\frac{1}{8}$; depth, $2\frac{1}{4}$. Scales in lateral line, 46. D. XII, 12; A. III, 10.....MEDIUS, 107.

97. CALAMUS CALAMUS. (Saucer-eye Porgy.)

Pagellus calamus Cuv. & Val., VI, 1830, 206, pl. 152 (Martinique, San Domingo).
Chrysophrys calamus, Günther, I, 487, 1859 (Bahia, Trinidad, Cuba, Jamaica; several species confounded).
Calamus calamus, Jordan & Gilbert, Proc. U. S. N. M. 1884, 17 (Key West, Havana).
Calamus megacephalus Swainson, Nat. Hist. Fish., II, 222, 1839 (after Cuv. & Val.); Guichenot, Revision des Pagels, Mem. Soc. Imp. Cherbourg, XIV, 112; Poey, Ann. Lyc. Nat. Hist., N. Y., 1872, 178.
Pagellus orbitarius Poey, Memorias, II, 1860, 201 (Havana).
Sparus orbitarius Poey, Synopsis, 1868, 308.
Calamus orbitarius Poey, Ann. Lyc. Nat. Hist., N. Y., 1872, 179, pl. VI, f. 2.
Calamus macrops, Jordan & Gilbert, Syn. Fish. N. A., 1883, 927 (Garden Key).

Habitat: West Indies, north to Florida Keys.

Etymology: *Calamus*, a reed, the equivalent of *pez de pluma*.

This species, described in detail in the paper of Jordan & Gilbert above mentioned, is generally common about Key West and Havana, reaching a length of 15 inches. It is, however, nowhere so abundant as *proridens* or *bajonado*. Among the specimens in the museum at Cambridge are some of the types of *Calamus orbitarius*. In some of these none of the canines are turned forward, and none of the specimens collected by Dr. Jordan show this character. In others the outermost of the seven or eight canines in the upper jaw is turned directly forward, as in *C. proridens*. Some of these also show an approximation to the head coloration of *C. proridens*. The dorsal spines and the depth of the preorbital show that all these belong to *C. calamus*. *Calamus megacephalus* Poey is based on specimens of *C. calamus*, with the antrorse canines of *C. proridens*. The implication of a confusion in Poey's description made by us (Proc. U. S. N. M. 1883, 16, 18) is probably unwarranted, as his specimens at Cambridge agree with his description. The direction of the teeth is less valuable as a diagnostic character than our specimens led us to suppose.

98. CALAMUS PRORIDENS. (Little-head Porgy; Pez de Pluma.)

Calamus megacephalus Jordan & Gilbert, Syn. Fish. N. A., 1883, 926 (Florida Keys; not of Swainson).
Calamus pennatula Jordan & Gilbert, Proc. U. S. N. M. 1884, 15 (Key West, Havana; not of Guichenot).
Calamus proridens Jordan & Gilbert, Proc. U. S. N. M. 1884, 150 (Key West).

Habitat: West Indies, north to the Florida Keys.

Etymology: *Prora*, prow; *dens*, tooth, from the projecting canines.

This species, the most brightly colored of the genus, is very abundant about the Florida Keys. It is not quite so common either at Key West or at Havana as *Calamus bajonado*, but in both places either species far outnumbers all the remaining species combined.

99. CALAMUS PENNATULA.

Calamus pennatula Guichenot, Revision des Pagels, 116 (Martinique).

Habitat: West Indies.

Etymology: *Pennatula*, diminutive of *penna*, a quill.

This species is known only from Guichenot's description, which has been verified by us on the original type by Mr. Alexandre Thominot. It seems to be close to *C. proridens*, differing in the elongate body.

100. CALAMUS BAJONADO. (Jolt-head Porgy; Bajonado.)

Bajonado Parra, Dif. Piezas Hist. Nat., 1787, 13, lam. 8 (Havana).

Sparus bajonado Bloch & Schneider, Syst. Ichth., 1801, 284 (after Parra).

Pagellus bajonado, Poey, Proc. Ac. Nat. Sci. Phila. 1863, 177; Poey, Synopsis, 1868, 308 (Havana).

Calamus bajonado, Poey, Ann. Lyc. Nat. Hist., N. Y., 1872, x, 176, pl. vi, f. 1 (Havana); Poey, Enumeratio, 55, 1875; Poey, Ann. Soc. Hist. Nat. Esp., x, 1881, 328 (Puerto Rico); Jordan & Gilbert, Proc. U. S. N. M. 1884, 20 (Key West, Havana, and elsewhere).

Pagellus caninus, Poey, Memorias, Cuba, II, 199, 1860 (Havana); Guichenot, Rev. Pagels, 123.

Calamus plumatula Guichenot, Rev. Pagels, 119 (Martinique); Jordan, Proc. U. S. Nat. Mus. 1886, 537 (reëxamination of type).

Habitat: West Indies, north to Florida Keys.

Etymology: *Bajonado*, the Cuban name, apparently equivalent to bayonet, and probably alluding to the interhæmal.

This species at Key West and at Havana is the most abundant of the genus, and reaches a larger size than any of the others. The largest seen by us were 22 inches long. It is the dullest in color of the large species. Specimens from Porto Seguro and from the Bermudas are in the museum at Cambridge. The type of *Calamus plumatula* now in the museum at Paris is a young *bajonado*.

101. CALAMUS BRACHYSOMUS. (Mojarra Garabata.)

Sparus brachysomus Lockington, Proc. U. S. N. M. 1880, 281 (Magdalena Bay); Jordan & Gilbert, Proc. U. S. N. M. 1881, 277 (Pichiluogo, Lower California); Jordan & Gilbert, Proc. U. S. N. M. 1884, 21 (Mazatlan); Evermann & Jenkins, Proc. U. S. N. M. 1891, 153 (Guaymas).

Habitat: Gulf of California and neighboring waters.

Etymology: *βραχύς*, short; *σῶμα*, body.

This species, which is allied to the Atlantic species *leucosteus*, is common about the Gulf of California. A specimen from Magdalena Bay is in the museum at Cambridge.

102. CALAMUS LEUCOSTEUS. (White-bone Porgy.)

Calamus bajonado, Jordan & Gilbert, Syn. Fish. N. A., 1883, 926 (Charleston); Jordan & Gilbert, Proc. U. S. N. M. 1882, 604 (not *bajonado*, Bloch & Schneider).
Calamus leucosteus Jordan & Gilbert, Cat. Fishes N. A., 1885, 91 (Charleston).

Habitat: South Atlantic coast of United States, in rather deep water.

Etymology: λευκός, white; ὀστέον, bone.

This species is known from several examples sent from the markets of Havana by Mr. Charles C. Leslie. The name "white-bone porgy" distinguishes it from *Stenotomus chrysops*, but the source of this name is unknown to us.

103. CALAMUS MACROPS.

Calamus macrops Poey, Ann. Lyc. Nat. Hist. N. Y., 1872, 181, f. 3 (Havana).

Habitat: West Indies.

Etymology; μακρός, long (large); ὤψ, eye.

This species is known only from Poey's description and figure. We have seen no specimens corresponding to it.

104. CALAMUS TAURINUS.

Chrysophrys taurina Jenyns, Zoöl. Beagle, Fishes, 1842, 56, pl. VII, 12 (Galapagos Islands); Valenciennes, Voyage Venus, V, 330, 1855 (Galapagos Islands).
Calamus taurinus, Jordan & Bollman, Proc. U. S. N. M. 1889, 181.
Chrysophrys cyanoptera Valenciennes, l. c. (Charles Island), pl. 4, f. 2 (Galapagos).

Habitat: Galapagos Islands.

Etymology: From *taurus*, bull; bull-headed.

Of this species we have examined several specimens in the museum at Cambridge, from Charles Island, one of the Galapagos. Specimens were also obtained from the same locality by the *Albatross*.

105. CALAMUS PENNA. (Little-mouth Porgy; Sheepshead Porgy.)

Pagellus penna Cuv. & Val., VI, 209, 1830 (Brazil); Guichenot, in Ramon de la Sagra, Hist. Cuba, 82 (Cuba).

Calamus penna, Guichenot, Revision Pagels, 114 (Brazil, Cuba, Martinique); Jordan & Gilbert, Proc. U. S. N. M. 1884, 21 (Key West); and in other papers.

Pagellus microps Guichenot, Ramon de la Sagra, Hist. Cuba, 188, tab. 3, f. 1 (Havana).

Calamus microps Guichenot, Revision Pagels, 118 (Cuba); Jordan, Proc. U. S. N. M. 1886, 537 (examination of type).

Pagellus humilis Poey, Synopsis, 1868, 308 (Havana).

Grammateus humilis Poey, Ann. Lyc. Nat. Hist. N. Y., 1872, 182; Poey, Enumeratio, 1875, 56.

Pagellus milneri Goode & Bean, Proc. U. S. N. M. 1879, 134 (Charlotte Harbor, Florida); Jordan & Gilbert, Synopsis, 1883, 556.

Etymology: *Penna*, a quill or pen.

The dark spot in the axil is a diagnostic mark of this species. The types of *milneri* and *penna* are identical. A small specimen in the museum at Cambridge, which may be the type of Poey's *Grammateus humilis*, belongs to this species. This example is 6 inches long, the eye nearly 4 in head, the depth 2⅓ in length, and the pectoral as long as head.

The type of *Calamus microps* Guichenot is in the museum at Paris. It agrees with *Calamus penna* in all respects except the size of the eye, which is 4⅓ in head. It is probably not a distinct species.

Specimens of *C. penna* are in the museum at Cambridge from Rio Janeiro, St. Thomas, Havana, Camaru, and Rio Grande do Sul.

106. CALAMUS ARCTIFRONS. (Grass Porgy; Shad Porgy.)

Calamus arctifrons Goode & Bean, Proc. U. S. N. M. 1882, 425 (Pensacola); Jordan & Gilbert, Synopsis, 1883, 928 (Pensacola); Jordan & Gilbert, Proc. U. S. N. M. 1884, 23 (Key West); Jordan & Swain., Proc. U. S. N. M. 1884, 232 (Cedar Keys).

Habitat: Gulf of Mexico, from Pensacola to Key West.

Etymology: *Arctus*, contracted; *frons*, forehead.

This small porgy is common in the eelgrass about Key West, and ranges northward at least to Pensacola.

107. CALAMUS MEDIUS.

Grammateus medius Poey, Ann. Lyc. Nat. Hist. N. Y., 1872, 183, pl. VII, f. 4 (Havana); Poey, Enumeratio, 1875, 56 (Havana).

Habitat: West Indies.

Etymology: *Medius*, medium.

We refer to this species a specimen from Havana (21838, M. C. Z.), 15 inches long. The species seems to be allied to *C. penna*, differing in the more elongate form.

XXIV. SPARUS.

Sparus Artedi, Genera Piscium, 1738, 35 (*aurata*, etc.).
Sparus Linnæus, Syst. Natura, ed. x, 1758, 277 (*aurata*, etc.), restricted to *aurata* by Bleeker, Gill, and various authors.
Pagrus Cuvier, Règne Animal, ed. i, 1817, 272 (*argenteus* = *pagrus*).
Aurata Risso, Europe Mérid., iii, 356, 1826 (*aurata*).
Chrysophrys Cuvier, Règne Animal, ed. ii, 1829 (*aurata*).
Chrysoblephus Swainson, Nat. Hist. Fishes, etc., ii, 1839, 221 (*gibbiceps*).
Argyrops Swainson, l. c. (*spinifer*).
Pagrichthys Bleeker, Nederl. Ind. Nat. Tijdschr., xxi, 60, 1860.

Type: *Sparus aurata* L.

Etymology: σπάρος, *sparus*, an old name of some fish of this genus.

This is a large genus, chiefly represented in the waters of the Old World, and comprising a considerable variety of forms. The species have been commonly distributed in two genera: *Pagrus* with the molar teeth in two series, and *Sparus* (*Chrysophrys*) with the molars in three or more. This character has not much importance, and Steindachner has proposed to substitute for it the following:

Sparus: Teeth behind the canines, with the apex rounded, granulated, or globose; molars in two or more series.

Pagrus: Teeth behind the canines acute, subulate or setaceous; molars in two or more series.

Although in general appearance *Sparus aurata* and *Sparus pagrus* differ considerably, and also considerably from other aberrant species, as *S. gibbiceps* and *S. spinifer*, there is no important difference in the skull or skeleton, and we place all in one genus. To this genus *Pagellus* is very closely allied.

But one species of *Sparus* is yet known from America. In Europe are found:

§ SPARUS.

108. SPARUS AURATA (L.). Southern Europe north to England.

109. SPARUS CÆRULEOSTICTUS Cuv. & Val. Northwest coast of Africa (lately obtained in Sicily by Prof. Doderlein).

§ PAGRUS.

110. SPARUS PAGRUS L. Southern Europe north to England; common also along the South Atlantic and Gulf coasts of the United States.

111. SPARUS EHRENBERGI (Cuv. & Val.). Mediterranean Sea; rare.

112. SPARUS BERTHELOTI (Valenciennes). Western Mediterranean and neighboring islands.

ANALYSIS OF AMERICAN SPECIES OF SPARUS.

a. Molar teeth in two series; teeth behind the canines slender; scales large (about 55). (*Pagrus.*)

b. Dorsal spines not elongate; second anal spine stronger but not longer than third, about 4 in head; pectoral fin elongate, reaching about to fourth soft ray of anal. Body oblong, the back moderately elevated, the profile parabolic; preorbital deep: D. XII, 10; A. III, 8. Scales 6–56–13. Life color, golden olive; the middle of each scale pinkish, so that the fish appears red; sides and below flushed silvery; many scales of back and sides each with a round purplish-blue spot, these forming streaks along the rows of scales; fins mostly reddish.

PAGRUS, 110.

110. SPARUS PAGRUS. (Red Porgy.)

Sparus pagrus L., Syst. Nat., ed. x, 1758, and of many authors.
Sparus argenteus Bloch & Schneider, 1801, 271.
Pagrus argenteus, Cuvier, Règne Animal, I, 1817, 272.
Pagrus vulgaris Cuv. & Val., VI, 142, 1830, and of most European writers.
Pagrus argenteus, Goode & Bean, Proc. U. S. N. M. 1879, 133 (Pensacola).
Sparus pagrus, Jordan, Proc. U. S. N. M. 1882, 278 (Pensacola) and elsewhere.

Habitat: Southern Europe and South Atlantic and Gulf coasts of the United States.

Etymology: πάγρος, *pagrus*, the old name, which has become *pargo* and *porgy* in modern tongues.

This species, common in southern Europe, has been several times taken on the snapper banks about Pensacola. There seems to be no difference between American and European specimens, except that in European descriptions we find no allusion to the blue spots characteristic of the American fish.

XXV. PAGELLUS.

Pagellus Cuv. & Val., VI, 169, 1830 (*erythrinus*).

Type: *Sparus erythrinus* Cuv. & Val.

Etymology: French, *pagel;* a derivative or diminutive of *pagre* and *Pagrus.*

This genus is very close to *Sparus*, from which it differs in no very important character, the skull and skeleton in the two being essentially alike, and the only tangible distinctions lying in the weaker dentition and more elongate form of *Pagellus.* The four recognized species are all European, one being doubtfully accredited to the coast of Brazil.*

The species are:

113. **PAGELLUS ERYTHRINUS** (L.). Southern Europe, etc., north to England.

114. **PAGELLUS ACARNE** Cuv. & Val. Southern Europe, etc., north to England.

115. **PAGELLUS CENTRODONTUS** (De la Roche). Southern Europe north to England.

116. **PAGELLUS BOGARAVEO** (Brünnich). Southern Europe, etc.

117. **PAGELLUS MORMYRUS** (L.). Mediterranean and neighboring waters; said to occur in Brazil.

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* ANALYSIS OF SUPPOSED AMERICAN SPECIES OF PAGELLUS.

a. Color, golden silvery, with seven narrow blackish crossbars, sometimes duplicated. Body oblong, compressed; mouth very protractile, the maxillary bent; eye 5 in head, which is a little less than depth of body. D. XI, 12; A. III, 10. Scales 6-64-13.....MORMYRUS (*pernambucensis*).

PAGELLUS MORMYRUS.

Sparus mormyrus Linnæus, Syst. Nat., 1758, ed. X.
Pagellus mormyrus Cuv. & Val., VI, 200, and of nearly all European authors.
Pagellus goreensis Cuv. & Val., VI, 203, 1830 (Gorea).
Pagellus pernambucensis Cuv. & Val., VI, 216, 1830 (Pernambuco?).

Habitat: Mediterranean Sea and neighboring coasts; ascribed on very doubtful authority to America.

Etymology: *Mormyrus, μόρμυρος,* a name given by Aristotle to this species.

The claim of this species to a place among American fishes is the presence in the Museum of Berlin of a stuffed example, received by Bloch from "Fernambouc," and bearing the label "*Sparus pernambuccensis.*" Günther mentions three specimens in the British Museum from "St. Vincent," collected by McGillivray. As already noticed, there is an island St. Vincent in the Cape Verde group where this species is common, as well as one among the Lesser Antilles, where it has not yet been taken. The specimens of McGillivray came from the Cape Verde Island of St. Vincent. The occurrence of any *Pagellus* in America is yet to be verified.

XXVI. LAGODON.*

Lagodon Holbrook, Ich. South Carolina, 59, 1860 (*rhomboides*).

Type: *Sparus rhomboides* L.

Etymology: λαγός, hare; ὀδών, tooth.

This genus contains a single species, very abundant along the Atlantic coasts of the United States. The essential character of the genus is in the form of the skull.

ANALYSIS OF SPECIES OF LAGODON.

a. Upper jaw with two rows of molars; dorsal spines, 12; second anal spine not longer than third; body elongate, elliptical; depth, 2 to 2⅔ in length; head, 3⅓; head flattened, muzzle pointed, profile not very steep; eye moderate, 1⅓ to 1½ in snout, 1 in interorbital, 4 in head; mouth moderate, maxillary not reaching to front of orbit, 3⅓ in head; incisors ¼, deeply notched; molars in two series in each jaw; dorsal spines all rather high, the highest about 2 in head; caudal deeply forked; ventrals short and broad; pectorals moderate, upper rays reaching past origin of anal; bluish above, paler below; sides with 8 to 12 golden longitudinal stripes and about 6 dark crossbars; a black blotch above pectoral; anal with a light margin; dorsal and anal each with a median golden stripe. D. XII, 11; A. III, 11; scales, 10–65 to 70–17 ..... RHOMBOIDES, 118.

118. LAGODON RHOMBOIDES.

(Pinfish; Bream; Sailor's Choice; Chopa Spina.)

Sparus rhomboides Linnæus, Syst. Nat., ed. XII, 470, 1766 (Charleston, on a specimen from Dr. Garden); Schöpf, "Schrift. der Naturf. Freunde, Berlin, VIII, 153," 1788 (New York); Gmelin, Syst. Nat., 1275, 1788 (copied); Shaw, "Genl. Zool., IV, 447, 1803."

Sargus rhomboides Cuv. & Val., Hist. Nat. Poiss., VI, 68, pl. 143, 1830 (New York, New Orleans); DeKay, Fishes New York, 93, pl. 71, fig. 228, 1842 (New York); Storer, Synopsis Fishes, 333, 1846 (copied); Günther, Cat. Fish. Brit. Mus., I, 447, 1859 (Southern United States).

Lagodon rhomboides Holbrook, "Ichth. S. Car., 58, pl. 8, fig. 1," 1860 (South Carolina); Gill, Cat. Fish. East Coast, 27, 1873; Poey, Syn. Pisc. Cub., 318, 1868 (Cuba); Gill, Cat. Fish. East Coast, 27, 1873; Poey, Enumeratio Pisc. Cub., 58, 1875 (Cuba); Uhler & Lugger, Fishes of Maryland, 104, 1876 (Maryland); Goode, Fishes Bermuda, Am. Journ. Sci. and Arts, 1877, 292 (Bermuda); Jordan & Gilbert, Proc. U. S. N. M. 1878, 378 (Beaufort); Goode & Bean, Proc. U. S. N. M. 1879, 133 (Pensacola); Jordan, Proc. U. S. N. M. 1880, 19 (eastern Florida); Jordan, Proc. U. S. N. M. 1880, 22 (St. Johns River); Bean, Proc. U. S. N. M. 1880, 95 (St. Johns River); Jordan & Gilbert, Proc. U. S. N. M. 1882, 278 (Pensacola); Jordan & Gilbert, Proc. U. S. N. M. 1882, 605 (Charleston); Bean, Cat. Fish. Internat. Fish. Ex. London, 57, 1883 (Galveston, Texas); Henshall, Florida, 239, 1884 (east and west coasts, Florida Keys); Gill, Standard Nat. Hist., III, 222, 1886; Eigenmann & Hughes, Proc. U. S. N. M. 1887, 66.

* In the synonymy and treatment of *Lagodon*, *Archosargus* and *Diplodus* we follow closely the paper by Eigenmann & Hughes (Proc. U. S. Nat. Mus. 1887, 65 *et seq.*). This paper was based on the material before us.

Diplodus rhomboides Jordan & Gilbert, Syn. Fish. N. A., 558, 1883; Jordan, Proc. U. S. N. M. 1884, 129 (Key West); Jordan & Swain, Proc. U. S. N. M. 1884, 233 (Cedar Keys); Jordan, Cat. Fish. N. A., 91, No. 1064, 1885 (name only); Jordan, Proc. U. S. N. M. 1886, 28 (Beaufort, N. C.).

Perca rhomboidalis Goode & Bean, Proc. U. S. N. M. 1885, 20 (not of Linnæus).

Habitat: Atlantic and Gulf coasts of the United States, Cape Cod to Cuba.

Etymology: *ῥόμβος*, rhomb; *εἶδος*, appearance.

This species is very common all along the eastern coast of the United States south of New York, and on the Gulf coast as far west as Pensacola.

XXVII. ARCHOSARGUS.

Archosargus Gill, Canadian Naturalist, August, 1865 (*probatocephalus*).

Type: *Sparus probatocephalus* Walbaum.

Etymology: *ἀρχός*, chief; *σαργός*, *Sargus*, an old name of *Diplodus*.

This genus, like *Lagodon* and *Stenotomus*, which show the same character of the procumbent dorsal spine, is confined to American waters. There are two color types in the genus, one group being made up of species with broad black crossbands, the other of species with golden streaks and inconspicuous crossbands, resembling the species of *Lagodon*.

ANALYSIS OF SPECIES OF ARCHOSARGUS.

a. Occipital crest rather thin, its honeycomb structure not exposed. Species with streaks of steel-blue and golden, the dark crossbands narrow, disappearing with age, about one-third the interspaces; a black humeral spot.

b. Dorsal spines 13; incisors $\frac{4}{4}$ on each side; side of back with 8 or 9 golden streaks, which are narrower than the metallic-blue interspaces.

c. Scales 9–48–15; pectoral fin not quite reaching second anal spine; body rather deep and compressed, the depth 2 to $2\frac{1}{3}$ in length; head $3\frac{1}{3}$; profile rounded, steep; mouth moderate, the maxillary not reaching front of orbit, 3 to $3\frac{1}{3}$ in head; eye large, as broad as preorbital, $3\frac{1}{3}$ to 4 in head, $1\frac{1}{2}$ in interorbital width. Incisors $\frac{4}{4}$ on each side, entire, or with a shallow notch; molars 3-rowed above, 2-rowed below. Fifth dorsal spine highest, 2 to $2\frac{1}{3}$ in head; second anal spine strong, recurved, $2\frac{1}{3}$ in head; ventrals moderate, $4\frac{1}{3}$ to $4\frac{1}{2}$ in head, not nearly reaching vent. Olivaceous, silvery below, the upper parts with golden longitudinal stripes alternating with bluish interspaces; humeral spot larger than eye. D. XIII, 10; A. III, 10 or 11; scales, 8 or 9–45 to 50–14 to 16 ..... UNIMACULATUS, 119.

cc. Scales 7 or 8–48–15; pectoral fin reaching second anal spine; body rather less deep, the snout a little longer; ventrals shorter, 5 to $5\frac{3}{4}$ in head; otherwise essentially as in the preceding, of which it is the Pacific coast representative. POURTALESII, 120.

bb. [Dorsal spines 12; incisors $\frac{3}{3}$ on each side. Depth $2\frac{2}{3}$ in total length; head more than 4; eye $3\frac{1}{3}$ in head, 1 in snout; maxillary extending to a point between the pupil and the "interior" border of eye; profile with a slight depression above the eye; second anal spine much longer than the third. Color grayish, belly white; 8 golden longitudinal bands; a black shoulder-spot. D. XII, 10; A. III, 9.] (*Poey*) ..... TRIDENS, 121.

aa. Occipital crest broad, its honeycomb structure plainly exposed at its upper margin; dorsal spines 12; species without blue or golden markings, but with about seven broad black crossbands crossing the body; no distinct shoulder-spot. Body much compressed; dorsal outline strongly arched; ventral outline almost straight. Profile straight and steep anteriorly. Depth 2 to 2⅓ in length; head 3⅓. Head compressed, deep; mouth large, almost horizontal; maxillary 2⅔ in head; eye placed high, 4 in head, 1⅛ in interorbital, 1¼ in suborbital. Incisors ⅔, entire or slightly emarginate, serrate in the young; molars in three series above, in two below; those of the inner series larger, those behind the incisors very small. Highest dorsal spine 1⅛ in head; caudal not deeply forked; second anal spine about twice in head, much longer than third. Ventrals not nearly reaching vent; pectorals reaching past beginning of anal. Color, head dark; body silvery-gray, with 5 to 7 dark bars, which are less distinct in the adult; base of pectorals, black. D. XII, 10 or 12; A. III, 10 or 11.

d. Incisors broad, their breadth about half their length. Scales, 7–48–15. PROBATOCEPHALUS, 122.

dd. Incisors narrower, their breadth 2½ in their length. Scales, 7–44–14. ARIES, 123.

119. ARCHOSARGUS UNIMACULATUS. (Salema.)

Salema Marcgrave, Hist. Pisc. Brasil., 153, 1648 (Brazil).

Bream Brown, "Jamaica, 446, No. 1," 1756.

Perca unimaculata Bloch, pl. 308, 1792 (Brazil), (on a figure by Prince Maurice).

Grammistes unimaculatus, Bloch & Schneider, Syst. Ichth., 184, 1801 (after Bloch).

Sargus unimaculatus, Cuv. & Val., Hist. Nat. Poiss., VI, 62, 1830 (Rio Janeiro, Martinique); Storer, Syn. Fish. N. A., 334, 1845 (copied); Günther, Cat. Fish Brit. Mus., I, 446, 1859 (Bahia, Rio Janeiro, Guatemala, Puerto Cabello, Jamaica); Günther, Fishes Cent. America, 386, 1866 (Belize).

Diplodus unimaculatus Jordan & Gilbert, Proc. U. S. N. M. 1884, 128 (Key West); Bean, Proc. U. S. N. M. 1884, 158; Jordan, Cat. Fish. N. A., 91, No. 1065, 1885; Jordan, Proc. U. S. N. M. 1886, 43 (Havana); Eigenmann & Hughes, l. c., 1887, 69.

Sparus salin Lacépède, Hist. Nat. Poiss., IV, 136, 1803 (based on *unimaculatus* of Bloch).

Sargus humeri-maculatus Quoy & Gaimard, Voyage Freycinet, Zoöl., 297, 1825 (Rio Janeiro).

Sargus flavolineatus Cuv. & Val., Hist. Nat. Poiss., VI, 60, 1830 (Cuba; Storer, Syn. Fish U. S., 333, 1845 (copied); Günther, Cat. Fish. Brit. Mus., I, 446, 1859 (copied); Poey, Syn. Fish. Cub., 310, 1868 (copied); Poey, Enumeratio, 57, 1875 (copied).

Diplodus flavolineatus, Jordan, Proc. U. S. N. M. 1886, 42 (Havana).

Sargus caribæus Poey, Mem. Pisc. Cub., II, 197, 1860 (Cuba); Poey, Fauna Puerto Riqueña, 328, 1881 (Porto Rico).

Diplodus caribæus, Jordan & Gilbert, Syn. Fish. N. A., 930, 1883 (copied).

Habitat: West Indies; north to Key West, south to Rio Janeiro.

Etymology: *Unimaculatus*, having one spot.

The numerous specimens examined by us are from Key West and Havana.

The specimens examined by Eigenmann and Hughes, now before us, differ decidedly in the proportions, the color, and the size of the teeth; but while the differences of the extremes are very marked, the intergradation is so perfect that no tangible specific distinctions can be made out. We have only the deeper form (*flavolineatus*) from Key West, while we have both extremes from Havana. As far as we are able to judge from the figures and the descriptions, the *unimaculatus* of Bloch & Schneider, Cuv. & Val., and Jordan & Gilbert, the *caribæus* of Poey, and the *humeri-maculatus* Quoy & Gaimard represent the more slender form, while the *flavolineatus* Cuv. & Val. represents the deeper form. The differences of the extreme forms seem to be these:

The deeper form (flavolineatus).	*The more slender form (unimaculatus).*
Greatest depth, 2 in length.	Greatest depth, 2½ in length.
Ventral outline very much rounded.	Ventral outline almost straight.
Distance from insertion of first dorsal spine, obliquely to snout, 1½ in depth.	Distance from insertion of first dorsal spine, obliquely to snout, 1 in depth.
Teeth about one-third narrower than in the more slender form.	
Body more compressed.	

120. ARCHOSARGUS POURTALESII.

Sargus pourtalesii Steindachner, Fische Afrikas, 39, 1881 (Galapagos Islands).
Archosargus pourtalesii, Jordan & Bollman, Proc. U. S. N. M. 1889, 186 (Chatham Island of the Galapagos).

Habitat: Galapagos Islands.

Etymology: To Louis F. de Pourtalès, a friend and associate of Agassiz, who was with him on the Hassler expedition, by which this fish was discovered.

This species is known to us from the description and excellent figure given by Dr. Steindachner and from a specimen obtained by the *Albatross* on Chatham Island. The differences between *pourtalesii* and *unimaculatus* are very slight, and might be ignored were it not for the remote and restricted habitat of the Pacific form.

121. ARCHOSARGUS TRIDENS.

Sargus tridens Poey, Enumeratio Pisc. Cub., 57, 1875 (Cuba).
Archosargus tridens Eigenmann & Hughes, l. c., 1887, 70 (copied).

Habitat: Cuba.

Etymology: *Tres*, three; *dens*, tooth.

This species is known to us only from the description of Prof. Poey. Its distinctive characters need verification, it being perhaps an abnormal specimen of *Archosargus unimaculatus*.

122. ARCHOSARGUS PROBATOCEPHALUS.

(Sheepshead; Sargo Raiado.)

Sparus Sheepshead, Schöpf, "Schriften der Gesellsch. Natf. Freunde, VIII, 152," 1788 (New York).

Sparus probatocephalus Walbaum, Artedi, Pisc., 295, 1792 (based on Schöpf).

Archosargus probatocephalus, Gill, Cat. Fish. East Coast North America, 27, 1873; Uhler & Lugger, Fishes of Maryland, 103, 1874 (Maryland); Jordan & Gilbert, Proc. U. S. N. M. 1878, 379 (Beaufort); Goode & Bean, Proc. U. S. N. M. 1879, 133 (Pensacola); Jordan, Proc. U. S. N. M. 1880, 22 (St. Johns River); Bean, Proc. U. S. N. M. 1880, 95 (St. Johns River); Goode & Bean, Proc. U. S. N. M. 1885, 208; Eigenmann & Hughes, loc. cit., 1887, 68.

Diplodus probatocephalus, Jordan & Gilbert, Proc. U. S. N. M. 1882, 278 (Pensacola); Jordan & Gilbert, Proc. U. S. N. M. 1882, 605 (Charleston); Jordan & Gilbert, Syn. Fish. North America, 558, 1883; Bean, Internat. Fish. Exhib. London, 57, 1883 (Matanzas River Inlet, Florida); Jordan, Proc. U. S. N. M. 1884, 128 (Key West); Jordan & Swain, Proc. U. S. N. M. 1884, 232 (Cedar Keys); Jordan & Meek, Proc. U. S. N. M. 1884, 237 (Jacksonville, Fla.); Henshall, Florida, 239, 1884 (east and west coast, Florida Keys); Jordan, Cat. Fish. N. A., 91, No. 1066, 1885; Gill, Standard Nat. Hist., III, 220, fig. 125, 1885; Goode, Hist. Aquat. Animals, 381, plates 130 and 131, 1886; Jordan, Proc. U. S. N. M. 1886, 27 (Beaufort, N. C.).

Sparus ovicephalus Bloch & Schneider, Syst. Ichth., 280, 1801 (based on Schöpf).

Sargus ovicephalus, Gill, Proc. Acad. Nat. Sci. Phila. 1860, 20 (name only); Gill, Cat. Fish. East Coast, 31, 1861 (name only).

Sargus ovis, Mitchill, Trans. Lit. and Phil. Soc. N. Y., I, 392, plate 2, fig. 5, 1814 (New York); Cuv. & Val., Hist. Nat. Poiss., VI, 53, 1830 (New Orleans); DeKay, Fishes, New York, 89, pl. 8, fig. 23, 1842 (New York); Storer, Synopsis Fishes North America, 332, 1846 (copied); Günther, Cat. Fish. Brit. Mus., I, 447, 1859 (North America); Holbrook, "Ichth. S. Carolina, 54, plate 8, fig. 2," 1860 (South Carolina); Storer, Fishes Mass., 126, plate 10, fig. 1, 1867 (New Bedford).

Habitat: Atlantic and Gulf coasts of the United States; Cape Cod to Florida Keys and Texas.

Etymology: *πρόβατον*, sheep; *κεφαλή*, head.

The numerous specimens examined by us are chiefly from Florida. The species is one of the most common and most valuable of the food-fishes of our Atlantic coast.

123. ARCHOSARGUS ARIES.

Sargus aries Cuv. & Val., Hist. Nat. Poiss., VI, 58, 1830 (Rio Janeiro, Maracaibo); Günther, Cat. Fish. Brit. Mus., I, 449, 1859 (copied); Günther, Fishes Cent. America, 386, 1864 (Belize).

Archosargus probatocephalus aries Eigenmann & Hughes, l. c., 1887, 69.

Etymology: *Aries*, the ram.

This species is unknown to us except through the published descriptions above referred to, and through the manuscript notes of Dr. Jordan on the type of Cuv. & Val. It would appear to be closely allied to *D. probatocephalus*, distinguishable only by the slightly narrower teeth and possibly larger scales. It is probably to be regarded as a geographical variety or southern representative of the common sheepshead.

XXVIII. DIPLODUS.

Diplodus Rafinesque, Indice d'Ittiologia Siciliana, 54, 1810 (*annularis*).
Sargus Cuvier, Règne Animal, 1817, ed. 1, 272 (*sargus;* name preoccupied in Insects).

Type: *Sparus annularis* Gmelin.

Etymology: διπλόος, double; ὀδούς, tooth, from the two forms of teeth.

The name *Diplodus* should of course supersede *Sargus*, both from the fact that it is prior in date and because the latter name was earlier used for a genus of insects. The genus *Diplodus*, as it is here understood, differs from *Archosargus* chiefly in the absence of a procumbent dorsal spine. Most of the species of *Diplodus* are European, as those of *Lagodon*, *Archosargus*, and *Stenotomus*—the genera which have the procumbent dorsal spine are American. The skull in *Diplodus* resembles that of *Archosargus*, but the cavernous or honeycombed structure of the interorbital area is still more prominent.

ANALYSIS OF AMERICAN SPECIES OF DIPLODUS.

a. Scales, 7–56–14; depth in adult, 2⅓ in length; black bar extending entirely across caudal peduncle; body regularly elliptical, moderately compressed; head, 3⅜ in length; profile regularly rounded, not as steep as in *argenteus;* eye, 1⅓ in preorbital, 1½ in snout, 4½ in head; mouth large, almost horizontal; maxillary, 3⅛ in head; incisors, ⅓, inserted obliquely; molars in three series above and two below; longest dorsal spine, 2⅜ in head; caudal deeply forked; second anal spine little larger than third, 3½ in head; ventrals reaching half way to the anal fin; pectorals not reaching to first anal spine; steel-blue above, paler below, a broad black border on the operculum; a black spot on upper part of base of pectoral; D. XII, 14 or 15; A. III, 13.....HOLBROOKI, 124.

aa. Scales, 8–62 to 65–16; black bar not extending entirely across caudal peduncle.

b. Eye, 3½ in head, 1 in snout; second anal spine, 2⅜ in head; body much compressed; dorsal outline greatly elevated; depth, 1⅝ in length; head, 3¼ in length; profile almost straight, very steep; eye large, 1½ in preorbital; mouth moderate, almost horizontal; maxillary, 3⅓ in head; incisors, ⅓, placed as in *holbrooki;* molars as in *holbrooki.* Longest dorsal spine, 2½ in head; caudal long, forked; second anal spine much stouter and ⅓ longer than third; ventrals reaching half way to second anal ray; pectorals reaching to first anal spine; steel-blue above, silvery below; a blackish border on the operculum; a black spot on the upper part of the base of pectorals; five or six very narrow, oblique blackish crossbars; D. XII, 14; A. III, 13; scales, 8–62–16.
ARGENTEUS, 125.

bb. [Eye, 4⅓ in head, 1½ in snout; second anal spine, 3½ in head; depth, about 2 in length; incisors, rather broad, implanted obliquely; three series of molars above, two below; eye, 1⅓ in interorbital; crown of head convex, a protuberance above the anterior angle of the orbit; preorbital not entirely covering maxillary; pectoral fin extending to origin of anal; ventrals nearly to vent; silvery or shining golden, with many narrow longitudinal dusky stripes (8 or 9 above lateral line, 15 or 16 below), and with four or five narrow blackish crossbands, the first between the origin of the dorsal and the axil; D. XI or XII, 12 to 15; A. III, 13 or 14; scales, 8–65–16.] (*Günther*).....SARGUS, 126.

124. DIPLODUS HOLBROOKI.

Sargus holbrooki Bean, Forest and Stream, June 13, 1878 (Charleston); Bean, Proc. U. S. N. M. 1878, 198 (Charleston); Jordan & Gilbert, Proc. U. S. N. M. 1878, 379 (Beaufort); Bean, Proc. U. S. N. M. 1880, 95 (Charleston, New York market).

Diplodus holbrooki Jordan & Gilbert, Proc. U. S. N. M. 1882, 605 (Charleston); Jordan & Gilbert, Syn. Fish. N. A., 559, 1883; Jordan & Swain, Proc. U. S. N. M. 1884, 232 (Cedar Keys); Jordan, Cat. Fish. N. A., 91, No. 1067, 1885; Goode, Hist. Aquat. Anim., 386, fig. 132, 1886; Jordan, Proc. U. S. N. M. 1886, 27 (Beaufort, N. C.); Eigenmann & Hughes, l. c., 1887, 72 (Cedar Keys, Pensacola, Beaufort).

Diplodus caudimacula Jordan & Gilbert, Syn. Fish. N. A., 559, 1883 (young, not *caudimacula* of Poey).

Habitat: South Atlantic and Gulf coasts of the United States; Cape Hatteras to Cedar Keys.

Etymology: Named for John Edwards Holbrook, author of the Ichthyology of South Carolina.

The specimens examined are from Cedar Keys and Pensacola, Fla., and from Beaufort, N. C. This species has not yet been found in the West Indies, though it probably occurs there. It may be considered as the northern representative of *argenteus*, but is unquestionably a different species.

125. DIPLODUS ARGENTEUS.

Sargus argenteus Cuv. & Val., Hist. Nat. Poiss., VI, 60, 1830 (Brazil); Günther, Cat. Fish. Brit. Mus., I, 444, 1859 (Rio Janeiro); Goode, Bull. U. S. N. M., V, 75 (Bermudas); Günther, Shore Fishes, 5–7, 1880 (Island of Ascension, Bermudas).

Diplodus argenteus Eigenmann & Hughes, l. c., 1887, 73 (New Smyrna, Fla.).

Sargus caudimacula Poey, Memorias de Cuba, II, 198, 1860 (Cuba); Poey, Syn. Pisc. Cub., 310, 1868 (Cuba); Poey, Enumeratio Pisc. Cub., 57, 1875 (Cuba).

Habitat: West Indies, Florida and the Bermudas to Rio Janeiro.

Etymology: *Argenteus*, silvery.

The specimen examined is from New Smyrna, Fla., where it was obtained by Mr. William P. Shannon. This is the only specimen yet recorded from the United States. The account of *Sargus argenteus* Cuv. & Val. agrees well with our specimen from New Smyrna, which is certainly the *Sargus caudimacula* of Poey. We have therefore substituted the name *argenteus* for the current name *caudimacula*. The types of *S. argenteus* in the Museum at Paris are also identified by Dr. Jordan as belonging to the same species as the types of *Sargus caudimacula* which are in the National Museum.

126. DIPLODUS SARGUS. (Sargo.)

Sparus No. 13, Artedi, Genera, 37; No. 2, Succi, Descr., 58, 1738.
Sparus sargus Linnæus, Syst. Nat., ed. x, 278, 1758 (Mediterranean), and of early European authors.
Sargus variegatus Lacépède, Hist. Nat. Poiss., iv, 207, 1803 (Mediterranean); Goode, Bull. U. S. N. M., v, 52, 1876 (Bermuda); Goode, Cat. Fish. Bermuda, Am. Jour. Science and Art, 292, 1877 (Bermuda).
Sargus rancus Geoffroy St. Hilaire, Descr. de l'Egypte, Poiss., 1813, pl. xviii, fig. 1.
Sargus rondeleti Cuv. & Val., Hist. Nat. Poiss., vi, 14, pl. cxli, 1830 (Mediterranean), and of European writers generally.
Sargus vetula Cuv. & Val., l. c.

Habitat: Coast of southern Europe; Bermudas.

Etymology: σαργός, *sargus*, the ancient name of a species of this genus.

This species is known to us only from descriptions. It is included in the American fauna on the record of Dr. Goode of its occurrence in the Bermudas.

The remaining European species of the genus are the following:

127. DIPLODUS VULGARIS (Geoffroy St. Hilaire). (**Sargo Seifia.**) Mediterranean Sea and neighboring islands.

128. DIPLODUS ANNULARIS (Gmelin). (**Mojarra.**) Mediterranean Sea and neighboring islands.

129. DIPLODUS FASCIATUS (Cuv. & Val.). Western Mediterranean and shores of northwestern Africa.

This species is intermediate between *Diplodus* and *Charax*, and, according to Steindachner, its existence makes the latter genus untenable.

XXIX. CHARAX.

Charax Risso, Europe Méridionale, iii, 1826, 353 (*acutirostis=puntazzo*) not *Charax* of Gronow, which is pre-Linnæan).
Puntazzo Bleeker, Systema Percarum Revisum, 1875, 284 (*puntazzo;* substitute for *Charax*, regarded as preoccupied).

Type: *Sparus puntazzo* Gmelin.

Etymology: *Charax*, χάραξ, an ancient name given "on account of the row of teeth which continues without interruption on each jaw."

This genus is very close to *Diplodus*, from which it differs only in the presence of a single row of very small molars instead of two or more rows of larger ones. The snout is slender and projecting, giving the species a somewhat peculiar physiognomy. The genus is of slight value, but may be retained for the present, although, as Steindachner has already noticed, *Diplodus fasciatus* with two rows of small molars marks the transition from *Diplodus* to *Charax*. The generic name *Puntazzo* is unnecessary if the pre-Linnæan and prebinomial names of Gronow (1754) are not to be considered. *Charax* of Gronow is based on species of *Characinidæ*. A single species is known:

130. CHARAX PUNTAZZO (Gmelin). Mediterranean Sea and islands of the Eastern Atlantic.

Subfamily VII.—BORIDIINÆ.

XXX. BORIDIA.

Boridia Cuv. & Val., v, 154, 1830 (*grossidens*).

Type: *Boridia grossidens* Cuv. & Val.

Etymology: Unexplained; possibly from βόξ and εἶδος.

This genus is based on a single species once brought from Brazil, but not seen by any recent collector. It is certainly very different from any other known fish. It resembles a *Xenichthys* with the teeth of a *Calamus*. Bleeker places it near *Hoplopagrus*, which is certainly not its natural position.

ANALYSIS OF SPECIES OF BORIDIA.

a. Body rather elongate, covered with moderate scales, which are ranged in series parallel with the lateral line; mouth small, the maxillary reaching front of eye; teeth all blunt and molar, in about three rows in each jaw, the front teeth enlarged; eye rather large; preorbital very narrow; nostril small, near eye; dorsal fin divided to base, the first and second spines very short, the third longest, about ⅓ head; soft dorsal and anal low; second anal spine longer and stronger than third, but still short; caudal well forked; pectorals quite short, shorter than ventrals; soft fins scaleless; depth about equal to length of head and about 4 in body; D. XI–I, 13; A. III, 11; color nearly plain, scales dotted with black. (*Cuv. & Val.*) ..... GROSSIDENS, 131.

131. BORIDIA GROSSIDENS.

Boridia grossidens Cuv. & Val., v, 154, pl. 114, 1830 (Brazil).

Habitat: Coast of Brazil.

Etymology: *Grossus*, thick; *dens*, tooth.

This species is known from Cuvier's description of a single individual, 14 inches long, brought from Brazil by De Lalande.

Subfamily VIII.—MÆNINÆ.

XXXI. MÆNA.

Mænas Klein, 1749 (nonbinomial).
Mæna Cuvier, Règne Animal, ed. II, 1828 (*mæna*).
Mæna, Bleeker, Systema Percarum Revisum, 1875, 273 (*mæna*).

Type: *Sparus mæna* Gmelin.

Etymology: μαινίς, an old name of some small fish.

This genus is very closely related to the next, with which it is united by Dr. Bleeker, the chief difference being in the presence of rudimentary vomerine teeth in *Mæna*. Two species are commonly recognized, besides two doubtful ones, *Mæna vomerina* Cuv. & Val. and *Mæna usculum* Cuv. & Val. All belong to the Mediterranean fauna.

132. MÆNA MÆNA (Gmelin).

133. MÆNA ZEBRA (Brünnich).

XXXII. SPICARA.

Spicara Rafinesque, Caratteri, etc., 1810, 51 (*flexuosa* = *smaris*).
Smaris Cuvier, Règne Animal, ed. I, 1817, 269 (*smaris*).

Type: *Spicara flexuosa*=*Sparus smaris* L.

Etymology: *Spicara*, a local name, probably from *spica*, a spike.

This genus is chiefly confined to the Mediterranean and neighboring waters. The name *Spicara* has priority over the commonly used name *Smaris*.

Two species are now recognized on the European coasts. These are:

134. SPICARA SMARIS (Linnæus). (Picarel.)

135. SPICARA ALCEDO (Risso).

Besides these, a single species has been* doubtfully recorded from the West Indies—*Spicara martinica*.

XXXIII. CENTRACANTHUS.

Centracantus (by misprint) Rafinesque, Caratteri, etc., 1820, 42 (*cirrus* = *insidiator*).

Type: *Centracanthus cirrus* Rafinesque=*Smaris insidiator* Cuv. & Val.

Etymology: κέντρον, point; ἄκανθα, spine.

This genus contains one species found in the Mediterranean fauna and another in the Indian seas. The European species has been usually referred to *Spicara* (*Smaris*), but the form of its dorsal and various minor characters sufficiently distinguish it. Its specific name *cirrus* is derived from a Sicilian name, "*cirri*."

136. CENTRACANTHUS CIRRUS Rafinesque. Coasts of southern Europe.

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* ANALYSIS OF SUPPOSED AMERICAN SPECIES OF SPICARA.

a. [Allied to *Spicara smaris*, but with the body rounded, compressed, the suborbital narrower and more notched. Color apparently plain, a small black spot on the side; D. XII, 11; A. III, 9.] (*Cuv. & Val.*) .....MARTINICA.

SPICARA MARTINICA.

Smaris martinicus Cuv. & Val., VI, 1830, 424 (Martinique).

Habitat: West Indian fauna.

Etymology: From Martinique.

The type of this species, 4 inches long, is reputed to have been sent to Paris from Plée, in Martinique. Very likely it is the common European picarel, *Spicara smaris*, and it may have come from the coasts of France. Errors of locality are common in museums, and the "Cabinet du Roi" has not been exempt from them.

XXXIV. ERYTHRICHTHYS.

Erythrichthys Temminck & Schlegel, Fauna Japonica, Poiss., 117, 1840-50 (*schlegeli*).
Emmelichthys Richardson, Voyage Erebus and Terror, Fishes, 47, 1846 (*nitidus*).
Boxaodon Guichenot, in Gay, Hist. Chili, II, 208, 1847 (*cyanescens*).
Dipterygonotus Bleeker, Contr. Ichth. Celebes, 1848 (*leucogrammicus*).
Inermia Poey, Memorias, II, 1860, 193 (*vittata.*)

Type: *Erythrichthys schlegeli* Günther.

Etymology: ἐρυθρός, red; ἰχθύς, fish; true only of the typical species.

This genus contains about five species, bright-colored fishes, inhabiting rather deep water. The species are not well known, and each one of them has been made the type of a distinct genus by writers who have failed to detect their association with each other. None of the species have been studied by us.

ANALYSIS OF AMERICAN SPECIES OF ERYTHRICHTHYS.

a. [Color greenish, with a broad band of yellowish green from the eye to the tail; three narrower streaks of darker green on the back; snout yellowish, dorsals pale yellow; caudal violet, its upper and lower edge white; pectoral rose; lower fins pale. Body fusiform, oval in section; maxillary reaching beyond eye; no teeth in jaws; preopercle with soft teeth at the angle; nostril small; no pores on lower jaw; dorsal fins separate; pectorals short; fins low, with slender spines; caudal deeply forked; D. XIV, 10; A. III, 9; scales, 100.] (*Poey.*) VITTATUS, 137.

aa. [Uniform bluish green; D. XIII-10; A. III, 12]. (*Günther from Guichenot.*) CYANESCENS, 138.

137. ERYTHYRICHTHYS VITTATUS. (Boga.)

Inermia vittata Poey, Memorias, II, 193, 1860 (Havana).
Emmelichthys vittatus Poey, Synopsis, 320, 1868.
Erythrichthys vittatus Poey, Enumeratio, 49, 1875.

Habitat: Coasts of Cuba.

Etymology: *Vittatus*, striped.

This little fish reaches a length of about 8 inches. According to Poey it is generally rare on the Cuban coast, occasionally appearing in great numbers.

138. ERYTHRICHTHYS CYANESCENS.

Boxaodon cyanescens Guichenot, in Gay, Hist. Chili, 209, Atlas, lam. 5, f. 1, 1847.
Erythrichthys cyanescens Günther, I, 395 (copied).

Habitat: Coast of Chile.

Etymology: *Cyanescens*, bluish.

This species is known only from the scanty and incorrect account given by Guichenot. We have not seen the original account, and copy our diagnosis from Günther.

Subfamily IX.—SCATHARINÆ.

XXXV. BOX.

Box Cuv. & Val., VI, 346, 1830 (*boops*).

Type: *Sparus boops* L.

Etymology: *βόξ*, *box*, an old name of the typical species, still called Bogue or Boga in southern Europe.

This genus contains one very well known species aoundant in the seas of southern Europe. It has been commonly referred to the same genus as the next species, but the elongate form of the body, the much larger eye, and especially the presence of 14 or 15 dorsal spines instead of 11, seem sufficient for its generic separation. The name *Box* has been almost universally used for both species, but that of *Boops* is older, and must take its place, as Bleeker has shown, if the two are placed in one genus. Under *Boops*, *B. salpa* is the first species mentioned by Cuvier, and Bleeker has made this the type of the genus *Boops*. It is evident however, that *B. boops* was regarded by Cuvier & Valenciennes as the type of *Box*. This fact may justify us in retaining both names, *Boops* and *Box*, rather than to invent a new generic or subgeneric name for *Box boops*.

139. BOX BOOPS (L.).

Besides the well known *Box boops*, another species* of *Box* has been erroneously accredited to the West Indies. The type of *Box carabaica** came, however, from St. Vincent of the Cape Verde group and not from the West Indian island of the same name.

XXXVI. BOOPS.

Cynædus Gronow, Zoophyl., 1763 (*salpa*) (non-binomial).

Boops Cuvier, Règne Animal, ed. 1, 1817, 270 (*salpa, melanurus, boops;* restricted by Bleeker, Systema Percarum Revisum, to *Boops salpa*, the first species mentioned by Cuvier).

Cynædus Gronow, Syst. Ed. Gray, 1854, 55 (*onias* = *salpa;* not *Cynædus* Swainson, 1839 = *Crenilabrus*).

Type: *Sparus salpa* L.

Etymology: *Βοώψ*, *boops*, large-eyed, a name applied by Rondelet to *Box boops*. It is probably an error for *βόξ*.

This genus as here understood contains one common European species.

140. BOOPS SALPA (L.). Mediterranean Sea and neighboring islands.

* *Box vulgaris* var. *carabaica* Günther, I, 419, 1859 (St. Vincent).

This species is said to differ from *Box boops* in the slightly smaller scales, and by the presence of 15 dorsal spines instead of 14. As already noted (*Parapristipoma viridense*) there is an island called St. Vincent in the Cape Verde Archipelago as well as in the West Indies. There is no doubt, as already shown, that the type of *Box carabaica* came from the other St. Vincent, and it is doubtless identical with the common *Boga* of Europe.

XXXVII. OBLADA.

Oblada Cuvier, Règne Animal, ed. 2, 1829 (*melanura*).
Oblata Cuv. & Val., VI, 1830, 366 (*melanura*).

Type: *Sparus melanurus* L.

Etymology: From *Oblado* or *Blade*, the common name of *Oblada melanura* at Marseilles.

This genus contains a single species common in the Mediterranean. We here restore the older orthography of the name.

141. OBLADA MELANURA (L.). Mediterranean Sea and neighboring waters.

XXXVIII. SCATHARUS.

Scatharus Cuv. & Val., VI, 375, 1830 (*græcus*).

Type: *Scatharus græcus* Cuv. & Val.

Etymology: ασχάθαρος or σχάθαρος, a name now used by the Greeks for *Scatharus græcus* and *Spondyliosoma cantharus*.

This genus contains a single species, abundant on the coasts of Greece.

142. SCATHARUS GRÆCUS Cuv. & Val. Eastern Mediterranean.

XXXIX. SPONDYLIOSOMA.

Cantharus Cuvier, Règne Animal, ed. 1, 1817, 278 (*cantharus;* name preoccupied in Mollusks and in Polypi).
Spondyliosoma Cantor, Catal. Malayan Fishes, 1850, 50 (*cantharus:* substitute for *Cantharus*, preoccupied).

Type: *Sparus cantharus* Gmelin.

Etymology: σπονδύλιον, spindle; σῶμα, body.

This genus contains some half a dozen old-world species, well characterized by the presence of a band of lanceolate teeth in each jaw. It is remarkable that the generic name *Cantharus*, although twice preoccupied, should have been almost universally used for this group, while Cantor's substitute name of *Spondyliosoma* has been entirely overlooked. The recognized species of *Spondyliosoma* in European waters are:

143. SPONDYLIOSOMA CANTHARUS (Gmelin). Southern Europe north to England.

144. SPONDYLIOSOMA ORBICULARE (Cuv. & Val.). Mediterranean Sea.

Subfamily X.—GIRELLINÆ.

XL. GIRELLA.

Girella Gray, Illustrations of Indian Zoölogy, about 1840 (*punctata*).
Melanichthys Temminck & Schlegel, Fauna Japonica, Poissons, 75, 1850 (*punctatus*).
Camarina Ayres, Proc. Cal. Acad. Nat. Sci. 1860, 81 (*nigricans*).

Type: *Girella punctata* Gray.

Etymology: From the French "*Girelle*," which is a derivative of *Julis*, and is applied to the smaller labroids.

This genus contains several species found in the western Pacific and a single species characteristic of the rocky shores of California. They are herbivorous fishes, feeding on seaweeds.

ANALYSIS OF AMERICAN SPECIES OF GIRELLA.

a. Body oval, compressed, with very deep caudal peduncle; snout thick, its profile evenly rounded; mouth small, subinferior, the maxillary reaching nearly to front of orbit; a minute patch of palatine teeth; each jaw with a series of flat, tricuspid, movable incisors, behind which is a broad band of smaller ones; no teeth on vomer or tongue; cheeks with very small scales; opercles and top of head naked; preopercle minutely serrulate at its angle; preorbital as broad as eye. Gill-rakers numerous, rather long. Scales firm, weakly ctenoid, those on thorax and front of back smaller. Dorsal spines lower than soft rays, with an imperfect sheath of scales at their base; anal spines small, graduated, the soft rays higher than those of the dorsal; caudal lunate; pectorals short and broad, not reaching vent; ventrals short. Air bladder with two posterior horns; intestinal canal very long; pyloric cæca numerous; peritoneum black. Color dusky green, paler below; young with a large yellowish blotch on each side of dorsal. Head, 4 in length; depth, 2½; D. XIV, 14; A. III, 12. Scales, 50. NIGRICANS, 145.

145. GIRELLA NIGRICANS. (Bluefish.)

Camarina nigricans Ayres, Proc. Cal. Acad. Nat. Sci. 1861, 81, f. 22 (California).

Girella nigricans, Gill, Proc. Acad. Nat. Sci. Phila. 1862, 244; Jordan & Gilbert, Proc. U. S. N. M. 1880, 27 (San Diego); Jordan & Gilbert, Proc. U. S. N. M. 1880, 456 (Monterey Bay, Santa Barbara, San Pedro, San Diego); Jordan & Jouy, Proc. U. S. N. M. 1881, 12 (Wilmington, Cal., Santa Barbara); Jordan & Gilbert, Proc. U. S. N. M. 1881, 47 (Monterey, Santa Barbara); Jordan & Gilbert, Proc. U. S. N. M. 1882, 363 (Cape San Lucas); Jordan & Gilbert, Syn. Fish. N. A., 1883, 560; Rosa Smith, Proc. U. S. N. M. 1883, 234 (Todos Santos Bay); Rosa Smith, Proc. U. S. N. M. 1884, 553 (San Cristobal); Jordan, Fish. Indus. U. S., I, 394, 1884 (Monterey, Santa Barbara); Jordan, Proc. U. S. N. M. 1885, 380 (Cape San Lucas); Jordan, Fish. Indus. U. S., II, 596, 1887 (Santa Catalina); Evermann & Jenkins, Proc. U. S. N. M. 1891, 154 (Guaymas).

Girella dorsomacula Gill, Proc. Acad. Nat. Sci. Phila. 1862, 244 (Cape San Lucas); Jordan & Gilbert, Proc. U. S. N. M. 1882, 363.

Habitat: Pacific coast from Monterey to the Gulf of California.

Etymology: *Nigricans*, blackish.

This fish is very common on the coast of southern California, reaching the length of about a foot. It is a food-fish of fair quality.

XLI. DOYDIXODON.

Doydixodon Valenciennes, Voyage de la Venus, V, 318, 1855 (*freminvillei*).

Type: *Doydixodon freminvillei* Valenciennes.

Etymology: *Doy*, meaning unexplained; δίξους, forked; ὀδών, tooth.

This genus contains two species, both as yet imperfectly described. It is certainly closely allied to *Girella* and may prove to be inseparable from that genus. The only important difference would seem to be in the smaller spinous dorsal of *Doydixodon*.

ANALYSIS OF SPECIES OF DOYDIXODON.

a. [Color, uniform dark green, or banded with darker; D. XII, 15; A. III, 12. Scales about 60. Form, squamation, and dentition of *Girella nigricans*.] (*Valenciennes.*) FREMINVILLEI, 146.

aa. [Color, uniform dark brown. D. XIII, 18; A. III, 12.].....LÆVIFRONS, 147.

146. DOYDIXODON FREMINVILLEI.

Doydixodon freminvillei Valenciennes, Voyage Venus, 323, pl. 5 (Galapagos Islands).
Doydixodon fasciatum Kner & Steind., Sitzb. Akad. Wien, LIV, 358, f. 2 (Iquique, Peru).

Habitat: Galapagos Islands, and coast of Peru.

Etymology: Named for Freminville, an early French naturalist and explorer.

This species is known to us only from the poor figure of Valenciennes, which closely resembles *Girella nigricans*, but the number of dorsal spines is smaller.

147. DOYDIXODON LÆVIFRONS.

Pimelepterus lævifrons Tschudi, Fauna Peruana, 1844, 18 (Huacho, Peru).

Habitat: Coast of Peru.

Etymology: *Lævis*, smooth; *frons*, forehead.

This imperfectly known species is probably to be referred to *Doydixodon*. It is probably close to *D. freminvillei*, but if correctly described it cannot be the same. The following is Tschudi's description:

PIMELEPTERUS LÆVIFRONS Tsch.

D. XIII, 18. V. I, 5; A. III, 12. P. 16.

Verhältniss der Höhe zur Länge 1 : 2, 8, des Kopfes zum Körper 1 : 3. Auge kreisrund, nahe am convexen obern Stirnrand; 1, 6 seines Durchmessers vom Vordeckelrande und zweimal sein Durchmesser vom Unterkieferrande. Nasenlöcher sehr nahe am Auge.

Maul klein, nicht ganz bis unter das Auge gespalten. Zähne des Ober- und Unterkiefers in zwei hechelförmigen Massen zusammengedrängt; die einzelnen Zähne leicht nach hinten gebogen.

Die verticale Deckelrand schwach nach hinten geschweift, der horizontale leicht nach unten gebogen; der Winkel abgerundet.

Der Vordeckeldorn stumpf; nach dem obern Winkel zu ist der Vordeckelrand ausgeschnitten. Stirn unbeschuppt, Nacken, Deckel und Brust so wie die Basis der Flossen mit kleinen, der übrige Körper mit grossen Schuppen besetzt. Die Seitenlinie verläuft dem Rückenprofil parallel, beinahe in der Mitte des Körpers.

Die Rückenflosse beginnt der Bauchflosse gegenüber und endet nach hinten so weit wie die Afterflosse. Die Stacheln sind beinahe gleichlang und ziemlich kurz, der 13te der längste, die ersten Flossenstrahlen noch einmal so lang als dieser. Schwanzflosse gerade abgeschnitten. Die Afterflosse beginnt dem ersten Rückenflossenstrahle gegenüber; die drei Stacheln sind kurz; der erste der spitzigste und längste. Die Bauchflosse beginnt hinter der Brustflosse und reicht nicht ganz bis zur Afterflosse; ihr Flossenstachel ist ziemlich lang. Die Brustflosse sitzt am weitesten nach vorn und endet dem 8ten Rückenflossenstachel gegenüber.

Färbung.—Auf dem ganzen Körper braun-grau; der Kopf, besonders auf der Stirn, olivenbraun, die Seiten mehr in's Graue übergehend, der Bauch weisslich braun. Länge 9″.

Vorkommen.—Bei Huacho, nördlich von Lima.

Subfamily XI.—KYPHOSINÆ.

XLII. HERMOSILLA.

Hermosilla Jenkins & Evermann, Proc. U. S. N. M. 1888, 144 (*azurea*).

Type: *Hermosilla azurea* Jenkins & Evermann.

Etymology: *Hermosilla*, name of the capital city of Sonora, along the coasts of which state the typical species was taken, derived from Spanish *hermosa*, beautiful (Latin, *formosa*).

This genus contains a single species, an ally of *Kyphosus*, found in the Gulf of California.

ANALYSIS OF SPECIES OF HERMOSILLA.

a. Top of head from posterior margin of eyes, snout, preorbitals, chin, and preopercles naked. Body ovate, compressed; head short; snout blunt, 3 in head; maxillary about equal to eye, which is 3⅔ in head, and reaching front of eye; both jaws with one series of close-set, equal, narrow, rounded incisors; no teeth on vomer; gill-rakers slender, 3+12, about equal to eye; preorbital 1¼ in eye; preopercle entire; fins except spinous dorsal finely scaled; seventh dorsal spine longest; second anal spine longest, 1⅓ diameter of eye; pectorals shorter than ventrals, 1¼ in head; spinous dorsal about half longer than soft. Head, 3⅔; depth, 2; D. XI, 11; A. III, 10. Scales, 11-55-17. Color, dark steel-blue, paler below; body with about 12 nearly vertical blackish crossbands about as wide as the eye; below eye silvery, with a dark streak from maxillary to angle of opercle; opercular blotch black; a black blotch in the axil; fins mostly dark. AZUREA, 148.

148. HERMOSILLA AZUREA.

Hermosilla azurea Jenkins & Evermann, Proc. U. S. N. M. 1888, 144 (Guaymas).

Habitat: Gulf of California.

Etymology: *Azureus*, sky-blue.

This beautiful species is known from two examples, taken by Jenkins & Evermann at Guaymas, in Sonora.

XLIII. KYPHOSUS.

Kyphosus Lacépède, Hist. Nat. Poiss., III, 114, 1802 (*bigibbus* = *fuscus*).
Pimelepterus Lacépède, Hist. Nat. Poiss., IV, 429, 1803 (*bosqui* = *sectatrix*).
Dorsuarius Lacépède, Hist. Nat. Poiss., V, 482, 1803 (*nigrescens* = *fuscus*).
Xyster Lacépède, Hist. Nat. Poiss., V, 484, 1803 (*fuscus*).
? Opisthistius Gill, Proc. Acad. Nat. Sci. Phila. 1862, 245, (*tahmel*).
Sectator Jordan & Fesler, subgen. nov. (*oceyurus*).

Type: *Kyphosus bigibbus* Lacépède.

Etymology: κυφός, a hump, the word more correctly written *cyphus*, and referring to a deformed specimen with hump back.

This genus contains some ten species, all but one confined to the Pacific Ocean, and most of them found in the East Indies. One of the species, *Opisthistius tahmel*, usually referred to this group, is probably the type of a distinct genus, distinguished by its elevated soft dorsal and anal.

ANALYSIS OF AMERICAN SPECIES OF KYPHOSUS.

a. Soft dorsal and anal moderately elevated.

b. Incisor teeth well developed, each with a conspicuous horizontal process or root; caudal fin moderate, about as long as the head, the outer rays not 3 times as long as middle rays; junction of gill-membranes forming an angle (*Kyphosus*).

c. Soft dorsal with 14 rays; anal with 14; teeth 25 to 30; color bluish, sides with about 12 dark longitudinal streaks; longest spine about 2¼ in head; D. XI, 14; A. III, 14.

d. Soft part of anal fin low, its longest ray 4 in base of fin and 4 in head; scales smaller, about 85; depth more than half length; eye nearly 4 in head. ANALOGUS, 149.

dd. Soft part of anal fin somewhat elevated in front, its longest ray 2¼ in head, 2¼ in base of fin; scales 12–70–22; depth 2 in length; eye 3½ in head; snout very blunt..... ELEGANS, 150.

cc. Soft dorsal with 11 or 12 rays; anal rays III, 11; teeth 35 to 40; color grayish or yellowish, with darker lengthwise streaks.

e. Scales 10–55–16; soft dorsal and anal fin moderate, the longest ray of anal about 2¼ in head; longest anal spine 2¼ in head. Body ovate, compressed, its depth 2⅛ in length; head, 3⅜. D. XI, 12; A. III, 11. Color dusky, with about 25 pale streaks following the rows of scales, those near middle of body broadest; a silver streak along preorbital..... SECTATRIX, 151.

ee. Scales 12–67–22; anal fin high in front, its longest soft ray about 1⅞ in head; longest anal spine about 2 in head; depth of body 2¼ in length; head, 3⅜; D. XI, 11; A. III, 11..... LUTESCENS, 152.

bb. Incisor teeth small, with inconspicuous roots; caudal much longer than head, the lobes falcate, the outer 5 times length of middle rays; gill-membranes not forming an angle at junction. (*Sectator* Jordan & Fesler.)

f. Anal low, its last ray longest, its middle rays shorter than eye; longest dorsal spine about 3¼ in head; scales 11–78–19; color olivaceous, with blue and golden spots and stripes; depth, 2⅔; head, 3⅓; D. XI, 13; A. III, 14. OCYURUS, 153.

149. KYPHOSUS ANALOGUS.

Pimelepterus analogus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 245 (Cape San Lucas); Jordan & Gilbert, Proc. U. S. N. M. 1881, 232 (Porto Escondido); Jordan & Gilbert, Bull. U. S. F. C. 1881, 328; Jordan & Gilbert, Bull. U. S. F. C. 1882, 107 (Mazatlan, no description); Jordan & Gilbert, Bull. U. S. F. C. 1882, 110 (Panama, no description); Jordan & Gilbert, Proc. U. S. N. M. 1882, 353, 363 (Cape San Lucas, no description).

Cyphosus analogus, Jordan & Gilbert, Proc. U. S. N. M. 1882, 626 (Panama, no description).

Kyphosus analogus, Jordan, Cat. Fish. N. A., 1885, 92 (Pacific coast, no description); Jordan, Proc. U. S. N. M. 1885, 380 (Mazatlan, Panama, no description); Evermann & Jenkins, Proc. U. S. N. M. 1891, 154 (Guaymas).

Habitat: Pacific coast of tropical America, from Panama to Gulf of California.

Etymology; *Analogus*, analogous (to *Kyphosus sectatrix*).

This species is generally common along the Pacific coast of tropical America, where it represents the closely allied *K. sectatrix*. The specimens examined by us are from Guaymas, Cape San Lucas, Porto Escondido, and Mazatlan.

150. KYPHOSUS ELEGANS. (Chopa.)

Pimelepterus elegans Peters, Berliner Monatsberichte, 707, 1869 (Mazatlan).
Kyphosus elegans, Evermann & Jenkins, Proc. U. S. N. M. 1891, 155 (Guaymas).

Habitat: Gulf of California.

Etymology: *Elegans*, elegant.

This species is very closely related to the more abundant *K. analogus*, from which it differs chiefly in the form of the anal fin and of the snout. The specimens seen by us are the original type from Mazatlan and the specimen obtained by Evermann & Jenkins from Guaymas.

151. KYPHOSUS SECTATRIX.

(Razor-fish; Chub; Bream; Rudder-fish; Bermuda-chub.)

Perca marina sectatrix, the Rudder-fish, Catesby, Nat. Hist. Car., 1738.
Perca saltatrix Linnæus, Syst. Nat., ed. x, 293, 1758 (incorrectly copied from Catesby, who called it *sectatrix*); Goode & Bean, Proc. U. S. N. M. 1885, 201.
Perca sectatrix Linnæus, Syst. Nat., ed. xii, 486, 1766; Jordan, Proc. U. S. N. M. 1884, 193, 198.
Kyphosus sectatrix Jordan, Cat. Fish. N. A., 92, 1885 (West Indies, no description); Jordan, Proc. U. S. N. M. 1886, 28 (Beaufort, no description); Jordan, Proc. U. S. N. M. 1886, 585 (West Indies, no description).
Pimelepterus bosci Lacépède, Hist. Nat. Poiss., iv, 429, 1803 (North Atlantic); Cuv. & Val., vii, 258, pl. 187, 1831 (Charleston, S. C.); Valenciennes, in Webb & Berthelot, Hist. Nat. Îles Canar., Poiss, pl. 19, 1836 (Canary Islands); De Kay, New York Fauna, Fishes, 100, pl. xx, f. 56, 1842 (New York, copied from Cuvier); Storer, Syn. Fishes N. A., 88, 1845 (copied from Cuvier); Günther, i, 497, 1859 (Jamaica, Cuba, Madeiras); Poey, Syn. Pisc. Cubens., 323, 1868; Baird, Rep't Comm. Fish and Fisheries, 824, 1873 (Woods Holl, no description); Bleeker, Syst. Percarum, ii, 6, 1875; Goode, Fishes of the Bermudas, 52, 1875; Jordan & Gilbert, Proc. U. S. N. M. 1878, 378 (Beaufort); Goode, Proc. U. S. N. M. 1879, 113 (east coast Florida); Bean, Proc. U. S. N. M. 1880, 94 (Bermuda, no description); Goode & Bean, Proc. U. S. N. M. 1882, 238 (Gulf of Mexico, no description); Jordan & Gilbert, Syn. Fish. N. A., 561, 1883.
Cyphosus bosci Goode, Fish Indust. Exh. 1884, 394 (Gulf of Mexico).
Cyphosus bosqui Jordan, Proc. U. S. N. M. 1884, 128 (Key West).
Pimelepterus oblongior Cuv. & Val., vii, 264, 1831 (locality unknown).
Pimelepterus incisor Cuv. & Val., vii, 266, 1831 (Brazil); Valenciennes in Webb & Berthelot, Hist. Poiss., Canaries, 47, 1838 (Canaries).
Pimelepterus flavolineatus Poey, Repertorio, i, 319, 1866; Poey, Syn. Pisc. Cubens 324, 1868.
Pimelepterus bosci var. *sicula* Doderlein, Bull. Soc. Sci. Nat. (Palermo).

Habitat: Atlantic coast of the United States from Cape Cod, crossing the ocean to the Canary Islands; accidental in the Mediterranean.

Etymology: *Sectator*, one that follows. According to Catesby, the species follows ships, hence the name of "Rudder-fish."

This species is not rare off our Atlantic coasts, becoming rather common southward. The specimens before us are from Key West. It has been once taken at Palermo, where it has been named var. *sicula*.

152. KYPHOSUS LUTESCENS.

Pimelepterus lutescens Jordan, Proc. U. S. N. M. 1881, 229 (Braithwaite Bay, Socorro Island); Jordan, Bull. U. S. F. C. 1881, 328.
Kyphosus lutescens Jordan, Proc. U. S. N. M. 1885, 380 (Socorro Island, no description).

Habitat: Revillagigedo Archipelago.

Etymology: *Lutescens*, growing yellow.

This species is known only from the original type taken on Socorro Island and from another taken at Clarion Island by Dr. Gilbert.

153. KYPHOSUS OCYURUS.

Pimelepterus ocyurus Jordan, Bull. U. S. F. C. 1881, 327, 328 (Bay of Panama); Jordan & Gilbert, Bull. U. S. F. C. 1882, 110 (Panama, no description).
Kyphosus ocyurus Jordan, Proc. U. S. N. M. 1885, 380 (Panama, no description).

Habitat: Panama.

Etymology: ὠκύς, quick; οὐρά, tail.

This species is known only from the original types, from Panama It is a strongly marked species, perhaps the type of a distinct subgenus or even genus, *Sectator*, characterized by the little development of the roots of the teeth and by the deeply forked caudal.

XLIV. MEDIALUNA.*

Medialuna Jordan & Fesler, *gen. nov.* (*californiensis*).

Type: *Scorpis californiensis* Steindachner.

Etymology: Spanish *medialuna*—half moon, the vernacular name of the typical species in California.

This genus contains a single species which belongs to the Californian fauna. Its nearest relative seems to be the Australian genus *Atypichthys* Günther, which has a different fin formula (D. XI, 15; A, III, 15) and the middle dorsal spines much longer, about half of head. The two genera are apparently distinct; certainly neither belongs to the *Chætodontidæ*.

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* The genera lately subtracted from *Scorpis* (type *S. georgianus*, an Australian species) may be defined as follows:

a. Anal fin long, 2½ in length of body, its rays, III, 25 to 27; dorsal spines gradually increasing in height posteriorly (teeth said to be conical, but probably compressed).
b. Soft dorsal and anal falcate, the longest ray 1¼ in base of rayed part; dorsal spines 9.....SCORPIS.
bb. Soft dorsal and anal not falcate, the longest ray 2⅞ in base of rayed part; dorsal spines 10. CÆSIOSOMA (*Kaup*).
aa. Anal fin short, its base 3¾ in length of body, its rays III, 19; dorsal spines gradually increasing in height to the sixth, decreasing posteriorly; soft dorsal and anal not falcate, the longest ray 1½ in base of rayed part; preoperculum serrated at angle; teeth compressed, incisor-like, but narrow.....MEDIALUNA.

ANALYSIS OF SPECIES OF MEDIALUNA.

a. Body ovate-elliptical, its outlines regular; head bluntish, rounded, the profile strongly convex; maxillary narrow, not reaching front of eye; preorbital narrow; eye small, 1¼ in snout, 5 in head; mouth small, terminal, horizontal; jaws with broad bands of slender teeth, the outer compressed, narrowly lanceolate, without evident roots behind; outer teeth similar, growing smaller backward, all somewhat movable; vomer, palatines, and tongue with patches of minute teeth; gill-rakers slender, rather long; preopercle entire. Dorsal spines low, the middle spines highest, scarcely longer than eye; soft dorsal low, not elevated in front, little higher than spines; anal low; caudal lunate, the upper lobe slightly longer; pectorals short and narrow; ventrals rather small; scales thinnish, adherent, with smaller ones intermixed; sides, top of head, and jaws closely scaled; head 3⅗ in length, depth 2¼; D. IX, I, 22; A. III, 19 Scales 9–58–12. Color blackish, with steely luster, paler, and often mottled below; sides with faint oblique vertical lines of spots; fins blackish.

CALIFORNIENSIS, 154.

154. MEDIALUNA CALIFORNIENSIS. (Medialuna.)

Scorpis californiensis Steind., Ichth. Beitr., III, 19, 1875 (San Diego); Jordan & Gilbert, Syn. Fish. N. A., 1883, 562, and elsewhere.

Cæsiosoma californiense Jordan, Cat. Fish. N. A., 1885, 92.

Habitat: Coast of southern California, from Point Concepcion southward.

Etymology: From California.

This handsome fish is abundant on the rocky coasts of southern California. It reaches a length of about a foot, and is a food-fish of good quality.

XLV. CÆSIOSOMA.

Cæsiosoma (Kaup) Bleeker, Systema Percarum Revisum, II, 11, 1875 (*æquipinnis*).

Type: *Scorpis æquipinnis* Richardson.

Etymology: *Cæsio*, an allied genus; σῶμα, body.

This genus is based on an Australian species which differs from the type of *Scorpis* (*Scorpis georgianus*) in having the soft dorsal and anal low and not falcate. The generic value of this character is at least open to question. In the form of the soft dorsal, *Cæsiosoma* resembles *Medialuna*, but in the latter genus the soft dorsal and anal are proportionately much shorter and the dorsal spines are not graduate. We refer to *Cæsiosoma* a South American species we have not seen, but which seems to have the same generic characters. In all these species the incisors have been described as cylindrical or conic, but they will probably be found to have a flattened form, as in *Medialuna*, and to be really lanceolate.

ANALYSIS OF AMERICAN SPECIES OF CÆSIOSOMA.

a. [Body deep, the outlines strongly arched; mouth very oblique, the maxillary reaching front of eye; snout shorter than eye; both margins of preopercle finely toothed; nostrils round, close together; preorbital finely toothed; head completely scaled, except the snout, lips, and part of each jaw; dorsal spines growing steadily longer to the last, which is about half head; second soft ray of dorsal highest; third anal spine slightly longer than eye; pectoral, 1¼ in head; ventral 2⅓; caudal deeply notched, its lobes slender; soft rays of vertical fins closely scaled. Color, dusky violet above, silvery gray below; fins yellowish; body sometimes irregularly mottled with darker. Head 4 in length; depth 2⅓; eye 3½ in head. D. X, 27; A. III, 25. Scales, 70.] (*Steindachner*)..CHILENSE, 155.

155. CÆSIOSOMA CHILENSE.

Scorpis chilensis Gay, "Hist. Chil. Zoology, II, 220; Ictiol., lam. 6, f. 1." (Juan Fernandez); Günther, II, 64 (copied); Steindachner, Ichth. Beiträge, II, 14, 1875 (Juan Fernandez).

Habitat: Islands of Chile.

Etymology: From Chile.

This species is known to us only from the scanty account copied by Günther from Gay and from the detailed description given by Steindachner. According to Steindachner, the species reaches a length of a foot, and is very common on the coasts of Juan Fernandez.

Subfamily XII.—APLODACTYLINÆ.

XLVI. APLODACTYLUS.

Aplodactylus Cuv. & Val., VIII, 476, 1831 (*punctatus*).
Haplodactylus Günther, I, 434, 1859 (corrected orthography, same type).

Type: *Aplodactylus punctatus* Cuv. & Val.

Etymology: ἁπλόος, simple; δάκτυλος, finger, from the unbranched pectoral rays.

This genus contains some half dozen herbivorous fishes of the South Pacific. The three species accredited to the coast of Chile are scantily described, and none of them have been examined by us.

ANALYSIS OF AMERICAN SPECIES OF APLODACTYLUS.

a. [Body and fins everywhere finely spotted with black, the ground color brownish-red; body moderately elongate; the head bluntish, formed as in *Girella*; scales very small; caudal lunate; soft dorsal higher than spinous; anal fin short and high; incisors tricuspid; simple pectoral rays 6; D. XVI–21; A. III, 8; cœca 2.] (*Günther; Cuv. & Val.*).....PUNCTATUS, 156.

aa. Body not everywhere spotted with black.

b. Color brownish gray, vermiculated with brown; fins brown-spotted; incisors tricuspid. D. XV–I, 20; A. III, 8. (*Gay* fide *Günther.*) VERMICULATUS, 157.

bb. Color yellowish, dotted all over with white. D. XV–I, 20; A. III, 7. (*Gay* fide *Günther*).....GUTTATUS, 158.

156. APLODACTYLUS PUNCTATUS.

Aplodactylus punctatus Cuv. & Val., VIII, 477, pl. 242, 1831; Jenyns, Zoöl. Beagle, 15, 1842; Gay, Hist. Chile, II, 156.
Haplodactylus punctatus Günther, I, 434.
Aplodactylus reginæ (Valenciennes) Gay, l. c., "II, 158, lam. I, f. 2."

Habitat: Coast of Chile.

Etymology: *Punctatus*, speckled.

This species is known to us from descriptions.

157. APLODACTYLUS VERMICULATUS.

Aplodactylus vermiculatus Gay, l. c., II, 159, lam. I, f. 1 (Valparaiso).

Habitat: Coast of Chile.

Etymology: *Vermiculatus*, with markings like worm tracks.

A doubtful species, known only from Gay's description.

158. APLODACTYLUS GUTTATUS.

Aplodactylus guttatus Gay, l. c., 160 (Chile).

Habitat: Coast of Chile.

Etymology: *Guttatus*, with spots like raindrops.

A scarcely known species, apparently to be recognized by its coloration.

RECAPITULATION.

The following is a list of the species of sparoid fishes recognized by us as occurring in the waters of America and Europe. Species not seen by the authors are marked with an asterisk. The general distribution of each species is indicated by the use of the following letters:

E, Europe.
I, Islands of eastern Atlantic; Azores, etc.
N, Atlantic coast of United States, Cape Cod to Cape Hatteras.
S, South Atlantic and Gulf coast.
K, Florida Keys.
W, West Indies.
C, Southern California (Point Concepcion to Cerros Island).
P, Pacific coast of tropical America.
G, Galapagos Islands.
V, Pacific coast of South America.
B, Brazil.

Family SPARIDÆ.

Subfamily I. HOPLOPAGRINÆ.

Genus I. **Hoplopagrus** Gill.

1. *Hoplopagrus güntheri* Gill. P.

Subfamily II. LUTJANINÆ.

Genus II. **Lutjanus** Bloch.

§ EVOPLITES Gill.

2. *Lutjanus viridis* (Valenciennes). G, P.

§ GENYOROGE Cantor.

3. *Lutjanus caninus** (Steindachner). B. Doubtful species.

§ DIPTERODON Lacépède.

4. *Lutjanus novemfasciatus* Gill. P.
5. *Lutjanus cyanopterus* (Cuvier & Valenciennes). W, B.
6. *Lutjanus griseus* (L.). S, K, W, B.
7. *Lutjanus jocú* (Bloch & Schneider). K, W, B.
8. *Lutjanus caxis* (Bloch & Schneider). K, W, B. Perhaps to be called *Lutjanus apoda.*
9. *Lutjanus argentiventris* (Peters). P.
10. *Lutjanus lutjanoides** (Poey). W. Probably a hybrid; *chrysurus-jocú.*
11. *Lutjanus buccanella* (Cuvier & Valenciennes). W.
12. *Lutjanus vivanus* (Cuvier & Valenciennes). W.
13. *Lutjanus aya* (Bloch). S, K, W, B.
14. *Lutjanus analis* (Cuvier & Valenciennes). K, W, B.
15. *Lutjanus colorado* Jordan & Gilbert. P.
16. *Lutjanus brachypterus* Cope. W. Probably a hybrid; *synagris-griseus.*
17. *Lutjanus guttatus* (Steindachner). P.
18. *Lutjanus synagris* (L.). W, K, B.
19. *Lutjanus ambiguus* Poey. W. Certainly a hybrid, *chrysurus-synagris.*
20. *Lutjanus mahogoni* (Cuvier & Valenciennes). W.

§ RABIRUBIA Jordan & Fesler. New subgenus based on *L. inermis.*

21. *Lutjanus inermis* (Peters). P.

§ RAIZERO Jordan & Fesler. New subgenus based on *L. aratus.*

22. *Lutjanus aratus* (Günther). P.

Genus III. **Ocyurus** Gill.

23. *Ocyurus chrysurus* (Bloch). S, W, K, B.

Genus IV. **Rhomboplites** Gill.

24. *Rhomboplites aurorubens* (Cuvier & Valenciennes). S, K, W, B.

Genus V. **Apsilus** Cuvier & Valenciennes.

25. *Apsilus dentatus* Guichenot. W.

Subfamily II. LUTJANINÆ—Continued.

Genus VI. **Aprion** Cuvier & Valenciennes.

26. *Aprion macrophthalmus* (Müller & Troschel). W.

Genus VII. **Etelis** Cuvier & Valenciennes.

27. *Etelis oculatus* (Cuvier & Valenciennes). W.

Genus VIII. **Verilus** Poey.

28. *Verilus sordidus* Poey. W.

Subfamily III. XENICHTHYINÆ.

Genus IX. **Xenocys** Jordan & Bollmann.

29. *Xenocys jessiæ* Jordan & Bollman. G.

Genus X. **Xenistius** Jordan & Gilbert.

30. *Xenistius californiensis* (Steindachner). C.

Genus XI. **Xenichthys** Gill.

31. *Xenichthys agassizii* (Steindachner). G.

32. *Xenichthys xanti* Gill. P.

Subfamily IV. HÆMULINÆ.

Genus XII. **Hæmulon** Cuvier.

§ HÆMULON.

33. *Hæmulon scrfasciatum* Gill. P.

34. *Hæmulon album* Cuvier & Valenciennes. W, K, B.

35. *Hæmulon macrostoma* Günther. W, K.

36. *Hæmulon bonariense* Cuvier & Valenciennes. W, B.

37. *Hæmulon parra* (Desmarest). W, K, B.

38. *Hæmulon scudderi* Gill. P.

39. *Hæmulon carbonarium* Poey. W, B.

40. *Hæmulon schranki* Agassiz. W, B, P.

41. *Hæmulon melanurum* (L.). W.

42. *Hæmulon sciurus* (Shaw). K, W, B.

43. *Hæmulon plumieri* (Lacépède). S, K, W, B.

44. *Hæmulon flavolineatum* Cuvier & Valenciennes. K, W, B.

§ BRACHYGENYS Scudder.

45. *Hæmulon chrysargyreum* Günther. K, W, B.

§ BATHYSTOMA Scudder.

46. *Hæmulon rimator* Jordan & Swain. S, K, W.

47. *Hæmulon aurolineatum* Cuvier & Valenciennes. K, W, B.

48. *Hæmulon striatum* (L.). W, B.

§ LYTHRULON Jordan & Swain.

49. *Hæmulon flaviguttatum* Gill. P.

§ ORTHOSTÆCHUS Gill.

50. *Hæmulon maculicauda* (Gill). P.

Genus XIII. **Anisotremus** Gill.

51. *Anisotremus pacifici* (Günther). P.

52. *Anisotremus cæsius* Jordan & Gilbert. P.

53. *Anisotremus dovii* (Günther). P.

54. *Anisotremus surinamensis* (Bloch). W, B, P.

55. *Anisotremus bicolor* (Castelnau). B, W.

56. *Anisotremus scapularis* (Tschudi). V.

57. *Anisotremus davidsoni* (Steindachner). C.

58. *Anisotremus taniatus* Gill. P.

59. *Anisotremus virginicus* (L.). K, W, B.

60. *Anisotremus catharinæ* * (Cuvier & Valenciennes). B. Doubtful species; probably identical with *A. virginicus*.

61. *Anisotremus serrula* * (Cuvier & Valenciennes). W. Doubtful species; perhaps identical with *Genyatremus luteus*.

Genus XIV. **Conodon** Cuvier & Valenciennes.

62. *Conodon nobilis* (L.). S, W, B.

63. *Conodon serrifer* Jordan & Gilbert. P.

Subfamily IV. HÆMULINÆ—Continued.

Genus XV. **Pomadasis** Lacépède.

§ POMADASIS.

64. *Pomadasis humilis* Kner & Steindachner. P.
65. *Pomadasis productus* * (Poey). W.
66. *Pomadasis macracanthus* (Günther). P.
67. *Pomadasis crocro* (Cuvier & Valenciennes). W, B.
68. *Pomadasis branicki* (Steindachner). P.
69. *Pomadasis ramosus* (Poey). W, B. Synonymy uncertain.

§ PSEUDOPRISTIPOMA Sauvage.

70. *Pomadasis panamensis* (Steindachner). P.

§ BRACHYDEUTERUS Gill.

71. *Pomadasis axillaris* (Steindachner). P.
72. *Pomadasis nitidus* (Steindachner). P.
73. *Pomadasis corvinæformis* (Steindachner). B.
74. *Pomadasis leuciscus* (Günther). P.
75. *Pomadasis elongatus* (Steindachner). P. Doubtful species; perhaps a form of the preceding.

Genus XVI. **Orthopristis** Girard.

§ ORTHOPRISTIS.

76. *Orthopristis bennetti* (Cuvier & Valenciennes). E, I.
77. *Orthopristis ruber* (Cuvier & Valenciennes). B.
78. *Orthopristis chalceus* (Günther). P, G.
79. *Orthopristis chrysopterus* (L.). S.
80. *Orthopristis pocyi* Scudder. W.
81. *Orthopristis cantharinus* (Jenyns). P, G, V.

§ ISACIELLA Jordan & Fesler. G.

82. *Orthopristis lethopristis* Jordan & Fesler. G.
83. *Orthopristis brevipinnis* (Steindachner). P.

§ MICROLEPIDOTUS Gill.

84. *Orthopristis inornatus* (Gill). P.

Genus XVII. **Isacia** Jordan & Fesler.

85. *Isacia conceptionis* (Cuvier & Valenciennes). V.

Genus XVIII. **Parapristipoma** Bleeker. Genus perhaps inseparable from *Plectorhynchus*.

86. *Parapristipoma mediterraneum* (Guichenot). E.
87. *Parapristipoma viridense* * (Cuvier & Valenciennes). E, I.

Genus XIX. **Genyatremus** Gill.

88. *Genyatremus luteus* (Bloch). W, B.

Subfamily V. DENTICINÆ.

Genus XX. **Dentex** Cuvier.

89. *Dentex macrophthalmus* (Bloch). E.
90. *Dentex dentex* (L.). E.
91. *Dentex maroccanus* Cuvier & Valenciennes. E.
92. *Dentex filosus* Valenciennes. I.

Genus XXI. **Nemipterus** Swainson. Doubtful genus; perhaps inseparable from *Dentex*.

93. *Nemipterus macronemus* Günther. B. Doubtful species; probably from the East Indies instead of South America.

Subfamily VI. SPARINÆ.

Genus XXII. **Stenotomus** Gill.

94. *Stenotomus aculeatus* Cuvier & Valenciennes. S.
95. *Stenotomus chrysops* (L.). N, S.
96. *Stenotomus caprinus* Bean. S.

Subfamily VI. SPARINÆ—Continued.

Genus XXIII. **Calamus** Swainson.

97. *Calamus calamus* (Cuvier & Valenciennes). K, W, B.
98. *Calamus proridens* Jordan & Gilbert. K, W.
99. *Calamus pennatula* * Guichenot. W.
100. *Calamus bajonado* (Bloch & Schneider). W, K.
101. *Calamus brachysomus* (Lockington). P.
102. *Calamus leucosteus* Jordan & Gilbert. S.
103. *Calamus macrops** Poey. W.
104. *Calamus taurinus* Jenyns. G.
105. *Calamus penna* Cuvier & Valenciennes. S, K, W, B.
106. *Calamus arctifrons* Goode & Bean. S, K.
107. *Calamus medius* Poey. W.

Genus XXIV. **Sparus** (Artedi) Linnæus.

§ SPARUS.

108. *Sparus aurata* Linnæus. E.
109. *Sparus cæruleostictus** (Cuvier & Valenciennes). E.

§ PAGRUS Cuvier.

110. *Sparus pagrus* Linnæus. E, S.
111. *Sparus ehrenbergi** Cuvier & Valenciennes. E.
112. *Sparus bertheloti** Valenciennes. E.

Genus XXV. **Pagellus** Cuvier & Valenciennes. Perhaps inseparable from *Sparus*.

113. *Pagellus erythrinus* (L.). E.
114. *Pagellus acarne* Cuvier & Valenciennes. E.
115. *Pagellus centrodontus* (De la Roche). E.
116. *Pagellus bogaraveo** (Brünnich). E.
117. *Pagellus mormyrus* (L.). E. Ascribed probably by error to the coast of Brazil.

Genus XXVI. **Lagodon** Holbrook.

118. *Lagodon rhomboides* (L.). N, S, W.

Genus XXVII. **Archosargus** Gill.

119. *Archosargus unimaculatus* (Bloch). K, W, P. Includes two forms or varieties: *unimaculatus* and *flavolineatus*.
120. *Archosargus pourtalèsii* (Steindachner). G. Perhaps a variety of *unimaculatus*.
121. *Archosargus tridens** (Poey). W. (Perhaps a variation of *unimaculatus*.)
122. *Archosargus probatocephalus* (Walbaum). N, S.
123. *Archosargus aries* (Cuvier & Valenciennes). W, B. Perhaps a southern variety of the preceding.

Genus XXVIII. **Diplodus** Rafinesque.

124. *Diplodus holbrooki* (Bean). S.
125. *Diplodus argenteus* (Cuvier & Valenciennes). S, W, B.
126. *Diplodus sargus** (L.). E, W.
127. *Diplodus vulgaris* (St. Hilaire). E, I.
128. *Diplodus annularis* (Gmelin). E, I.
129. *Diplodus fasciatus** (Cuvier & Valenciennes). E, I.

Genus XXIX. **Charax** Risso. Perhaps inseparable from *Diplodus*.

130. *Charax puntazzo** (Gmelin). E, I.

Subfamily VII. BORIDIINÆ.

Genus XXX. **Boridia** Cuvier & Valenciennes.

131. *Boridia grossidens** Cuvier & Valenciennes.

Subfamily VIII. MÆNINÆ.

Genus XXXI. **Mæna** Cuvier.

132. *Mœna mœna* (Gmelin). E.

133. *Mœna zebra** (Brünnich). E.

Genus XXXII. **Spicara** Rafinesque.

134. *Spicara smaris* (L.). E. Recorded, probably by error, from Martinique, as S. *martinica* (Cuvier & Valenciennes).

135. *Spicara alcedo* (Risso). E.

Genus XXXIII. **Centracanthus** Rafinesque.

136. *Centracanthus cirrus* Rafinesque. E.

Genus XXXIV. **Erythrichthys** Temminck & Schlegel.

137. *Erythrichthys vittatus* * (Poey). W.

138. *Erythrichthys cyanescens* * (Guichenot). V.

Subfamily IX. SCATHARINÆ.

Genus XXXV. **Box** Cuvier & Valenciennes. Perhaps indistinguishable from *Boops*.

139. *Box boops* (L.). E, I.

Genus XXXVI. **Boops** Cuvier.

140. *Boops salpa* (L.). E, I.

Genus XXXVII. **Oblada** Cuvier.

141. *Oblada melanura* (L.).

Genus XXXVIII. **Scatharus** Cuvier & Valenciennes.

142. *Scatharus græcus* Cuvier & Valenciennes. E.

Genus XXXIX. **Spondyliosoma** Cantor.

143. *Spondyliosoma cantharus* (Gmelin). E.

144. *Spondyliosoma orbiculare* (Cuvier & Valenciennes). E.

Subfamily X. GIRELLINÆ.

Genus XL. **Girella** Gray.

145. *Girella nigricans* (Ayres). C, P.

Genus XLI. **Doydixodon** Valenciennes. Genus perhaps not distinguishable from *Girella*.

146. *Doydixodon freminvillei* * Valenciennes. G.

147. *Doydixodon lævifrons** (Tschudi). V.

Subfamily XI. KYPHOSINÆ.

Genus XLII. **Hermosilla** Jenkins & Evermann.

148. *Hermosilla azurea* Jenkins & Evermann. P.

Genus XLIII. **Kyphosus** Lacépède.

§ KYPHOSUS.

149. *Kyphosus analogus* (Gill). P

150. *Kyphosus elegans* (Peters). P.

151. *Kyphosus sectatrix* (L.). S, W, K, B, E.

152. *Kyphosus lutescens* Jordan & Gilbert. P.

§ SECTATOR Jordan & Fesler.

153. *Kyphosus ocyurus* Jordan & Gilbert. P.

Genus XLIV. **Medialuna** Jordan & Fesler.

154. *Medialuna californiensis* (Steindachner). C.

Genus XLV. **Cæsiosoma** Kaup. Perhaps inseparable from *Scorpis*.

155. *Cæsiosoma chilense* * (Gay). V.

Subfamily XII. APLODACTYLINÆ.

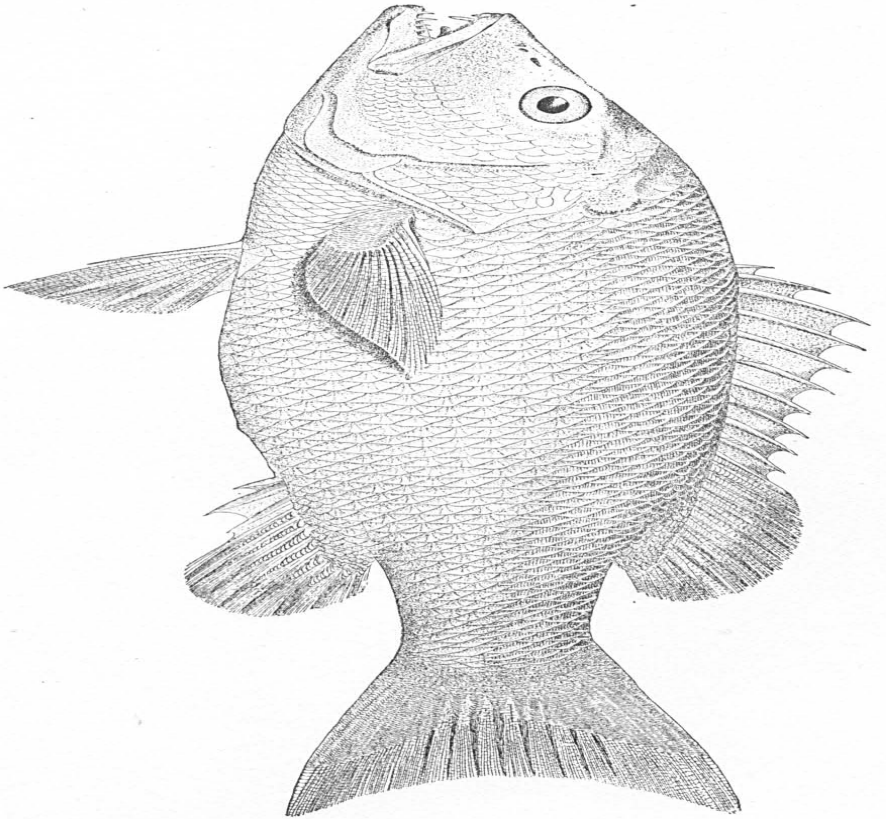
Genus XLVI. **Aplodactylus** Cuvier & Valenciennes.

156. *Aplodactylus punctatus* * Cuvier & Valenciennes. V.

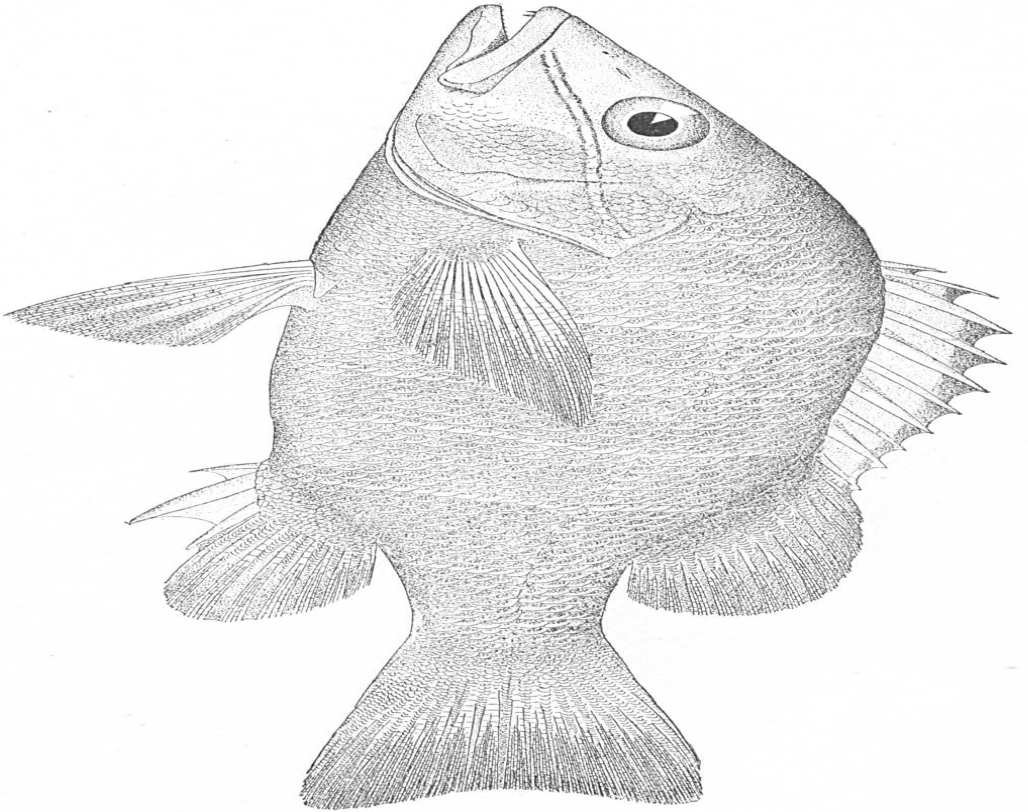
157. *Aplodactylus vermiculatus* * Gay. V.

158. *Aplodactylus guttatus* * Gay. V.

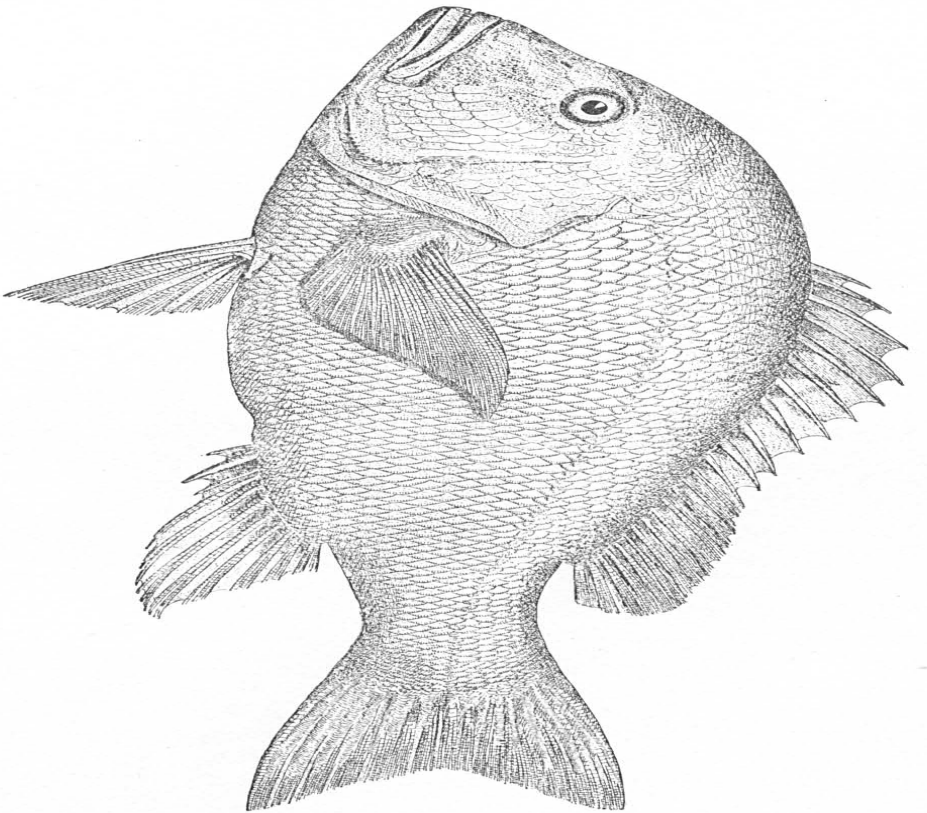
PALO ALTO, CAL., *March 20, 1892.*



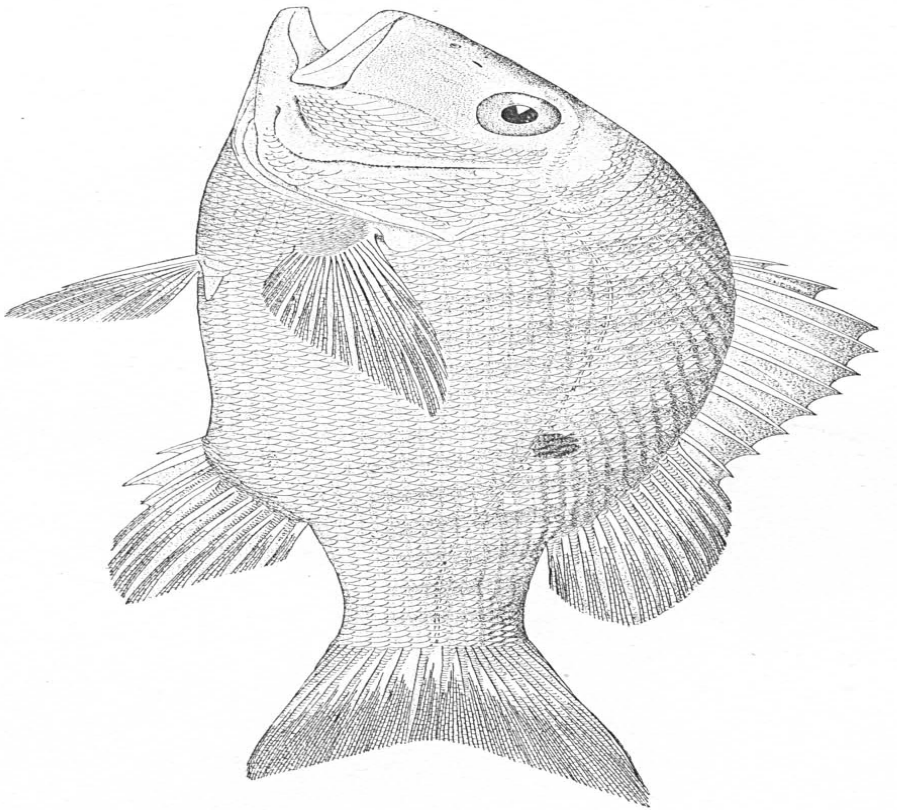
LUTJANUS GRISEUS (Linnæus). *The Gray Snapper or Mangrove Snapper.*



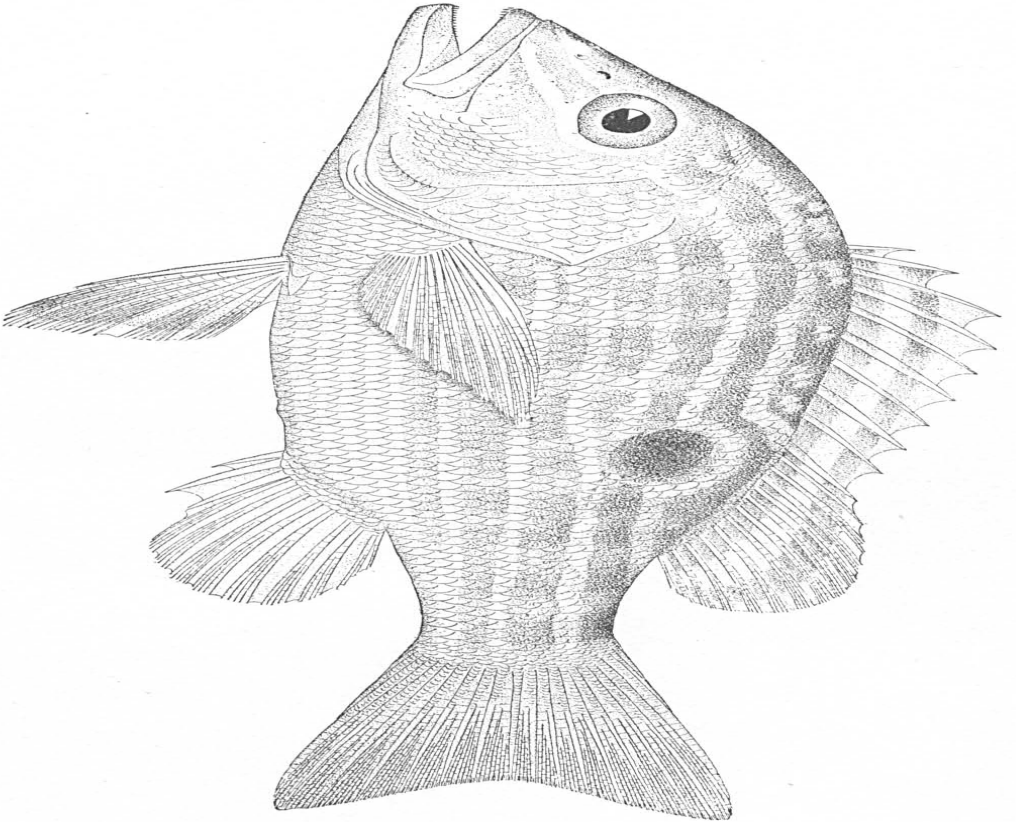
LUTJANUS CAXIS (Bloch and Schneider). *The Schoolmaster.*



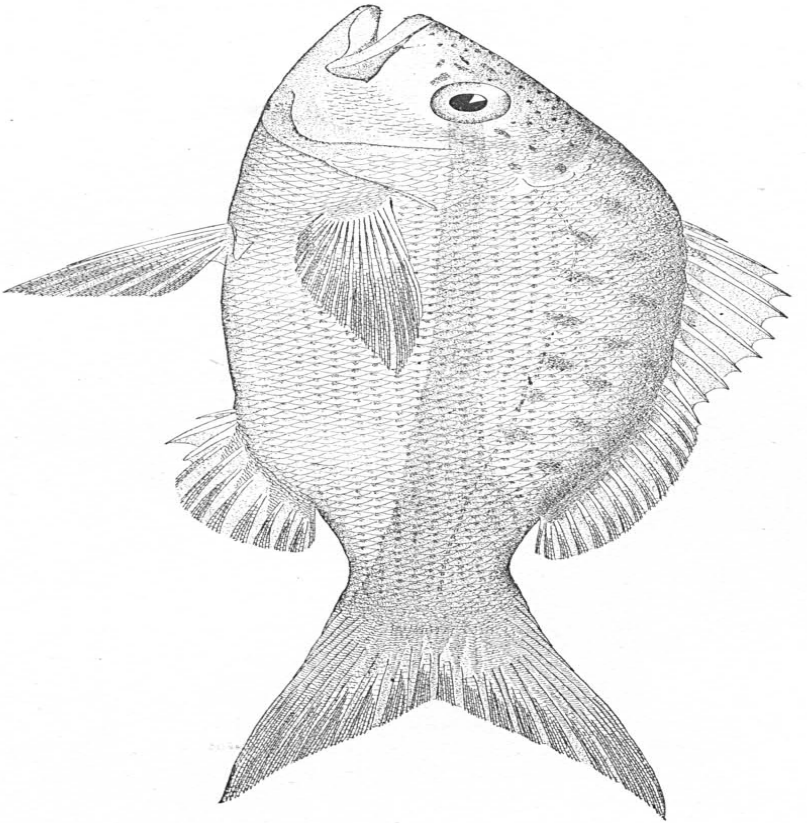
LUTJANUS AYA (Bloch). *Red Snapper.*



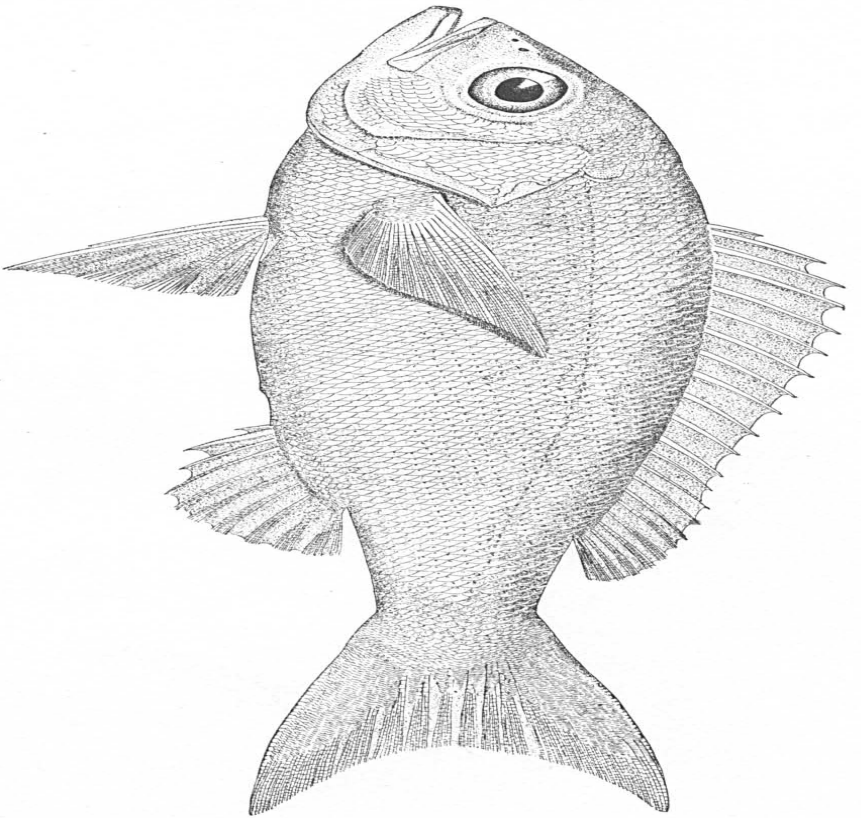
LUTJANUS ANALIS (Cuvier and Valenciennes). *The Mutton-fish or Pargo Criollo.*



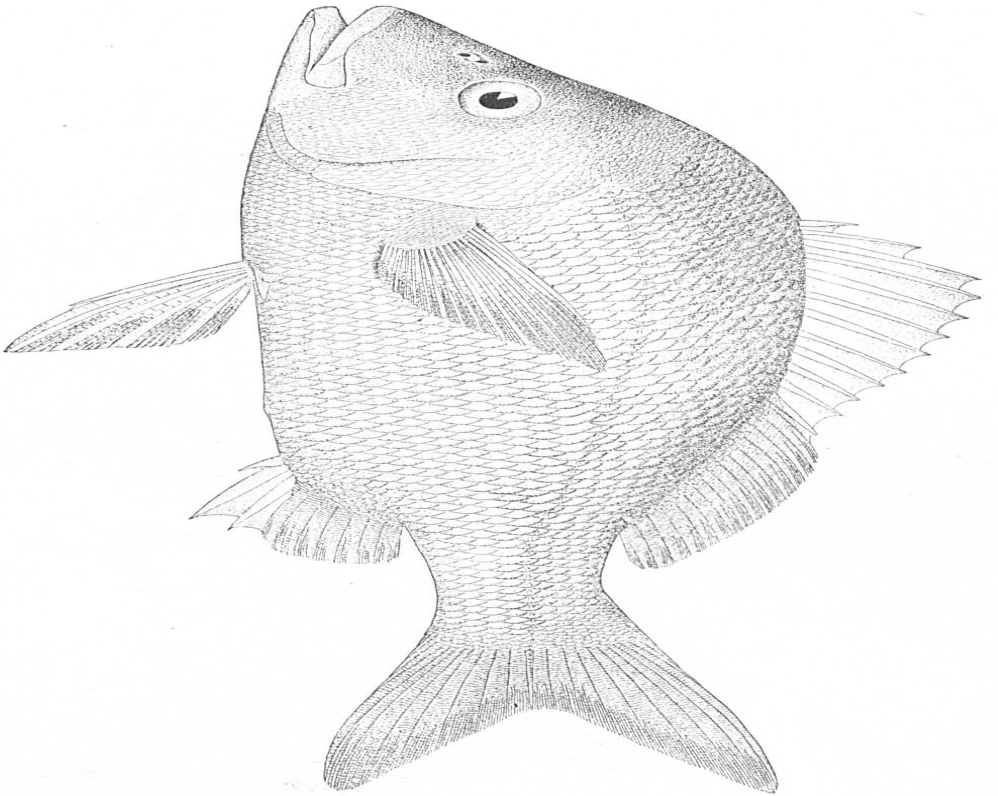
LUTJANUS SYNAGRIS (Linnæus). *The Lane Snapper or Biajaiba.*



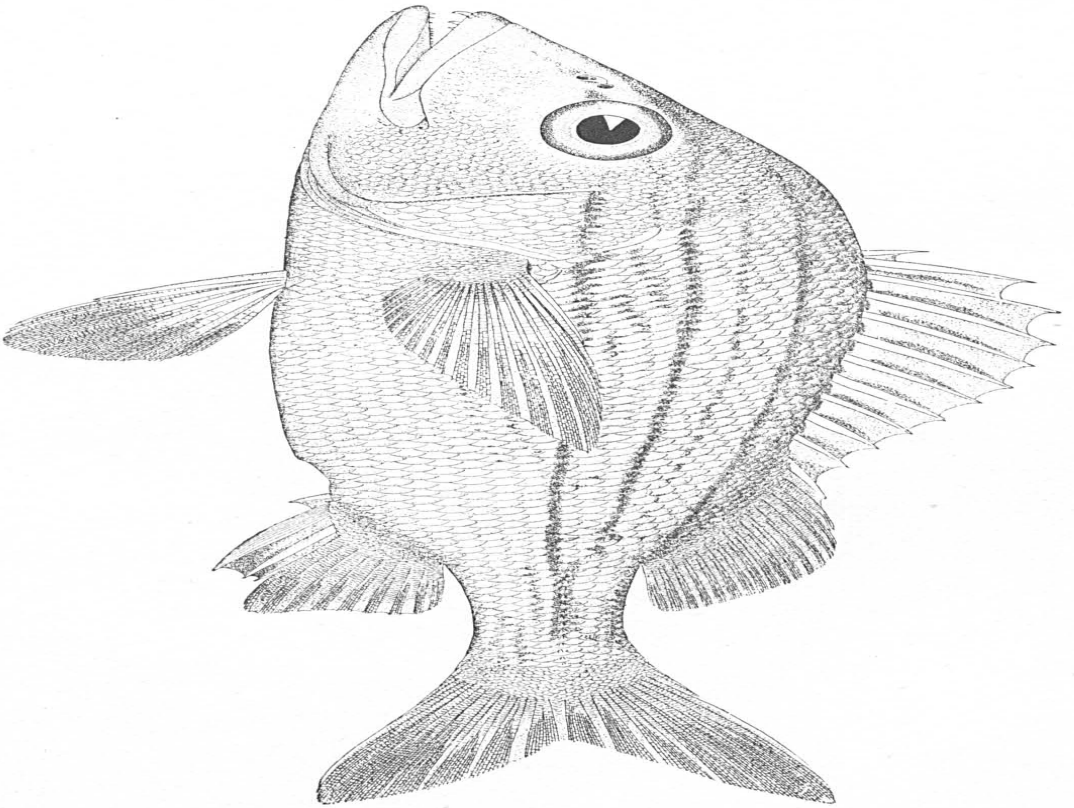
OCYURUS CHRYSURUS (Bloch). *The Yellow-tail Snapper or Rabirubia.*



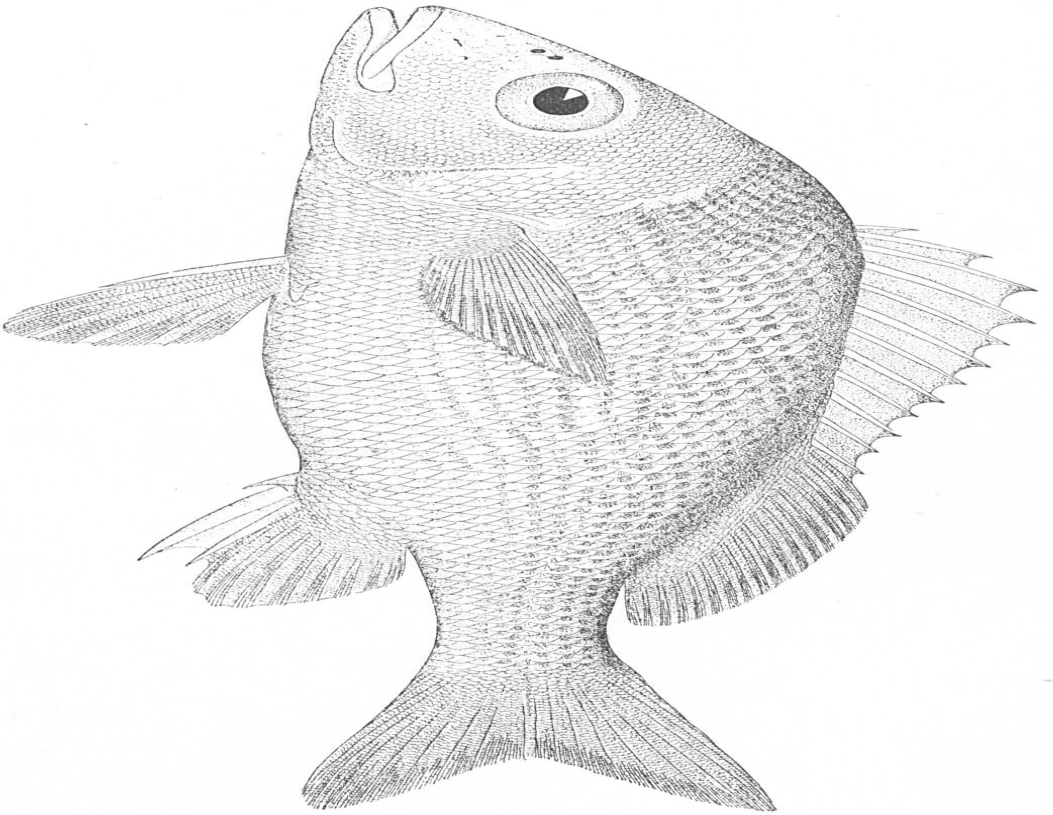
RHOMBOPLITES AURORUBENS (Cuvier and Valenciennes). *The Capon.*



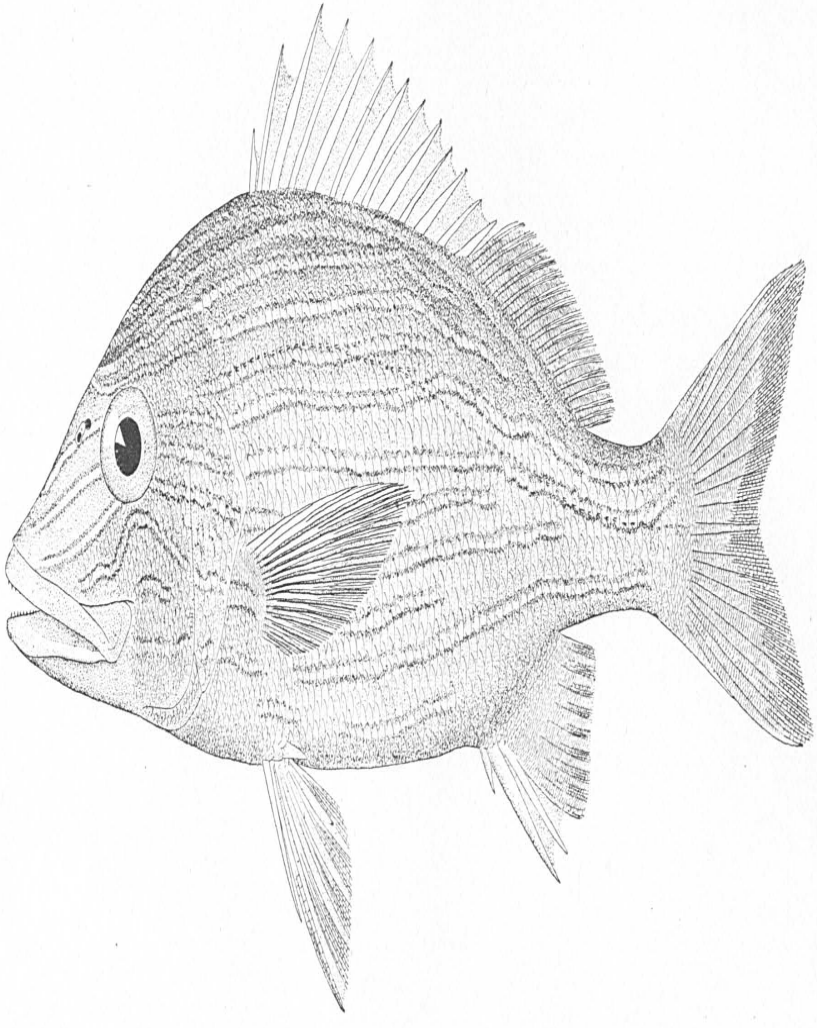
HÆMULON ALBUM Cuvier and Valenciennes. *The Margate-fish or Tallitto.*



HÆMULON MACROSTOMA Günther. *The Striped Margate-fish.*

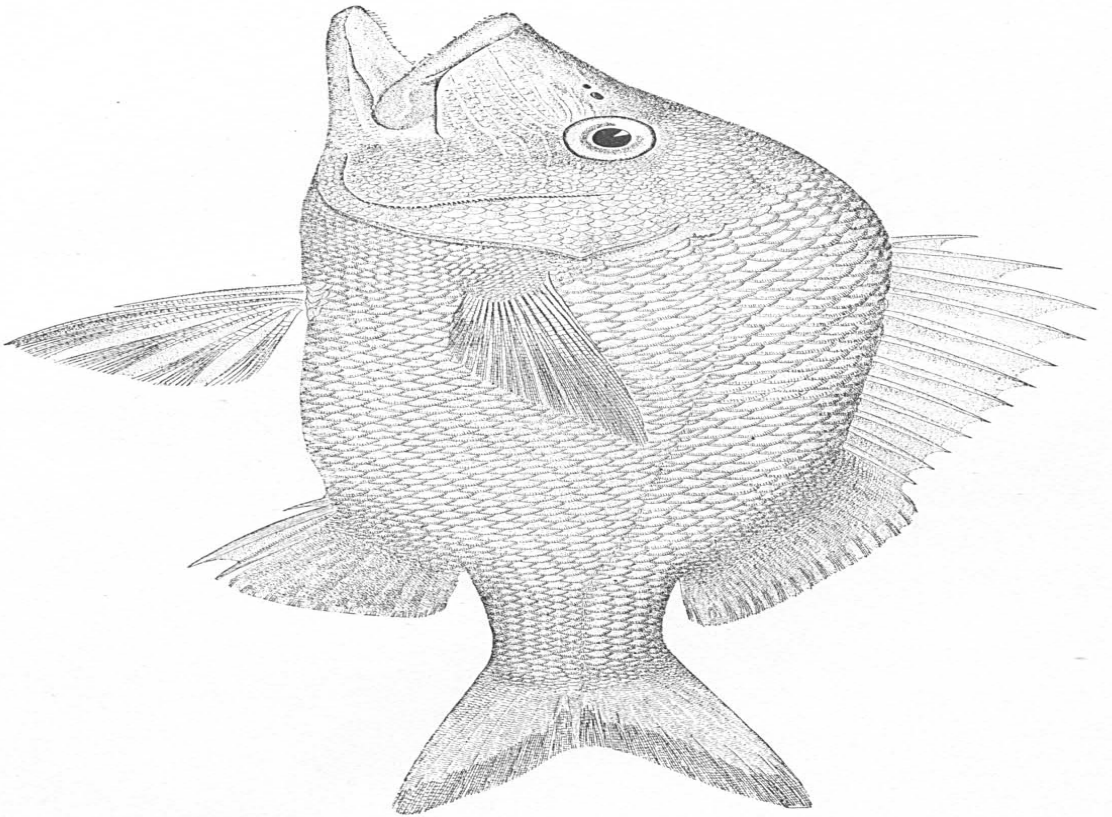


HÆMULON PARRA (Desmarest). *The Sailor's Choice or Ronco Blanco.*

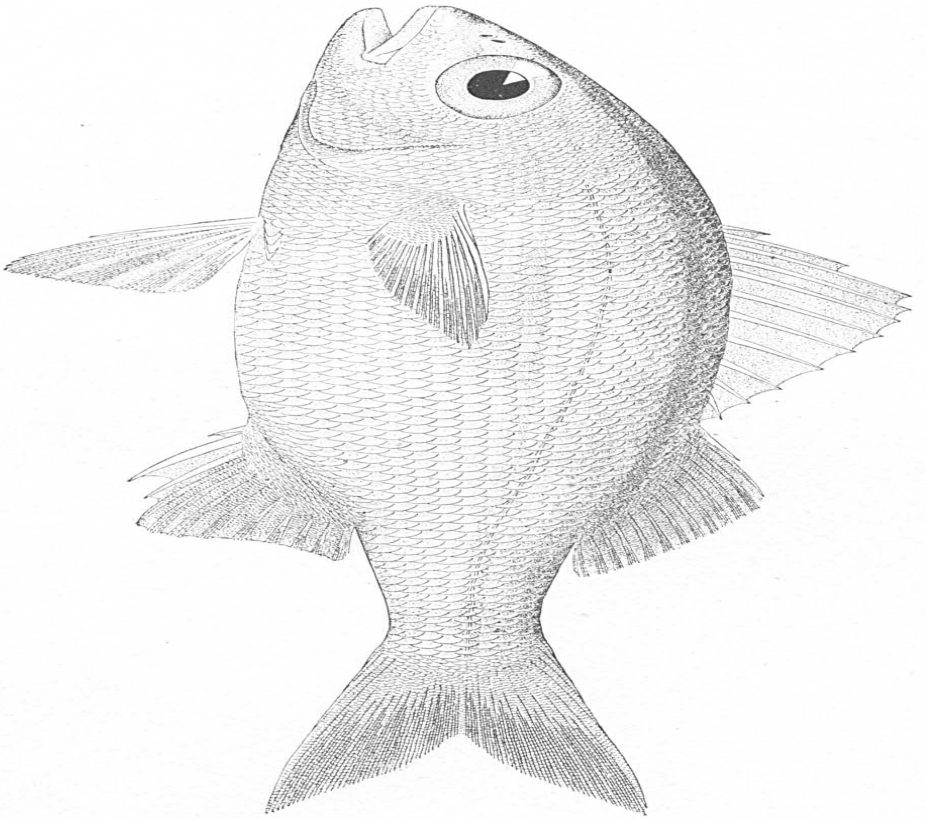


HÆMULON SCIURUS (Shaw). *The Yellow Grunt or Ronco Amarillo.*

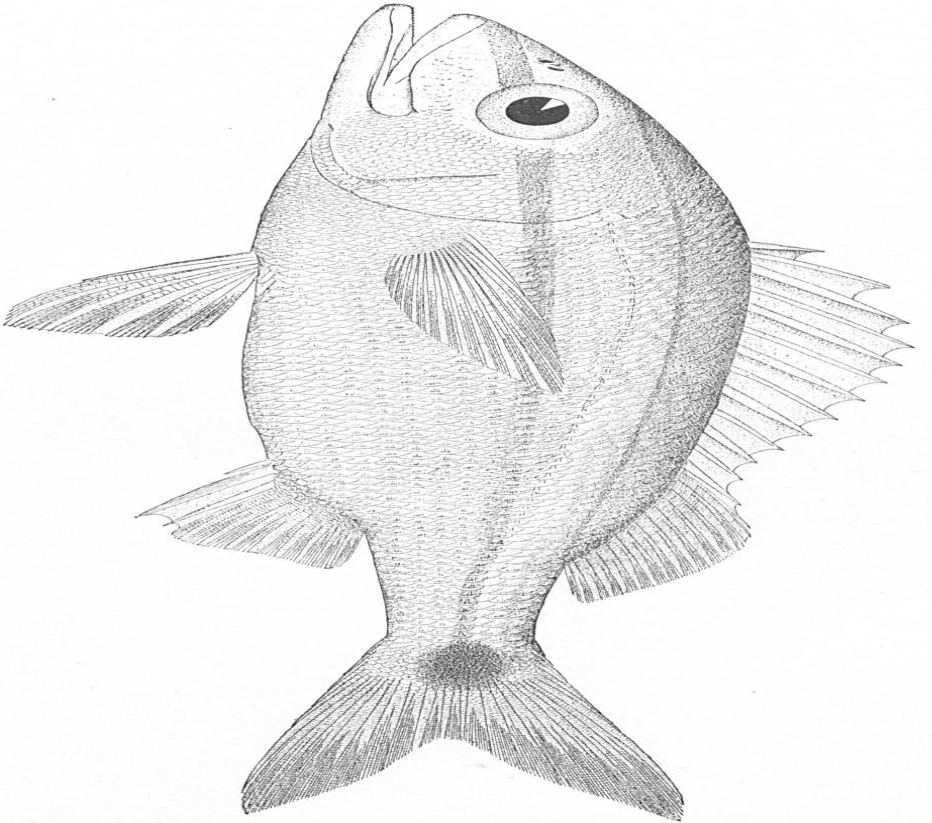
Report U. S. F. C. 1889 to 1891. (To face p. 544.)



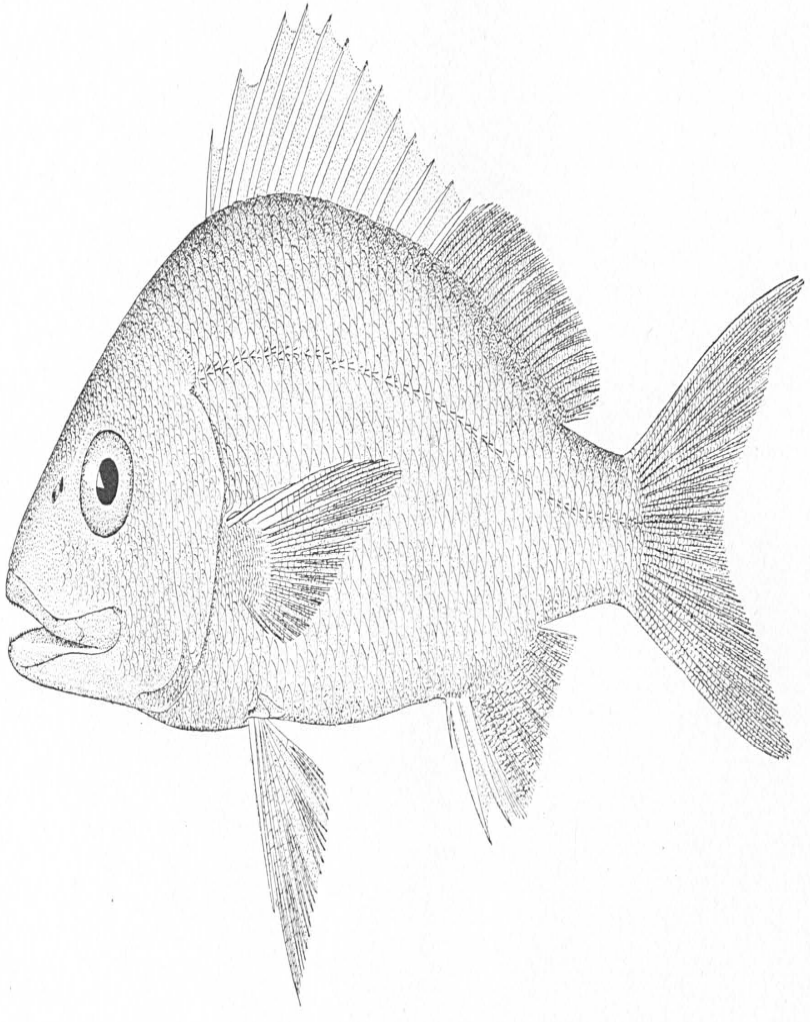
HÆMULON PLUMIERI (Lacépède). *The Common Grunt or White Mouth.*



HÆMULON CHRYSARGYREUM Günther. *The Small-mouthed Grunt.*

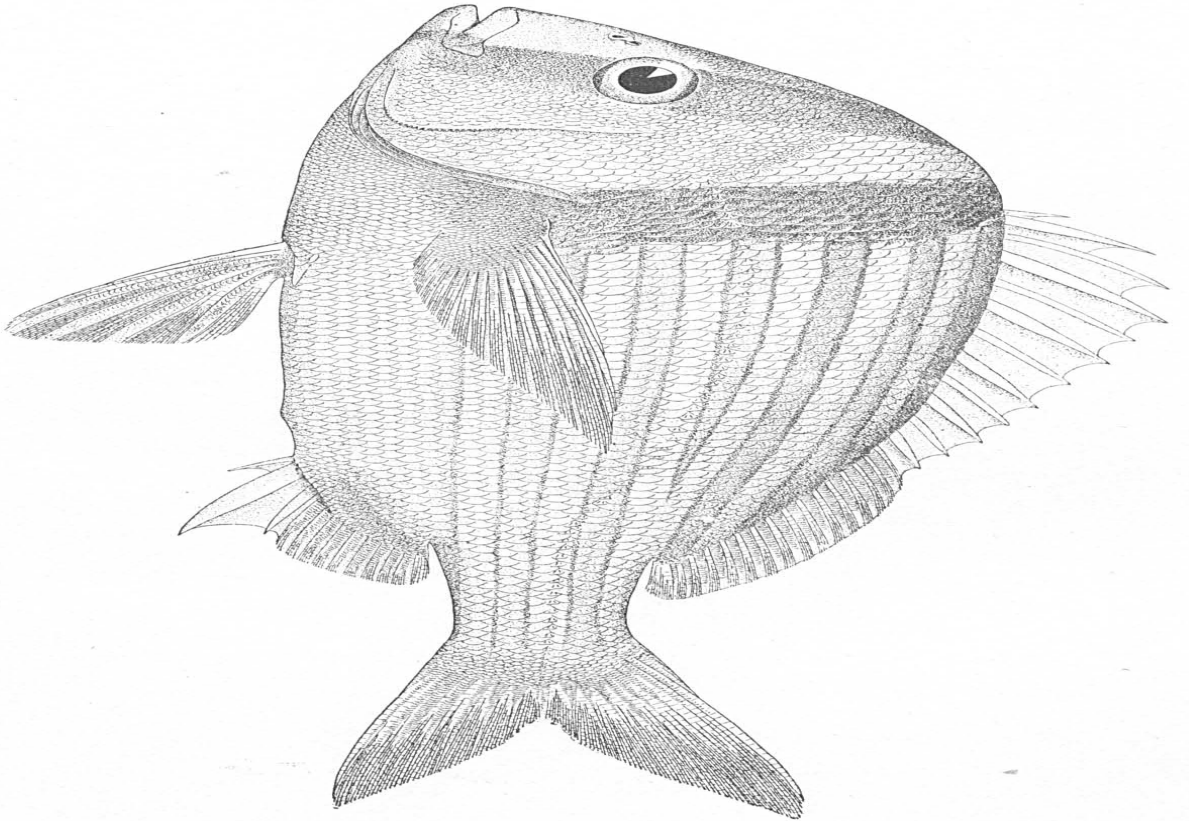


HÆMULON RIMATOR Jordan and Swain. Young. *The Tom-tate or Flannel-mouthed Grunt.*

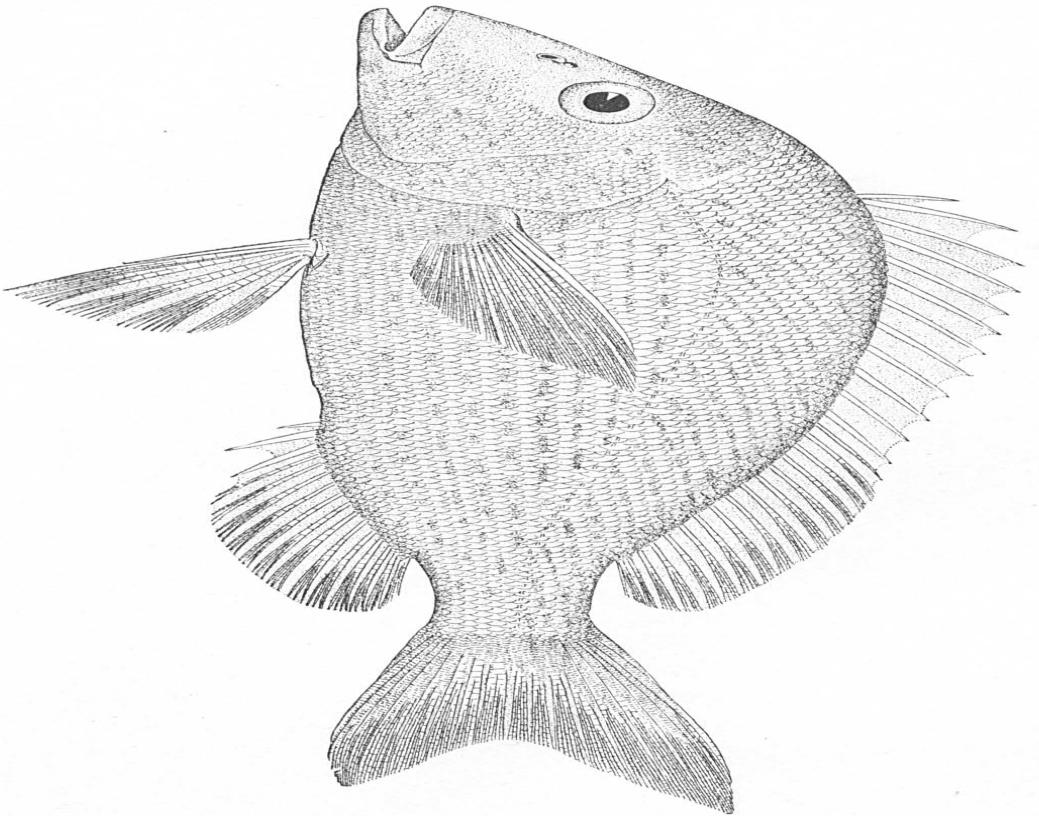


HÆMULON RIMATOR Jordan and Swain. Adult. *The Tom-tate or Flannel-mouthed Grunt.*

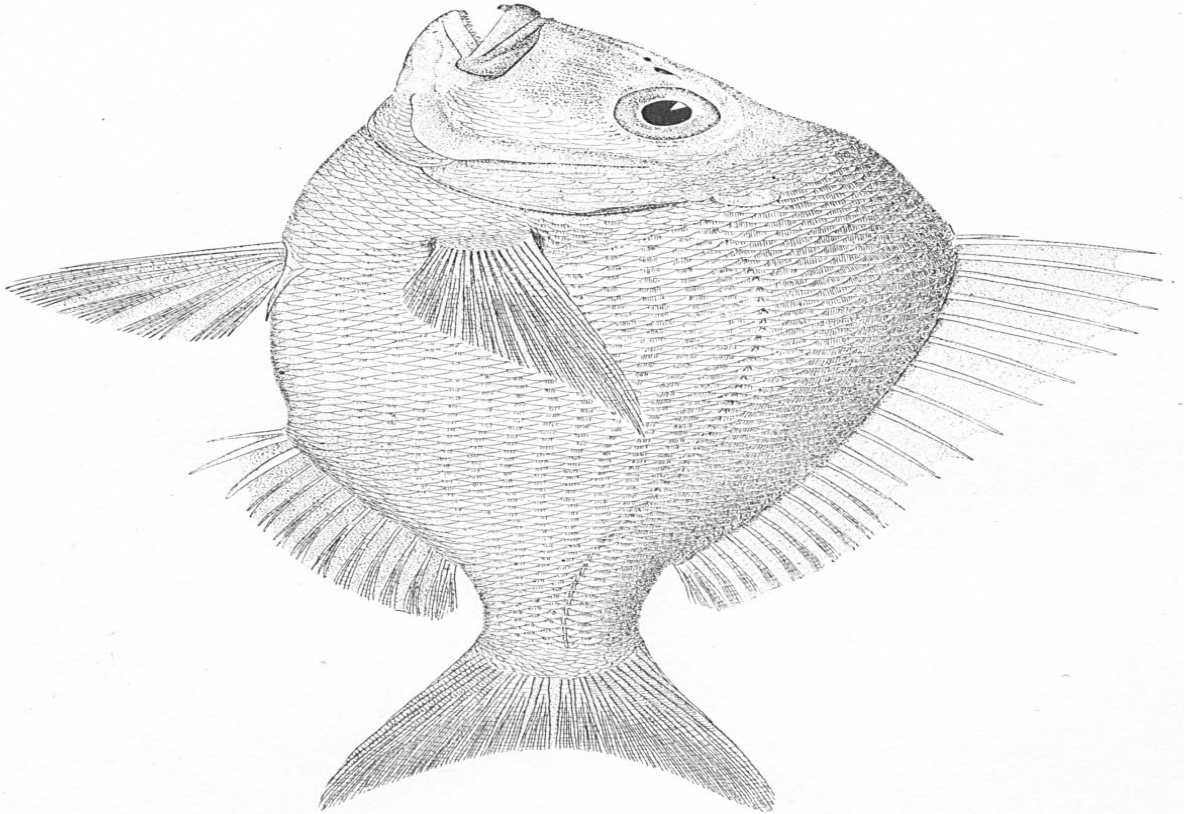
Report U. S. F. C. 1889 to 1891. (To face p. 544.)



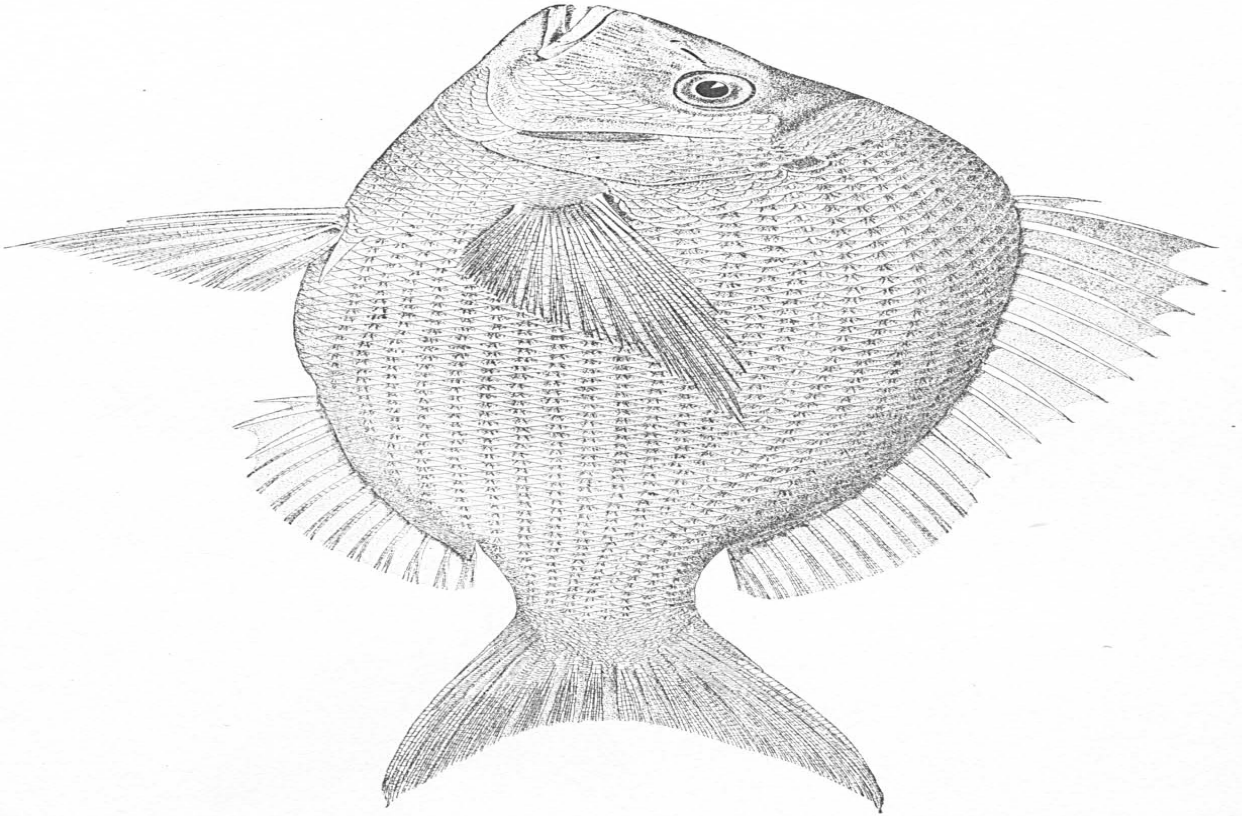
ANISOTREMUS VIRGINICUS (Linnæus). *The Pork-fish or Catalineta.*



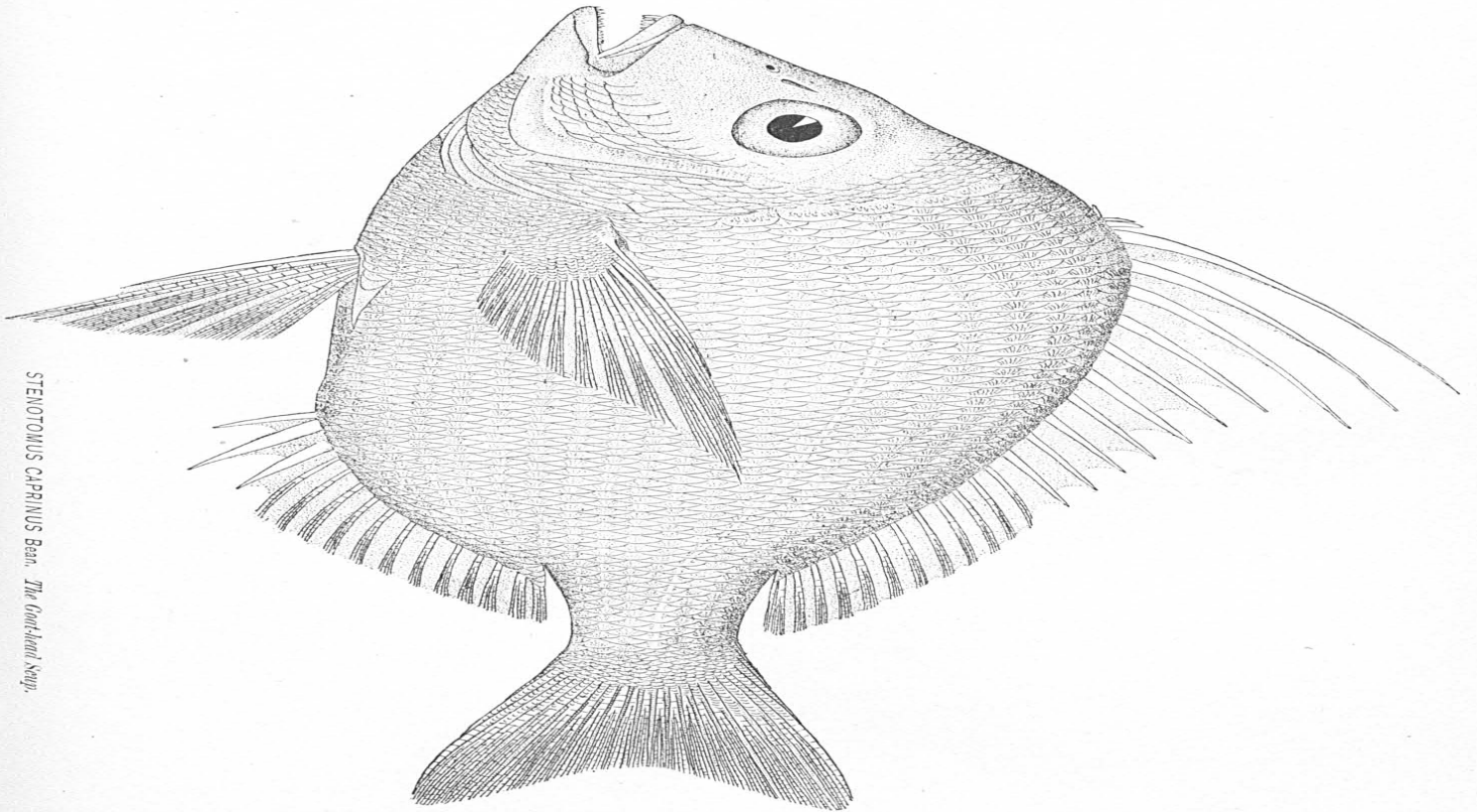
ORTHOPRISTIS CHRYSOPTERUS (Linnæus). *The Pejí-fish.*



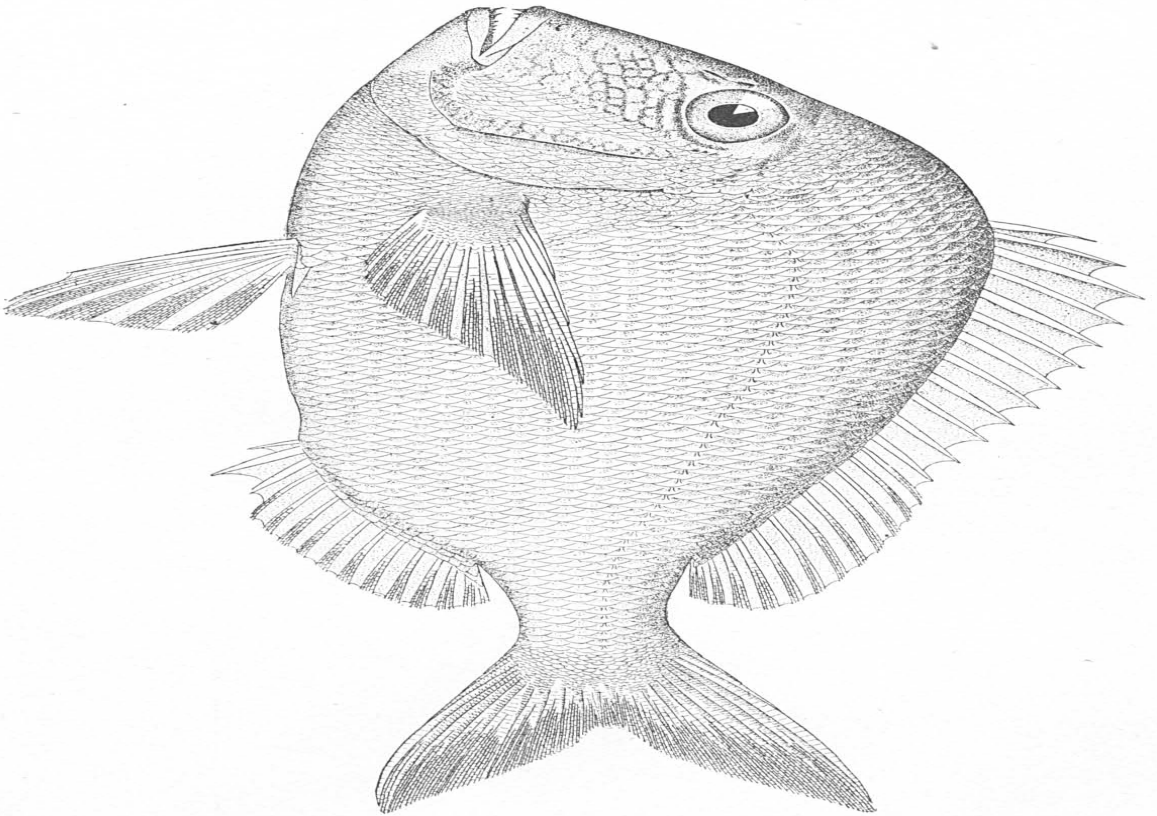
STENOTOMUS ACULEATUS (Cuvier and Valenciennes). *The Southern Porgy.*



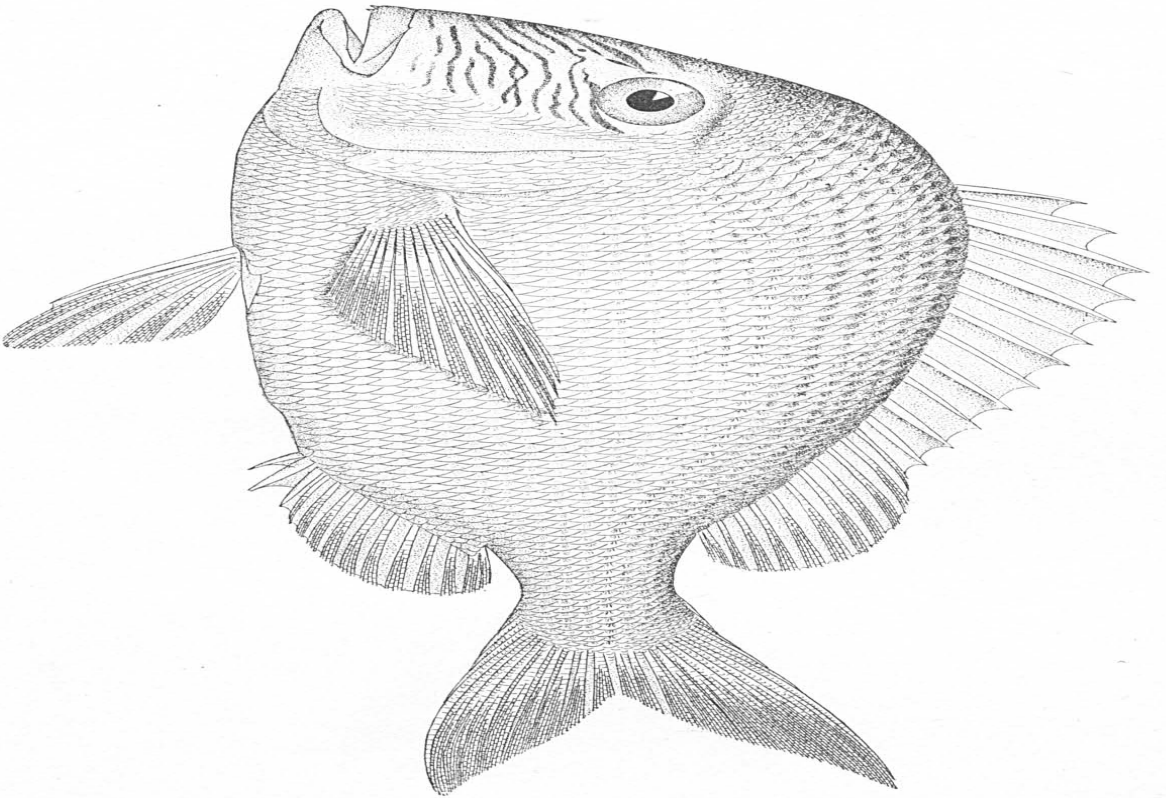
*STENOTOMUS CHRYSOPS (Linnæus). *The Scup.*



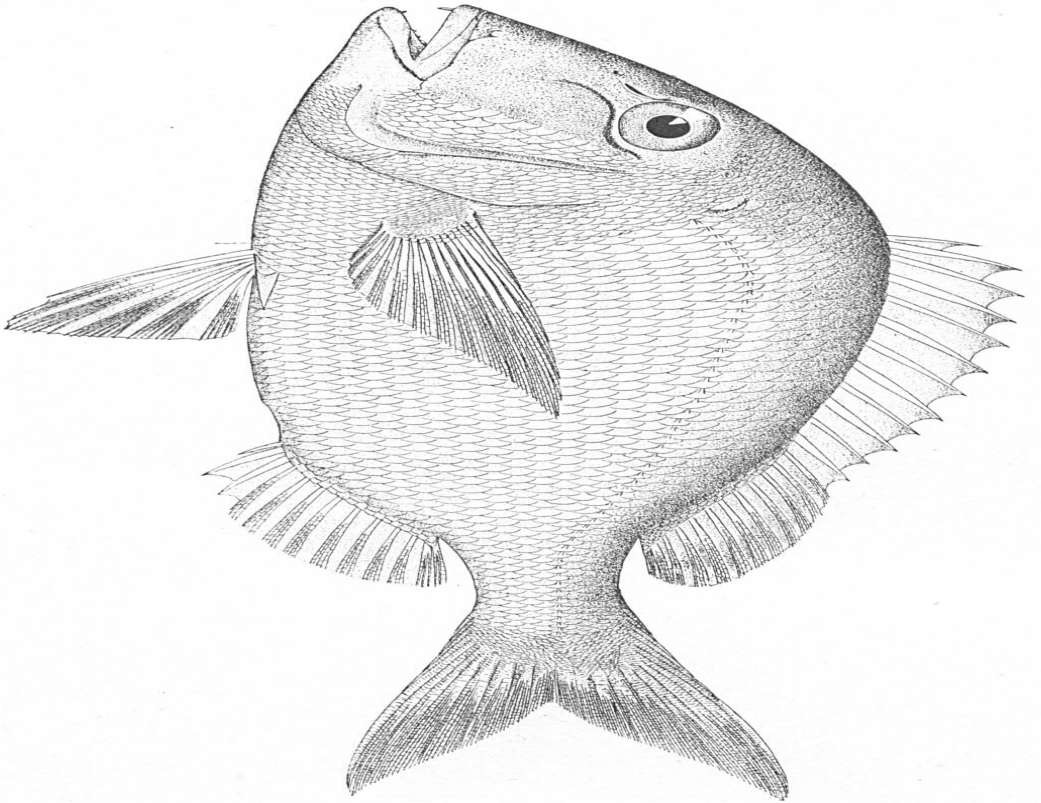
STENOTOMUS CAPRINUS Bean. *The Goat-head Seup.*



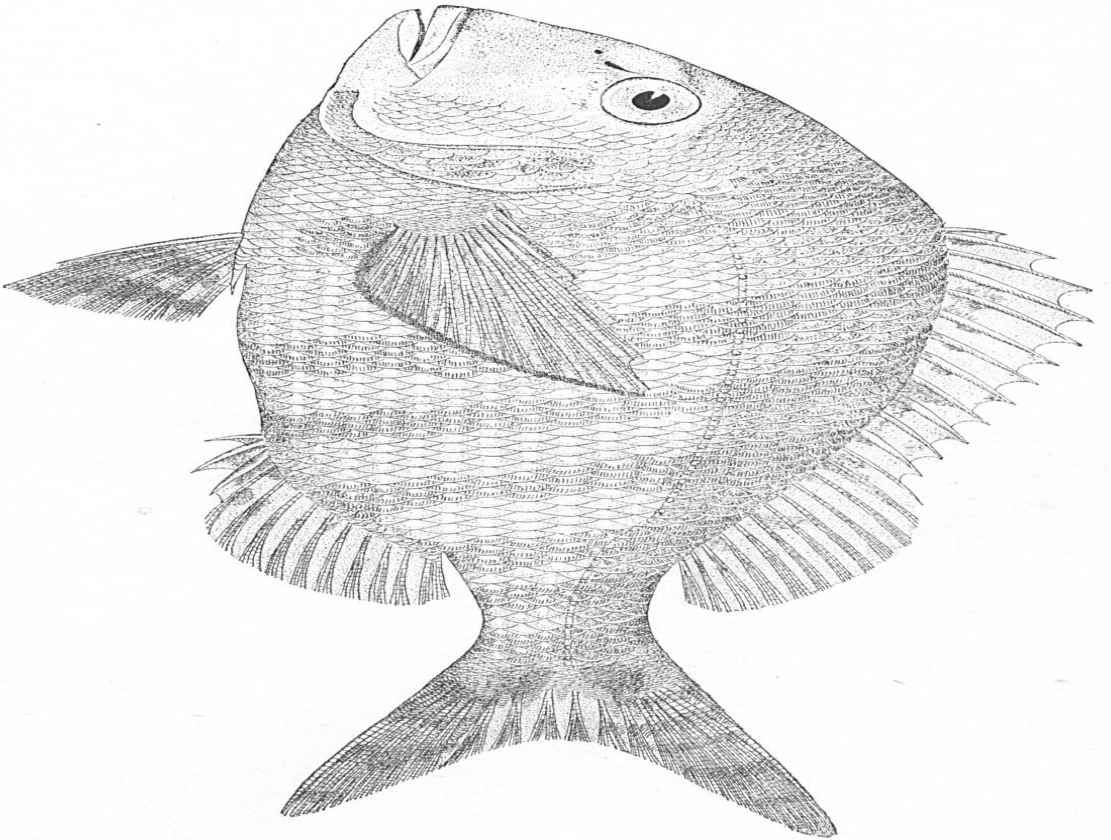
CALAMUS CALAMUS (Cuvier and Valenciennes). *The Nauvergue Porgy.*



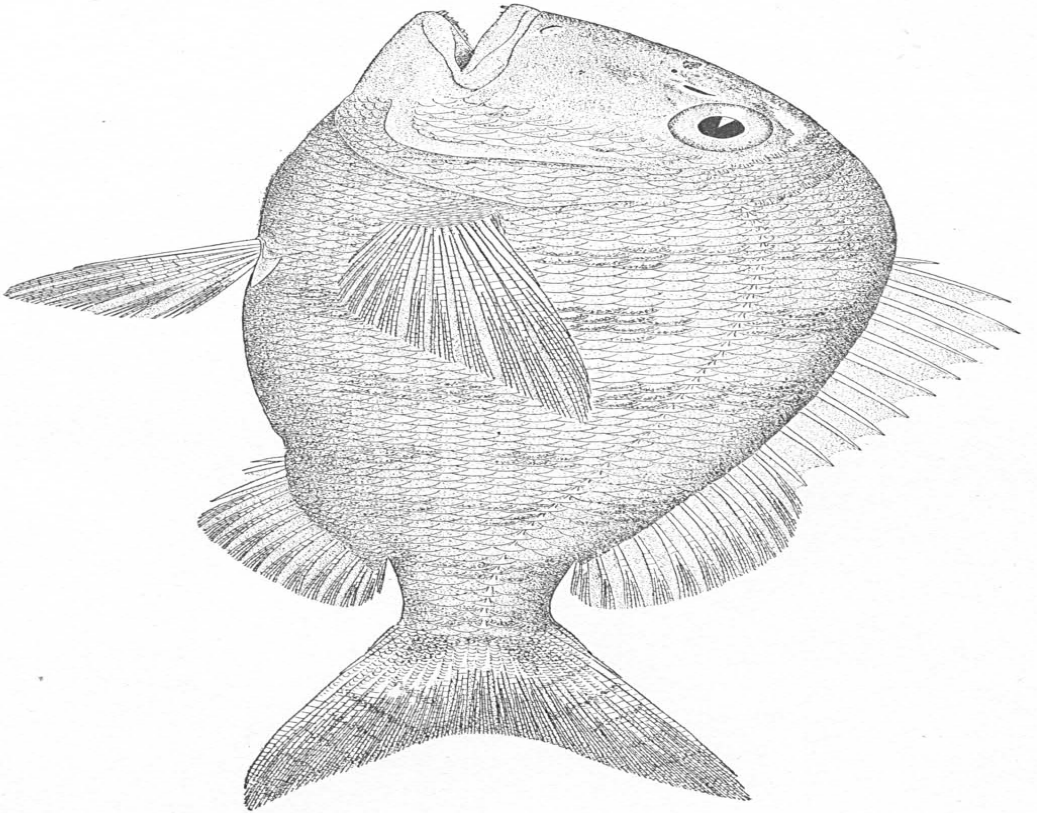
CALAMUS PRORIDENS Jordan and Gilbert. *The Littlehead Porgy or Pez de Pluma.*



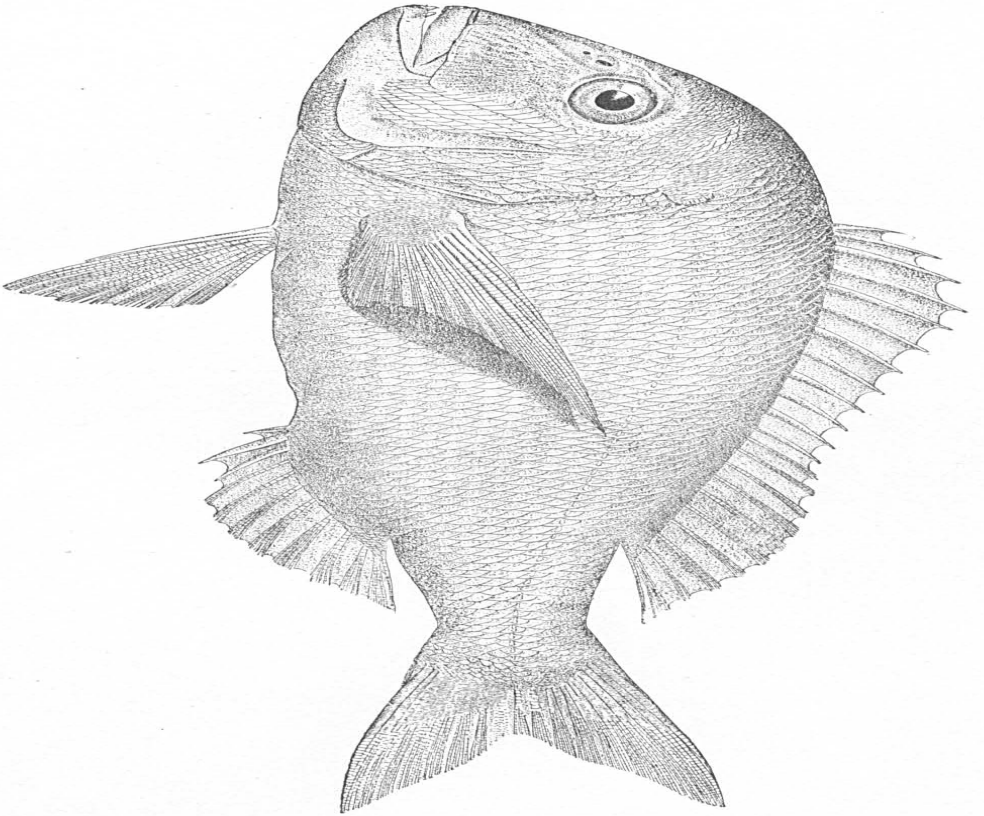
CALAMUS BAJONADO (Bloch and Schneider). *The Jolt-head Porgy or Bajonado.*



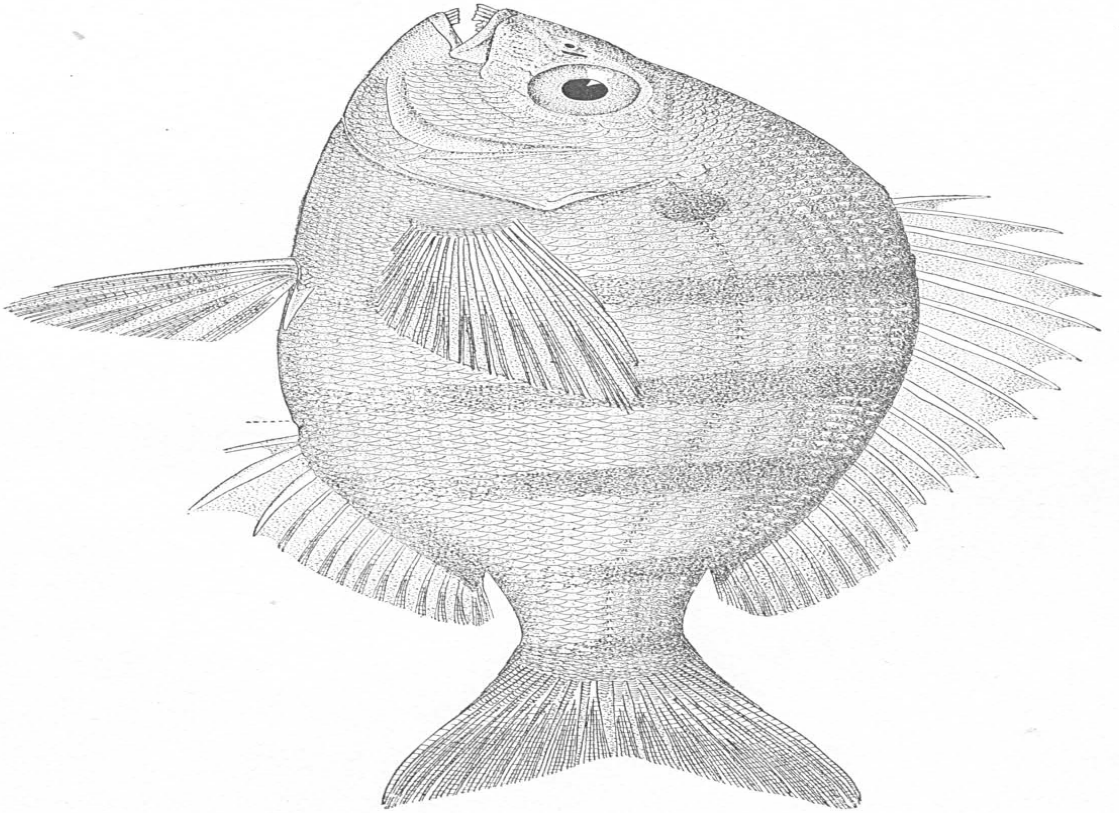
CALAMUS PENNA Cuvier and Valenciennes. *The Little-mouth Porgy or Sheepshead Porgy.*



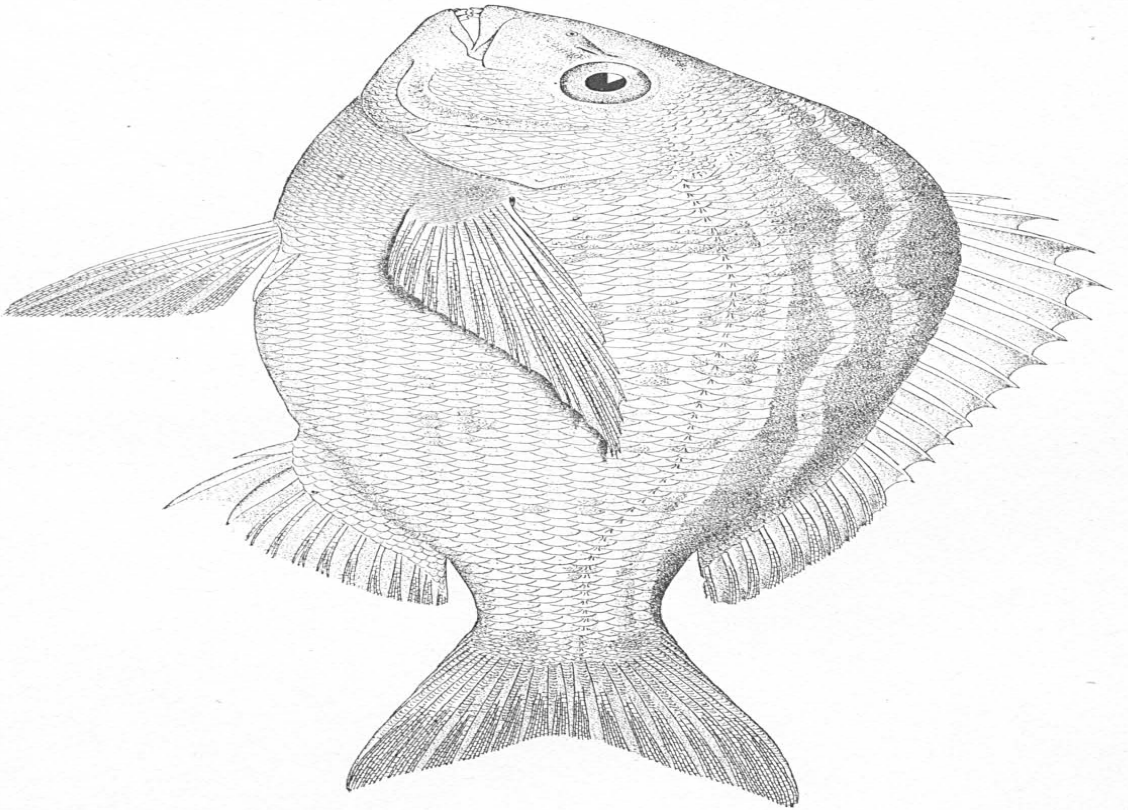
CALAMUS ARCTIFRONS Goode and Bean. *The Grass Porgy.*



SPARUS PAGRUS Linnæus. *The Red Porgy (the true Porgy or Pargo of Europe.)*

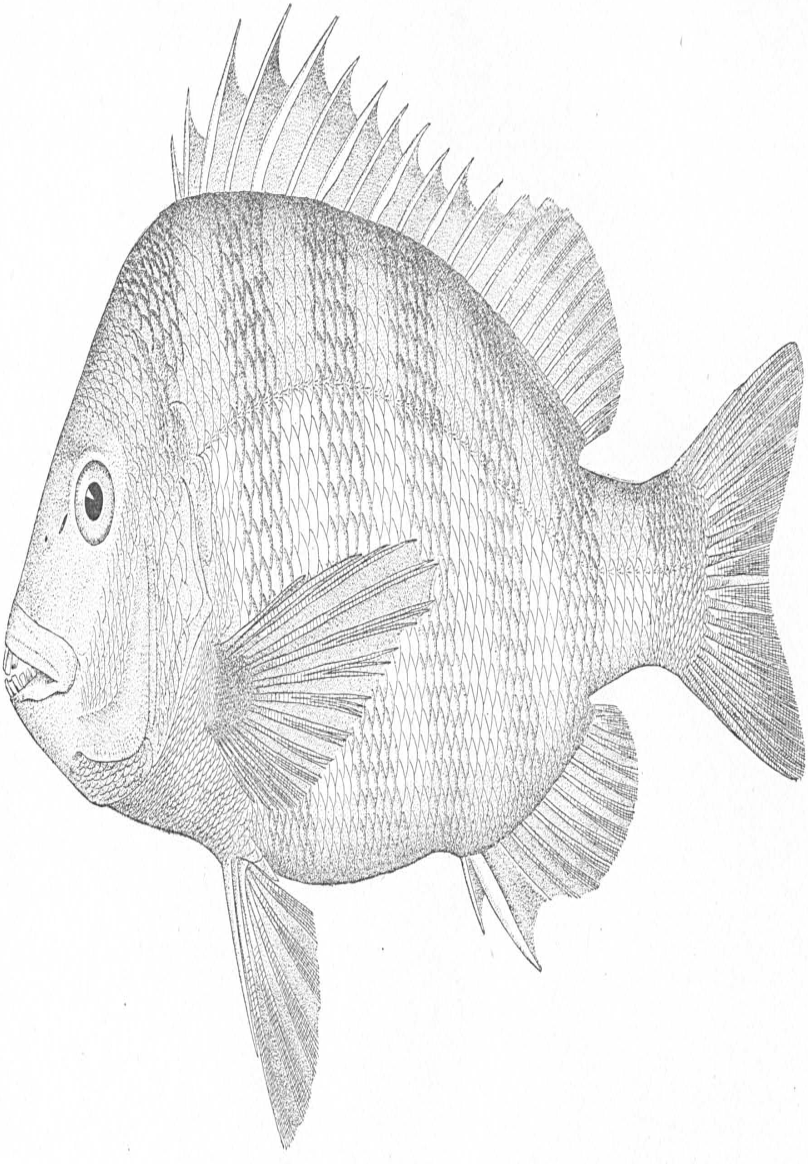


LAGODON RHOMBOIDES (Linnæus). *The Pin-fish or Choya Spinn.*

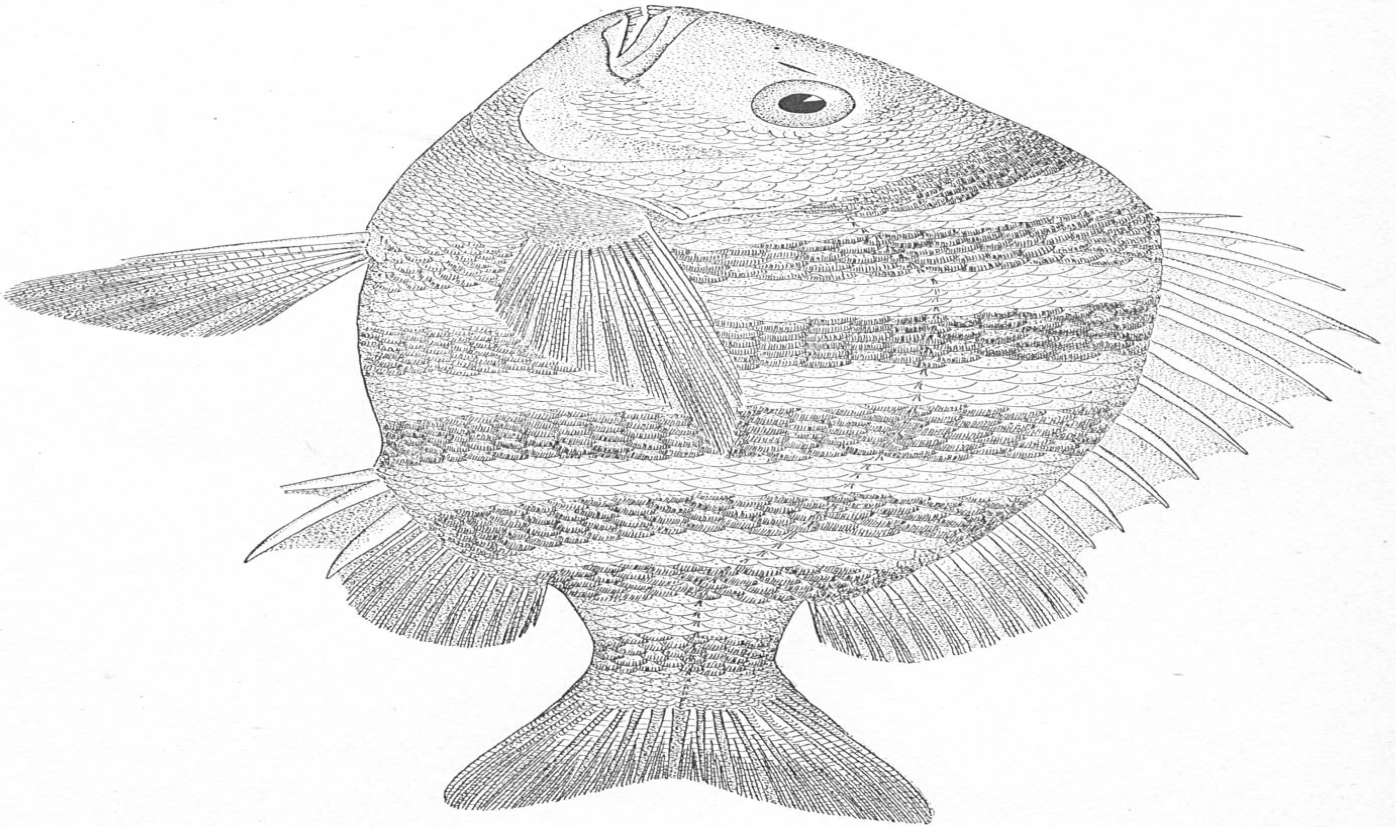


ARCHOSARGUS UNIMACULATUS (Bloch). *The Sideman.*

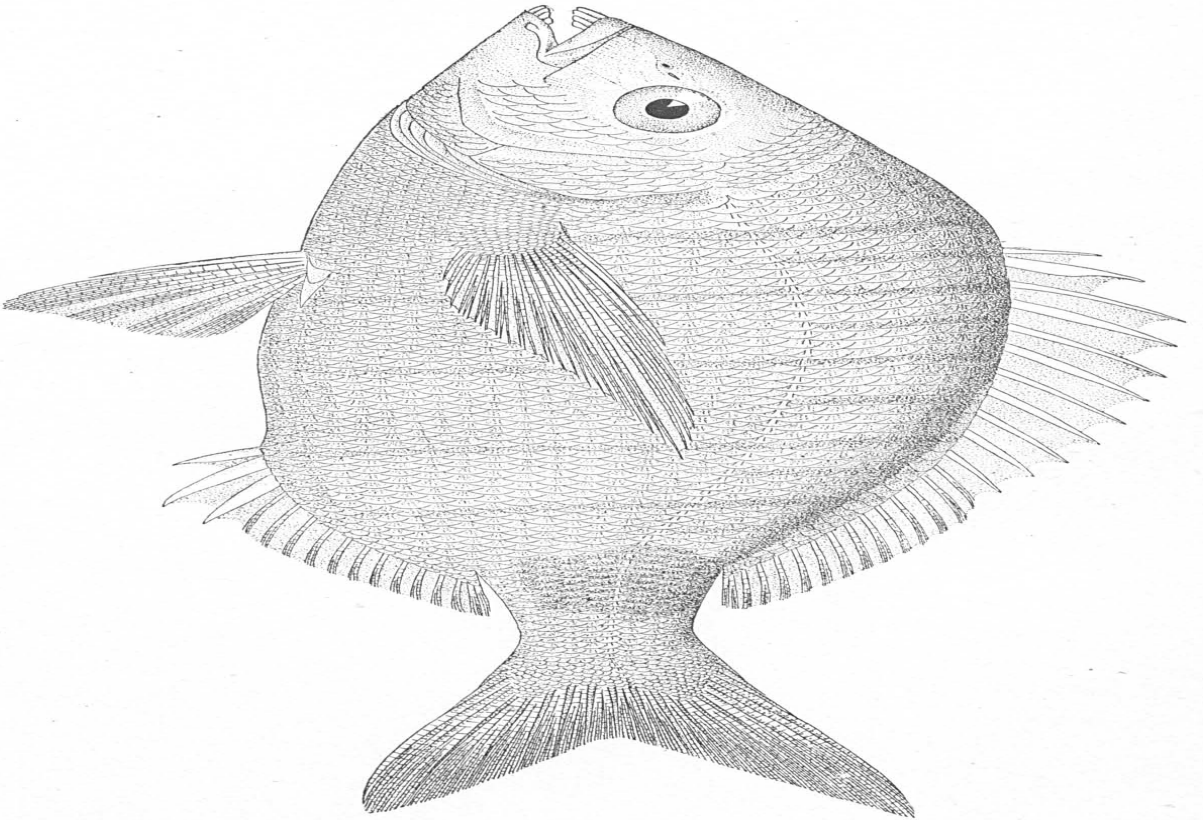
 (To face p. 544.)



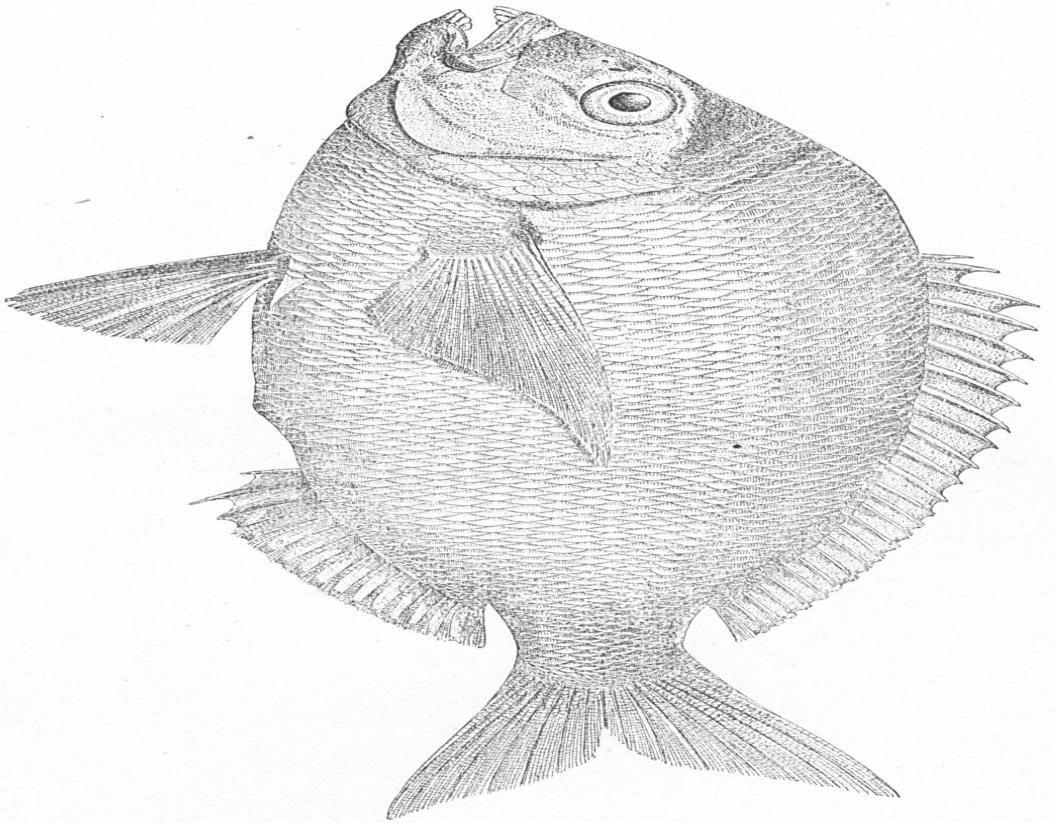
ARCHOSARGUS PROBATOCEPHALUS (Walbaum). *Sheepshead.* Adult. Third anal spine too slender.



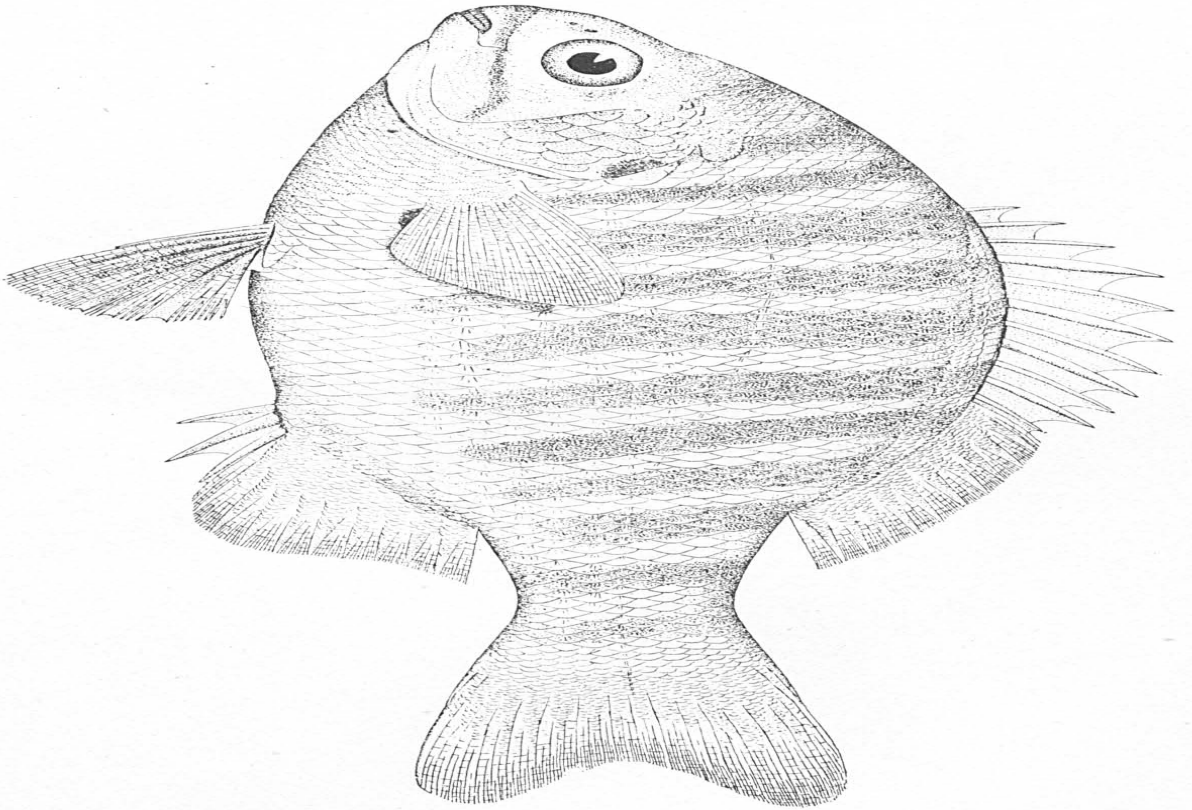
ARCHOSARGUS PROBATOCEPHALUS (Walbaum) *The Sheepshead.* Young.



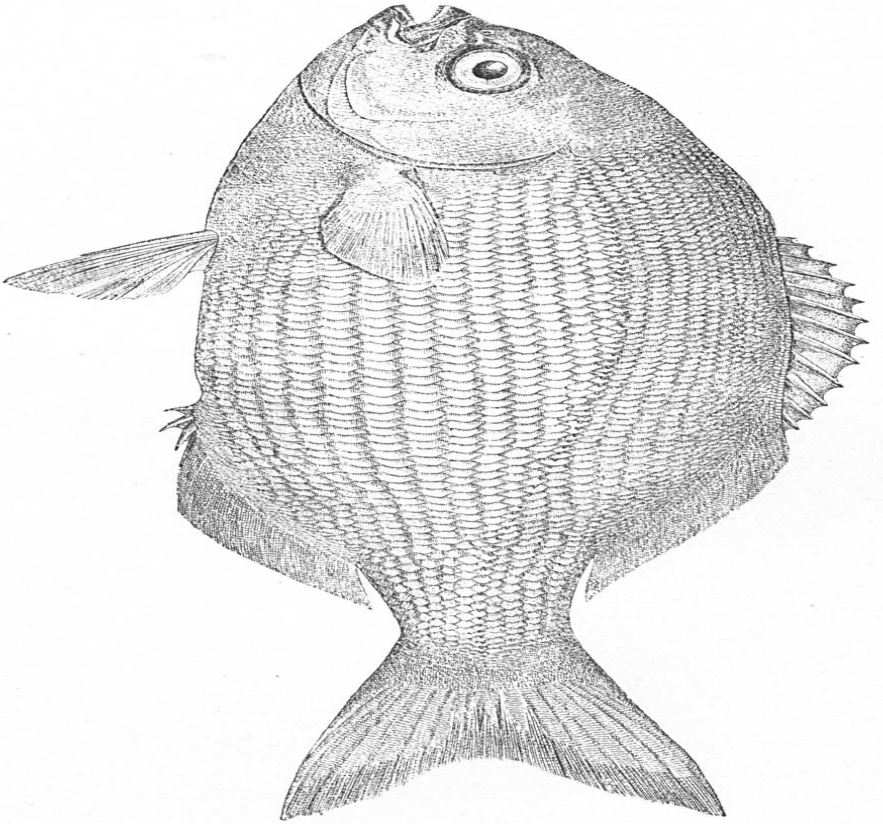
DIPLODUS HOLBROOKI (Bean). *Ringtailed Bream.* Young.



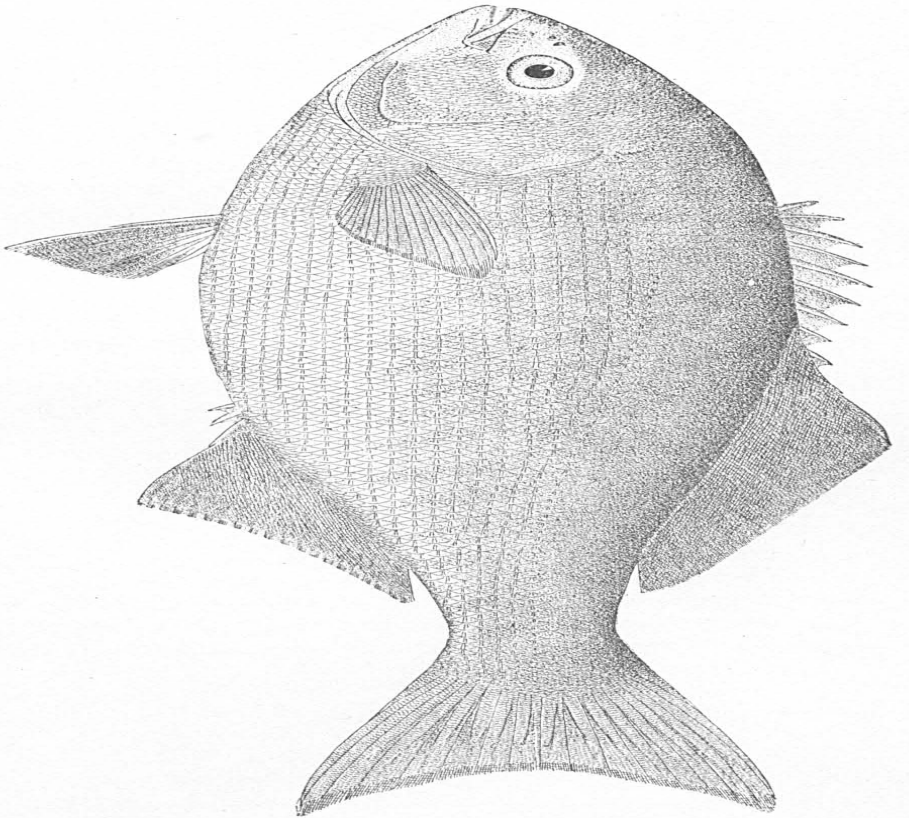
DIPLODUS HOLBROOKI (Bean). *Ring-tailed Bream.* Adult.



HERMOSILLA AZUREA Jenkins and Evermann. *The Hermosillas.*



KYPHOSUS SECTATRIX (Linnæus). *The Bermuda fish.*



MEDIALUNA CALIFORNIENSIS (Steindachner). *The Mediluna.*