7.—A REVIEW OF THE LABROID FISHES OF AMERICA AND EUROPE.

By DAVID STARR JORDAN.

In this paper, I have tried to give a systematic catalogue of all the species of Labroid fishes (Old-wives, Wrasses, Doncellas, Pudianos, Parrot-fishes, etc.) found in the waters of America and Europe, with the synonymy of each species and analytical keys by which the various genera and species may be distinguished. In the preparation of this work I have been especially indebted for important aid to my wife, Jessie Knight Jordan.

The material examined comprises the collections of the Indiana University, rich in West Indian and Mediterranean fishes; a considerable part of the American *Labridæ* in the U. S. National Museum; the Sandwich Island collections of Dr. Oliver P. Jenkins; all the *Scarinæ* in the Museum of Comparative Zoology, and a large part of the fishes of this family in the Museum at Paris.

Of about one hundred and twenty species of *Labridæ*—American and European, I have examined two-thirds. The following species I have not seen.

Centrolabrus exoletus.
Centrolabrus trutta.
Acantholabrus palloni.
Labrus berggylta.
Labrus comber.
Labrus nubilus.
Symphodus melanocercus.
Symphodus pirca.
Ctenolabrus iris.
Ctenolabrus suillus.
Ctenolabrus brandaonis.
Harpe eclancheri.
Harpe tredecimspinosus.
Harpe pulchella.
Lepidaplois scrofa.
Crans nigra.
Trochocopus maculatus.
Pimelometopon darwini.
Pseudolabrus gayi.
Leptojulis bimaculatus.
Thalassoma nitidum.
Thalassoma steindachneri.
Thalassoma pavo.
Xyrichthys modestus.
Malapterus reticulatus.
Callyodontichthys bleekeri.
Sparisoma strigatum.
Sparisoma maschalespilos.
Sparisoma aracanga.
Scarus aracanga.
Scarus acutus.
Scarus flavomarginatus.
Scarus simplex.
Scarus pleianus.

I have preferred to unite the Labroid and Scaroid fishes in a single family, *Labridæ*, as the two groups are very closely similar in all respects excepting in their dentition, both of the mouth and the pharyngeals. In the matter of the dentition of the jaws there is a strong tendency towards transition into the Labroid type seen in some of the genera of Scaroids. We therefore recognize the *Scarinæ* as forming one of the suborders of the *Labrinæ*. The other *Labrinæ* show characters less strongly marked.

The *Labrinæ* are the most generalized forms, well distinguished from the others by their greater number of vertebræ, a character associated

with the greater number of dorsal spines, and with their northern habitat. These are the only Labroids properly belonging to the north temperate zone, and all but two of the species are European.

The *Malapterinæ* seem to be allied to the *Labrinæ*, although they may belong to some other family. The number of vertebræ have not been counted in the single known species. It belongs to the South Temperate Zone, and differ from the *Labrinæ* in having most of its dorsal spines replaced by soft rays.

The *Harpinæ* are allied to the *Labrinæ*, but are chiefly tropical fishes with a reduced number of vertebræ and spines. Close to the *Bodianinæ* is the small subfamily of *Clepticinæ*, distinguished by the little development of the jaws and pharyngeals and by the correspondingly feeble dentition.

The *Julidinæ* are the most abundant of the tropical Labroids, brilliant little fishes, abounding about banks and reefs, and having the vertebræ reduced to the normal number 10+14=24 and the dorsal spines to about nine.

The *Scarinæ* are almost exclusively tropical. They have the normal number of vertebræ and of spines. Their pharyngeal bones and teeth are, however, modified in a very singular way, and they must be regarded as forming the most specialized type of *Pharyngognathi*, the suborder to which the Labroids belong. Professor Cope regards this suborder as the most specialized or "highest" in the group of fishes. The specialization of the Labroids is, however, reducible to two or three characters, the specialization of the pharyngeal bones, the gills, and in general of the pigment cells. In general they are not less generalized than the majority of the *Acanthopteri*, and they do not depart so widely from the usual fish type as do the *Pediculati*, *Plectognathi* or *Heterosomata*.

NUMBERS OF VERTEBRÆ.

The fact that northern forms have an increased number of vertebræ is well shown in this group. The following table shows the numbers of vertebræ as given by Doctor Günther* in the species examined by him.

* "It will be evident that in those genera which are composed entirely or for the most part of tropical species, the vertebral column is composed of twenty-four or nearly twenty-four vertebræ, whilst those which are chiefly confined to the temperate seas of the Northern or Southern hemisphere have that number increased in the abdominal and caudal portions." (Günther, IV, 65.) This increase in the number of vertebræ in northern forms has been used as a basis of the classification of the *Pleuronectidæ*, by Jordan & Goss, of the *Scorpænidæ*, by Jordan & Gilbert, and it will doubtless prove to have a high value in the subdivision of other families which have representatives in different zones. The cause of this peculiarity of fishes of cold waters is still obscure. Probably the reduction in number of segments is a result of the specialization of structure incident to the sharper competition of the tropical waters, where the outside conditions of life are very favorable for fishes, but the struggle of species against species is most severe.

Labrus viridis, 20+21 = 41.
Labrus bimaculatus, 18+21 = 39.
Labrus livens, 18+20 = 38.
Labrus berggylta, 19+19 = 38.
Ctenolabrus adspersus, 17+19 = 36.
Acantholabrus palloni, 18+18 = 36.
Odax balteatus (Antarctic), 19+17 = 36.
Hiatula onitis, 16+18 = 34.
Ctenolabrus suillus, 15+18 = 33.
Symphodus melops, 15+18 = 33.
Symphodus tinca, 15+18 = 33.
Symphodus ocellaris, 14+18 = 32.
Symphodus cinereus, 14+17 = 31.
Symphodus scina, 13+18 = 31.
Symphodus mediterraneus, 13+17 = 30.
Lachnolaimus maximus, 12+17 = 29.
Lepidaplois scrofa, 11+17 = 28.
Lepidaplois hirsutus, 11+17 = 28.
Decodon puellaris, 12+16 = 28.*
Clepticus genizara, 10+17 = 27.*
Anampses cœruleopunctatus, 11+15 = 26.
Duymæria aurigaria, 10+15 = 25.
Halichœres nigrescens, 10+15 = 25.
Hemitautoga hortulanus, 10+15 = 25.
Thalassoma pavo, 11+14 = 25.
Thalassoma lunare, 11+14 = 25.
Thalassoma dorsale, 11+14 = 25.
Julis julis, 11+14 = 25.
Julis atlantica, 11+14 = 25.
Coris aygula, 11+14 = 25.
Güntheria trimaculata, 10+15 = 25.
Pseudolabrus psittaculus, 9+16 = 25.
Pseudolabrus laticlavius, 9+16 = 25.
Gomphosus tricolor, 9+15 = 24.
Pseudolabrus celidotus, 10+13 = 23.
Xyrichthys macrolepidotus, 10+15 = 25.
Xyrichthys novacula, 9+16 = 25.
Cheilinus fasciatus, 10+13 = 23.
Cheilinus trilobatus, 10+13 = 23.
Sparisoma cretense, 11+14 = 25.

As in most other large groups there has been shown considerable difference of opinion as to the characters which should be used in dividing the Labroids into genera. The tendency with all recent writers has been towards a rather minute subdivision. The numbers of vertebræ seem to us to yield characters of the highest importance. Other characters not to be neglected can be drawn from the size of the scales, the numbers of the dorsal spines, and the dentition. The degree of squamation of the head seems to us to have an importance lower than that attributed to it by Bleeker and Günther. The number of genera as given in this paper could bear reduction only in the *Harpinæ* and *Julidinæ*. The genera of the *Labrinæ* seem to us natural enough, and most of those of the *Scarinæ* are most trenchantly separated.

ANALYSIS OF SUBFAMILIES OF LABRIDÆ.

a. Lower pharyngeals T-shaped or Y-shaped, their teeth conical or tubercular; teeth in jaws more or less distinct. Carnivorous species, the sexes usually not colored alike.

b. Dorsal spines 8 or more, usually well separated from the soft rays; anal spines 3 to 6 (rarely 2).

c. Vertebræ about 36 (15 + 18 to 20 + 21); dorsal spines 14 to 21; anal spines 3 to 6; all the spines pungent; anterior canines $\frac{4}{4}$; no posterior canines; lateral line complete; caudal fin never forked. Species of northern waters, none of them tropical. ..... LABRINÆ, A.

cc. Vertebræ 22 to 29; dorsal spines 8 to 13; (species of tropical or subtropical seas.)

e. Vertebræ 27 to 29 (so far as known); dorsal spines usually 12 (11 to 14); sides of head more or less scaly; preopercle serrulate or entire.

f. Anterior canines strong; lower pharyngeals large, with large, tubercular teeth; spinous dorsal not enveloped in scales; lower jaws naked. HARPINÆ, B.

* In specimens examined by us.

ff. Anterior teeth very small, not canine-like; lower pharyngeals very small, with small, coalescent teeth; spinous dorsal enveloped by scales; lower jaw scaly ..... CLEPTICINÆ, C.

ee. Vertebræ 23 to 25 (rarely 26); dorsal spines 8 or 9 (rarely more); anterior canines strong $\frac{2 \text{ to } 4}{2 \text{ to } 4}$; head usually naked, the cheeks sometimes scaly; preopercle entire ..... JULIDINÆ, D.

bb. Dorsal spines 3; anal spines 2; the spines all very slender and flexible, essentially similar to the soft rays; body elongate; preopercle entire; sides of head scaly; lateral line complete; anterior canines about $\frac{1}{2}$; vertebræ probably numerous. Species of the South Temperate Zone ..... MALAPTERINÆ, E.

aa. Teeth in jaws more or less perfectly confluent; lower pharyngeals more or less spoon-shaped or basin-shaped, their teeth broadest transversely and truncate, arranged in a sort of mosaic; anal spines 2; dorsal spines 9; scales very large, 23 to 25 in the lateral line; vertebræ about 11+14 = 25. Herbivorous species, the sexes similarly colored. SCARINÆ, F.

Subfamily A.—LABRINÆ.

(Labroid fishes with the vertebræ and dorsal spines in increased number. Species of moderate or small size, nearly all European and all confined to the North Temperate Zone.)

a. Anal spines 4 to 6; dorsal spines 16 to 21; cheeks and opercles scaly; scales rather large; preopercle serrate.

b. Teeth small in single series; mouth small; dorsal fin nearly scaleless. CENTROLABRUS, 1.

bb. Teeth larger, in about two series; mouth large; dorsal fin scaly. ACANTHOLABRUS, 2.

aa. Anal spines, 3.

c. Teeth in one series; cheeks and opercles scaly.

d. Scales small, 43 to 55 in the lateral line; preopercle entire (in the adult); lips very thick; teeth strong; dorsal spines 17 to 21; vertebræ 38 to 41 ..... LABRUS, 3.

dd. Scales large, 30 to 35 in the lateral line; preopercle serrulate; dorsal spines 14 to 16; vertebræ 30 to 32 ..... SYMPHODUS, 4.

cc. Teeth in more than one series.

c. Preopercle serrate; opercles scaly; scales moderate or large. CTENOLABRUS, 5.

ee. Preopercle entire; opercles naked; scales small ..... HIATULA, 6.

Subfamily B.—HARPINÆ.

(Labroids with the vertebræ 28 to 29; the dorsal spines 11 to 14, and the jaws with strong canines. Species mostly of large size and bright coloration, inhabiting warm seas.)

a. Dorsal spines about 14, the 3 or 4 anterior falcate produced in long streamers; body deep and compressed, the anterior profile steep; teeth uniserial; no posterior canine; cheeks and opercles scaly; bases of soft dorsal and anal scaly; soft parts of vertical fins produced; scales moderate (40) ..... LACHNOLAIMUS, 7.

aa. Dorsal spines 11 or 12 (rarely 13), none of them produced in filaments; cheeks and opercles scaly; body oblong; the back not greatly elevated.

b. Soft dorsal and anal fins each with a scaly sheath at base; scales large (about 32); posterior canine present.

c. Soft dorsal and anal elevated, produced behind ..... HARPE, 8.

cc. Soft dorsal and anal low, their outline rounded ..... LEPIDAPLOIS, 9.

bb. Soft dorsal and anal without sheath of scales; preopercle serrulate (at least in young); soft dorsal and anal more or less falcate.

d. Scales large, about 30; lower limb of preopercle scaly; posterior canine present; anterior canines $\frac{4}{4}$ ..... DECODON, 10.

dd. Scales moderate or small, 45 to 60; both limbs of preopercle naked; adult male with a fleshy hump on the forehead; caudal subtruncate, with the angles more or less produced.

e. Posterior canine present; anterior canines $\frac{4}{4}$; dorsal spines 12. TROCHOCOPUS, 11.

ee. Posterior canine obsolete; anterior canines $\frac{8}{10}$; dorsal spines 13. GRAUS, 12.

Subfamily C.—CLEPTICINÆ.

(Labroids with the vertebræ about 27, the dorsal spines 12, and the jaws and lower pharyngeals very small, with small teeth, which are not canine-like. A single species in tropical America.)

a. Anterior teeth small, bluntish, not canine-like; no posterior canine; mouth very small, terminal; snout short and blunt; dorsal and anal enveloped in scales, except produced tips of both fins; caudal deeply forked; dorsal spines almost hidden by series of scales; head everywhere closely scaled, except on lips and snout; scales of body large; preopercle serrulate; gill-rakers slender, short; pectoral falcate; lower pharyngeals very small, V-shaped; their teeth small, very blunt and coalescent; vertebræ 10+17 ..... CLEPTICUS, 13.

Subfamily D.--JULIDINÆ.

(Labroid fishes with the vertebræ and dorsal spines in moderate number. Species of the tropics, mostly of small size and bright coloration.)

I. Lateral line complete and continuous.

a. Snout not tubiform; preopercle entire; teeth uniserial; none of the teeth chisel-shaped.

b. Cheeks and opercles scaly; posterior canine present; scales large; snout pointed; base of dorsal without scaly sheath. PSEUDOLABRUS, 14.

bb. Cheeks and opercles naked.

c. Scales small, 70 to 80 in the course of the lateral line; dorsal spines 9, all, except sometimes the two anterior, pungent; posterior canines present; anterior canines mostly $\frac{4}{4}$; the outer pair sometimes small; lips very fleshy; lower pharyngeals T-shaped, the posterior border not concave, the median tooth of the posterior row blunt, enlarged; anal spines 3..... JULIS, 15.

cc. Scales large, 25 to 30 in the lateral line; anal spines, 2 or 3.

d. Dorsal spines 9; dorsal enlarged, without scaly sheath; scales of breast not enlarged.

e. Anterior canines $\frac{4}{4}$, the outer enlarged, bent outwards and backwards; lower pharyngeals Y-shaped, the posterior border concave. LEPTOJULIS, 6.

ee. Anterior canines all normal in position; lower pharyngeals T-shaped, with numerous teeth.

f. Posterior canine well developed on both sides; dorsal spines pungent..... HALICHŒRES, 17.

ff. Posterior canines wanting or reduced to a slight rudiment. PSEUDOJULIS, 18.

dd. Dorsal spines 8; no posterior canines; anterior canines $\frac{2}{2}$, normal in position; low sheath of scales at base of dorsal; dorsal spines pungent.....THALASSOMA, 19.

II. Lateral line interrupted posteriorly, beginning again on the level of the axis of the body, on the caudal peduncle.

g. Scales large, 20 to 30 in the lateral line; dorsal spines 9.

h. Posterior canine present; snout slender, the anterior profile not convex; cheeks and opercles scaly; dorsal spines pungent, the three anterior longer and with filamentous appendages; dorsal and anal with a scaly sheath; scales very large. DORATONOTUS, 20.

hh. Posterior canine none; anterior profile more or less convex; head naked except usually a few scales below the eye; canines usually $\frac{2}{2}$; body more or less strongly compressed.

i. Scales very large, about 20 in the lateral line, which is placed on the first row of large scales below the dorsal sheath; anterior dorsal spines not detached.....XYRULA, 21.

ii. Scales large, about 26 in the lateral line, which is placed on the second row of large scales below the dorsal sheath.

j. First two dorsal spines joined by membrane to the others and inserted nearly above base of pectorals ... XYRICHTHYS, 22.

jj. First two dorsal spines detached from the others and inserted on or close behind the occiput .....INHISTIUS, 23.

Subfamily E.—MALAPTERINÆ.

(Labroid fishes with the dorsal spines scarcely developed, similar to the soft rays, and in very small number. Species of the South Temperate Zone.)

a. Body rather elongate; cheeks scaly; opercles with small scales above and with a row of large scales along posterior border; preopercle entire; teeth in one series; no posterior canine; lateral line continuous; dorsal and anal spines scarcely different from the soft rays. D. III, 29; A. II, 19 .....MALAPTERUS, 24.

Subfamily F.—SCARINÆ.

Labroid fishes with the lower pharyngeals concave, covered with flattish or tesselated teeth, which are transversely oblong and compressed, not conical; teeth in jaws more or less coalescent. Scales large; vertebræ about 25. Fishes of moderate or large size, all tropical, mostly of brilliant coloration, the sexes similar. (Parrot fishes.)

a. Lower pharyngeals broader than long, flattish or basin-shaped; gill membranes broadly joined to the isthmus, not forming a fold across it; lateral line subcontinuous; scales about head few and large, those on the cheeks in one row; lower jaw projecting.

b. Dorsal spines flexible; teeth more or less distinct, at least anteriorly.

c. Teeth in both jaws in few series, not imbricated in quincunx; lateral teeth of both jaws coalescent in a more or less continuous cutting edge; the teeth more free anteriorly and not adnate to the dental plate..CRYPTOTOMUS, 25.

cc. Teeth in both jaws in three or four series, all imbricated in quincunx order on the dental plate, to which they are adnate by the posterior face; cutting edge of both jaws formed by the teeth ..... CALOTOMUS, 26.

bb. Dorsal spines stiff, pungent; teeth of upper jaw at least more or less coalescent.

d. Teeth of lower jaw distinct, disposed in oblique series.. CALLYODONTICHTHYS.

dd. Teeth of both jaws chiefly coalescent, the jaws divided by a rather indistinct median suture ..... SPARISOMA, 27.

aa. Lower pharyngeal spoon-shaped, much longer than broad; teeth of jaws fully coalesced; each jaw divided by a distinct median suture; gill-membranes forming a fold across the isthmus; dorsal spines flexible; lateral line interrupted behind, beginning again lower down on the peduncle of the tail; scales about head rather numerous, those on cheeks in two or more series; lower jaw included ..... SCARUS, 28.

Genus I.—CENTROLABRUS.

Centrolabrus Günther, Cat. Fish. Brit. Mus., iv, 92, 1862 (*exoletus*).

TYPE: *Labrus exoletus* L.

Etymology: *Κέντρον* spine; *Labrus*, an allied genus.

This genus contains two or three species, found on the coasts of Europe, one of them ranging farther to the north than any other Labroid fish.

ANALYSIS OF SPECIES OF CENTROLABRUS.

a. [Dorsal rays XVIII to XX, 6. Anal rays V, 7 or 8; body rather robust; the snout of moderate length, about 3⅓ in head; mouth very small, its cleft reaching barely half way to front of eye; eye rather large; dorsal spines low, the soft rays somewhat higher, but lower than the anal; caudal rounded. Head 3½ in length; depth 3½; scales =3-33-10, three rows on cheeks; color rich brown, the sides shaded with yellow; narrow yellow lines along the rows of scales; a dark spot on eye, above; two blue bands from eye to angle of mouth, and two more across preopercle; no black spot behind eye; a dull bluish mark on opercle; fins yellowish-silvery; a line of dark marks along spinous dorsal; caudal with a black base and a white outer margin.] (*Day*)..... EXOLETUS, 1.

aa. [Dorsal rays XVI or XVII, 8 or 9; Anal rays IV, 9, or V, 8; teeth equal, close-set; a dull spot behind the orbit; sometimes a spot at the root of the caudal fin; coloration dark green, back with interrupted cross-bars, sides sometimes with indistinct darker longitudinal streaks; depth 3½ in length. D. XVII, 8. A. IV, 9, or V, 8. Scales 3-34-11.] (*Günther*)..... TRUTTA, 2.

1. CENTROLABRUS EXOLETUS.

(ROCK COOK.)

Labrus exoletus Linnæus, Syst. Nat. Ed. x, 1758, 274. (Atlantic Ocean.) Ed. xii, 479. Fabricius, Fauna Grönlandica, 1780, 166. (Greenland) (and of the early writers).

Acantholabrus exoletus Cuv. & Val., xiii, 247 (copied); Collett, Norges Fiske, 94 (and of several authors).

Centrolabrus exoletus Günther, iv, 92; Day, Fish. Gt. Britain, 267.

Labrus pentacanthus Lacépède, Hist. Nat. Poiss., iii, 503, 1803 (after Linnæus).

Crenilabrus microstoma (Couch) Thompson, "Proc. Zool. Soc. London, 1837, 55."

Habitat.—Coasts of northern Europe, south to Cornwall; said to range westward to Norway.

Etymology: *Exoletus*, antiquated; said to be in allusion to the anomalous number of five spines in the anal.

We have not studied this species, and have taken our description of it chiefly from the account given by Dr. Day. It is the most northern in its range of all the Labroid fishes.

2. CENTROLABRUS TRUTTA.

(VERDE.)

Crenilabrus trutta Lowe. "Proc. Zool. Soc. London, i, 1833, 143." (Madeira).
Centrolabrus trutta Günther, i, 93 (Madeira.)
Acantholabrus viridis Cuv. & Val., xiii, 252, 1839 (Canaries).
? *Acantholabrus romerus* Valenciennes, Webb & Berthelot, Ichth. Îles Canaries, 64 (Canaries).
? *Acantholabrus romeritus* Valenciennes, l. c. (Canaries).

Habitat.—Madeira and Canary Islands.

Etymology; *trutta*, low Latin word for trout.

We know this species only from descriptions. We follow Dr. Günther in regarding *romerus* and *romeritus* as probably indentical with *trutta*. Possibly two species exist, *trutta* with five anal spines and *viridis* (= *romeritus*) with but four.

Genus II.—ACANTHOLABRUS.

Acantholabrus Cuv. & Val. xiii, 242, 1839 (*palloni*).

TYPE: *Lutjanus palloni* Risso.

Etymology: *Ἀκανθα*, a spine; *Labrus*, an allied genus.

This genus contains but one (possibly two) species, found in the waters of Europe.

ANALYSIS OF SPECIES OF ACANTHOLABRUS.

a. [Body rather elongate; head long, with pointed snout, which is nearly one-third the length of the head; mouth large, the maxillary reaching the front of the large eye; spines rather long, the posterior longest; soft dorsal and anal somewhat elevated; both spinous and soft dorsal scaly; caudal rounded; pectorals and ventrals short; head, 3⅔; depth, 4. D. XX or XXI, 10. A. V, 9. Scales 4–42–16. Color, olive, varying to orange or bluish above; sides yellowish; usually a dark blotch at base of caudal, above lateral line; a large, black blotch on last dorsal spines and the first soft rays; blue spots sometimes present on the scales of lower parts, especially anteriorly.] (*Day*, etc.) ..... PALLONI, 3.

3. ACANTHOLABRUS PALLONI.

(TENCO.)

Lutjanus palloni Risso, Ichth. Nice, 1810, 263 (Eza).
Acantholabrus palloni Cuv. & Val., xiii, 243, 1839 (and of Günther, Steindachner, and recent writers generally).
Acantholabrus imbricatus Lowe, "Proc. Zool. Soc., London, 1839, 86" (Madeira).
Acantholabrus couchi Cuv. & Val., xiii, 248 (Cornwall, after Couch); Günther, iv, 92; Collett, Norges Fiske, 1875, 93 (Flekkefjord).

Habitat.—Deep waters in the Mediterranean, north to southern England and south to Madeira.

Etymology: *Palloni;* a personal name unexplained by the author.

This rather rare species is known to us only from descriptions. Judging from published accounts there is not much doubt that *A. couchi*, with 6 anal spines, is an individual variation of *A. palloni*.

Genus III.—LABRUS.

Labrus Artedi, Genera, etc., 1734. (Includes all known *Labridæ*, and other fishes supposed to be related to them.)

Labrus Linnæus, Syst. Nat., Ed. x, 1758, 282 (*viridis, bimaculatus, turdus, mixtus*, and many other species, many of them non-labroid).

Scarus Gronow, Museum Ichthyol., 1764, ii, 8 (non binominal) (*viridis = livens.*)

Labrus Rafinesque, Caratteri, etc., 1810, 36 (restricted to Labroid fishes).

Labrus Cuvier, Règne Animal, Ed. i, 1817, 261 (*Labrus retula* Bloch, and relatives).

TYPE.—*Labrus bimaculatus* Linnæus.

Etymology: *Labrus*, a name taken by Artedi from Pliny and Ovid, thought by Artedi to be from *labrum*, lip, on account of the thick lips. The original word is apparently from λάβρος, meaning voracious. Rondelet uses the name for the thick-lipped mullet, *Mugil chelo* Cuvier.

This genus, as now restricted, contains about six species, all of them belonging to the seas of Europe. Most of them are gaily colored, and some of them show great variations in color in accordance with sex and age.

ANALYSIS OF SPECIES OF LABRUS.

a. Scales comparatively large, 39 to 45 in the lateral line; lateral canines large, not much smaller than anterior.

b. Dorsal spines 20 to 21, the soft rays 10 or 11; body rather robust, the depth about equal to length of head, 3⅔ in length; snout short, not acute, about 3 in head; eye small, 5½ in head; width of scaly part of cheek about equal to eye. Color, green or brown, usually much spotted or reticulated with orange red; vertical fins mostly green, variously spotted; paired fins orange red.

c. [Sides without distinct silvery lateral band; head with curved streaks and other markings, but without blue longitudinal stripes; spinous dorsal notably lower than soft dorsal.] (*Day.*).....BERGGYLTA, 4.

cc. [Sides with a distinct silvery lateral band; head with longitudinal blue stripes; spinous dorsal comparatively higher.] (*Day.*) Otherwise as in the preceding, of which it is probably a color variety .....COMBER, 5.

bb. Dorsal spines, 17 to 19; soft rays, 11 to 13.

c. Body robust, the depth about equal to length of head, 3⅓ in body; snout short, bluntish, barely one-third head; lips thick; sides of body usually without silvery band.

d. Coloration nearly plain brown; the young with a dark blotch on the opercle and with dark cross-blotches or dark streaks along the rows of scales; eye small, 6 in head, much narrower than scaly part of cheek; interorbital area two-thirds length of snout; dorsal spines low, much lower than the rather high soft rays .....LIVENS, 6.

dd. [Coloration brown, reticulated with chestnut, each scale with a pale center; dark spots before and behind eye; fins spotted or plain; a silvery lateral band sometimes present.] (*Günther.*) Otherwise as in preceding, of which it is probably a variety, though its coloration is more like that of *L. viridis* ..... NUBILUS, 7.

cc. Body rather elongate, the depth less than the length of the head; depth $3\frac{2}{3}$ in length; head about $3\frac{1}{4}$, snout rather long, about $2\frac{4}{5}$ in head; eye small, 6 in head, not so broad as scaly part of cheek; interorbital width about half snout; dorsal spines not much lower than the soft rays; ground color chiefly green, of varying shade; a silvery or paler longitudinal band always present, but sometimes interrupted or obscured; sides usually spotted with blue; blue or pearl colored ocelli sometimes present on the vertical fins (var. *festivus*), or on body and fins (*prasostictus*); or reduced to blue spots (*viridis*) ..... VIRIDIS, 8.

aa. Scales comparatively small, 50 to 55 in the lateral line; dorsal rays XVII to XVIII, 11 to 13; anterior canines $\frac{1}{4}$, the lateral canines somewhat smaller; body elongate, the depth considerably less than length of head; depth 4; head 3; snout very long and sharp, $2\frac{3}{4}$ in head, about twice the interorbital space; eye large, $4\frac{2}{3}$ in head, considerably wider than scaly part of cheek; maxillary long, $2\frac{4}{5}$ in head, the mouth longer than in the other species; dorsal spines slender, little lower than the soft rays. Coloration extremely various, the sexes unlike; a large dark blue blotch on front of spinous dorsal in both sexes, this largest in the males; caudal and anal with blue margins; males usually with a broad dusky lateral band or else with blue longitudinal streaks; females nearly plain, reddish, with three or four large blackish blotches along base of soft dorsal and back of caudal peduncle, these very obscure in the male; sometimes a dark shade at base of caudal ..... BIMACULATUS, 9.

4. LABRUS BERGGYLTA.

(BERGLE; BALLAN-WRASSE; OLD-WIFE.)

Labrus berggylta Ascanius, "Icones, t. 1, 1772;" Collett, Norges Fiske, 1775, 91, and of numerous writers.

Labrus berg-galt Müller, "Zool. Danica Prodromus, 46, 1776."

Labrus maculatus Bloch, Ichthyol., vi, 17, t. 294, 1792; Günther, iv, 70; Steindachner, Ichth. Berichte, 1868, 27; Day, British Fishes, 252, and of numerous authors.

Labrus ballan Walbaum, Artedi Pisc., 259, 1792 (after the Ballan-wrasse of Pennant).

Labrus tinca Lacépède, Hist. Nat. Poiss, iii, 439, 1802 (not of Linnæus).

Labrus neustriæ Lacépède, l. c., 501 (Rouen).

Labrus lineatus Turton, "British Fauna, 99, 1807."

Labrus cornubiensis Couch, "Trans. Linn. Soc., xiv, 80," 1832.

Labrus pusillus Jenyns, "Man. Brit. Vert., 1835, 392" (Young).

Crenilabrus multidentatus Thompson, "Proc. Zool. Soc. London, 1837, 56" (Young).

Labrus variabilis Thompson, "Proc. Zool. Soc. London, 1837, 58."

Habitat.—Coasts of Europe, from Norway to the Mediterranean, most abundant northward.

Etymology: The Norwegian name of the fish, from *berg*, cliff.

This species is abundant on the rocky coasts of northern Europe. It is excessively variable in color, like most of the members of the family. We have examined specimens in the fish market of Bergen. The synonymy above given is chiefly on the authority of Günther and Day.

The Norwegian name *berggylta* seems to have clear priority over the name *maculatus* for the species, although the latter name has been more generally used.

5. LABRUS COMBER.

(COMBER.)

Comber Pennant, "British Zoology, iii, 252, pl. 47, f. 123, 1776" (Cornwall).
Labrus comber Gmelin, Syst. Nat., 1788, 1297 (after Pennant).
Labrus donovani Cuv. & Val., xiii, 39, 1839 (Brittany); Steindachner, Ichth. Berichte, 1868, 25, t. iv, f. 2; Day, British Fishes, 253; and of most authors.

Habitat.—Coasts of Europe, north to England.

Etymology: *Comber*, the Cornish name of the species.

We have not seen this species. Dr. Day regards it as a variety of *Labrus berggylta*, from which it seems to differ chiefly in the coloration.

6. LABRUS LIVENS.

Turdus niger, Merula Salviani Willughby, 320.
Labrus cæruleo-nigricans Artedi, Synonymia, 55 (after Willughby).
Labrus livens Linnæus, Syst. Nat., x, 287, 1758 (description incomplete).
Labrus merula Linnæus, Syst. Nat., Ed. x, 288, 1758 (after Artedi); Cuv. & Val. iii, 80; Günther, iv, 72; and of Steindachner and nearly all recent writers.
Labrus crassus Agassiz, Spix, Pisc. Brazil, 1829, 95, tab. 52 (coast of Brazil) ?
Labrus psittacus Risso, "Eur. Mérid., 1826."
Labrus lividus Cuv. & Val., Hist. Nat. Poiss, xiii, 87, 1839.
Labrus limbatus Cuv. & Val., l. c., 89.
Labrus lineolatus Cuv. & Val., l. c., 90.
Labrus saxorum Cuv. & Val., l. c., 91.
Scarus viridis Gronow, Systema, Ed. Gray, 1854, 63.

Habitat.—Coast of southern Europe. (Brazil ?).

Etymology: *Livens*, "black and blue," growing livid.

Our specimens of this species are from Venice. The species is distinguished from all the others in the group by its plain coloration, compared by Willughby and other early writers to that of the English Blackbird, *Turdus* or *Merula*.

We follow Dr. Steindachner in regarding *L. lineolatus* and *L. saxorum* as the young of *Labrus livens*.

Prof. Agassiz has described from Brazil a *Labrus* allied to *L. merula* under the name of *Labrus crassus*. As no species of this genus is known to occur in American waters, it is perhaps possible that this *Labrus crassus* really came from Europe. In this case, we do not know how to distinguish it from *Labrus livens*.

We have substituted the name *livens* for *merula* as having the priority of a page over the latter name. The description of Linnæus is very short, but the number of dorsal rays (XVIII, 13) shows it to be a *Labrus*, and no other species has "corpore fusco-livido."

7. LABRUS NUBILUS.

Labrus reticulatus Lowe, "Trans. Zool. Soc., 1837, iii, 11" (Madeira); Günther, iv, 73 (not *Labrus reticulatus* Walbaum).
Labrus nubilus Valenciennes, "Webb and Berthelot, Exp. Îles Canaries, 62."

Habitat.—Mediterranean Sea and adjacent islands.

Etymology: *Nubilus*, cloudy.

We know this species from Dr. Günther's description only. It must be very closely allied to *Labrus livens*, but Dr. Günther gives it as distinct.

The name *reticulatus* being pre-occupied in the genus *Labrus*, this species, if valid, will stand as *Labrus nubilus*.

8. LABRUS VIRIDIS.

Turdus viridis minor Willughby, p. 320.
Turdus viridis major Willughby, p. 322.
Turdus oblongus fuscus maculosus Willughby, p. 323.
Labrus viridis linea utrinque cærulea Artedi, Genera, 34 (after Willughby, 320).
? *Labrus oblongus viridis iride aurea* Artedi, Genera, 34; Synonymia, 57 (after Willughby, 322).
Labrus viridis Linnæus, Syst. Nat., Ed. x, 1758, 286 (after Artedi); Cuv. & Val., xiii, 75, pl. 370.
Labrus luscus Linnæus, Syst. Nat., Ed. x, 287 (habitat unknown).
? *Labrus turdus* Linnæus, l. c. 287 (after Artedi).
Labrus turdus Cuv. & Val., xiii, 62; Günther, iv, 72; and of Steindachner, Day, Canestrini, and most recent writers.
Labrus saphyrinus Walbaum, Artedi, Piscium, 1792, 236 (after Brünnich).
Labrus luteus Walbaum, l. c. (after Brünnich).
Labrus psittacus Lacépède, iii, 501, 1802 (after *L. viridis* Linnæus).
Labrus nereus Risso, Ichth. Nice, 1810, 231.
Labrus zittoides Rafinesque, Caratteri, 38, 1810.
Labrus zittus Rafinesque, l. c.
? *Labrus porcus* Rafinesque, l. c., 39.
Labrus prasostictus Pallas, Zoogr. Rosso.-Asiat., iii, 272, 1811.
Labrus pincus Nardo, "Prodromus, Adriat. Ichthyol., 21, 96, 1827."
Labrus rufus Rathke, "Fauna der Krym., 1839, 337."
Labrus festivus Risso, Europe Mérid., 1826, 304; Canestrini, Labroïdes, 1868, 6.
Labrus nardii Perugia, "Cat. Pesc. Adriat., 1866" (*fide* Canestrini).

Habitat.—Coasts of southern Europe.

Etymology: *Viridis*, green.

Dr. Steindachner remarks:

Es unterliegt keinem zweifel, dass auch *Labr. festivus, nereus, luscus, viridis* und *prasostictus*, welche zum grössten Theile noch in den neuesten Werken als besondere Arten angeführt sind, mit *Labrus turdus* zusammenfallen, da Sie nur auf Farbenvarietäten letztgenannter Art basirt sind, deren jede im Wiener Museum durch 3–4 Exemplare vertreten ist.

We have accordingly placed these nominal species in the synonymy as above given. The one of the Linnæan names of this species which has the earliest place on the page is *Labrus viridis*, which is also the

one concerning the application of which there is least doubt. We have, therefore, substituted *viridis* for *turdus* as the specific name of the species.

The specimens of *Labrus viridis* in our collection were taken at Palermo by Professor Doderlein, and in the markets of Paris by Dr. Jordan.

9. LABRUS BIMACULATUS.

(COOK-WRASSE; COOK-CUNNER; RED WRASSE.)

Turdus major varius Willughby, 322 (male).
Labrus ex flavo et cæruleo varius Artedi, Syn., 57 (after Willughby).
Labrus bimaculatus Linnæus, Syst. Nat., Ed. x, 285, 1758. (Mediterranean Sea); and of a few copyists. (Based on females.)
? *Labrus ossifagus* Linnæus, l. c., 286 ("Europa").
Labrus mixtus Linnæus, l. c., 287 (after Artedi); Cuv. & Val., xiii, 43; Günther, iv, 74; Steindachner, Ichth. Ber., ii. 1868, 23; Day, Fish. Great Britain, 256; Collett, Norges Fiske, 91; and of authors generally.
Labrus cæruleus Ascanius, "Icones, t. xii. 1772 (male)."
Labrus carneus Ascanius, l. c., t. xiii (female) and of various authors.
Labrus variegatus Gmelin, Syst. Nat., 1788, 1294 (on the Striped Wrasse of Pennant); and of numerous early authors.
Labrus trimaculatus Gmelin, l. c., 1294 (female), and of various authors
Labrus coquus Gmelin, l. c., 1297 (male) (on the "Cook" of Pennant) and of various authors.
Labrus vittatus Walbaum, Artedi, Piscium, 1792, 256 (on the "Striped Wrasse" of Pennant).
Labrus herbeus Walbaum, Artedi, Piscium, 1792, 258 (on the "Grönne Berggyltte" of Ström).
Labrus badius Walbaum, l. c., 258 (on the "Brune og morkplettede Berggylte" of Ström).
? *Labrus microlepidotus* Bloch, Ichth., 1792, taf. 292 (scales much too small for the species of *Labrus*).
Labrus vetula Bloch, Ichth., 1792, taf. 293 (North Sea) and of authors.
Sparus formosus Shaw, "Nat. Misc., i, pl. 31," about 1800.
Labrus cook Bloch & Schneider, Syst. Ichth., 1801, 268 (after Pennant).
Labrus luvarus Rafinesque, Caratteri, 1810, 38.
Labrus quadrimaculatus Risso, Europe Mérid., iii, 302, 1826.
Acantholabrus yarrelli Cuv. & Val., xiii, 1839, 250 (on a specimen said to have 6 anal spines).

Habitat.—Coasts of Europe, north to Norway and Scotland.

Etymology: *Bimaculatus*, two-spotted, in allusion to the color of the dorsal fin in the female.

This handsome and excessively variable species is generally common in the waters of southern Europe. Our specimens, male and female, are from Palermo. We follow Günther, Day, and Steindachner in regarding the species called *carneus* and *bimaculatus* as the female of *Labrus mixtus*. The name *bimaculatus* stands first in the Systema Naturæ, for which reason we have adopted it, though it is by no means an appropriate one.

Genus IV.—SYMPHODUS.

Symphodus Rafinesque, Caratteri di Alcuni Nuovi Generi, 1810, 41 (*fulvescens*).
Crenilabrus Cuvier, Règne Animal, Ed. i, 1817, 263 (*rupestris, bidens, norvegicus*).
Coricus Cuvier, Regno Animal, 1817, 263 (*virescens* Risso = *scina*).
Cynædus Swainson, Nat. Hist. Class'n. Anim., ii, 229, 1839 (*tinca*, etc.).

TYPE: *Symphodus fulvescens* Rafinesque—*Labrus scina* Forskäl.

Etymology: Συμφόδης grown together, οδούς tooth.

This genus is composed of small fishes strongly resembling the young of the genus *Labrus*, but distinguished from the species of the latter genus by the large size of the scales. The species which reach the largest size most resemble the species of *Labrus*, in the large lips, smaller scales, stronger teeth, and weaker serrature of the preopercle. As, however, no really intermediate forms exist, the genus seems to us well established.

We agree with Dr. Günther, that the production of the snout in *S. rostratus* is not a character of such importance as to justify placing that species in a separate genus (*Coricus*). The name *Symphodus* has priority over *Coricus* and *Crenilabrus*,* and must supersede both names if the groups are united.

The species of *Symphodus* are quite variable both in form and coloration. All of them are readily recognized, however, although there are some individuals of almost every species which will not quite answer to the characters given in the following analysis.

ANALYSIS OF SPECIES OF SYMPHODUS.

a. Head not notably long and low, its depth at centre of eye more than half its length and considerably more than length of snout; premaxillaries moderately protractile, the length of their posterior processes from tip of upper jaw backward about one-third head (*Crenilabrus* Cuvier.)

b. Scaly part of cheek comparatively broad, usually broader than eye, and provided with 4 to 6 (rarely 3) rows of scales; dorsal spines 15 to 17; scales 33 to 35; (snout shorter, lips thicker, and preopercle less serrate than in the next group).

c. Base of pectoral with a very conspicuous jet-black spot, which extends on the fin; color usually greenish, the back with very faint dark cross-shades; a large, more or less distinct dusky blotch at base of caudal above; dorsal and anal with a longitudinal dusky shade; all the vertical fins with small blue dots; snout dusky; soft dorsal and anal high, considerably higher than the spines; anterior profile nearly straight; snout $2\frac{2}{3}$ in head; head $3\frac{1}{4}$ in length; depth $3\frac{1}{3}$. D. XVII, 9; A. III, 10; scales on cheek in three or four rows ..... MEDITERRANEUS, 10.

*Swainson remarks: "Mr. Cuvier having expressly stated that the type of his genus *Crenilabrus* is *Lutjanus verres* of Bloch, I have so retained it, placing all the others which seem peculiar to the Mediterranean Seas under the subgenus *Cynædus*." I find no such statement made anywhere by Cuvier.

cc. Base of pectoral without jet-black spot; scales on cheek in 5 or 6 rows; dorsal spines not much lower than the soft rays.

d. Snout of moderate length, $2\frac{1}{5}$ to $2\frac{3}{8}$ in length of head; serrature on preopercle lost with age; eye small, 5 in head; usually an obscure dusky blotch above the base of pectoral and another just below middle of base of caudal; coloration quite variable, usually greenish, with longitudinal series of blue or red spots, or both; sometimes a pale band from head to caudal fin; vertical fins with blue dots; pectoral translucent; three red longitudinal bands sometimes present on sides; sides of head sometimes with blue dots; head $3\frac{3}{8}$; depth $3\frac{2}{5}$; D. XV, 10; A. III, 10; scales 4-35-10 ..... TINCA, 11.

dd. [Snout short, about one-third length of head; eye small, 5 in head; usually a curved black blotch close behind eye, often extending forward around lower jaw; a small dark spot at base of caudal just below lateral line; color purplish green; sides of head red, with green bands, edged with darker; sides of body with violet stripes, composed of violet and red spots on the scales; vertical fins green, often with darker spots or ocelli; back and sides sometimes with dusky cross-bands; body short and deep; head $3\frac{1}{4}$; depth $3\frac{2}{5}$; D. XVI, 9; A. III, 10; scales 4-35-12.] (*Day*) ..... MELOPS, 12.

bb. Scaly part of cheeks comparatively narrow, usually not so broad as eye, and provided with two or three (rarely four) rows of scales.

x. Opercle without jet-black blotch.

e. Form of body oblong, not elliptical; the depth usually not greater than the length of head, and little if any more than one-third the length of the body.

f. Spinous dorsal with a black blotch on the anterior spines; a large inky black blotch (rarely absent) on lower side of base of caudal fin; a faint brown band along sides from above eye to base of caudal fin; another from below eye to caudal spot; usually a narrow brown streak from eye to chin; body and vertical fins with dark points; snout $2\frac{2}{5}$ in head; eye $4\frac{1}{2}$; head $3\frac{1}{4}$; depth 3; D. XIV, 9; A. III, 9; scales 3-32-9 ..... CINEREUS, 13.

ff. Spinous dorsal without distinct black blotch; no black spot on lower edge of caudal.

g. [Sides without dark lateral band; caudal fin yellow, its tip black or with blackish blotches; pectoral fin pale, usually with a black spot towards its tip; color brownish, a curved bluish streak from eye to below lower jaw; eye $3\frac{2}{5}$ in head; snout short, $3\frac{1}{8}$ to 4; depth about $3\frac{1}{8}$ in length; D. XVI, 10; A. III, 9; scales 3-34-8.] (*Günther; Steindachner*) ..... MELANOCERCUS, 14.

gg. Sides with a dark lateral band; caudal fin plain, its tip without black blotch; pectoral fin without black spot near its tip; scales 3-35-11; scaly part of cheek as broad as eye; snout short, about 3 in head; anterior profile a little concave, especially in adult; cheeks with three (rarely four) series of small scales; color rose-red; sides with a very distinct broad brown lateral band from snout through eye to upper part of base of caudal, bordered by silvery above and below, the lower of the silvery stripes from angle of mouth to lower half of base of caudal; some small black streaks or spots below lateral band, a small black spot usually present on upper base of caudal; vent black; a dusky lengthwise stripe along dorsal fin; body rather elongate; depth nearly equal to length of head, about 3 in body. D. XV, 10; A. III, 9; scales, 3-35-11 DODERLEINI, 15.

ee. Form of body regularly elliptical, the back and belly somewhat evenly curved, the depth greater than the length of the head and more than one-third the length to base of caudal; no black spot on pectoral or front of spinous dorsal; the caudal spot small and on the median line.

h. [Scales comparatively small, 4½-35 to 38-11; scales on cheek large, in two series; snout 3 in head; eye about 5; a large, blue-black spot on last spines and first soft rays of dorsal, a smaller one on base of last soft ray, another on middle of caudal; a dark streak across base of pectoral; sides of body with dark cross-shades, especially in the young; male with shining blue spots; snout with bright-colored streaks; preopercle strongly serrate; head 3½ in length; depth about 3; D. XIV, 10; A. III, 10.] (*Steindachner*). ..... PIRCA, 16.

hh. Scales comparatively large, 3½-31-11; scales on cheeks small, in three or four series; snout 3⅓ in head (2¾ in the adult); eye 5 to 6; color olivaceous, with longitudinal streaks in life; back with five obscure dark cross-bands, which usually extend as two or three blotches on the dorsal fin; one of these usually larger and more distinct than the others; a small dark spot usually present on middle of base of caudal; base of pectoral with a curved, bluish streak, sometimes obsolete; some specimens (males?) with curved, inky streaks on head, and numerous, irregular dark spots sprinkled over the body; others (females?) nearly plain; usually a dark area on preorbital and on preopercle; sometimes a curved streak from eye to chin; vent dark; head 3½ in length; depth 2⅔; D. XV, 9; A., III, 9.... OCELLARIS, 17.

xx. Opercle with a large jet-black blotch, bordered with whitish, and nearly as large as eye; usually a small dark spot at base of caudal; sides sometimes with two or three silvery bands; usually three brownish blotches along base of dorsal extending on the fin and two on anal; vent pale; body elongate-elliptical; the head rather low, with concave profile and short sharp snout (approaching somewhat the form seen in *S. scina*); snout 3⅓ in head; eye 5; head 3; depth 3; D. XIV, 10; A. III, 9; scales 3-33-10..... OCELLATUS, 18.

aa. Head notably long and low, its depth at center of eye scarcely half its length and scarcely more than length of snout; premaxillaries extremely protractile, the length of their posterior processes, from tip of upper jaw, more than one-third length of head (*Symphodus* Raf.= *Coricus* Cuvier).

i. Scales 3-30-11; scaly part of cheek not so broad as eye and with three rows of small scales; snout very long, 2¼ in head, the anterior profile being considerably concave; body much compressed, the back elevated; color greenish, with many brown dots and marblings; brown band from snout through eye to middle of sides; vent black; a faint blackish spot at base of caudal; a black spot anteriorly on dorsal fin; dorsal fin with brown dots; a blackish blotch on the first two or three spines; caudal dusky; anal with a dusky shade; head 3; depth 3; D. XV, 10; A. III, 9; scales 3-30-11 ..... SCINA, 19.

The use of the above key may, perhaps, be facilitated by the following table of the usual diagnostic marks of the species of *Symphodus*:

Mediterraneus: Large inky blotch on base of pectoral; large dark blotch on upper part of caudal peduncle; caudal speckled.

Tinca: No sharp markings in spirits; diffuse dusky blotch usually present above base of pectoral and another on middle of base of caudal.

Melops: A curved black blotch behind eye and a small one at base of caudal below median line.

Cinereus: A jet black blotch on anterior dorsal spines and another on lower part of base of caudal.

Melanocercus: Tip of caudal blackish; a black spot toward tip of pectoral (rarely absent).

Doderleini: Sides with a brown band edged with silvery, and a small black spot on base of caudal, just above median line; vent black.

Pirca: A large dark spot on last spines and first soft rays of dorsal, a smaller one at base of last ray, and a small one on middle of base of caudal; a dark streak across base of pectoral; scales on cheek large.

Ocellaris: Two to four dark spots along base of soft dorsal; a small one on middle of base of caudal; body deep, covered with large scales; vent dark; body plain (in spirits) or sprinkled with black spots.

Ocellatus: A large inky-black blotch on operele; a small black spot on middle of base of caudal; vent dark.

Scina: Snout produced, subtubiform; body sprinkled with black specks; vent and spot at base of caudal dark.

The literature of this genus is extremely bad. A large proportion of the nominal species can not be identified with certainty. We have endeavored to refer all these to the species to which they probably belong, but in the case of the species of Rafinesque, and many of those of Brünnich, Walbaum, Risso, and other writers, absolute certainty is impossible. In few cases, however, will the nomenclature be affected by the identification of these useless names.

Besides those mentioned below, the following synonyms we find quoted from a paper which we have not seen: "*Tentamen Ichthyologiæ Melitensis* by Gavinus Gulia, 1861.

Crenilabrus zeraphinus.
Crenilabrus schemberianus.
Crenilabrus dubius.
Crenilabrus serranus.
Crenilabrus serranoides.
Crenilabrus intermedius.
Crenilabrus locanius.
Crenilabrus propinquus.

10. SYMPHODUS MEDITERRANEUS.

Perca mediterranea Linnæus, Syst. Nat., Ed. x, 291, 1758, and Ed. xii, 485 (Mediterranean Sea); Brünnich, Ichth. Massil., 1768, 66, and of copyists.

Crenilabrus mediterraneus Cuv. & Val., xiii, 186, 1839; Günther iv, 79 (and of most recent authors).

Lutjanus bidens Bloch, Ichthyol., pl. 251, f. 1, 1792.

Labrus purpurescens Bloch and Schneider., Syst. Ichth., 1801, 262 (after Seba, 95, No. 6, t. 31, f. 6.)

? *Lutjanus chlorosochrus* Risso, Ichth. Nice, 1810, 275.

Labrus pittima Rafinesque, Caratteri, etc., 1810, 92.

Crenilabrus boryanus Risso, Europe Mérid., 1826, III, 320.

Crenilabrus nigrescens Risso, l. c., 320.

? *Crenilabrus lapina* et vars. *unicolor* and *fasciatus* Risso, l. c. (*fide* Bonaparte).

Crenilabrus brünnichi Cuv. and Val., xiii, 183 (not of Lacépède).

Habitat.—Mediterranean fauna.

Etymology: Mediterranean.

This abundant species may be known at once by the inky black ocellus on the pectoral fin, a mark which is never absent or even obscure so far as we have noticed. No doubt of any importance exists in connection with its synonymy, the name *mediterraneus* being of unquestioned application and of clear priority. Our specimens are from Venice and Palermo.

11. SYMPHODUS TINCA.

Turdus vulgatissimus tinca marina venetis Willughby, Hist. Pisc., 319, 1686.
? *Alphestes sive Cinædus* Willughby, l. c., 323.
Labrus rostro sursum reflexo, etc., Artedi, Genera 33, Syn. 56 (after Willughby, p. 319).
? *Labrus luteus, dorso purpureo*, Artedi, Syn. 56 (after Willughby, etc.).
Labrus tinca Linnæus, Syst. Nat., Ed. x. 285, 1758, and of the early copyists (after Artedi, 33).
? *Labrus cynædus* Linnæus, Syst. Nat., Ed. x., 288, 1758 (after Artedi, Syn. 56).
Labrus pavo Brünnich, Ichth. Massiliensis, 1768, 49 (not of Linnæus).
Crenilabrus pavo Cuv. & Val. xii, 140; Günther, iv, 78 (and of most recent writers).
? *Labrus corpore fusco*, etc., Brünnich, Ichth. Massiliensis, 1768, 56. No. 72.
? *Labrus fuscus* Gmelin, Syst. Nat., 1788 (after Brünnich); Walbaum, Artedi Piscium, 1792.
? *Labrus lapina* Forskäl, l. c., 36 (Constantinople).
? *Labrus serpentinus* Bonnaterre, Encycl. Meth., 1788, 117 (after Brünnich.)
? *Labrus lincki* Bloch, Ichth., iv, 127, taf., 252, 1792.
? *Labrus notatus* Bloch, Ichth., taf., 251, f. 2, 1792.
? *Labrus virescens* Bloch, l. c., taf., 254, 1792.
? *Labrus violaceus* Bloch & Schneider, Syst. Ichth., 1801, 248 (after *Labrus lincki*).
? *Lutjanus brünnichi* Lacépède, Hist. Nat. Poiss., iv, 222, 1803 (after Brünnich).
Lutjanus geoffroyius Risso, Ichth. Nice, 1810, 261, pl. 8, f. 25.
Labrus chrysostoma Rafinesque, Caratteri, etc., 37, 1810.
? *Labrus caliophthalmus* Rafinesque, l. c., 37.
Labrus lappanus Rafinesque, l. c., 39.
Labrus chlorophthalmus Rafinesque, l. c., 40.
? *Labrus marmoratus* Rafinesque, l. c., 41.
? *Lutianus erythrophthalmus* Rafinesque, Indicè, 1810, 67.
Labrus polychrous Pallas, Zoogr, Rosso-Asiatica, 1811, iii, 262.
? *Crenilabrus arcuatus* Risso, Europe Méridionale, 1826, iii, 328.
Labrus fatidus Chiereghini, p. 123.
Labrus verdutius Chiereghini, p. 124 (fide Canestrini).

Habitat.—Mediterranean fauna.

Etymology: from *tinca*, tench, a fresh-water fish, which these Labroid fishes slightly resemble.

This species is generally abundant in the Mediterranean, and it reaches a larger size (10 or 12 inches) than any of the others. Its synonymy offers no special room for doubt. It is evident, as Valenciennes has shown, that this species is clearly the original of *Labrus tinca* Linnæus, and that it is by no means the original *Labrus pavo* L. Nevertheless all recent writers have called this species *pavo*, and another of the same genus *tinca*, regardless of the confusion which always follows any knowing infraction of the law of priority. If this is the orig-

inal *Labrus tinca* of Linnæus, and of this we see no room for doubt, then it must stand as *Symphodus* or *Crenilabrus tinca*, the other *Crenilabrus tinca* (of Cuv. & Val., 1839), must take some other name, and the name *pavo* must be restored to *Thalassoma* (or *Julis*) *pavo*, to which it has always belonged.

Our specimens of *Symphodus tinca* are from Palermo, and from the south coast of France.

12. SYMPHODUS MELOPS.

Labrus melops Linnæus, Syst. Nat., ed. x, 1758, 286 (southern Europe), and of the copyists.
Crenilabrus melops Cuvier, Règne Animal; Cuv. & Val., xiii, 167; Günther iv, 80; Steindachner, Ichth. Berichte, 1868, 30; Collett, Norges fiske, 92.; Day, British fishes, 260; and of nearly all recent writers.
Labrus rone Ascanius, "Icones, t. xiv, 1772."
Gibbous Wrasse, Pennant, "British Zoology, iii, 250, pl. 47, 1776.
Goldsinny, Pennant, l. c., 251.
Labrus goldsinny Bonnaterre, Encycl. Method, 1788, 112 (after Pennant).
Labrus gibbosus Bonnaterre, l. c., (after Pennant).
Labrus gibbus Gmelin, Syst. Nat., 1788, 1295 (after Pennant).
Labrus cornubicus Gmelin, l., c. 1297.
Lutjanus norwegicus Bloch, Ichth., 256, 1792.
? *Labrus reticulatus* Walbaum, Artedi Piscium, 1792, 236 (after Klein).
Perca maculosa Retzius, "Fauna Suecica, 337, 1800."
Crenilabrus melops et vars. *lugubris* et *superbus* Risso, Eur. Mérid., 1826, fide Bonaparte).
Crenilabrus pennanti Cuv. & Val., xiii, 178, 1839.
Crenilabrus couchi Cuv. & Val., l. c. 1878.
Crenilabrus donovani Cuv. & Val., xiii, 180, 1839.

Habitat.—Coasts of northern Europe; occasionally in the Mediterranean.

Etymology: *Μέλας* black, *ὄψ* eye, from the black spot behind the eye.

This species is found chiefly in the waters of northern Europe, where it is said to be generally common. We have not studied it, and have taken our account of it chiefly from the figure and description of Dr. Day. It is one of the most strongly marked species, and its synonymy offers no special question.

13. SYMPHODUS MELANOCERCUS.

Lutjanus melanocercus Risso, Ichthyol. Nice, 1810, 283.
? *Labrus melanotus* Rafinesque, Caratteri, etc., 1810, 40.
Crenilabrus melanocercus Risso, Eur. Mér., iii, 316, 1826; Cuv. & Val., xiii, 213; Günther, iv, 80; and of all recent authors.
Crenilabrus cœruleus Risso, Eur. Mér., iii, 316, 1826; and of authors.
Crenilabrus cyanospilotus Cocco (fide Bonaparte).
Crenilabrus xanthomelanus Cocco (fide Bonaparte).
Crenilabrus melanoxanthurus Cocco (fide Bonaparte).

Habitat.—Mediterranean fauna.

Etymology: *Μέλας* black, *κέρκος* tail.

We have not seen this species. We follow Dr. Steindachner in regarding *C. cœruleus* as identical with *S. melanocercus*.

14. SYMPHODUS CINEREUS.

Labrus corpore grisco obscurius punctato Brünnich, Ichthyol. Massil., 1768, 58. No. 75.
Labrus cinereus Bonnaterre, Encycl. Meth., 1788, 118 (after Brünnich).
Labrus griseus Gmelin, Syst. Nat., 1788, 1296 (not of Linnæus, nor of Gmelin *op. cit.*, p. 1283, after Brünnich).
Crenilabrus griseus Günther, iv, 83; and of most recent writers.
Labrus rubellio Walbaum, Artedi Piscium, iii, 1792, 264 (after Brünnich).
? *Labrus bicolor*, Bloch & Schneider, Syst. Ichth., 1801, 267 (after Seba).
Labrus fuscus Pallas, Zoogr. Ross.—Asiat., iii, 1811.
Crenilabrus fuscus Cuv. & Val., xiii, 219.
? *Labrus frenatus* Pallas, l. c., 270.
? *Labrus simus* Pallas, l. c., 271.
Lutjanus massa Risso, Ichth. Nice, 1810, 274.
Crenilabrus cottæ Cuv. & Val., xiii, 204 (not *Lutj., cotta* Risso).
? *Labrus facii* Rafinesque, Caratteri, etc., 38, 1810.
? *Labrus lappanoides* Rafinesque, l. c., 39.
Crenilabrus staiti Nordmann, Demidoff's Reise, iii, 1840, 452.
Crenilabrus pusillus Nordmann, l. c., 454.

Habitat.—Mediterranean fauna and neighboring coasts.

Etymology: *Cinereus*, color of ashes.

This species is generally abundant in the Mediterranean. We have specimens from Venice and Palermo.

The names *Labrus cinereus* Bonnaterre and *Labrus griseus* Gmelin were given simultaneously to this species, and we can not find which of the two is the earlier. The name *Labrus griseus* is, however, inadmissible, because there was an earlier *Labrus griseus* Linnæus (= *Lutjanus griseus*). On an earlier page of Gmelin's work we find this *Labrus griseus* also, the compiler, Gmelin, with characteristic carelessness, not having noticed the duplication of the name *griseus*.

In all our specimens of this species, the dark spot on the front of the dorsal and that on the lower side of the caudal peduncle are very conspicuous.

15. SYMPHODUS DODERLEINI.

Crenilabrus tinca Cuv. & Val. xiii, 199 (probably not *Labrus tinca* L., nor of Brünnich; probably not *Lutjanus tinca* Risso; these being probably *S. scina.*)
Crenilabrus tinca Günther, iv, 86; Canestrini, Labroidés del Mediterraneo, 1868, 31, with an excellent figure.
Symphodus doderleini Jordan (nom. sp. nov.).

Habitat.—Mediterranean fauna and coasts of southern Europe.

Etymology: named for Pietro Doderlein, professor of zoology in the University of Palermo.

This species seems to be rather rare in the Mediterranean, and among the many nominal species, we find none which seem to have been based on it. It is evidently the *Crenilabrus tinca* of Cuv. & Val., their description according perfectly with our specimens. It is also apparently the *Crenilabrus tinca* of Steindachner, Vinciguerra and Doderlein. The description of Günther applies well to our specimens. Günther

does not, however, describe the form of the head, and we are informed by Mr. G. A. Boulenger that in the specimens in the British Museum the form of the head is much as in *Coricus rostratus* (*Symphodus scina*). We do not think that the *Labrus tinca* either of Risso or of Brünnich can be our species. Their descriptions apply better to *Symphodus scina* which also has the vent black, and which is green, without distinct lateral bands. Our species is, of course, not the *Labrus tinca* of Linnæus, and it can not retain the specific name of *tinca*.

We have given to it the new name of *Symphodus doderleini*, in honor of our excellent friend Prof. Pietro Doderlein of the University of Palermo.

The numerous specimens in our possession were sent by the museum at Paris, and probably came from the neighborhood of Marseilles.

16. SYMPHODUS PIRCA.

Labrus species, Dalmatinis *Pirca*, etc., Brünnich, Ichth. Massiliensis, 97, 1768.
Labrus pirca Walbaum, Artedi Piscium, 1792, 265 (after Brünnich).
Crenilabrus bailloni Cuv. & Val. xiii, 191, 373, 1839; Günther iv, 84; and of recent writers.

Habitat.—Mediterranean fauna.

Etymology: *Pirca*, a Dalmatian name, a corruption of the Latin *perca*, perch, from *Πέρκη*, derived by Rondelet from *Πέρκαίνων* to be of diverse colors.

We have not seen this species, which seems to be rather rare in the Mediterranean. The description given by Brünnich of his *Labrus* called *Pirca* in Dalmatia, and which he thinks may be a variety of his No. 73 (*S. cœruleovittatus*), agrees very closely with this species. We have therefore substituted the name "*pirca*" for "*bailloni*." Faber gives "*Spirca*" as the Dalmatian vernacular name for *S. melops*.

17. SYMPHODUS OCELLARIS.

? *Labrus ocellaris* Linnæus, Syst. Nat., Ed. x, 1758, 285.
Labrus tinca Brünnich, Ichth. Mass. 55, No. 70 (and of Risso, 1810, not of Linnæus).
? *Labrus corpore olivaceo lineato, pinna dorsali postice unimaculata*, Brünnich, Ichthyol. Massil., 1768, 57, No. 73.
Labrus corpore rubescente nigro vario, Brünnich, Ichthyol. Massil. 1768, 59, No. 76.
Labrus cœruleovittatus Bonnaterre, Encycl. Meth., 1788, 117 (after Brünnich, No. 73).
Labrus unimaculatus Gmelin, Syst. Nat., 1788, 1295 (after Brünnich, No. 73).
Labrus guttatus Bonnaterre, Encycl. Meth., 1788, 118; Gmelin, Syst. Nat., 1788, 1296 (after Brünnich, No. 76).
Labrus erithrophthalmus Walbaum, Artedi Piscium, 1792, 263 (after Brünnich, No. 73).
? *Labrus garcetto* Walbaum, Artedi Piscium, 1792, 250 (after Seba).
Labrus quinquemaculatus Bloch, Ichthyol., taf., 291, 1792.
Crenilabrus quinquemaculatus Günther, iv, 82; and of most recent writers.
? *Labrus flavescens* Bloch & Schneider, Syst. Ichth., 1801, 260 (after Seba.).
Labrus rubens Bloch & Schneider, Syst. Ichth., 1801, 256 (after Brünnich, No. 76).
Labrus massiliensis Lacépède, iv, 222, 1803 (after Brünnich, No. 73).
Lutjanus roissali Risso, Ichth. Nice, 1810, 276.
Crenilabrus roissali Cuv. & Val., xiii, 205; and of authors.

Lutjanus alberti Risso, l. c., 277.
Lutjanus varius Risso, l. c., 277.
Lutjanus cotta Risso, l. c., 282.
Labrus oculis-perdix Rafinesque, Ichth. Oh., 1810, 39.
Crenilabrus tigrinus Risso, Eur. Mérid., iii, 317, 1826 (and varieties *semimaculatus* and *rubiginosus*) (fide Bonaparte).
Labrus æruginosus Pallas, Zoogr. Rosso-Asiat., iii, 1811, 261.
Labrus capistratus Pallas, l. c., 269.
?? *Crenilabrus aurantiacus* "Cocco."

Habitat.—Mediterranean fauna.

Etymology: *Ocellaris*, having an eye-like spot.

This brilliant little fish seems to be abundant in the Mediterranean. Our specimens are from Palermo. Its great variations in color have given it a long and complicated synonymy, and even the question as to which is its oldest name must remain unsettled.

Labrus ocellaris L. may be this species, but of this there can be no certainty. The description only shows that the species is a *Symphodus*, and that it has a black spot at the middle of the base of the caudal. It is very likely a female of the present species, for the female of this species is probably the only one with a black spot at the middle of the base of the caudal and no distinct markings elsewhere. We have, however, hesitated to adopt the name *Symphodus ocellaris* for the present species, as Linnæus' fish might possibly have belonged to *S. rostratus* or possibly to *S. tinca*. It is certain that Brünnich's No. 76 belonged to the present species, and scarcely less certain that this is his No. 73 also.

In the year 1788 Bonnaterre gave to this Brünnich's No. 73 the specific name of *cœruleovittatus*, and to No. 76 a page later the name of *guttatus*. In the same year Gmelin called No. 73 *Labrus unimaculatus*, and No. 76 also *Labrus guttatus*. If the name *ocellaris* be set aside as unidentifiable we must then choose between *Labrus cœruleovittatus* of Bonnaterre and *Labrus unimaculatus* of Gmelin. We are unable to find which of these two works, both now a century old, has priority. Neither writer mentions the other. Gmelin's preface is dated March 16, 1788, while the page devoted by Bonnaterre to the "Privilege du Roi," or copyright, bears date of May 16, 1788. Bonnaterre states that there have been thirteen editions of the Systema Naturæ, and Gmelin's edition is styled the thirteenth, but there is no evidence that he had seen or used the thirteenth edition, or that the latter had appeared when his own work was published. Most likely the two works were nearly simultaneous in their appearance, a very slight probability lying in favor of Gmelin, whose preface was written two months before Bonnaterre obtained his privilege of publication. On the other hand, Bonnaterre's name for the present species is much preferable to Gmelin's, which is irrelevant and misleading. A little later in date is Bloch's name, *quinquemaculatus*, lately brought into use by Dr. Günther. This name is scarcely preferable to *unimaculatus*, and the figure of Bloch is a caricature, though it can not refer to any other species. In any case

other well-identified names are prior to *quinquemaculatus*. The other synonyms need no special discussion.

For the present we may use for this species the name of *Symphodus ocellaris*, which in all probability belongs to it, and as no absolute certainty would accompany the use of any of the other names.

18. SYMPHODUS OCELLATUS.

Labrus corpore viridi-olivaceo operculorum apice caeruleo Brünnich, Ichth. Mass., 56, No. 71, 1768.
Labrus viridis venis rubris anastomosantibus Brünnich, l. c., 58, No. 74, 1768.
Labrus ocellatus Forskål, Descr. Anim., 37, 1775 (Smyrna).
Crenilabrus ocellatus Cuv. & Val., xiii, 193; Günther, iv, 85; and of authors generally.
Labrus olivaceus Bonnaterre, Encycl. Meth., 1788, 117 (after Brünnich, No. 71, and of Gmelin, Walbaum, etc.).
Labrus reticulatus Bonnaterre, l. c., 117 (after Brünnich, No. 74).
Labrus venosus Gmelin, Syst. Nat., 1296, 1788 (and of Walbaum), (after Brünnich, No. 74).
Labrus mendorella Rafinesque, Indice all' Ittiol. Sicil., 1810, 54.
Lutianus ruber, Rafinesque, l. c., 63.
Labrus perspicillatus Pallas, Zoogr. Rosso-Asiat., 1811, 267.
Crenilabrus littoralis Risso, Eur. Mérid, iii, 232, 1826.
Crenilabrus rissoi Cuv. & Val., xiii, 197, 1839.
Crenilabrus morelli Nordmann, "Demidoff's Reise, 459, 1840."
Crenilabrus argentostriatus Nordmann, l. c., 461, 1840.

Habitat.—Mediterranean fauna.

Etymology: *Ocellatus*, having an eye-like spot.

This handsome little fish seems to be rather common in the Mediterranean. Our specimens are from Palermo. Its variations in color are great, but the jet black opercular ocellus is always diagnostic. Its synonymy is long, but none of it seems to admit of doubt and the name *ocellatus* has clear priority over all others.

19. SYMPHODUS SCINA.

Labrus scina Forskål, Descr. Anim., 1775, 36 (Constantinople), (and of the copyists).
Lutjanus rostratus Bloch, Ichthyol., taf. 254, f. 2, 1792.
Coricus rostratus Cuv. & Val. xiii, 256, pl. 376; and of numerous authors.
Crenilabrus rostratus Günther iv., 86; and of numerous recent authors.
Lutjanus rubescens Risso, Ichth. Nice, 271.
Lutjanus virescens Risso, Ichth. Nice, 280 (not of Bloch).
Lutjanus lamarcki Risso, l. c., 281.
? *Labrus pittimoides* Rafinesque, Caratteri, etc., 1810, 36.
Labrus verdolidus Rafinesque, l. c., 36.
Labrus macrostomus Rafinesque, l. c., 36.
Symphodus fulvescens Rafinesque, l. c., 41.
Coricus brama Nordmann, Demidoff's Reise, 1840, 464.
Coricus fasciatus Cocco (*fide* Bonaparte).

Habitat.—Mediterranean fauna.

Etymology: Σκίνα, Greek name for the species at Constantinople, perhaps from σκίναξ, nimble.

This curious little fish seems to be very common in the Mediterranean. Our numerous specimens are from Venice, Palermo, and southern France. No special doubt seems to exist in regard to its synonymy, the name *scina*, clearly belonging to it, having priority over the generally received specific name *rostratus*.

Genus V.—CTENOLABRUS.

Ctenolabrus Cuvier & Valenciennes, Hist. Nat. Poiss., xiii, 223, 1839, (*rupestris* = *suillus*).
Tautogolabrus Günther, Cat. Fish, Brit. Mus., iv, 89, 1862 (*burgall* = *adspersus*).
Lappanella Jordan, subgenus nova.

TYPE: *Labrus rupestris* L. = *Labrus suillus* L.

Etymology: *Κτείς* comb, from the serrated preopercle; *Labrus*, an allied genus.

This genus contains four species, distinguished from the species of *Symphodus* by having the teeth in the jaws in two series anteriorly, there being a series of smaller teeth behind the canines. The known species diverge considerably from each other, and each of the three best known may be the type of a distinct subgenus. The first of these groups approaches very closely to the subgenus *Symphodus* of the preceding genus.

ANALYSIS OF SPECIES OF CTENOLABRUS.

a. Snout long and sharp, low, horizontally produced, the depth of the head at the eye not half the length of the head; inner series of teeth small. (*Lappanella*, Jordan.)

b. [Body elongate, the greatest depth 4 in length, the head 3½; back somewhat elevated, the anterior profile somewhat concave; snout a little longer than eye, which is 4 in head; cheeks not broader than eye, provided with about four rows of scales; scales on body large; interopercle scaly; dorsal spines rather high; color scarlet; a brown band backward from eye to gill-opening; a large black blotch on the front of the soft dorsal, one on the tail at the base of caudal, near the upper margin, one on the upper rays of caudal, and one near the tip of the middle rays. D. XVI, 11; A. III, 10; scales 3-37-10.] (*Cuv. & Val.*) ..... IRIS, 20.

aa. Snout not specially elongated or depressed, the depth of the head at the eye not less than half its length; scales smaller; vertebræ probably more numerous (33 to 36).

c. Interopercle scaly (European species) (*Ctenolabrus*).

d. [Body moderately robust, the depth about 3⅔ in length, the head 3½; snout rather pointed, the anterior profile being nearly straight; eye 3¾ in head, rather shorter than snout; mouth small, the maxillary not reaching front of eye; cheeks with six rows of scales; dorsal spines low, lower than the soft rays; color golden or pinkish, darker above; fins reddish; a dark blotch along front of spinous dorsal, another at upper base of caudal; body sometimes with a short, pale lateral stripe, sometimes with dusky cross-bands. D. XVII, 10; A. III, 8; scales 4-40-15; vertebræ 15 + 18 = 33.] (*Day.*) ..... SUILLUS, 21.

cc. Interopercle wholly naked (American species), (*Tautogolabrus* Günther).

e. Scales rather small, about 46 in the lateral line; body rather robust, the depth 3 in length; the head 3½; snout short, not very sharp; eye shorter than snout 4½ in head; cheeks with small scales, in 5 rows; dorsal spines low and pungent; color livid blue, shaded with brownish above and with more or less of a brassy luster on sides; head and back sometimes spotted with brassy; young with darker blotches and markings, and often a black blotch near middle of dorsal fin. D. XVIII, 10; A. III, 9; scales 6-46-17; vertebræ 17 + 19 = 36.

ADSPERSUS, 22.

ee. [Scales rather large, 37 or 38 in the lateral line; head about 4¼ in total length; depth 3⅔; eye 4¾ in head; scales on cheeks in 5 rows; middle of the opercle scaly, the last row of smaller scales, and falling almost wholly on the subopercle; preopercle finely serrate, interopercle scaleless; color of body golden brown, paler below; soft dorsal and anal regularly dotted with small brown spots; scales of upper part edged with dark brown; D. XIX, 9; A. III, 9; scales 5 or 6-37 or 38-14.] (*Steindachner.*) ..... BRANDAONIS, 23.

20. CTENOLABRUS IRIS.

LAPPANELLA.

Ctenolabrus iris Cuv. & Val., xiii, 236, pl. 374, 1839 (Naples; Sicily; Malta); Günther iv, 90 (Sicily); and of authors.

Habitat.—Mediterranean.

Etymology: *Iris*, rainbow.

We have not studied this species. It has evidently affinities with *Symphodus rostratus*, and excepting in its dentition it resembles *Symphodus* rather than the more boreal species which are typical of *Ctenolabrus*.

21. CTENOLABRUS SUILLUS.

Labrus suillus Linnæus, Syst. Nat. Ed. x, 1758, 285 (West Gotha); and of copyists.
Labrus rupestris Linnæus, Syst. Nat., l. c., 286; and of copyists.
Ctenolabrus rupestris Cuv. & Val., xiii, 223; Günther, iv. 89; Steindachner, Ichth. Ber., 1868, 32; Day, British Fishes, 264; and of most recent writers.
Sparus carudse Lacépède, iv, 148, 1803 (after *Labrus rupestris* L.).
Labrus cinereus Pallas, Zoog. Rosso-Asiat., iii, 267, 1811.
Ctenolabrus marginatus Cuv. & Val., xiii, 232, 1839.
Ctenolabrus acutus Cuv. & Val., xiii, 235, 1839.

Habitat.—Coasts of Europe, especially northward; rare in the Mediterranean.

Etymology: *Suillus*, belonging to swine.

We have not studied this species, which is one of the common fishes of northern Europe, reaching a length of 6 inches. Of the two Linnæan names for this species that of *Labrus suillus* has, unfortunately, the priority of a page.

22. CTENOLABRUS ADSPERSUS (Plate I, fig. 1).

CUNNER; CHOGSET; BERGALL; BLUE PERCH.

Labrus burgall Schœpf, Gesellsch. Naturf. Freunde, viii, 155, 1788 (New York).
Labrus adspersus Walbaum, Artedi Piscium, 254, 1792 (after Schœpf).

Tautogolabrus adspersus Bean, Proc. U. S. Nat. Mus., 1880, 87 (Wood's Holl, Gloucester, and Provincetown, Mass.; Portland, Me.; Noank, Conn.).

Ctenolabrus adspersus Stearns, Proc. U. S. Nat. Mus., 1883, 123 (Cape Britain); Jordan & Gilbert, Syn. Fishes N. Am., 599, 1883; Goode, Nat. Hist. Aquat. Anim., 273, 1884.

Tautoga niger Mitchill, Rep. (in part) on the Fishes of New York, 23, 1814 (New York); Cuv. & Val., xiii, 293, 1839 (New York).

Tautoga cærulea Mitchill, Rep. (in part) on the Fishes of New York, 24, 1814 (New York).

Ctenolabrus ceruleus Dekay, New York Fauna, Fishes, 172, pl. 29, f. 93, 1842.

Labrus chogset Mitchill, Trans. Lit. and Phil. Soc. N. Y., i. 402, pl. 3, f. 2, 1815 (New York).

Labrus chogset fulva Mitchill, l. c., 403, 1815.

Ctenolabrus chogset Cuv. & Val., xiii, 237, 1839 (New York; Newfoundland).

Crenilabrus burgall Storer, Fishes of Mass., 78, 1839; Ayres, Bost. Jour. Nat. Hist., iv, 263, 1842 (Brookhaven).

Ctenolabrus burgall Günther, iv, 90, 1862 Canada; Boston; Nahant Bay).

Ctenolabrus uninotatus Cuv. & Val., xiii, 239, 1839 (New York); Dekay, New York Fauna, Fishes, 174, pl. 29, f. 90, 1842; Günther, iv, 90, 1839 (Halifax).

Habitat.—Atlantic coasts of North America, from Labrador to New York.

Etymology: *Adspersus*, speckled (besprinkled).

This little fish is exceedingly abundant about rocks and wharves near shore in the regions where it is found. It reaches a length of about 10 inches, being too small to have much value as food, although its flesh is of excellent flavor. These fishes, although performing a useful duty as scavengers, are a pest to the fishermen from their habit of nibbling the bait from their hooks.

23. CTENOLABRUS BRANDAONIS.

Ctenolabrus (*Tautogolabrus*) *brandaonis* Steindachner, Ichth. Notiz., iv, 16, 1867 (Brazil).

Habitat.—Coast of Brazil.

Etymology: Personal name unexplained.

This species is known from Dr. Steindachner's description only. It would be interesting to know in what part of Brazil it was found, as it is not of the type of Labroids usually found in the tropics.

Genus VI.—HIATULA.

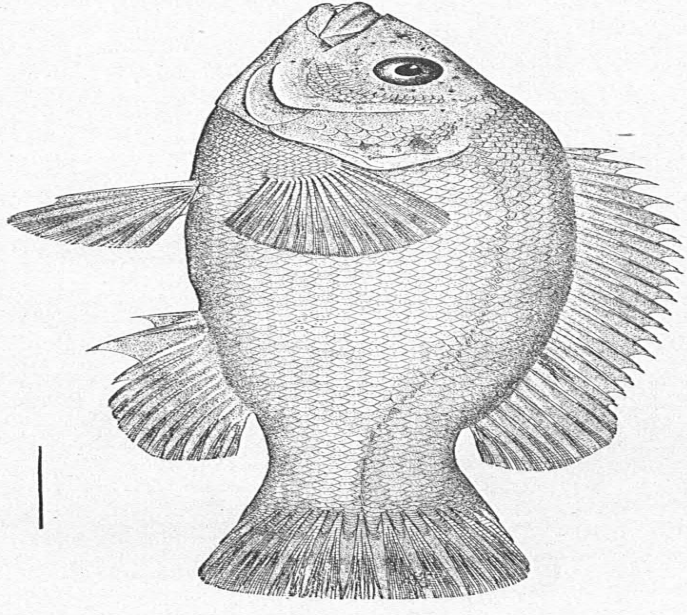
Hiatula Lacépède, Hist. Nat. Poiss., ii, 522, 1800 (*hiatula=onitis*).
Tautoga Mitchill, Hist. Fish. N. Y., 1814, 23 (*tautoga=onitis*).
Hiatula Jordan, Proc. U. S. Nat. Mus., 1882, 571.

TYPE: *Labrus hiatula* L. = *L. onitis* L.

Etymology: *Hiatula*, an old Latin name of *Serranus cabrilla*, from *hiatus*, a gaping.

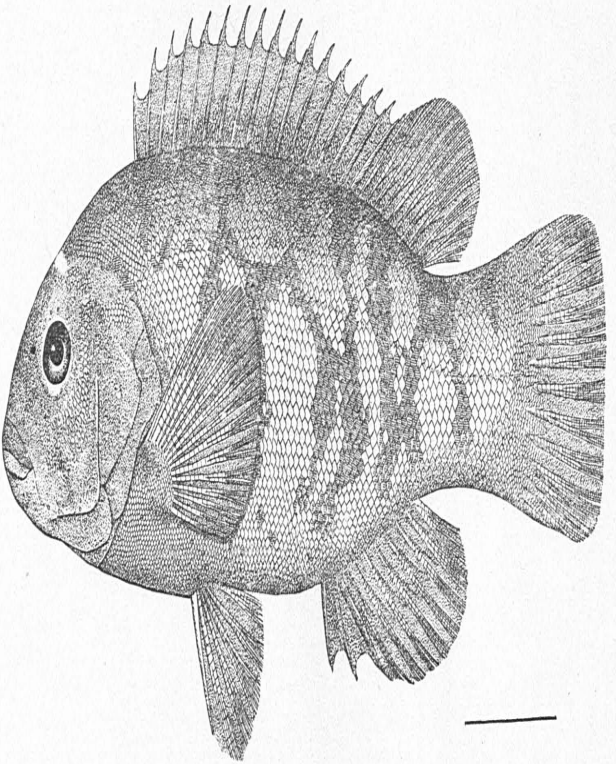
This genus contains a single species, a large, dull-colored labroid, abundant on the Atlantic coast of the United States.

a. Body somewhat deep and compressed; the head about 3¼ in length; depth 2⅔; eye rather small, about 5 in head; caudal truncate or very slightly rounded; snout rather blunt; the profile moderately steep; a patch of small scales behind



CTENOLABRUS ADSPERSUS Walbaum. Cunner; Chogset.

(No. 17641, U. S. N. M.; from Wood's Holl, Massachusetts.)



HIATULA ONITIS Linnæus. Tautog; Blackfish.

(No. 17738, U. S. N. M.; from Wood's Holl, Massachusetts.)

eye extending downward to middle of cheek, where there are five or six series; pectorals 4½ in length; color blackish or greenish; the young usually with about three pairs of dark bars connected by reticulations; adult often nearly plain blackish; chin white; D. XVI, 10; A. III, 8; Lat. l. 60 ..... ONITIS, 24.

24. HIATULA ONITIS. (PLATE II.)

(TAUTOG; BLACKFISH; OYSTER-FISH.)

Labrus onitis Linnæus, Syst. Nat., ed. x, 286, 1758; ed. xii, 478, 1766 (habitat unknown) and of the copyists.

Tautoga onitis Günther, iv, 88, 1862 (Boston; New York; Beesley's Point); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 374 (Beaufort, N. C.); Bean, Proc. U. S. Nat. Mus., 1880, 87 (Wood's Holl, Mass.; Noank, Conn.; Massachusetts Bay); Jordan & Gilbert, Syn. Fishes N. Am., 600, 1883; Goode, Nat. Hist. Aquat. Anim., 268, 1885.

Hiatula onitis Jordan & Gilbert, Syn. Fishes N. Am., 600, 1883; Jordan, Proc. U. S. Nat. Mus., 1886, 28 (Beaufort, N. C.).

Labrus hiatula Linnæus, Syst. Nat., ed. xii, 475, 1766 (Carolina); Jordan, Proc. U. S. Nat. Mus., 1885, 396 (note on Linnæus' type).

Hiatula hiatula Goode & Bean, Proc. U. S. Nat. Mus., 1885, 201 (note on type of *Labrus hiatula*).

Labrus carolinus Bonnaterre, Tableau Enclycloped. et Method., Ichthyologie, 113, 1788 (Carolina), (after Linnæus).

Labrus, Blackfish, Schœpf, Schrift der Gesellsch. Natur. Freunde, viii, 156, 1788 (New York).

Labrus subfuscus Walbaum, Artedi Piscium, 254, 1792 (after Schœpf).

Labrus tessellatus Bloch, Ichthyologie, taf. 291, 1792 ("Norway").

Tautoga tessellata Cuv. & Val., xiii, 315, 1839 (after Bloch).

Hiatula gardiniana Lacépède, Hist. Nat. Poiss, ii, 522, 1800 (after *L. hiatula* Linnæus).

Labrus americanus Bloch & Schneider, Syst. Ichth., 261, 1801 (after Schœpf); Ayres, Bost. Journ. Nat. Hist., iv, 263, 1842 (Brookhaven; Sag Harbor; Greenport; Gardiner's Bay, Long Island).

Tautoga americana Storer, Hist. Fish. Mass., 276, 1867 (Plymouth; Lynn; Boston; Wellfleet); Dekay, New York Fauna, Fishes, 175, pl. xiv, f. 39, 1842 (New York).

Labrus tautoga Mitchill, Trans. Am. Phil. Soc., 399, 1815 (Long Island; Rhode Island; Cape Cod; Sandy Hook).

Labrus tautoga fusca Mitchill, Trans. Am. Phil. Soc., 402, 1815.

Labrus tautoga rubens Mitchill, Trans. Am. Phil. Soc., 402, 1815.

Labrus tautoga alia, l. c., 402, 1815.

Habitat.—Atlantic coasts of the United States, from Cape Ann to Charleston.

Etymology: Ὀνίτις, a kind of plant; application unexplained.

The tautog is one of the most valuable food fishes of the Atlantic coast. It is generally abundant within its range, and its flesh is of superior quality. The largest specimen known, according to Professor Goode, has a length of about 3 feet.

It is probable that this is the *Labrus onitis* of Linnaeus, but the description is too incomplete to permit absolute certainty of identification.

Genus VII.—LACHNOLAIMUS.

Lachnolaimus Cuvier & Valenciennes, Hist. Nat. Poiss., xiii, 274, 1839 (*aigula* = *maximus*).

Lachnolæmus Jordan & Gilbert, Syn. Fishes N. Am., 600, 1883 (amended orthography).

TYPE: *Lachnolaimus aigula* C. & V. = *Labrus maximus* Walbaum.

Etymology: *Λάχνος*, wooly; *λαιμὸς*, throat, part of the surface of the pharyngeals being covered with a velvety membrane.

This genus contains a single species, a large, showy fish of tropical America, remarkable for the long streamer-like filaments on the dorsal spines.

ANALYSIS OF SPECIES OF LACHNOLAIMUS.

a. Body deep, strongly compressed, the back much elevated, the profile long and steep; snout sharp; canine teeth prominent; filamentous dorsal spines reaching to last rays of soft dorsal. Color reddish gray, varying to brick red; some of the scales olive-green at base, cheeks greenish, head mottled; a large round blue-black blotch at base of last rays of soft dorsal; caudal grayish, with three rows of dull olive spots; anal similarly colored; an undulate blue line below eye; deep-water fishes brick-red or orange red; adult male with vertical fins blackish at base, the black forming a crescent on the caudal; frontal region from snout to occiput abruptly blackish; head 3 in length; depth 2⅓; D. XIV, 11 or 12; A. III, 11. Lat. l. 39 ..... MAXIMUS, 25.

25. LACHNOLAIMUS MAXIMUS. (PLATE III.)

(HOG FISH; CAPITAINE; PERRO PERRO.)

Suillus (The Great Hog Fish) Catesby, Nat. Hist. Carolina, pl. 15, 1750.

Labrus maximus Walbaum, Artedi Piscium, 261, 1792 (after Catesby).

Lachnolæmus maximus Jordan, Proc. U. S. Nat. Mus., 1884, 546; Jordan, l. c., 1886, 45 (Cuba).

Lachnolaimus suillus Cuvier, Règne Animal, Ed. ii, 1829 (after Catesby); Cuvier and Val., xiii, 286, 1839 (Saint Thomas); Poey, Enumeratio, 105, 1875 (Havana); Bean & Dresel, Proc. U. S. Nat. Mus., 1884, 153 (Jamaica); Jordan, l. c., 134 (Key West.)

Lachnolaimus aigula Cuv. & Val., xiii, 277, 1839 (St. Bartholomew).

Lachnolaimus dux Cuv. & Val., xiii, 285, 1839 (Martinique).

Lachnolaimus caninus Cuv. & Val., xiii, 288, 1839 (St. Thomas; San Domingo); Poey, Synopsis, 330, 1868 (Havana).

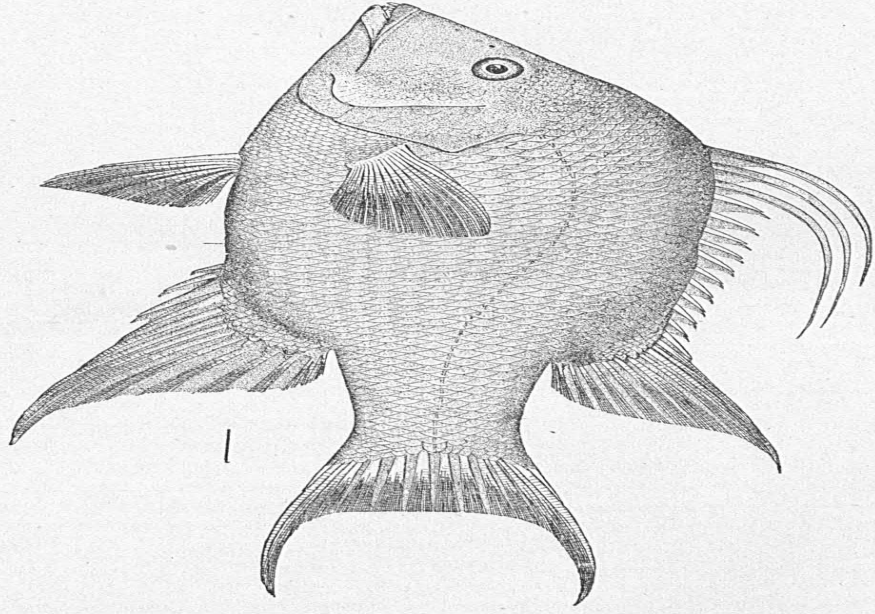
Lachnolaimus psittacus Cuv. & Val., xiii, 291, 1839 (Porto Rico).

Lachnolaimus falcatus Günther, iv, 87, 1862 (Cuba; Jamaica; Puerto Cabello) (after *Labrus falcatus L.*, but the Linnæan *falcatus* is probably a *Trachinotus*); Goode, Bull. U. S. Nat. Mus., v, 1876, 36 (Bermudas); Goode, Nat. Hist. Aquat. Anim., 1885, 275 (Key West); Jordan & Gilbert, Syn. Fishes N. Am., 601, 1883; Stearns, Nat. Hist. Aquat. Anim., 275, 1885; Jordan & Gilbert, Proc. U. S. Nat. Mus., 1884, 134 (Key West).

Habitat.—West Indies, north to Key West.

Etymology: *Maximus*, largest.

This large and showy species is generally common in the West Indies. It reaches sometimes a weight of 12 to 15 pounds, and is generally es-



LACHNOLAIMUS MAXIMUS Walbaum. Hog Fish; Capitaine.

teemed as a food fish. It changes much in the course of its growth, and it has thus received several specific names. The oldest binomial name is that of *Labrus maximus* Walbaum, based on the Great Hog Fish of Catesby. The *Labrus falcatus* of Linnæus is doubtless a species of *Trachinotus*.

Genus VIII.—HARPE.

Bodianus Bloch, Ichthyol., iv, 33, 1790 (in part; not as restricted by Cuvier).
Harpe Lacépède, Hist. Nat. Poiss., iv, 426, 1802 (*cæruleo-aureus* = *rufus*).
Cossyphus Cuvier & Valenciennes, xiii, 102, 1839 (*bodianus*=*rufus*) (name pre-occupied in *Coleoptera* and in birds).
Crenilabrus Swainson, Nat. Hist. Class'n Fishes, ii, 1839 (*verres* = *rufus*) (not of Cuvier).
? **Lepidaplois** Gill, Proc. Acad. Nat. Sci. Phila., 1862, 140 (*axillaris*; species with the dorsal fins low, not falcate, the preopercular limb scaly, the snout produced).
? **Euhypsocara** Gill, op. cit., 1863, 222 (*anthioides*; dorsal and anal not falcate; limb of preopercle scaly, snout short).
? **Gymnopropoma** Gill, op. cit., 1863, 222 (*bilunulata*; as in the last, but limb of preopercle naked).
Harpe Gill, l. c., 1863, 222 (*bodianus*; soft dorsal and anal falcate).
? **Achœrodus** Gill, op. cit., 1863, 222 (*gouldi*; species without posterior canine, and with the scales smaller than usual; lat. l. 39; probably a distinct genus).
Bodianus Poey, Rep. Fis. Nat. Cuba, ii, 331, 1867 (*bodianus*).

TYPE: *Harpe cæruleo aureus* Lacépède = *rufus L.*

Etymology: Ἅρπη, scythe, in allusion to the falcate fins.

The genus *Bodianus*, as originally constructed, was a most heterogeneous assemblage of species, having only the supposed common character of the head naked anteriorly, the preopercle entire, and the opercle spinous. Most of the species originally included are Serranoid fishes. The name, however, was taken from the species called *Bodianus bodianus*. The word *bodianus* is the Portuguese *Bodiano*, or rather *Pudiano*, a name still used in Brazil for various Labroid fishes. For this reason the name *Bodianus* has been taken by Gill and Poey for this group instead of using it for the Labroid genus *Enneacentrus* or *Cephalopholis*, to which it was restricted by Cuvier. It seems to me that the first restriction must hold. The name *Harpe*, an euphonious and appropriate one, comes next in order of time and may be used instead of *Cossyphus*. The latter name has been in general use, although it has been twice used before its application to these fishes. All of the American species of *Harpe*, in fact all the American *Harpinæ*, have the soft parts of the dorsal and anal fins produced in angular lobes, and often in long streamers. This is true of few or none of the Old World species, which are also somewhat different in squamation and in the form of the head. It is probable that Gill is right in separating these from *Harpe* to form the genus *Lepidaplois*. Of the later subdivisions of *Lepidaplois*, *Achœrodus* will perhaps prove to represent a different genus, but the value of the characters used to distinguish *Euhypsocara* and *Gymnopropoma* can not be very great.

ANALYSIS OF SPECIES OF HARPE.

Common characters.—Body rather robust, somewhat compressed, covered with large scales; cheeks, opercles, and interopercle scaly; preopercle serrulate, usually becoming entire with age; mouth rather large, the anterior canines $\frac{4}{4}$, the median canines of the lower jaw usually smallest; posterior canines present; a scaly sheath at base of both dorsals; angles of caudal, and of soft dorsal and anal fin more or less produced, especially in the adult; median caudal rays subtruncate; depth in the adult about equal to length of the head. D. usually XII, 11 (rarely XIII, 10); A. III, 13; lat. l, usually 33.

a. Male, in life, blue, with a yellow patch behind the pectoral fin, which has a large dark spot on its extremity; head, tail, and fins bright red, their tips black and yellow; forehead very gibbous in the adult, preopercle entire, or very slightly crenulated; eye a little less than 6 in head, which is about $3\frac{1}{8}$ in length; all the fins (except the pectorals) elongate in the adult, the dorsal nearly reaching and the anal extending beyond the median caudal rays; external caudal rays twice as long as the median; ventrals reaching nearly to base of anal.

Females: Color brownish-yellow; a dark band commences behind the snout and is divided into two behind the eye, the upper portion running along the back and nearly joining its fellow from the other side on the back of the free portion of the tail, while the lower crosses the angle of the operculum and is continued on to the middle of the tail, terminating near the caudal and alternating with two spots behind the base of the caudal fin; fins yellowish or orange. Forehead scarcely gibbous in the adult; preopercle entire or slightly crenulated; eye 6 in head, which is about equal to depth; vertical fins elongate in the adult, the dorsal extending nearly to and the anal beyond the median caudal rays, which are one-half as long as the external rays; ventrals extending to the third anal spine. Depth (including scaly dorsal sheath) nearly $3\frac{1}{2}$ in length; D. XII, 11; A. III, 13; scales 5–33–12 ..... DIPLOTÆNIA, 26.

aa. Color chiefly red, without dark bands or stripes.

b. Pectorals immaculate.

c. Body without dark cross band, or conspicuous pale blotch.

d. General color violet-red above and anteriorly, yellow or orange behind and below; lower part of sides and posterior part of body yellowish-orange; upper part of head and body (as far back as a line joining base of pectoral and soft dorsal) violet-red; middle of caudal, bases of pectorals and ventrals, and most of anal violaceous. Head $3\frac{1}{2}$ in length; depth nearly 3. D. XII, 9; A. III, 11 or 12; scales 5–32–13; fins a little less produced than in *H. pectoralis* ..... RUFA, 27.

dd. [General color vermilion, with two large, irregular, black blotches on the back and dorsal fin, the anterior on the first six dorsal spines, the posterior extending over the whole soft dorsal and over a portion of the back of the tail; snout pointed, with the upper profile slightly concave; head longer than high; dorsal and anal fins produced; caudal emarginate. D. XII, 10; A. III, 12; Lat. l, 32.] (Valenciennes.) ..... ECLANCHERI, 28.

cc. [Body with a dark-brown cross band before with a pale blotch under soft dorsal; snout pointed, less than 3 in head, eye nearly 7; scales on cheek small, in eight series; dorsal spines increasing in length posteriorly, the first being rather shorter than the eye, the last as long as the ventral spine, which is $2\frac{3}{8}$ in head; produced rays of soft dorsal and anal not reaching root of caudal; color unknown, probably red; a large whitish blotch below the soft dorsal; a blackish cross-band in front of this blotch, descending from the ninth, tenth, and eleventh dorsal spines. Head equal to depth of body and 3 in total; D. XIII, 10; A. III, 12; scales 5–33–12.] (Günther.)
TREDECIMSPINOSA, 29.

bb. [Pectorals with a large dark-blue spot towards the tip; color carmine-red, fins edged with darker; base of pectoral whitish; side of body with a pale rose-colored band; dorsal fin low; ventrals reaching vent; snout sharp; length of head equal to depth of body, which is 4¾ in total length; D. XII, 9; A. III, 12.] (Poey) ..... PULCHELLA, 30

26. HARPE DIPLOTÆNIA.

Harpe diplotænia Gill, Proc. Ac. Nat. Sci. Phil., 1862, 140; Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, 367 (note on *H. diplotænia* Gill) (female).
Cossyphus diplotænia Günther, iv, 110, 1862 (copied).
Bodianus diplotænia Jordan, Proc. U. S. Nat. Mus., 1885, 384 (Cape San Lucas).
Harpe pectoralis Gill, Proc. Ac. Nat. Sci. Phil., 1862, 141; Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, 367 (note on type) (male).
Cossyphus pectoralis, Günther, iv, 110, 1862 (copied).
Bodianus pectoralis Jordan, Proc. U. S. Nat. Mus., 1885, 384 (Cape San Lucas; Panama).

Habitat.—Pacific coast of Tropical America.

Etymology: Διπλός, double; ταινία, band, from the coloration of the female.

This species was first known from two or three male specimens taken by John Xantus at Cape San Lucas. It has since been taken in abundance by Dr. C. H. Gilbert about the Revilla-Gigedo Islands. As already suspected by us *pectoralis* is the male and *diplotænia* the female of the same species.

27. HARPE RUFA.

LADY-FISH; SPANISH LADY-FISH; SPANISH HOG-FISH; PUDIANO; PERRO COLORADO.

Pudiano vermelho Marcgrave, Hist. Bras., 145, 146, 1648 (Brazil).
Turdus flavus (the Hog-fish) Catesby, Nat. Hist. Carolina, ii, tab. ii, fig. 1; Jordan, Proc. U. S. Nat. Mus., 1884, 194 (identification of Catesby's figure).
Labrus rufus Linnæus, Syst. Nat., Ed. x, 284, 1758, Ed. xii, 475, 1766 (after Catesby); Goode and Bean, Proc. U. S. Nat. Mus., 1885, 200 (note on Linnæan specimen).
Cossyphus rufus Günther, iv, 108, 1862 (Bahia; Jamaica; West Indies); Günther, Shore-Fishes, Challenger 14, 1880 (St. Paul's Rocks).
Harpe rufa Gill, Proc. Acad. Nat. Sci. Phil., 1863, 222; Goode, Fishes Bermudas, 37, 1876 (Bermudas); Jordan and Gilbert, Syn. Fish. N. Am., 601, 1883.
Bodianus rufus Poey, Repertorio, ii, 331, 1867 (Havana); Poey, Synopsis, 331, 1868; Poey, Enumeratio, 105, 1875 (Havana); Jordan, Proc. U. S. Nat. Mus., 1884, 148 (Key West); Jordan, Proc. U. S. Nat. Mus., 1886, 45 (Havana).
Perro colorado Parra, Descr. Dif. Piez. Hist. Nat. Cuba, 3, lam. 3, fig. 1, 1787 (Havana).
Bodianus bodianus Bloch, Ichth., vii, 24, tab. 223, 1790 (from a drawing by Prince Maurice, the same used by Marcgrave).
Cossyphus bodianus Cuv. and Val., xiii, 103, 1839 (San Domingo; Porto Rico; Saint Thomas).
Lutjanus verres Bloch, op. cit., tab. 255, 1791 (locality uncertain).
Cossyphus verres Castelnau, Anim. Nouv. ou Rares, Amerique du Sud., Ichth., 27, 1855 (Bahia; Rio Janeiro).
Sparus falcatus Bloch, op. cit., tab. 258, 1791 (after a drawing by Plumier, made at Martinique).
Bodianus blochii Lacépède, Hist. Nat., Poiss., iv, 279, 290, 1803 (after *Bodianus bodianus* Bloch).

Harpe cæruleo-aureus Lacépède, op. cit., 426, 427, tab. 8, fig. 2 (from the drawing of Plumier, used by Bloch).
Labrus semiruber Lacépède, op. cit., iii, 428 (Rio Janeiro, from notes by Commerson).

Habitat.—West Indian Fauna, north to Key West.

Etymology: *Rufus*, yellowish-red.

This handsomely colored fish is generally common in the West Indies. Our specimens are from Havana.

28. HARPE ECLANCHERI.

Cossyphus eclancheri Valenciennes, Voy. Vénus, Zool., 340, Poiss., pl. 8, fig. 2 (Galapagos Isl.) (plates 1846; text 1855); Günther, iv, 108, 1862.

Habitat.—Galapagos Islands.

Etymology: A personal name.

This species is known from Valenciennes' description and figure only. It much resembles *Harpe rufa*, apparently differing only in color.

29. HARPE TREDECIMSPINOSA.

? *Labrus iagonensis* Bowdich, Excurs. Mad. and Porto Santo, 234, fig. 47, 1825 (Porta Praya); Cuv. and Val., xiii, 100, 1839 (copied) (may be *Lepidaplois scrofa*).
Cossyphus jagonensis Troschel, Wiegmann's Archiv., 229, 1866 (Cape Verde Islands).
Cossyphus tredecimspinosus Günther, iv, 1862, 107 (locality unknown).

Habitat.—Madeira and Cape Verde Islands.

Etymology: *Tredecim*, thirteen; *spinosus*, spined.

This species is known to us only from the scanty description of Dr. Günther. The very imperfect description of *Labrus jagonensis* apparently belongs to some red fish of the *Harpinæ*, but it resembles *Lepidaplois scrofa* about as much as the present species. The presence of thirteen dorsal spines in the original type is probably merely accidental.

30. HARPE PULCHELLA.

Cossyphus pulchellus Poey, Memorias, ii, 208, 1860 (Havana); Günther, iv, 1862 (copied).
Bodianus pulchellus Poey, Syn., 232, 459, 1868; Poey, Enumeratio, 105, 1875 (Havana).

Habitat.—West Indies.

Etymology: *Pulchellus*, pretty.

This species is known to us solely through Poey's descriptions.

Genus IX.—LEPIDAPLOIS.

Lepidaplois Gill, Proc. Ac. Nat. Sci. Phila., 1862, 140 (*axillaris*).
Euhypsocara Gill, op. cit., 1863, 322 (*anthioides*).
? **Gymnopropoma** Gill, op. cit., 1863, 222 (*bilunulata*).

TYPE: *Labrus axillaris* Bennett.

Etymology: Λεπις, scale; απλοις, "a simple cloak that fits the body."

We have not examined any of the typical species of this genus; neither of the two species which we refer to it have been studied by us and

neither of the two have ever been properly described. All the Asiatic species allied to *Harpe* seem to have the soft dorsal and anal low, not at all produced in a point, and this character may therefore be regarded as of generic value. The fins in *Harpe scrofa* seem to agree with those of *H. axillaris*. The form of the dorsal and anal in *H. tredecimspinosus* is not stated, only that the dorsal and anal do not reach the root of the caudal. It may, however, be a true *Harpe*.

ANALYSIS OF EUROPEAN SPECIES OF LEPIDAPLOIS.

a. [Snout pointed, its length $2\frac{2}{3}$ in that of head; preopercle serrate or entire; color bright red, lower parts and fins yellow; dorsal and anal spotted with brown; caudal plain; a large black blotch between the five anterior dorsal spines. D. XII, 10; A. 3, 12–14; scales 6–50–19.] ..... SCROFA, 31.

31. LEPIDAPLOIS SCROFA.

Labrus scrofa Cuv. & Val., xiii, 93, 1839 (Cape Verde; Madeira).
Crenilabrus caninus Lowe, Proc. Zool. Soc., 1839, 84; Lowe, Trans. Zool. Soc., ii, 186, and iii, 10 (Madeira).
Cossyphus scrofa Günther, iv, 111, 1862.

Habitat.—Madeira and Cape Verde Islands.

Etymology: *Scrofa*, an old hog, from the large canines.

We know this species from description only. Its scales are smaller than in other species of *Lepidaplois*, but it probably belongs to that genus.

Genus X.—DECODON.

Decodon Günther, Cat. Fish. Brit. Mus., iv, 1862, 101 (*puellaris*)

TYPE: *Cossyphus puellaris* Poey.

Etymology: Δέκα, ten; ὀδών, tooth, there being ten canines in the mouth as in most *Harpinæ*.

This genus contains but a single species, a small fish belonging to the West Indian fauna. It is closely related to *Trochocopus* and *Harpe*.

ANALYSIS OF SPECIES OF DECODON.

a. Body moderately compressed, oblong; head oblong; cheeks, opercles, and lower limb of preopercle scaly, the posterior limb being naked; teeth uniserial; four canines in the front of each jaw; maxillary reaching a little beyond eye, which is as wide as the interorbital space, shorter than snout; edge of preopercle minutely denticulated; caudal emarginate; ventrals not reaching vent; color, according to Poey, rose-red with three large red blotches; head with several pearl-colored streaks (yellow in life); a transverse one between the nostrils; two oblique ones running from orbit towards suboperele, and a broad one from angle of mouth to angle of preopercle; some yellow spots on sides of head; each scale on sides with a yellow spot on its edge; fins mostly red, the soft dorsal and anal with four rounded yellow spots; several spots on spinous dorsal and caudal. Head $3\frac{1}{4}$ in length; depth 4; D. XI, 10; A. III, 10; scales $2\frac{1}{2}$–30–8 ..... PUELLARIS, 32.

32. DECODON PUELLARIS.

Cossyphus puellaris Poey, Memorias Cuba, ii, 210, 1860 (Havana).
Decodon puellaris Günther, iv, 101, 1862 (Barbadoes); Poey, Synopsis, 332, 1868; Poey, Enumeratio, 107, 1875 (Havana); Jordan, Proc. U. S. Nat. Mus., 1884, 545 (Pensacola); Cat. Fish. N. Am., 1885, 98 (Pensacola).

Habitat.—West Indies.

Etymology: *Puellaris*, pretty, from *puella*, girl.

This small species is not uncommon at Havana. The two specimens examined by us were taken from the stomachs of groupers in deep water in the Gulf of Mexico.

Genus XI.—TROCHOCOPUS.

Trochocopus Günther, Cat. Fish. Brit. Mus., iv., 1862, 100 (*opercularis*)
Pimelometopon Gill, Proc. Ac. Nat. Sci. Phil., 1864, 58 (*pulcher*).

TYPE: *Trochocopus opercularis* Günther (East Indies).

Etymology: *Τροχος*, wheel, or a runner; *κόπος*, pain (?) weariness.

This genus is close to *Harpe*, differing chiefly in the naked dorsal and smaller scales. It is divisible into two well-marked subgenera on the size of the scales, *Trochocopus* and *Pimelometopon*.

ANALYSIS OF AMERICAN SPECIES OF TROCHOCOPUS.

a. Scales of moderate size, 45 to 50 in the lateral line. (*Trochocopus*).
b. [Body moderately elongate; highest at the occiput in the adult male; preopercle entire; cheeks and opercles scaly; head compressed; mouth large; canines $\frac{1}{1}$; posterior canine evident; a smaller one before it; a row of smaller teeth in each jaw behind the canines; spinous dorsal very low; second dorsal and anal elevated; longest spine $2\frac{3}{4}$ in longest soft ray, the latter nearly equal to head; pectoral moderate, obliquely truncate; ventrals pointed, inserted behind pectorals; no scaly sheath at base of dorsal. Head 4; depth 4; D. XII, 9; A. III, 12; scales 45 to 50; length m. .63; color uniform black, except a large orange blotch above the pectoral fins.] (*Philippi.*)
MACULATUS, 33.

33. TROCHOCOPUS MACULATUS.

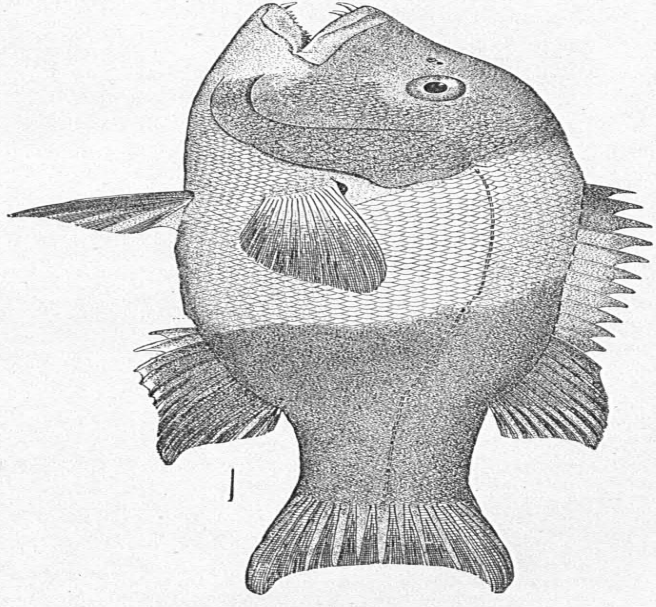
(PEJE-PERRO.)

Dentex maculatus Perez, "Estudio sobre los Escualos de la Costa de Chile," about 1886, p. 11 (Valparaiso).
Trochocopus canis Philippi, Sobre los Tiburones, etc., de Chile, 1887, 38, lam. vii, fig. 3 (Iquique).

Habitat.—Coast of Chili.

Etymology: Latin *maculatus*, spotted.

We know this species from the account given by Dr. Philippi. The fact that Dr. Perez curiously mistook this fish for a Sparoid does not justify Dr. Philippi in setting aside the specific name proposed by the latter.



TROCHOCOPUS PULCHER Ayres. California Redfish; Fathead.

(No. 24800, U. S. N. M.; from San Diego, California.)

aa. Scales small, about 60 in the lateral line. (*Pimelometopon, Gill.*)

c. Body somewhat deep and compressed, the head 3 in length; depth 3; eye 5 in head; snout rather blunt; caudal truncate, its lobes being produced and pointed in the adult; gill-rakers short and thickish; scales on breast small; preopercle serrulate in young. Color (males): head, dorsal, anal, and caudal fins, also the posterior part of body as far forward as vent, purplish black; lower jaw white; the rest of body varying in tint from clear crimson to blackish, with coppery or purplish luster; females dusky rose-colored, with the black areas ill-defined or obsolete. D. XII, 10; A. III, 12; lat. l. 60 ..... PULCHER, 34.

cc. [Snout pointed; outer lobes of caudal noticeably produced as are also the soft dorsal and anal; preopercle entire. Color, red; a large, yellow blotch above the pectoral, and a black one anteriorly on the spinous dorsal.] D. XII, 10; A. III, 12; lat. l. 62. (*Valenciennes*) ..... DARWINII, 35.

34. TROCHOCOPUS PULCHER. (PLATE IV.)

(CALIFORNIA REDFISH; FATHEAD.)

Labrus pulcher Ayres, Proc. Cal. Acad. Nat. Sci., i, 3, 1854 (San Diego).

Semicossyphus pulcher Günther, iv, 99, 1862 (copied).

Pimelometopon pulcher Gill, Proc. Acad. Nat. Sci. Phila., 1864, 59; Jordan, Proc. U. S. Nat. Mus., 1880, 29 (San Diego); Jordan & Gilbert, l. c., 455; Jordan and Jouy, l. c., 1881, 10 (Wilmington, Santa Barbara, Cal.).

Harpe pulcher Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 278 (Ascension Island, Lower California); Jordan & Gilbert, Syn. Fish. N. Am., 1883, 602.

Trochocopus pulcher Rosa Smith, Proc. U. S. Nat. Mus., 1883, 233 (Todos Santos); Jordan, Cat. Fish. N. Am., 98, 1885; Jordan, Nat. Hist. Aquat. Anim., 275, 1885 (Point Conception to Cerros Island).

Habitat.—Coast of southern California, from Point Conception to Cerros Island.

Etymology: *Pulcher*, beautiful.

This large and handsome fish is very common on the coast of southern California, and it is taken in enormous numbers in the kelp of the coast. It is taken chiefly by the Chinese, with hook and line. It is salted and dried by them. It reaches a weight of 12 to 15 pounds. The male is quite different in color from the female, and the old specimens, as usual with large Labroids, have the forehead surmounted by a mass of fat.

The specimens before us are from San Diego.

35. TROCHOCOPUS DARWINII.

Cossyphus darwinii Jenyns, Voy. Beagle, Fishes, 100, pl. 20, 1842 (Chatham Island, Galapagos).

Trochocopus darwinii Günther, iv, 100, 1862 (copied).

Pimelometopon darwinii Gill, Proc. Acad. Nat. Sci. Phila., 1864, 59.

Labrus aper Valenciennes, Voy. de la Vénus, Zool., 338; Poiss., pl. 8, f. 1 (Galapagos Island) (text, 1855; plates, 1846).

Habitat.—Galapagos Islands.

Etymology: Named for its discoverer, Charles Darwin.

This species is known to us from descriptions only. It is evidently very closely related to *T. pulcher*, differing from the latter chiefly in color.

Genus XII.—GRAUS.

Graus Philippi, Sobre los Tiburones y algunos Otros Peces de Chile, 1887, 41 (*nigra*).

TYPE: *Graus nigra* Philippi.

Etymology: Γράος, an old woman; the word corresponding to the Spanish *vieja*.

This genus is based on a single species, found on the coast of Chili. It is evidently very close to *Trochocopus*.

ANALYSIS OF SPECIES OF GRAUS.

a. [Body moderately elongate; anterior profile regularly curved; head compressed, formed as in *Trochocopus maculatus;* preoperele entire; soft dorsal and anal similar, the soft rays just twice the height of the longest spines, 2⅓ in head; scales moderate, smaller than in *Trochocopus maculatus;* forehead scaly (?); opercles with small scales; no scales on sheath at base of dorsal; canines large, ⅔ on each side; no posterior canine; a second row of small teeth behind the main row in each jaw; (gills 4); pectorals rounded; ventrals pointed, inserted behind pectorals; color dusky, each scale with a black spot at its base so that the fish appears reticulate; D. XIII; length m. .58; depth m. .12; head m. .135.] (*Philippi.*)
NIGRA, 36.

36. GRAUS NIGRA.

(VIEJA NEGRA.)

Graus nigra Philippi, Sobre los Tiburones, etc., 1887, 40 (Navidad, Chili).

Habitat.—Coast of Chili.

Etymology: Latin *niger*, black.

This species is known only from the scanty description of Dr. Philippi, condensed above.

Genus XIII.—CLEPTICUS.

Clepticus Cuv. & Val., Règne Animal, Ed. ii, 1829, 201 (*genizara*).

TYPE: *Clepticus genizara* Cuvier.

Etymology: Κλεπτικος, one inclined to steal; a name given to recall the affinity of the genus to *Epibulus*, from επιβουλος, insidious, its Dutch name in Molucca being *de Bedriger*.

This genus contains a single species, a singular-looking Labroid fish, inhabiting the West Indian waters. It is remarkable for the close squamation of its head and fins, as well as for the feebleness of its dentition.

ANALYSIS OF SPECIES OF CLEPTICUS.

a. Body robust, considerably compressed, depth 2⅞ in length, head 3⅜; four rows of scales on cheek; pectorals falcate, slightly longer than head; dorsal and anal completely enveloped in a scaly sheath; produced soft rays of both fins naked except at base; produced ray of dorsal nearly as long as head; color in spirits reddish-brown anteriorly as far back as an irregular line connecting ventrals and last ray of dorsal fin, becoming coppery below, posteriorly insensibly shading into greenish marbled with verdigris green; D. XII, 90; A. III, 12; scales 5-35-9.
GENIZARA, 37.

37. CLEPTICUS GENIZARA.

(GENIZARA.)

Rabirrubia genizara Parra, Dif. Piezas de Hist. Nat. Cuba, 44, pl. 21, f. 1, 1787 (Havana).

Clepticus genizara Cuvier, Règne Animal, Ed. ii, 1829, 201 (after Parra); Cuv. & Val., xiii, 367, pl. 377, 1839 (Antilles); Günther, iv, 112, 1862 (Jamaica); Poey, Repert., i, 370, 1866; Poey, Synopsis, 332, 1868; Poey, Enumeratio, 107, 1875 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 45 (Havana).

Habitat.—West Indies.

Etymology: Spanish *genizara*, janissary; from its gay coloration.

This species seems to be rather rare in the West Indies. We have a single specimen nearly a foot long, from Havana.

Genus XIV.—PSEUDOLABRUS.

Pseudolabrus Bleeker, Proc. Zool. Soc. London, 1861, 413 (*rubiginosus*)

? **Labrichthys** Bleeker, l. c., 415 (*cyanotænia*).

TYPE: *Labrus rubiginosus* Schlegel.

Etymology: Ψευδής, false; *Labrus*, an allied genus.

A single species of this East Indian genus occurs on the Pacific coast of South America. Dr. Günther unites *Labrichthys* with *Pseudolabrus*, not regarding either the single (instead of double) row of teeth on the lower pharyngeal or the slight sheath of scales at the base of the dorsal in the former group as of generic value. In any case, the name *Pseudolabrus* has priority, and it is to that group that our species apparently belongs.

ANALYSIS OF AMERICAN SPECIES OF PSEUDOLABRUS.

a. [A small posterior canine; four rows of small scales on cheeks below the eye; a small blue spot on the upper part of the base of pectoral; edges of the scales paler than the middle; pectorals bright yellow; dorsal generally dull indigo blue. D. IX., 11; A. III, 10; scales 3-25-8.] (*Steindachner.*) .....GAYI, 38.

38. PSEUDOLABRUS GAYI.

Labrus gayi Cuv. & Val., xiii, 97, 1839 (Juan Fernandez); Guichenot, in Gay, "Hist. Chil., Zool., ii, 299, lam. 8, f. 1."

Labrichthys gayi Günther, iv, 115, 1862 (copied); Steindachner, Ichth. Beitr., ii, 19, 1875 (Juan Fernandez; Chili).

Habitat.—Coast of Juan Fernandez and Chili.

Etymology: Named for Claude Gay, author of a history of Chili.

We know this species from the scanty published descriptions.

Genus XV.—JULIS.

? **Coris** Lacépède, Hist. Nat. Poiss., iii, 96, 1802 (*aygula*).

Julis Cuvier, Règne Animal, Ed. i, 1817, 262 (*julis*, etc.).

Julis Swainson, Nat. Hist. Classn. Fishes, ii, 1839, 233 (restricted to *julis*=*Julis mediterranea* Swainson.)

Julis Bonaparte, Catologo Metodico, 1846, 86 (*julis.*)

Coris Günther, iv, 195, 1862 (in part: probably not type.)

TYPE: *Labrus julis* Linnæus.

Etymology: Ἰουλίς, name of some red Labroid, from ἴον, violet.

This genus, as now restricted, contains some half dozen species of the eastern Atlantic and the East Indies. We have not been able to study critically many of the foreign species referred to *Coris*. It seems to us that the type of the latter genus, *Coris aygula*, with 60 scales in the lateral line and weak or wanting posterior canines should not be congeneric with *Julis julis*, but is related rather to the group called *Hermicoris* by Bleeker. *Pseudocoris* Bleeker and *Hologymnosus* Lacépède, referred by Günther to *Coris*, seem to be distinct genera.

The name *Julis*, used for the group here called *Thalassoma* by Günther and Bleeker, was originally based by Cuvier on *Labrus julis*; and it was further explicitly restricted to this species by Swainson, who declared that *Julis mediterraneus* Risso (*Labrus julis* L.) is the *Julis* of the ancients.

ANALYSIS OF EUROPEAN SPECIES OF JULIS.

a. Male with the anterior spines of the dorsal elevated, flexible, nearly half length of head; females with the spines subequal, slender, but more or less pungent; body elongate, somewhat compressed, covered with small scales, the head naked; canine teeth ¼, the outer pair smaller; caudal fin subtruncate; male brown above, a broad red band (whitish in spirits) with serrated edges from the eye across opercle to upper part of base of caudal; below this a brown band, its upper edge jagged, its lower fading into the color of the belly; this band on the head is bounded below by a dark line, but fades into the pale band above; an oblong jet-black blotch about as long as head immediately behind pectoral, its upper edge along lower edge of red band; a jet-black spot on tip of opercle; front of spinous dorsal black, the long spines tipped with white; dorsal whitish, with one or two grayish longitudinal streaks; anal pale; caudal pale, sometimes with very faint oblique streaks; sometimes the pale lateral band wanting and the body marked with dark cross-streaks (var. *speciosa*); female pale, with a dusky lateral shade from snout through eye to base of caudal; sometimes a narrow streak below this; jet-black spot on opercle present; fins pale, unmarked; young males sometimes with the upper half of the body dark, the lower from the level of the eye abruptly pale; the opercular spot present in both sexes at all ages. Head 3½ in length; depth 4½; D. IX, 12; A. III, 12; scales 3-75-25; vertebræ 11 + 14 = 25 ..... JULIS, 39.

39. JULIS JULIS.

(RAINBOW WRASSE; DONCELLA.)

Labrus palmarius varius Artedi, Genera 34, Syn. 53, 1738.

Labrus niloticus Hasselquist, "Iter Palæstinum, 1757, 346," (Egypt). (Pre-Linnæan.)

Labrus julis Linnæus, Syst. Nat., ed. x, 1758, 284 (after Artedi) (and of copyists).

Coris julis Günther, iv, 195; Steindachner, Ichth. Bericht. 1868, 35; Day, British Fishes, 269 (and of many recent writers).

Labrus niloticus Linnæus, Syst. Nat., ed. x, 1758, 286 (after Hasselquist).

Labrus perdica Forskål, Descr. Anim., 34, 1775 (Constantinople).

Labrus subfuscus Bloch & Schneider, Syst. Ichth., 1801, 28 (after Gronow; Mediterranean).

Labrus giofredi Risso, Ichth. Nice, 1810, 228 (female).

Julis giofredi et vars. *argentata* et *fuscoviolacea* Risso, Eur. Mérid., 1826.

Julis giofredi Cuv. & Val., xiii, 371, pl. 385.
Coris giofredi Günther, iv, 196.
? *Labrus doncella* Rafinesque, Caratteri, 1810, 39.
Labrus cettii Rafinesque, Indice, 1810, 54.
Julis mediterranea Risso, Eur. Mérid., iii, 309, 1826; and of some authors.
Julis mediterranea vars. *viridula* et *pallidula* Risso, l. c.
Julis speciosa, Risso, l. c. 311.
Julis speciosa var. *unicolor*, Risso, l. c.
Julis vulgaris Fleming, British Animals, 1828, 210; Cuv. & Val., xiii, 361.
Julis festiva Cuv. & Val., xiii, 374, 1839.
Julis melanura, Lowe, Trans. Zool. Soc. London, iii, 12 (Madeira).

Habitat.—Shores of southern Europe, north to England.

Etymology: *Ἰουλίς*, ancient name of some small violet-colored fish, from *ἴον*, violet.

This beautiful little fish is generally common in the waters of southern Europe and the Madeira Islands. The females were for a considerable time thought to represent a distinct species *Coris* (or *Julis*) *giofredi*. Besides this sexual variation, there is much individual variation in the color of specimens. Our specimens are from Palermo and from the shores of France.

Genus XVI.—LEPTOJULIS.

Leptojulis Bleeker, Proc. Zool. Soc. London, 1861, 412, *cyanopleura*.

TYPE: *Leptojulis cyanopleura* Bleeker.

Etymology: *Λεπτός*, slender; *Julis*, an allied genus.

This genus consists, so far as known, of three species of brightly colored Labroids, two of them found in the East Indies, the other on the west coast of South America.

ANALYSIS OF AMERICAN SPECIES OF LEPTOJULIS.

a. [Four rows of scales between the lateral line and first dorsal spine; two anterior canines in upper jaw much longer than the outer ones; outer canines of lower jaw little longer than the inner ones, which are somewhat shorter than the opposite ones of the upper jaw; caudal rounded, the outer rays somewhat prolonged; general color brownish yellow; a large (in some specimens small) blotch under the fifth scale of the lateral line, this blotch being surrounded by a blue shade or by blue dots; a second blotch on and partly over the last scale of the lateral line; several blue radiating lines about the eye; on the cheeks and opercle brownish wave-like lines, with single golden red spots and dashes upon the back of head and the upper part of the opercle; dorsal plain golden white, colored like the anal; the latter with the longitudinal faint narrow brown stripe; caudal yellowish green, a bright red stripe running over the center of each row of scales.] D. IX, 11; A. III, 11; scales 4-27-9. (*Kner* and *Steindachner*) ....BIMACULATUS, 40.

40. LEPTOJULIS BIMACULATUS.

Leptojulis bimaculatus Kner and Steindachner, Neue Fische aus dem Museum Godeffroy, Hamburg, 23, 1866 (Chili).

Habitat.—Coast of Chili.

Etymology: *Bimaculatus*, two-spotted.

This species is known from the original description only.

Genus XVII.—HALICHŒRES.

Halichœres Rüppell, Neue Wirbelthiere, Fische, 16, 1835 (*bimaculatus*, etc.) (not preoccupied by *Halichœrus*, a genus of seals).

Platyglossus species Günther, and most recent authors; probably not identical with *Platyglossus* Bleeker, Proc. Zool. Soc. London, 1866, 411 (*marginatus*).

Ichthycallus Swainson, Nat. Hist. Class'n Anim., ii., 1839, 232 (*dimidiatus*, etc., a confused jumble of species).

Chœrojulis Gill, Proc. Ac. Nat. Sci. Phila., 1862, 142 (substitute for *Halichœres*).

TYPE: *Halichœres bimaculatus* Rüppell.

Etymology: Ἅλς, the sea; χοῖρος, hog.

I adopt the genus *Halichœres* as defined by Bleeker, and in a sense somewhat narrower than that in which it is taken by Dr. Günther. I separate from it *Platyglossus* (*marginatus*). The dorsal in *Platyglossus* has a scaly sheath at its base somewhat as in the genus *Harpe*. The anterior canines in *Platyglossus* are $\frac{2}{2}$. In *Güntheria* (*cœruleovittata*) the upper part of the opercle is scaled and the canines are $\frac{4}{2}$. In *Hemitautoga* (*centiquadra*) there are two rows of small scales on the cheeks, as well as on the opercles above. In *Macropharyngodon* (*gœffroyi*) the strongest marked of the various genera of Bleeker, which Günther has united with *Platyglossus* and *Halichœres*, the lower pharyngeals are very small, provided with but three teeth, of which the middle one is quite large. In *Macropharyngodon*, the canines are small, $\frac{4}{2}$ in number. All the American species now referred to *Halichœres* have the anterior canines $\frac{2}{4}$. The East Indian species have the teeth $\frac{2}{2}$, except in two or three species, in which the teeth are $\frac{4}{2}$. The American species may properly be held to constitute a subgenus, or perhaps even a distinct genus, for which the name *Ichthycallus*, based in part on *Halichœres dimidiatus*, may be retained.

Most or all of the species of *Ichthycallus* have three anal spines, while in *Halichœres* the usual number is two.

Should the name *Halichœres* be regarded as preoccupied by the similar name *Halichœrus*, this genus may be called *Ichthycallus* or *Chœrojulis*.

ANALYSIS OF AMERICAN SPECIES OF HALICHŒRES.

I. Anterior canines $\frac{2}{4}$; anal spines three; American species (Subgenus *Ichthycallus* Swainson).

a. Caudal fin very slightly concave, truncate when spread open, the outer rays longer than the middle ones; body deep and compressed; the depth about $2\frac{3}{4}$ in the length; ventral fins filamentous, the outer ray produced, more than twice as long as inner ray; scales before dorsal not crossing the middle line, in about five series.

b. Side below spinous dorsal without dark cross-bar; general color bluish (♂) or bronze (♀) with many sky-blue spots, most distinct posteriorly; sky-blue spots and streaks on head; a stripe passing through upper part of eye; fins with blue stripes; a dark axillary spot; end of pectoral dusky.....RADIATUS, 41.

bb. Side below spinous dorsal with a very broad, blackish cross-bar.

c. General color bluish or olive; dark cross-bar obscure, running from middle of spinous dorsal to the space between ventrals and vent; behind this a pale yellowish bar; head and anterior region with round pale bluish spots, which extend on back and on the dark bar; dorsal bluish at base, yellowish above, with regular blue spots ringed with darker; a narrow blue margin along edge of fin; caudal with obscure round bluish spots; anal like dorsal; pectorals and ventrals plain.....NICHOLSI, 42.

cc. General color red; dark cross-bar conspicuous from the fourth to seventh dorsal spines downwards to middle of sides; scales of sides each with a vertical blue line, those anteriorly margined with violet; sides of head with blue lines and spots; dorsal and caudal orange, the former with oblique broken lines of blue, the latter with a few blue spots at base; anal violet, then yellowish, then margined with blue, with a blue median line and broken blue lines at base; other fins pale. Head 3¼ in length; canines strong, scales on nape in 5 or 6 series, not crossing the median line; caudal very slightly emarginate; outer ray of ventrals twice inner ray and reaching vent.....SELLIFER, 43.

aa. Caudal fin rounded or subtruncate; the outer rays not produced, shorter than the middle rays.

d. Scales before dorsal reduced in size, extending across the median line, and in 10 to 13 rows; ventral short, its rays not filamentous; snout rather blunt; body moderately elongate, the depth 3¾ in length; color olivaceous, with some blue and bronze markings; males with a broad indigo-blue cross-band behind pectorals; females with inky spots on the scales of the upper posterior part of back; pectorals yellow, with a black axillary spot.
SEMICINCTUS, 44.

dd. Scales before dorsal large, in 4 to 6 rows, not crossing the median line; snout moderately pointed.

e. Ventral fins with the outer rays produced, more than twice the length of the inner.

f. Sides without conspicuous dark lateral band and with a distinct dark vertical bar, extending downward from spinous dorsal; axillary spot obscure; body rather elongate, the depth about 3¾ in length; profile not steep; posterior canines rather small; head with black streaks and spots above; caudal sharply barred.....GARNOTI, 45.

ff. Side with a broad blue-black lateral band extending from eye to tip of caudal; the back above this dark brown or bluish; spinous dorsal fin with no conspicuous black spot; a dark blue stripe from eye to nape; fins mostly blue-black with pale edgings; middle and base of caudal dusky; tip of pectoral dusky; profile rather steep; body rather robust, the depth 3$\frac{1}{11}$ in length.....DIMIDIATUS, 46.

ee. Ventral fins with the outer ray not produced, its length not more than half that of inner rays; side with a dark lateral band; species of small size.

g. Spinous dorsal with a conspicuous blue-black spot between the fifth and seventh spines; body not very slender, the depth 3⅞ in length; a dark band from snout through eye to operele, the lateral band on side broader than eye and placed a little above the opercular band, the lateral band extending nearly to tip of caudal; no second dark band below it; a faint dark spot

under last dorsal ray and one at base of pectoral above; two or three narrow bluish-white stripes across cheek; "three bluish bands across nape" (not shown in our specimen); body and fins in life with bright colors which fade in alcohol.

MACULIPINNA, 47.

gg. Spinous dorsal pale, the black spot very small or wanting; body slender, the depth 4 in length; opercle with a conspicuous black spot; a blue-black band from snout through eye and across opercles to base of caudal, not extending on the fin; a narrower and fainter band from lower base of pectoral to above anal, these bands growing fainter with age and sometimes disappearing, the lower always wanting in the adult; no axillary spot; no distinct bands across cheek; fins mostly pale, with bright red and blue colors in life, young specimens and deep water specimens often showing a black spot at base of caudal, and sometimes a dark spot near middle of dorsal with sometimes a larger one at the base of its last ray; angles of caudal black in adult; lower pharyngeals T-shaped, the anterior limb very short.....BIVITTATUS, 48.

aaa. Caudal fin double-concave, the median portion convex, the outer rays more or less produced in the adult (the fin rounded in the young); scales before dorsal in six or seven rows, not crossing the median line.

h. A round blue-black spot on lateral line below fourth and fifth dorsal spines, the spot larger than eye; no spot behind eye; ventrals with the outer ray little produced, not reaching nearly to tips of pectorals; body rather stout, the depth about $3\frac{3}{8}$ in length; profile steep; snout moderately pointed; no axillary spot; color olive, blue spots on the scales posteriorly, whitish spots anteriorly; four or five pale blue wavy lines on side of head, the lower broadest; a pale yellowish area behind pectoral with horizontal blue streaks; dorsal and anal each with a brown longitudinal stripe; caudal (in ♂) blackish mesially, with blue streaks; a white stripe along each outer ray.

DISPILUS, 49.

hh. A distinct blue-black spot close behind eye; ventrals with the outer rays scarcely filamentous, about reaching tips of pectorals.

i. Tubes of pores of lateral line distinctly branched, the branches usually three in number; body moderately slender, the depth a little less than length of head, and $3\frac{3}{4}$ to 4 in body; head $3\frac{3}{8}$; snout not very sharp, the anterior profile of head steep and slightly convex; snout $2\frac{4}{5}$ in head measured along the axis; eye $1\frac{3}{8}$ in snout; pectoral shortish, $1\frac{3}{8}$ in head; color in spirits, olivaceous, with traces of three darker cross-bands; dark spot behind eye large, with a distinct golden spot above it in some examples; a round black spot at base of last ray of dorsal; fins all pale in spirits, the anal edged with bluish; a bluish cross bar on base of pectoral.....POEYI, 50.

ii. Tubes of pores of lateral line all simple or very nearly so, not trifid; body very slender, the depth much less than length of head, $4\frac{1}{2}$ in body; head $3\frac{3}{8}$; snout very sharp, the anterior profile of head straightish and not steep; snout $2\frac{4}{5}$ in head; eye 2 in snout; pectoral moderate, $1\frac{3}{8}$ in head; color, in spirits, pale, unmarked, except for the small black spot behind eye; in life, olivaceous; a row of round sky-blue spots along each

side of back; a broad band-like area of orange mingled with violet spots along sides backward from head to middle of body, the lower edge of this band serrate; below this a pale violet band darker behind; still lower a yellow stripe; head olivaceous, marked with blue; preorbital scarlet, with three violet stripes; opercles bright red, with three violet stripes, the postocular black spot in the uppermost; dorsal and anal orange and yellow, with blue spots; caudal with convergent bands of orange forming reticulations around blue spots. CAUDALIS, 51.

41. HALICHŒRES RADIATUS.

(PUDDING-WIFE; DONCELLA; PUDIANO VERDE.)

Pudiano verde Maregrave, Hist. Pisc. Brazil, 146, 1648 (Brazil; on a drawing by Prince Maurice of Nassau).

Turdus oculo radiato (Pudding-wife) Catesby, Nat. Hist. Carol., ii, 12, tab. xii, fig. 1, 1743 (Bahamas).

Labrus radiatus Linnæus, Syst. Nat., Ed. x, 288, 1758 (based on Catesby).

Platyglossus radiatus Günther, Cat. Fish. Brit. Mus., iv, 163, 1862 (copied); Jordan, Proc. U. S. Nat. Mus., 135, 1884 (Key West); Jordan, Proc. U. S. Nat. Mus., 194, 1884 (identification of Catesby's figure); Jordan, Bull. U. S. Fish Com., 78, 1884 (Key West); Jordan, Cat. Fish. N. Am., 98, 1885; Jordan, Proc. U. S. Nat. Mus., 45, 1886 (Havana).

Chærojulis radiatus Goode, Bull. U. S. Nat. Mus., v, 35, 1875 (Bermudas).

Doncella Parra, Desc. Dif. Piez. Hist. Nat. Cuba, 95, lam. 37, fig. 1, 1787 (Havana).

Labrus brasiliensis Bloch, Ichth., taf. 280, 1792 (Brazil; on a drawing by Prince Maurice of Nassau, of the *Pudiano verde*); Bloch & Schneider, Systema Ichthyol., 242, 1801 (copied).

Chlorichthys brasiliensis Swainson, Class. Fish., etc., 232, 1839 (name only).

Julis crotaphus Cuvier, Règne Anim., Ed. ii, 1828 (based on Doncella of Parra; no description).

Julis cyanostigma Cuv. & Val., Hist. Nat. Poiss., xiii, 391, 1839 (Martinique).

Platyglossus cyanostigma Günther, Cat. Fish. Brit. Mus., iv, 161, 1862 (Caribbean Sea); Cope, Trans. Am. Phil. Soc., 464, 1871 (St. Croix); Günther, Shore Fishes, Challenger, 4, 1880 (St. Paul's Rocks, mid-Atlantic).

Chærojulis cyanostigma Poey, Synopsis Pisc. Cub., 334, 1868 (Havana); Poey, Enumeratio, 1875, 107 (Havana).

Julis opalina Cuv. & Val., Hist. Nat. Poiss., xiii, 392, 1839 (Martinique).

Platyglossus opalinus Günther, iv, 163, 1862 (copied).

Julis patatus Cuv. & Val., xiii, 398. 1839 (Martinique; Cuba).

Julis principis Cuv. & Val., xiii, 402, 1839 (Bahia).

Platyglossus principis Günther, iv, 164, 1862 (copied).

Platyglossus radiatus Jordan & Hughes, Proc. U. S. Nat. Mus., 1886, 59 (Key West; Havana).

Habitat.—West Indian fauna; Florida Keys to Brazil.

Etymology: *Radiatus*, radiant.

This is the largest in size of the American species of this genus, and one of those most readily recognized. It has been well described by Professor Goode, who has noted the variations due to age, and by Professor Jordan (Proc. U. S. Nat. Mus., 1884, 194), who has indicated the several variations in the adult.

This species is evidently the *Pudiano verde* of Maregrave, the Pudding-wife of Catesby, and the *Doncella* of Parra.

The *Labrus radiatus* of Linnæus, in the tenth edition, is based solely on the pudding-wife* of Catesby. The Linnæan name, *radiatus*, must therefore be taken for this species. In the twelfth edition the *Labrus radiatus* disappears, and the pudding-wife appears as a doubtful synonym of a *Sparus radiatus*, which is based on a specimen of *H. bivittatus* sent by Dr. Garden from South Carolina.

The *Labrus brasiliensis* of Bloch is a fairly good figure of the female of this species, except that the coloration is made bright yellow and orange, rather than olive and bronze.

The *Julis crotaphus* of Cuvier is based solely on a reference to Parra's Doncella, and must therefore be referred to this species, although the fish subsequently described as *Julis crotaphus* by Valenciennes seems to be *H. Poeyi*. The names *cyanostigma*, *patatus*, and *principis* are regarded by Goode as referring to different stages in the growth of this species. This view seems to be correct, and we may add *opalina* also as apparently the adult female.

The specimens of this species examined by us are all adult (15 to 18 inches long) and are from Key West and Havana.

42. HALICHŒRES NICHOLSI.

Platyglossus nicholsi Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 231 (Braithwaite Bay, Socorro island); Jordan & Hughes, Proc. U. S. Nat. Mus., 1886, 61.

Habitat.—Islands of the west coast of tropical America, Revilla-Gigedos and Galapagos.

Etymology: Named for Capt. Henry E. Nichols, U. S. Navy.

This species was first described from a single specimen from Socorro Island. A second and larger example, 13½ inches long, taken by the Albatross at Charles Island in the Galapagos, shows the original coloration better than the type. This species is the Pacific representative of *Halichœres radiatus*. Other specimens have been since obtained at the Revilla-Gigedos by Dr. Gilbert.

43. HALICHŒRES SELLIFER.

Halichœres sellifer Gilbert, Proc. U. S. Nat. Mus., 1890 (Clarion Island).

Habitat.—Revilla-Gigedos Islands.

Etymology: *Sella*, saddle; *fero*, I bear.

This handsome species is known from a single specimen 11 inches long, taken by Dr. Gilbert at Clarion Island

It is closely related to *H. nicholsi*, differing chiefly in its red color, a hue which is rare in the present genus.

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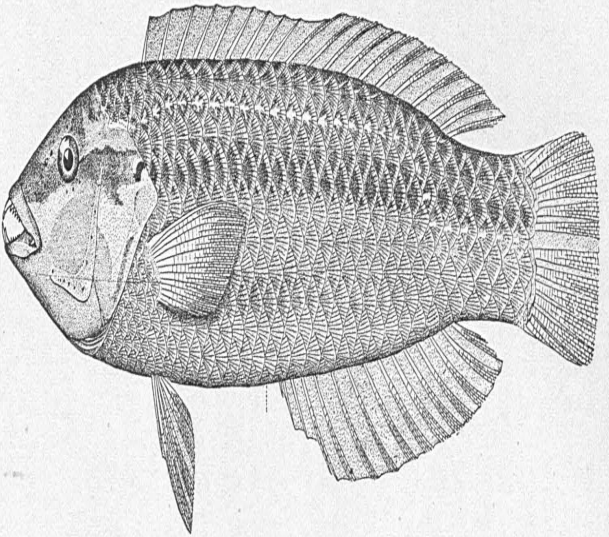
* This name "pudding-wife" still used by the fishermen of the Florida Keys and the Bahamas, seems to be a remarkable compound of the Portuguese "Pudiano" (from *pudor*, modesty) the name of the brighter colored Labroids in Brazil, and "old-wife" or "Vieja," a name given to some of the Scaroid fishes in the West Indies and as "old-wife" to the larger Labroids in England.



HALICHŒRES BIVITTATUS Bloch. Slippery Dick; Doncella. (Young.)

(No. 35168, U. S. N. M.; from Key West, Florida.)

44. HALICHŒRES SEMICINCTUS.

(KELP-FISH; SEÑORITA.)

Julis semicinctus Ayres, Proc. Cal. Acad., 32, 1859 (Cerros Island; male).

Platyglossus semicinctus Günther, Cat. Fish. Brit. Mus., iv, 161, 1862 (copied); Steindachner, Ichthy. Beiträge, v, 151, 1876 (San Diego); Jordan & Gilbert, Proc. U. S. Nat. Mus., 455, 1880 (San Pedro); Jordan & Gilbert, Proc. U. S. Nat. Mus., 10, 1881 (Wilmington, Cal.); Jordan & Gilbert, Proc. U. S. Nat. Mus., 52, 1881 (Santa Catalina, San Pedro); Jordan & Gilbert, Synopsis Fish. N. Am., 603, 1883; Jordan, Cat. Fish. N. Am., 99, 1885; Jordan & Hughes, Proc. U. S. Nat. Mus., 1886, 60 (San Diego).

Chœrojulis semicinctus Gill, Proc. Ac. Nat. Sci. Phil., 223, 1863 (no description).

Habitat.—Lower California fauna; Los Angeles to Cerros Island.

Etymology: *Semicinctus*, half-banded.

This species reaches a length of about a foot. It has been described with sufficient accuracy by Steindachner and by Jordan & Gilbert (Synopsis). The coloration is comparatively plain, but that of the female is notably different from that of the male.

The specimen before us is from San Diego.

45. HALICHŒRES GARNOTI.

Julis garnoti Cuv. & Val., xiii, 390, 1839 (Martinique); Guichenot in Sagra, Hist. de Cuba, 218, about 1855 (Havana).

Platyglossus garnoti Günther, iv, 162, 1862 (Martinique); Jordan, Proc. U. S. Nat. Mus., 45, 1886 (Havana); Jordan & Hughes, l. c., 1886, 61 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 541 (Martinique; types of *Julis garnoti*).

Julis cinctus Poey, Mem. Cuba, ii, 211, tab. 13, fig. 19, 1860 (Havana).

Chœrojulis cinctus Poey, Synopsis, 334, 1868 (Havana); Poey, Enumeratio, 108, 1875 (Havana).

Julis ruptus Poey, Mem. Cuba, ii, 212, tab. 13, fig. 20, 1860.

Chœrojulis ruptus Poey, Synopsis, 334, 1868 (Havana).

Platyglossus ruptus Cope, Trans. Am. Phil., Soc., 464, 1870 (St. Croix).

Habitat.—West Indian fauna.

Etymology: Named for M. Garnot, a collector at Martinique.

Of this small species we have but two specimens, each about 8 inches long, from Havana. Poey notes that this species varies much in color-markings, and includes in his Enumeratio his *Julis ruptus* as a synonym of *Julis cinctus*. The types of *Julis garnoti* examined by us in Paris belong to the same species.

The life coloration in our specimens of *H. garnoti* was as follows:

Head olive, shaded with brown; bright violet-blue on the lower jaw; dark violet dots and streaks behind and above eye; shoulders deep yellow-olive; behind this a blackish cross-band, behind which the back and the base of the dorsal is a rich maroon-crimson; body below this livid purplish, shaded with olive. Spinous dorsal olive, with blue dots; soft dorsal bluish, banded with bronze and edged with dusky; caudal bluish-gray, with sharply-defined, narrow, bronze bands; anal olive-reddish, with streaks of crimson, violet, and blue; pectorals light reddish, their tips black; axil violet; ventrals pale; a diffuse dusky spot at upper base of caudal.

46. HALICHŒRES DIMIDIATUS.

?*Labrus cyanocephalus* Bloch, Ichthyol., pl. 286, 1791 (Museum of Link).

Julis dimidiatus Agassiz, in Spix, Pisc. Braz., 96, pl. 53, 1829 (Brazil); Cuv. & Val., xiii, 407, 1839 (Martinique; Brazil).

Ichthycallus dimidiatus Swainson, Class. Fish, etc., 232, 1839 (name only).

Platyglossus dimidiatus Jordan, Proc. U. S. Nat. Mus., 45, 1886 (Havana); Jordan & Hughes, l. c., 1886, 61 (Havana).

Julis internasalis Poey, Mem. Cuba, ii, 421, 1860 (Havana).

Platyglossus internasalis Günther, Cat. Fish. Brit. Mus., iv, 164, 1862 (Caribbean Sea); Cope, Trans. Am. Phil. Soc., 463, 1870 (St. Martin's).

Chærojulis internasalis Poey, Synopsis, 334, 1868 (Havana); Poey, Enumeratio, 108, 1875 (Havana).

Habitat.—West Indian fauna; south to Brazil.

Etymology: *Dimidiatus*, halved, the upper half of the body being colored differently from the lower.

There seems to be no reason for regarding the Cuban *internasalis* as different from the Brazilian *dimidiatus*, the alleged differences in color being due to defects in descriptions. A specimen before us from Bahia shows the band from eye to nape very distinctly. It is broader behind and edged with darker blue. We have also examined a smaller specimen from St. Lucia. Two male specimens of *H. dimidiatus* from Havana are each about 15 inches in length. In life they showed the following coloration:

Deep light olive-green on head and back, the head bluer, then a broad lateral band of deep indigo, below this light clear green, then darker bluish-green; clear blue on lower jaw below and clear greenish-blue on lower part of cheek; lateral band becoming faint on head; a dark streak along profile from snout to nape; a dark bluish band upward and backward from eye to nape, rather conspicuous, narrowed posteriorly; dorsal indigo, edged with sky-blue; caudal green, indigo in center, yellowish at tip; anal indigo, then dull orange, then sky-blue; ventrals green; pectorals plain greenish, indigo above.

It is not unlikely that *Labrus cyanocephalus* Bloch, from unknown locality, was based on this species, as Castelnau has already suggested.

47. HALICHŒRES MACULIPINNA.

Julis maculipinna Müller & Troschel, in Schomburgk Hist. Barbadoes, 674, 1848 (Barbadoes).

Platyglossus maculipinna Günther, Cat. Fish. Brit. Mus., iv, 1862, 165 (Trinidad). Jordan, Cat. Fish. N. Am., 1885, 99 (Beaufort, N. C.). Jordan, Proc. U. S. Nat. Mus., 1886, 28 (Beaufort). Jordan & Hughes, l. c., 1886, 62 (copied).

Chærojulis maculipinna Poey, Synopsis Pisc. Cub., 1868, 336. Poey, Enumeratio, 109, 1875 (Havana).

Pusa radiata Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 374 (Beaufort).

Habitat.—West Indian fauna; north to Beaufort, N. C.

Etymology: *Macula*, spot; *pinna*, fin.

Of this species we have examined a small specimen taken by the *Albatross* at Port Castries, St. Lucia. From this our description has been taken. The species is closely allied to *H. bivittatus*, but is readily distinguished by the black dorsal spot and stouter form.

48. HALICHŒRES BIVITTATUS. (Plate V and VI.)

SLIPPERY DICK; DONCELLA.

Sparus radiatus Linnæus, Syst. Nat., Ed. xii, 472, 1766 (Carolina; based on a specimen from Charleston, sent by Dr. Garden). Gmelin, Syst. Nat., 1278, 1788 (copied). Walbaum, Artedi Piscium, 289, 1792 (copied). Bloch & Schneider, Syst. Ichth., 207, 1801 (copied), (not *Labrus radiatus* L., Ed. x).

Platyglossus radiatus Jordan & Gilbert, Proc. U. S. Nat. Mus., 608, 1882 (Charleston).

Labrus bivittatus Bloch, Ichth., taf. 284, fig. 1, 1792 (from a painting by Plumier, made at Martinique).

Ichthycalkus bivittatus Swainson, Class. Fish., etc., 232, 1839 (name only).

Platyglossus bivittatus Günther, Cat. Fish. Brit. Mus., iv, 164, 1862 (Jamaica). Steindachner, Ichth. Notiz., vi, 49, 1867 (Barbadoes and Surinam). Cope, Trans. Am. Phil. Soc., 463, 1870 (St. Martin's). Jordan, Proc. U. S. Nat. Mus., 40, 1884 (foot-note). Jordan, Proc., U. S. Nat. Mus., 136, 1884 (Key West). Bean & Dresel, Proc. U. S. Nat. Mus., 153, 1884 (Jamaica). Jordan, Bull. U. S. Fish Com., 79, 1884 (Key West). Jordan, Cat. Fish. N. Am., 98, 1885. Jordan, Proc. U. S. Nat. Mus., 1886, 45 (Havana). Jordan, l. c., 1886, 63 (Charleston; Pensacola; Key West). Jordan, Proc. U. S. Nat. Mus., 1886, 540 (types of *Julis psittaculus* C. & V., from Surinam).

Chœrojulis bivittatus Poey, Syn., 335, 1868 (Havana).

Labrus psittaculus Lacépède, Hist. Nat. Poiss., iii, 522, 1800 (Martinique; from a copy of Plumier's painting).

Julis psittaculus Cuv. & Val., Hist. Nat. Poiss., xiii, 387, 1839 (Martinique and Surinam).

Julis humeralis Poey, Mem. Cub., ii, 212, 1860 (Havana).

Chœrojulis humeralis Poey, Syn., 335, 1868 (Havana); Poey, Enumeratio, 108, 1875 (Havana).

Platyglossus humeralis Günther, Cat. Fish. Brit. Mus., iv, 165, 1862 (Cuba); Jordan & Gilbert, Syn. Fish. N. Am., 603, 1883.

Chœrojulis humeralis Goode & Bean, Proc. U. S. Nat. Mus., 338, 1879 (Clear Water Harbor).

Chœrojulis grandisquamis Gill, Proc. Acad. Nat. Sci. Phil., 206, 1863 (Beaufort, N. C.).

Pusa grandisquamis Jordan & Gilbert, Proc. U. S. Nat. Mus., 374, 1879 (Beaufort).

Platyglossus grandisquamis Jordan & Gilbert, Syn. Fish. N. Am., 603, 1883 (copied).

Chœrojulis arangoi Poey, Enumeratio Pisc. Cub., 109, 1875 (Havana).

Platyglossus florealis Jordan & Gilbert, Proc. U. S. Nat. Mus., 287, 1882 (Pensacola).

Habitat.—West Indian fauna; Beaufort, N. C., to Brazil. Excessively abundant along rocky or weedy shores and reefs.

Etymology: *Bivittatus*, two-banded.

This species reaches a smaller size than any other of our representatives of the genus. It is also by far the most common in the waters of Florida and Cuba, and its range extends considerably farther north than any of the others.

The variations due to age and to character of the bottom are very considerable, having caused the establishment of several nominal species. In the description above mentioned by Professors Jordan & Gilbert of specimens from Charleston, Pensacola, and Key West, these variations have been sufficiently indicated. Our Cuban specimens (from coral sand) are much paler in color than those from farther north. The dark markings, however, remain similar. In old examples the dark lateral bands fade, sometimes becoming more or less broken; the

corners of the caudal become dark, and there is usually a dark spot at base of last dorsal ray. Deeper water examples are quite pale or red with distinct longitudinal stripes, and the spot at base of caudal and at base of last dorsal ray distinct.

The earliest specific name, *radiatus*, is untenable, because preoccupied. The name next in date, *bivittatus*, is based on a rather poor figure, which could, however, have been intended for no other known species. This name must therefore be retained. The name *psittaculus* was based on the same figure. The *humeralis* of Poey seems to be unquestionably the adult of this fish, common in the Havana markets, and his *arangoi* is a young example of the same, from different bottom, and showing a coloration more like our Florida specimens. The *grandisquamis* of Gill is based on an adult example in which the coloration is less sharply defined, and finally the *florealis* of Jordan & Gilbert is the gaily-colored young. None of this synonymy seems to us subject to any serious question. Besides numerous specimens from localities already recorded, we have a specimen from St. Lucia.

49. HALICHŒRES DISPILUS.

Platyglossus dispilus Günther, Proc. Zool. Soc. London, 25, 1864 (Panama); Günther, Fish. Cent. Am., 447, 1869 (Panama); Steindachner, Ichth. Beiträge iii, 64, 1875 (Acapulco); Jordan & Gilbert, Bull. U. S. Fish Com., 108, 1882 (Mazatlan); Jordan, Proc. U. S. Nat. Mus., 384, 1885 (Mazatlan) name only; Jordan, Cat. Fish. N. Am., 99, 1885; Jordan & Hughes, Proc. U. S. Nat. Mus., 1886, 64 (Mazatlan).

Habitat.—Panama fauna; Mazatlan to Panama.

Etymology: Δίς two, σπῖλος, spot.

This species has been well figured and described by Dr. Günther. It was found by Dr. Gilbert to be rather common in the rock pools about Mazatlan. It reaches but a small size. The characters in our analysis of species are taken from a specimen obtained by the *Albatross* at Panama.

50. HALICHŒRES POEYI.

Julis crotaphus Cuv. & Val., Hist. Nat. Poiss., xiii, 395, tab. 395, 1839 (Bahia), (not of Cuvier); Jordan, Proc. U. S. Nat. Mus., 1886, 541 (note on type).

Platyglossus crotaphus Günther, Cat. Fish. Brit. Mus., iv, 163, 1862 (Bahia; Jamaica); Cope, Trans. Am. Phil. Soc., 463, 1870 (St. Croix).

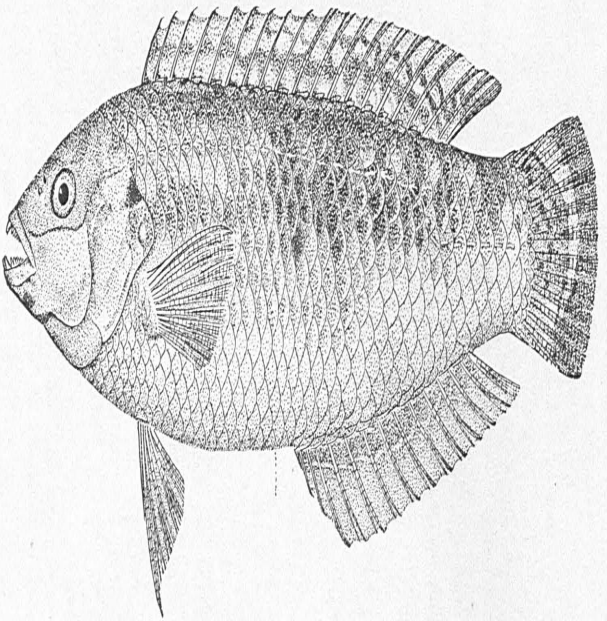
Chærojulis crotaphus Poey, Enumeratio, 109, 1875 (Havana).

? *Platyglossus poeyi* Steindachner, Ichth. Notiz., vi, 49, 1867 (Surinam).

Habitat.—West Indian fauna; Cuba to Bahia.

Etymology: Named for Felipe Poey.

Of this species we have examined the types of *Julis crotaphus* Cuv. & Val., and three specimens taken by the *Albatross* at Bahia. The name *crotaphus* is ineligible, because originally based on *Halichœres radiatus*. The only other name which could belong to the species is that of *Platyglossus poeyi*, but our specimens do not agree well with Steindachner's description. According to Steindachner *P. poeyi* has the depth $3\frac{11}{12}$ in length, the eye "almost three" (two?) times in the snout. Lower half



HALICHŒRES BIVITTATUS Bloch. Slippery Dick; Doncella. (Adult.)

(No. 25643, U. S. N. M.; from Charleston, South Carolina.)

of body violet-red, the upper reddish brown; on each scale above a deep blue spot; a clear blue band backward and downward from the dark preorbital spot; a second from corner of mouth; a blue crescent on base of pectoral which widens into a blue axillary spot; caudal greenish with converging streaks of yellow, edged with violet.

This species is, however, probably identical with our Bahia specimens, and so we adopt for them the name of *Halichœres poeyi*.

51. HALICHŒRES CAUDALIS.

? *Julis caudalis* Poey, Memorias Cuba, ii, 213, 1861 (Havana); Günther, iv, 191, 1862 (copied).

Platyglossus caudalis Günther, iv, 166, 1862 (copied); Jordan & Gilbert, Proc. U. S. Nat. Mus., 286, 1882 (Pensacola); Jordan, l. c., 1884, 37 (Pensacola); Jordan & Hughes, l. c., 1886, 64 (Pensacola).

? *Julis pictus* Poey, Memorias Cuba, ii, 214, 1861 (Havana).

? *Platyglossus pictus* Günther, iv, 166, 1862 (Cuba).

Habitat.—West Indian fauna; north to the Snapper Banks, off Pensacola.

Etymology: *Caudalis*, pertaining to the tail.

This species is known to us from a number of specimens, all taken from stomachs of groupers and snappers on the Snapper Banks, between Pensacola and Tampa.

We identify our specimens with the *caudalis* and *pictus* of Poey, although while agreeing in the coloration of the head and in the form of the tail with both, it differs in various details.

In *caudalis*, the depth is said to be $4\frac{1}{2}$ in the length with caudal ($3\frac{5}{6}$ without). Color, olive-green above, blue below, an olive spot on each scale; a yellow band on sides, by which the color of the back passes to that of the belly; color paler behind; head with blue bands; a green, blue-edged spot behind eye; two series of blue spots on posterior half of body; dorsal and anal rosy, with rows of blue spots.

In *pictus* the body is more slender, the depth $5\frac{1}{2}$ in total length, the eye two diameters from the corner of the mouth. Color, blue above; in front of middle of body the sides blood-red, darker on the head; behind the middle the body is olive-green; blue bands on the head; scales each with a bluish crescent; caudal with three orange bands which converge behind; dorsal and anal orange, the latter with two blue lines.

It is probable that *Julis pictus* is identical with our specimens, and perhaps *caudalis* is the female of the same, lacking the red shades on anterior half of body. In any event, we retain for the present the name of *Halichœres caudalis* for our specimens from Pensacola, placing both of Poey's species in the synonymy.

Genus XVIII.—PSEUDOJULIS.

Pseudojulis Bleeker, Proc. Zool. Soc. London, 1861, 412 (*girardi*).

Oxyjulis Gill, Proc. Ac. Nat. Sci. Phila., 1863, 330 (*modestus* = *californicus*).

TYPE: *Pseudojulis girardi* Bleeker (East Indies).

Etymology: ψευδής, false: Julis.

This genus contains some six or eight species, closely allied to *Halichœres*, and scarcely differing from it except in the absence or rudimentary condition of the posterior canines. As in *Halichœres*, there is no sheath at the base of the dorsal. In most of the American species the anterior canines are $\frac{2}{4}$ as in the American species of *Halichœres* (subgenus *Ichthycallus*). The East Indian species have the canines $\frac{3}{2}$ as in the species of *Halichœres* found in the same region. Some of the American species of *Pseudojulis* have the dorsal spines slender and flexible.

ANALYSIS OF SPECIES OF PSEUDOJULIS.

a. Anterior canines $\frac{2}{4}$ or $\frac{4}{4}$.

b. Dorsal spines pungent.

c. Body rather stout, the depth not less than length of head, 3 to $3\frac{1}{4}$ in length; profile above eye convex; no trace of posterior canine; canines $\frac{2}{4}$; caudal fin rounded; scales before dorsal rather large, in about eight series; snout rather pointed.

d. Depth $2\frac{1}{8}$ in length; head 3; ventrals rather long, reaching nearly to vent; the inner rays $1\frac{2}{3}$ in the outer; scales 27. Color, brown, darker at bases of scales; pectorals pale; other fins black; soft dorsal, anal and caudal with white margins, broadest at tip of caudal; sometimes pale wavy lines on head ..... ADUSTUS, 52.

dd. Depth $3\frac{1}{2}$ in length; head $3\frac{1}{4}$; ventrals short, the outer ray not nearly twice inner; scales 2–25–8. Color, olive; young with a silvery lateral streak; back with four or five indistinct broad, dark cross-bands, these forming blotches on the dorsal fin, one of these on the first three soft rays largest and quite black; angles of caudal pale; ventrals whitish, with a broad black outer margin ..... NOTOSPILUS, 53.

cc. Body rather slender, its depth less than length of head, $4\frac{1}{4}$ in length; profile above eye nearly straight; head long and slender; snout long; eye small; caudal subtruncate; ventral short, its outer ray not produced; posterior canine very weak or wanting, rarely present on both sides; scales before dorsal small, in 10 or 12 series; scales on breast small; scales 2–30–8; canines slender, $\frac{4}{4}$. Color, creamy orange, the back darker; many of the scales of back and upper part of sides each with a vertically oblong dark brown spot; one of these at upper part of base of caudal more distinct than the others; a narrow dark bar across base of pectoral; a horizontal dusky streak through eye and snout; fins plain, pale; male with a vertical blue-black bar behind pectorals, much as in *Halichœres semicinctus* ..... VENUSTUS, 54.

bb. Dorsal spines slender and flexible. (*Oxyjulis* Gill.)

c. Body elongate, strongly compressed; the head slender, with sharp snout; depth, $4\frac{1}{2}$ in length, less than length of head; snout, 3 in head; eye, 5; anterior canines $\frac{2}{4}$, the upper larger and divergent; posterior canine weak or wanting, rarely present on both sides; scales before dorsal much reduced, in ten or twelve rows, those on breast considerably smaller than those on sides; caudal truncate; ventrals short, the first ray not twice the length of the inner ray; scales, 28. Color, olive-brown; centers of scales orange-brown; belly cream color; sides of head with alternate streaks of brown and bluish; a large inky blotch at base of caudal, covering one-third of fin; membrane of base of spinous dorsal largely indigo-blue; fins otherwise pale; lower pharyngeals essentially as in *Halichœres*, the large teeth more acute.

CALIFORNICUS, 55.

aa. Anterior canines $\frac{2}{2}$; no trace of posterior canine. (*Pseudojulis.*)

f. Dorsal spines slender and flexible; body very slender, the depth $5\frac{1}{8}$ in length; the head $3\frac{1}{2}$; caudal truncate; pectorals and ventrals very short; scales not continuous across median line of nape; six series in front of dorsal. Color nearly uniform olivaceous; a faint dark streak forward from eye; a dark spot on each scale along base of dorsal; scales along lower half of sides edged with pale; spinous dorsal dusky; a small black spot at base of fifth ray and one at base of last ray; fins otherwise plain translucent.....INORNATUS, 56.

ff. Dorsal spines slender but pungent; body rather slender, the depth $4\frac{2}{3}$ in length; head, $3\frac{3}{4}$; caudal, rounded; pectorals and ventrals short; scales not continuous across median line of nape; eight series before dorsal. Color olivaceous, the back and sides above with seven broad dusky cross-bars, the pale interspaces less than half their width; these bars not continued on the dorsal fin; a streak forward from eye, another backward; opercular flap with a jet black spot, which has a broad, pale margin; a round black spot at base of caudal above the median rays; a dusky spot on each side above vent, in front of which are two short silvery parallel lines down and forwards with traces of four others; a small jet black spot between first and second dorsal spines; fins otherwise plain translucent.....MELANOTIS, 57.

52. PSEUDOJULIS ADUSTUS.

Pseudojulis adustus Gilbert, Proc. U. S. Nat. Mus., 1890 (*Socorro Island*).

Habitat.—Revilla-Gigedos Islands.

Etymology: *Adustus*, browned or scorched.

This species is known from three specimens, the largest 9 inches long; taken by Dr. Gilbert on Socorro Island.

53. PSEUDOJULIS NOTOSPILUS.

Pseudojulis notospilus Günther, Proc. Zool. Soc., London, 26, 1864 (Panama); Günther, Fish. Cent. Am., 447, 1869 (Panama); Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 108 and 111 (Mazatlan, Panama); Jordan, Proc. U. S. Nat. Mus., 1885, 384 (Mazatlan, Panama); Jordan, Cat. Fish. N. Am., 99, 1885; Jordan & Hughes, Proc. U. S. Nat. Mus., 1886, 66 (Panama, Mazatlan)

Habitat.—Panama fauna; Mazatlan to Panama.

Etymology: *Νώτος*, back; *σπίλος*, spot.

This species reaches a length of about 4 inches. Several specimens were taken by Dr. Gilbert in the rock-pools about Mazatlan, and others were found at Panama. As these specimens are not now accessible to us we have taken our analysis from the description and figure of Dr. Günther.

54. PSEUDOJULIS VENUSTUS.

Pseudojulis venustus Jenkins & Evermann, Proc. U. S. Nat. Mus., 1888, 145 (Guaymas).

Habitat.—Gulf of California.

Etymology: *Venustus*, pretty (from Venus).

This pretty little fish is known from numerous specimens collected at Guaymas by Jenkins & Evermann, and also from specimens taken in the Gulf of California by Dr. Gilbert.

55. PSEUDOJULIS CALIFORNICUS.

(SEÑORITA; PESCE REY).

Julis modestus Girard, Proc. Ac. Nat. Sc. Phil., vii, 151, 1854 (copied); Girard, U. S. Pac. R. R. Sur. Fish, 163, 1859 (San Diego, Monterey, San Miguel); Gill, Proc. Ac. Nat. Sci. Phil., 142, 1862 (foot-note), (not *Julis modestus* Bleeker).

Pseudojulis modestus Günther, Cat. Fish. Brit. Mus., iv, 168, 1862 (San Diego); Jordan & Gilbert, Proc. U. S. Nat. Mus., 455, 1880 (Monterey, San Diego); Jordan & Gilbert, Proc. U. S. Nat. Mus., 10, 1881 (Monterey, Santa Barbara); Jordan & Gilbert, Proc. U. S. Nat. Mus., 225, 1881 (Guadalupe Isl.); Jordan & Gilbert, Synopsis Fish, N. A., 1883, 604; Jordan, Cat. Fish, N. A., 99, 1885.

Oxyjulis modestus Gill, Proc. Ac. Nat. Sci. Phil., 331, 1863, (Coast of California).

Halichœres californicus Günther, Proc. Zool. Soc. London, 1861, (Name only; substitute for *Julis modestus*, preoccupied).

Oxyjulis californicus Jordan and Hughes, Proc. U. S. Nat. Mus., 1886, 66.

Habitat.—Coast of California; Monterey to Guadalupe Island.

Etymology: Californian.

This pretty little fish is well described in the Synopsis of the Fishes of North America above cited. It is common in the kelp along the coast of Lower and Southern California, and reaches a length of 7 inches. On the rule that "once a synonym, always a synonym," now adopted by most American ornithologists and ichthyologists, the name *modestus* must give place to *californicus*.

56. PSEUDOJULIS INORNATUS.

Pseudojulis inornatus Gilbert, Proc. U. S. Nat. Mus., 1890 (west coast of Mexico).

Habitat.—Pacific coast of Mexico.

Etymology: *Inornatus*, not adorned.

This species is known from a single specimen, 3½ inches long, dredged by the *Albatross* at station 2829, off the west coast of Mexico.

57. PSEUDOJULIS MELANOTIS.

Pseudojulis melanotis Gilbert, Proc. U. S. Nat. Mus., 1890 (west coast of Mexico).

Habitat.— Pacific coast of Mexico.

Etymology: *Μέλας*, black; *οὖς*, ear.

This species is also known from one example. It was dredged at station 2825 by the *Albatross*.

Genus XIX.—THALASSOMA.

Julis species Cuvier & Valenciennes, xiii, 1839 (not type).
Thalassoma Swainson, Nat. Hist. Classn., Fishes, ii, 1839, 224 (*purpureus*),
Chlorichthys Swainson, l. c., ii, 1839, 232 (*bifasciatus*, etc., a jumble of species).
Julis Gunther, iv, 1862, 179, and of Bleeker (not of Swainson.)

TYPE: *Julis purpureus* Rüppell.

Etymology: *θάλασσα* (sea), green; *σῶμα*, body.

This genus as understood by us comprises numerous species, allied to *Halichœres*, but differing in the possession of but eight dorsal spines and in the absence of the posterior canine.

The anterior canines are $\frac{2}{2}$ in number in all the species seen by us,

and there is a slight scaly sheath along the base of the dorsal, as in *Platyglossus*. The anal spines are very slender. In *Thalassoma purpureum*, the type of the genus, and in all other East Indian species examined by us, the anal spines are two in number, but in all the American species which we have seen there are three. In this case the third spine is slender, resembling the soft rays. Should this character prove constant the American species may form a distinct subgenus, for which the name *Chlorichthys* should be retained. In *Thalassoma pavo* two anal spines are counted by Günther, but this character needs verification. The name *Thalassoma* was given by Swainson to a group typified by *T. purpureum*, and supposed by Swainson to be allied to *Xyrichthys*, from which it was distinguished by the form of the head and the position of the eyes. It is, however, the oldest tenable name given to this group, and must be retained, unless these related genera be reunited with *Halichœres*.

The name *Julis*, commonly used for this group, was first given by Cuvier especially to the Mediterranean species, *Labrus julis*. Other species were included with this, but by Swainson all these were removed, leaving *Labrus julis* as the type of *Julis*.

Of the American species of Thalassoma two (*nitidum* and *steindachneri*) we have not seen. The characters given below are therefore in part in need of verification.

ANALYSIS OF AMERICAN AND EUROPEAN SPECIES OF THALASSOMA.

a. Caudal fin slightly lunate in the adult, truncate in the young.

b. Body bicolor, the upper half blackish, the lower pale; body slender, the depth about 4 in length; ventrals shorter than pectorals, not filamentous; upper half of body dark purplish, the lower half abruptly rosy, the dark color of back becoming gradually deeper downward, this forming a broad blackish lateral band, the edge of which curves upward at base of caudal; a faint brown streak below the dark; middle line of back black; head black, with two streaks downward and forward from eye; dorsal dark, with whitish margin; anal brownish, distal half pale; caudal yellowish, with two purple longitudinal bands extending up on the longest rays; axil with a purple dot; tip of pectoral dark; six small scales before dorsal ..... LUCASANUM, 58.

bb. Body not bicolor.

c. Body rather deep, the depth 3 to 3¼ in length, equal to length of head; nape scaled on median line; 8 or 9 scales before dorsal; ventrals short, the outer rays not produced; interopercles meeting below throat; scales 27. D., VIII, 13; A., III, 11; color deep brown, each scale on sides with a vertical bluish bar at base and margined with pale blue; sides of head thickly covered with blue spots and broken lines, those on cheek radiating from eye; dorsal and anal purplish, a submarginal pale streak and a narrow white margin; a black blotch on front of spinous dorsal; caudal brown, the outer rays tipped with black, pectorals and ventrals purplish at base with yellowish distal portion; dorsal spines, strong ..... SOCORROENSE, 59.

cc. [Body slender, compressed, the depth about 4 in length; ventrals much shorter than pectorals; top of head and back brilliant yellow, this color extending on sides of head and to ventrals; a large yellow blotch on

caudal fin; lower parts rosy white; a maroon band backward from eye, breaking up on body into a series of six quadrate spots of bottle-green, the last blotch extending on outer rays of caudal; dorsal mostly greenish, with pale margin, a dark blotch between second and fifth spines; pectorals pale; ventrals yellow.] (*Goode*)..NITIDUM, 60.

aa. Caudal fin deeply forked, the outer rays much produced, especially in the adult.

d. Color not uniform deep green.

e. Pectoral fin with a large blue-black blotch near its tip.

f. [Basal half of anal violet-black; pectoral with a small black spot in the axil, and a large blotch near its tip; body greenish or reddish, each scale with a red vertical streak; a broad oblique transverse green (or bright red) band behind the pectoral from first three dorsal spines downward; head with oblique green streaks radiating from eye; dorsal green, with a very broad black longitudinal band from the third dorsal spine occupying nearly the whole of the middle of the fin; caudal lobes, each with a blackish longitudinal streak; back sometimes with black cross-bars, (var. *unimaculatum*). Head 3⅓; depth 3⅓; D., VIII, 13; A., II, 11; scales 3-30-11; vertebræ 11-14.] (*Günther.*) .....PAVO, 61.

ff. [Basal half of anal not violet black; head and caudal fin entirely bluish violet; edge of caudal pale; obscure paler streaks on side of head; breast to ventrals violet, paler than head; body violaceous, its anterior third paler, the scales posteriorly edged with dull violet; dorsal dull violet, its base paler, its edge whitish; anal with a violet stripe above the pale edge.] (*Steindachner*) .....STEINDACHNERI, 62.

ee. Pectoral fin without black blotch near its tip.

g. Body bicolor, the anterior and posterior halves different; anterior half deep blue, the head paler, posterior half bottle-green, a deep blue band across body covered by pectoral; a fainter one behind gill opening, the two perhaps sometimes coalescing; spinous dorsal dark; tip of pectoral dark; caudal pale; its lobes dark blue on the outer part; soft dorsal greenish; anal and ventrals bluish.

BIFASCIATUM, 63.

gg. Body not bicolor, bright green throughout, each scale with a purplish bar at base; head, nape, and belly purplish, the head with four green streaks on each side, margined with brown; these streaks continued backwards as wavy green streaks on breast; dorsal and anal purplish, with a wide terminal green band nearly half width of fin; upper and lower caudal rays purplish, the median rays pale; pectorals and ventrals pale, a small black blotch at base of pectorals above. Head 3⅓; depth 3⅓; scales covering median line of nape; 7 or 8 rows before dorsal; caudal deeply lunate in adult, the outer rays twice median ones; outer ventral rays produced, not quite twice inner rays; dorsal spines pungent. D., VIII, 13; A., III, 11.

GRAMMATICUM, 64.

dd. Color uniform bright green, without well defined marks on head or body. Head 3 in length; depth about 3; scales continuous across nape; about 7 rows before dorsal; scales 27; outer caudal lobes much produced, 1⅓ in head; outer ventral rays filamentous; dorsal spines pungent. D., VIII, 13; A., III, 11.....VIRENS, 65.

58. THALASSOMA LUCASANUM.

Julis lucasanus Gill, Proc. Ac. Nat. Sci. Phil., 142, 1862 (Cape San Lucas); Günther, Cat. Fish. Brit. Mus., iv, 184, 1862 (Cape San Lucas); Jordan & Gilbert, Proc. U. S. Nat. Mus., 367, 1882 (Cape San Lucas); Jordan & Gilbert, Bull. U. S. Fish. Com., 1881.

Thalassoma lucasanum Jordan, Cat. Fish. N. Am., 98, 1885; Jordan, Proc. U. S. Nat. Mus., 1885, 384 (Mazatlan); Jordan & Hughes, l. c., 1886, 68; Jordan, Proc. U. S. Nat. Mus., 1888, 333 (Tres Marias).

Habitat.—Pacific coast of Mexico.

Etymology: From Cape San Lucas.

This little fish was found in some abundance at Cape San Lucas by Xantus, and at Mazatlan by Gilbert. It reaches a length of about 3½ inches.

Our description is taken from three specimens brought from Tres Marias Islands by Alphonso Forrer.

59. THALASSOMA SOCORROENSE.

Thalassoma socorroense Gilbert, Proc. U. S. Nat. Mus., 1890 (Socorro Island).

Habitat.—Revilla-Gigedos Islands.

This species was found by Dr. Gilbert to be abundant about Socorro Island. The longest of the types is 10½ inches.

60. THALASSOMA NITIDUM.

Julis nitida Günther, Cat. Fish. Brit. Mus., iv, 190, 1862 (Jamaica).
Thalassoma nitidum Jordan & Hughes, Proc. U. S. Nat. Mus., 1886, 68.
Julis nitidissima Goode, Am. Jour. Sci. and Arts, 293, 1877 (Bermuda).

Habitat.—West Indian fauna.

Etymology: *Nitidus*, shining.

This species is unknown to us. In describing *J. nitidissima*, Professor Goode indicates his suspicion that it is identical with *Julis nitida*. One can hardly think otherwise on comparing his description, taken from a single fresh specimen, with that of Dr. Günther, taken from three preserved examples. This agreement seems to us perfect when we take into account the variations to which the *Labridæ* are subject. The only tangible distinction would be in the length of the ventrals, two-thirds the pectorals in *J. nitida* and three-sevenths in *J. nitidissima*.

61. THALASSOMA PAVO.

PESCE LEONE.

Labrus pavo Hasselquist, Iter Palæstinum, 389, 1757 (Syria).
Labrus pavo Linnæus, Syst., Nat., Ed. x, 283, 1758 (after Hasselquist; confused with *Labrus bimaculatus*).
Julis pavo Cuv. & Val., xiii, 377, pl. 386; Günther, iv, 179, and of recent writers generally.
Labrus lunaris Bloch, Ichthy., plate 281, 1792 (not of Gronow).
Labrus syriacus Bloch & Schneider, Syst. Ichthy., 1801, 244 (after Hasselquist).
Labrus leo Rafinesque, Caratteri, etc., 1810, 37 (Sicily).
? *Labrus ciavolus* Rafinesque, l. c., 40.
? *Labrus imperialis* Rafinesque, l. c., 40.
Julis turcica Risso, Eur. Merid., iii, 299, 1826.
Julis unimaculata Lowe, Trans. Zool. Soc. London, iii, 11 (Madeira).
Labrus blochi Cuv. & Val., xiii, 422, 1839 (after Bloch).

Habitat.—Mediterranean Sea and shores of northern Africa.

Etymology: *Pavo*, peacock.

This species is known to us from descriptions only. This is the original *Labrus pavo* of Linnæus, and it should retain the specific name *pavo*, which should not be transferred to *Symphodus tinca*, the "*Crenilabrus pavo*" of recent authors.

62. THALASSOMA STEINDACHNERI.

? *Julis melanochir* Bleeker, Act. Soc. Sc. Indo-Nederl., ii; Amboyna, viii, 77, 1859; ? Bleeker, Atl. Ichthy., 89, tab. 33, fig. 2, 1862; Günther, Cat. Fish. Brit. Mus., iv, 182, 1862 (Amboyna); Steindachner, Ichth. Beiträge, iii, 63, 1875 (Acapulco, Sandwich Islands).

Thalassoma steindachneri Jordan, nom. sp. nov. (after Steindachner).

Thalassoma melanochir Jordan, Proc. U. S. Nat. Mus., 1886, 384 (name only); Jordan & Hughes, l. c., 1886, 68.

Habitat.—Pacific coast of tropical America; Acapulco.

Etymology: Named for Dr. Franz Steindachner, the discoverer of the species.

Dr. Steindachner observes:

> An example caught at Acapulco agrees on the whole so closely with *Julis melanochir* that I can only on account of its color regard it as a variety of that species.
>
> *Julis melanochir* comes very abundantly on the coast of the Sandwich Islands, and it may from thence extend its range to the west coast of North America, which, on the whole, possesses but few Labroids.

The characters in our analysis are taken from Steindachner's account of the specimen from Acapulco.

Inasmuch as the account of the Acapulco fish differs considerably from *Julis melanochir* as shown in Bleeker's figure, and as the Labroid fauna of the west coast of Mexico is in general wholly unlike that of the Western Pacific, it is probable that the fish from Acapulco is not identical with *Julis melanochir*. I have therefore given it the provisional name of *Thalassoma steindachneri*.

63. THALASSOMA BIFASCIATUM.

Labrus capite obtuso Gronow, Zoophyl., No. 243, 1781 (Antilles).

Labrus bifasciatus Bloch, Ichthy., 131, pl. 283, 1792 (East Indies); Bloch & Schneider, Syst. Ichthy., 243, 1801 (after Bloch).

Chlorichthys bifasciatus Swainson, Nat. Hist. Class'n Fish, ii, 1839, 232 (name only).

Julis bifasciata Günther, Cat. Fish. Brit. Mus., iv, 186, 1862 (Jamaica).

Julis bifasciatus Poey, Enumeratio, 107, 1875 (Jamaica).

Thalassoma bifasciatum Jordan & Hughes, Proc. U. S. Nat. Mus., 1886, 68; Jordan, l. c., 1886, 540 (types of *Julis detersor*).

Labrus bifasciatus var. *torquatus* Bloch & Schneider, Syst. Ichth., 1801, 243 (Antilles; after Gronow).

Julis detersor Cuv. & Val., Hist. Nat. Poiss., xiii, 408, 1839 (San Domingo, Martinique); Günther, iv, 186, 1862 (copied).

Labrus ornatus Gronow, Syst., ed. Gray, 83, 1854 (Antilles; after *Labrus capite obtuso*), (not of Carmichael).

Julis gillianus Poey, Mem. Cuba, ii, 214, 1860 (Cuba); Poey, Syn., 332, 1868 (Cuba).

Habitat.—West Indian fauna.

Etymology: *Bifasciatus*, two-banded.

There seems to be no doubt that *Julis detersor*, the types of which species we have examined in Paris, is identical with *Th. bifasciatum*. The

agreement is, as Poey has noticed, very close in all respects, except that implied in the remark of Valenciennes that the "spinous dorsal is low and scaly" ("basse et couverte d'écailles"). This expression doubtless refers to the scaly sheath of the fin.

64. THALASSOMA GRAMMATICUM.

Thalassoma grammaticum Gilbert, Proc. U. S. Nat. Mus., 1890, (Socorro Island; Clarion Island).

Habitat.—Revilla-Gigedos Islands.

Etymology: *Γραμματικός*—streaked.

This species is known from a single specimen 11½ inches long, taken by Dr. Gilbert at Clarion Island, and from numerous examples taken at Socorro Island.

65. THALASSOMA VIRENS.

Thalassoma virens Gilbert, Proc. U. S. Nat. Mus., 1890 (Socorro Island).

Habitat.—Revilla-Gigedos Islands.

Etymology: *Virens*, green.

This species, remarkable for its uniform coloration, was found by Dr. Gilbert very abundant at Socorro Island, the largest specimen being 13 inches long.

Genus XX.—DORATONOTUS.

Doratonotus Günther, Cat. Fish. Brit. Mus., iv, 124, 1862 (*megalepis*).

TYPE: *Doratonotus megalepis* Günther.

Etymology; *Δόρυ*, spear; *νώτος*, back.

This genus contains a single species of small fishes found in the West Indies. It is one of the most beautiful of the *Labridæ*, and the genus to which it belongs is one of the best defined in the group.

ANALYSIS OF SPECIES OF DORATONOTUS.

a. Body much compressed; snout rather slender and sharp; its length, 3⅓ in head; maxillary, 4 in head; eye, 5 in head; cheeks and opercles scaly; dorsal spines robust and pungent, the first three with conspicuous filaments; first and second spines, including filaments, nearly equal in length, 1½ in head; fourth spine shortest, half second; ninth highest, but somewhat shorter than the following soft rays; longest soft ray, 1⅔ in head; anal spines stoutish, the longest about half head; pectorals reaching beyond ventrals; membranes of vertical fins with scales on bases; lateral line following outline of back to one scale beyond end of dorsal fin, then interrupted and continued below on four scales of caudal peduncle. Color, everywhere intense grass-green; head yellowish, some orange on tips of shorter spines and on ventrals; head, 2¾ in length; depth, 2⅔; D., IX, 10; A., III, 9; scales, 1½-20 (pores)-6½.

MEGALEPIS, 66.

66. DORATONOTUS MEGALEPIS.

Doratonotus megalepis Günther, iv, 125, 1862 (St. Christopher).
Doratonotus thalassinus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1884, 29 (Key West).

Habitat.—West Indian fauna, north to Key West.

Etymology: *Μεγάς*, great; *λεπίς*, scale.

Of this exquisite little fish only five specimens are known: (1) the

type of *D. megalepis*, a specimen in poor condition from St. Kitts; (2) the type of *D. thalassinus*, a specimen in fine condition from Key West, now in the U. S. National Museum; (3) a third specimen sent by Prof. Poey, from Havana, to the museum at Cambridge; and (4) two specimens taken by Dr. James A. Henshall at Garden Key. These last specimens have the snout less slender than it is in the original types, but this difference may be due to their greater age.

We have little doubt of the identity of *D. thalassinus* with *D. megalepis*, the slight differences in the descriptions being apparently due to the poor condition of Dr. Günther's specimens.

Genus XXI.—XYRULA.

Xyrula Jordan, gen. nov. (*jessiæ*).

TYPE: *Xyrichthys jessiæ* Jordan.

Etymology: A diminutive suggested by *Xyrichthys*.

We have separated from *Xyrichthys* one of the American species on account of the very large size of the scales, a character which, until intermediate forms are found, may be regarded as of generic value.

ANALYSIS OF SPECIES OF XYRULA.

a. Scales very large, about 1½—20—8; anterior profile less trenchant than in other species, forming an even curve from the snout to the front of the dorsal. Eye larger than in *Xyrichthys novacula*, 4⅓ in head; depth of preorbital, 2⅔ in head; cheeks more than half as long as deep; canine teeth ⅔, large and divergent, as in other species; lateral teeth smaller and more closely set than in *X. novacula*; dorsal spines very slender, scarcely pungent; lateral line running on the highest complete row of scales next the back, the diameter of one of its scales greater than that of the eye. Head 3¾ in length; depth 3⅔. Color, uniform bright scarlet, more yellowish below, the fins similar; no blue markings anywhere.....JESSIÆ, 67.

67. XYRULA JESSIÆ.

Xyrichthys jessiæ Jordan, Proc. U. S. Nat. Mus., 1887, 698 (off Tampa Bay).

Habitat.—Gulf of Mexico, in deep water.

Etymology: Named for Mrs. Jessie Knight Jordan.

This species is known from a single specimen taken by Mr. Charles H. Bollman from the stomach of some large fish in deep water off Tampa Bay, Florida. It is now in the U. S. National Museum.

Genus XXII.—XYRICHTHYS.

Xyrichthys Cuvier, Mémoires du Museum d'Hist. Nat., I., 324, 329, 1815 (*novacula*).
Novacula Cuvier, Règne Animal, Ed. i, 265, 1817 (*novacula*).
Xyrichthys Cuvier, Règne Animal, Ed. ii, 1829 (*novacula*).
Xyrichthys Swainson, Nat. Hist. Class'n Amin., ii, 1839 (*novacula*); Bleeker and Günther (not *Novacula* Gill, which is *Hemipteronotus* of Lacépède and Bleeker, a genus distinguished from *Iniistius* Gill by its scaly cheeks).
Novaculichthys Bleeker, Proc. Zool. Soc. London, 1861, 414 (*macrolepidotus*).

Malacocentrus Gill, Proc. Ac. Nat. Sci., 1862, 143 (*tæniurus*, "ventrals subjugular").
Dimalacocentrus Gill, op. cit., 1863, 223 (*kallosoma*, "first two dorsal spines more or less detached").

TYPE: *Coryphæna novacula* L.

Etymology: Ξύρον, razor; ἰχθύς, fish.

ANALYSIS OF AMERICAN SPECIES OF XYRICHTHYS.

a. Anterior profile of head simply convex, not parabolic; preorbital moderate, its depth not half of head; eye not placed very high, its diameter in the adult more than half depth of preorbital; anterior edge of head scarcely trenchant; first two spines of dorsal not pungent, more or less elevated in the young.

b. *Two anterior spines of dorsal more or less elevated, their length (in young) two-thirds that of head, their tips filamentous (*Dimalacocentrus* Gill).

c. Third and fourth spines of dorsal lowest, the spines thence slightly increasing to the last; second spine connected by a membrane with the third; caudal rounded; a series of small scales below eye; head otherwise naked. Color (male) light olive, head more yellowish; body with five brownish cross-bars, the first obscure at the nape, the last forming a blotch at base of caudal; a small yellowish spot at base of caudal, and a fainter one above it; cheeks and lower jaw banded; an olive blotch on opercle; some brown dots behind eye; dorsal cherry-red, paler posteriorly, darkest on the produced anterior rays; caudal pale; anal cherry-red, with two spots of deeper red; pectorals plain; ventrals deep cherry-red. Female, orange brown, much mottled, five cross-bands darker and broader than in the male; two yellowish brown bands across from eye over lower jaw; two similar bands across breast before ventrals; caudal and pectorals plain; ventrals deep brownish red. Head $3\frac{3}{8}$ in length; depth $3\frac{1}{8}$; D., IX, 13; A., III, 12; Lat. l. 23 or 24. ROSIPES, 68.

bb. Anterior spines of dorsal not elevated above the others in the adult (in the young slightly produced). (*Novaculichthys* Bleeker.)

c. Ventral fins much produced ending in long filaments; in the adult, $\frac{1}{4}$ longer than head and reaching much beyond front of anal; shorter in the young; a black ocellus on middle of side; depth $3\frac{1}{8}$ in length; preorbital 3 in head, $1\frac{1}{2}$ times diameter of eye; two anterior dorsal spines in adult a little shorter and less sharp than the others, which are slender but pungent; in young longer than the others; some small scales below eye. Olive, redder below, the head with sharply defined blue vertical bars alternating with yellowish ones; central part of sides with a large sharply defined inky black spot (sometimes a smaller one below it) in the center of a large silvery blotch; soft dorsal and anal with oblique bluish streaks; caudal with vertical streaks; no black ocelli on fins; young with the silvery blotch obsolete and the black spot on side nearly or quite so; the head plain, vertical fins all with oblique dark bars; back with darker cross-shades....† SPLENDENS, 69.

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* This character is of little value, as it may disappear with age. Some or all of the species called "*Dimalococentrus*" may be the young of *Novaculichthys*.

† Very closely related to *X. splendens* and to *X. rosipes* is a species described by Dr. Bean as *X. ventralis* in a paper published since the present account was written. The form of head and body is the same in the three, and *X. ventralis* and *X. splendens* agree in the prolongation of the ventrals. *X. ventralis* lacks the silvery lateral blotch and black ocellus; there is a broad red lateral shade; the stripes on the head are fewer than in *X. splendens*, and the anal and caudal are nearly plain. Perhaps this species may prove to be the adult form of *X. rosipes*.

cc. Ventral fins moderate; no black ocellus anywhere; first two dorsal spines flexible like the rest, none of them being pungent; no small scales below eye; body more elongate than in *X. novacula*, the anterior profile of the head less steep and less trenchant; head 3⅞ in length; depth 3⅞; scales 29. Color in spirits reddish, the fins dark (in the male); head without evident blue lines; a blue vertical streak on each scale, as in other species; no silvery blotch, and no inky spot on body (doubtful species, imperfectly described) .....*MARTINICENSIS, 70.

aa. Anterior profile of head parabolic; preorbital very deep, its depth half head; eye near top of head, its diameter not half depth of preorbital; anterior profile of head more or less trenchant; head with blue vertical stripes, at least in the male; usually a blue vertical bar on each scale. (*Xyrichthys.*)

d. Black ocellus (at least in males) present on body or fins.

e. Black ocellus, bordered with blue present on dorsal fin, behind sixth spine, none on body; a few small scales below eye; depth 3¼ in length; head 4; ventrals somewhat filamentous, their tips scarcely reaching beyond vent. Color violaceous, with a diffuse brownish cross-blotch at end of first third of body, under dorsal ocellus; dorsal and anal red; caudal yellow, with transverse violet lines, head with 12 vertical blue stripes; eye 2½ in preorbital, which is 2¼ in head .....UNIOCELLATUS, 71.

ee. Black ocellus larger than eye and located at base of caudal, just below lateral line; none on dorsal fin; three concentric blue curved lines on flap of opercle; three narrow blue lines across cheek; a violet vertical line on base of each scale; lower jaw with numerous lines; fins pale; unmarked; female plain light brown, without markings on head or body; depth about 3¼ in length, the males deeper than the females; head 3¼; scales 2–24–9.....MUNDICEPS, 72.

dd. No black ocellus present anywhere on body or on fins in either sex.

f. Scales of sides of body each with a vertical blue spot. General color more or less red; side of body with a diffuse silvery area below and behind the pectoral fin, often wanting or disappearing in spirits; scales below this area with pearly vertical streaks; color rose-red or brownish, with a blue vertical streak on each scale; vertical blue streaks on the head, as in other species; males (in life, always) with a dark-red cross-shade behind pectorals, this disappearing in spirits; dorsal immaculate; anal with oblique violaceous streaks; caudal with 6 or 8 dark cross-streaks. Head 3½ in length; depth 3⅓; eye small, 5½ in head; scales 2–26–8.....NOVACULA, 73.

ff. [Scales of sides of body without blue spots; head with but five vertical streaks of blue; color red, the fins nearly plain; a red axillar band, disappearing in spirits; iris red; caudal truncate; otherwise as in *X. novacula*, of which it is probably a color variety.] (*Poey.*)
MODESTUS, 74.

68. XYRICHTHYS ROSIPES.

Xyrichthys rosipes Jordan & Gilbert, Proc. U. S. Nat. Mus., 1884, 27 (Key West).

Habitat.—West Indian fauna, Key West.

Etymology: *Roseus*, rosy; *pes*, foot, from the red ventrals.

Of this curious little fish only two specimens are known, both young,

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*Allied to *X. martinicensis*, or perhaps intermediate between it and *X. novacula*, is *X. infirmus* Bean. This species has the profile moderately parabolic, its edge not very trenchant; the eye nearly twice in the preorbital, and half its diameter from the profile; dorsal spines all flexible. Color olive, with blue cross-streaks and dark axil. No black ocelli anywhere.

the one male the other female. Both were taken with a seine in the surf at Key West. They are now in the U. S. National Museum. The adult will probably be found to approach *X. splendens* in form and coloration, probably having the dorsal lower and the ventrals longer than in the young.

The young of *X. splendens* has the caudal barred, while in *X. rosipes* it is plain; I have noticed no other characters by which the young of the two can be separated.

69. XYRICHTHYS SPLENDENS.

Xyrichthys splendens Castelnau, Anim. Nouv. ou Rares de l'Amer. du Sud, 1855, 28, pl. 5, 2 (Bahia).

Xyrichthys argenti-maculata Steindachner, Zool. Bot. Gesellsch. Wien, 1861, 134 (Cape of Good Hope).

Novacula argentimaculata Günther, iv, 170, 1862 (Brazil).

Habitat.—Coasts of Brazil and Southern Africa.

Etymology: *Splendens*, brilliant.

We know this species from three specimens taken by the *Albatross* at Bahia. These agree well with Günther's description of *X. argentimaculatus*, and this is probably the species for which that name was originally intended, although the original type came from the Cape of Good Hope. Its general characters are well represented in the figure of Castelnau, who, however, fails to show the silvery area around the black lateral ocellus. In one young example this black spot is very faint and the coloration is different, the back with darker cross-shades and the vertical fins all barred. In this specimen the first two dorsal spines are somewhat elevated, so as to give considerable resemblance to *X. rosipes*.

69*b*. XYRICHTHYS VENTRALIS. (PLATE VII, FIG. 1.)

Xyrichthys ventralis Bean, Bull. U. S. Fish Com., 1888, 193, pl. 29, f. 1 (Cozumel).

Habitat.—West Indian fauna.

Etymology: *Ventralis*, pertaining to the belly, from the long ventrals.

This species is known from two examples taken by Dr. Bean at Cozumel Island, Yucatan. It is closely related to *X. splendens* and to *X. rosipes*, and may prove to be the adult of the latter.

70. XYRICHTHYS MARTINICENSIS.

Xyrichthys martinicensis Cuv. & Val., xiv, 49, 1839 (Martinique); Jordan, Proc. U. S. Nat. Mus., 1886, 541 (note on type).

Novacula martinicensis Günther, iv, 171, 1862.

Xyrichthys vitta Cuv. & Val., xiv, 51, 1839 (no locality); Jordan, Proc. U. S. Nat. Mus., 1886, 541 (note on type).

Habitat.—West Indies.

Etymology: *Martinicensis*, living in Martinique.

Of this species we have examined the original types of *martinicensis* and *vitta* in the museum at Paris. The two are not evidently different, although they are not in very good condition for comparison. The characters of this species are yet to be made out from fresh specimens.

70*b*. XYRICHTHYS INFIRMUS. (PLATE VII, FIG. 2.)

Xyrichthys infirmus Bean, Bull. U. S. Fish Com., 1888, 199, pl. 29, f. 2 (Cozumel).

Habitat.—West Indian fauna.

Etymology: *Infirmus*, limp, flexible.

This species is described and well figured in Dr. Bean's paper on the Fishes of Cozumel, to which the reader is referred. It is probably a near relative of *X. martinicensis*.

71. XYRICHTHYS UNIOCELLATUS.

Xyrichthys uniocellatus Agassiz in Spix, Pisc. Brazil, 97, tab. 55, 1829; Cuv. & Val., xiv, 48, 1839 (Bahia); Jordan, Proc. U. S. Nat. Mus. 1886, 541 (note on type).

Novacula uniocellata Günther, iv, 171, 1862 (Bahia).

Habitat.—Coast of Brazil.

Etymology: *Uniocellatus*, having one ocellus.

We have examined the original type of this species in the museum at Paris, and also a single example taken by the *Albatross* at Bahia.

72. XYRICHTHYS MUNDICEPS.

Xyrichthys mundiceps Gill, Proc. Ac. Nat. Mus. Sci. Phila., 1862, 143 (Cape San Lucas); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 367 (Cape San Lucas); Jordan, l. c., 1885, 384 (Cape San Lucas).

Novacula mundiceps Günther, iv, 172, 1862 (Cape San Lucas).

Habitat.—Cape San Lucas.

Etymology: *Mundus*, neat; *ceps*, head.

This species is known from numerous specimens, the original types and others, sent to the U. S. National Museum from Cape San Lucas, by Mr. John Xantus.

73. XYRICHTHYS NOVACULA. (PLATE VIII.)

(RAZOR-FISH.)

Coryphæna palmaris pulchre varia, dorso acuto Artedi, Genera, 15, 1738; Artedi, Synonymia, 29, 1738.

Coryphæna novacula Linnæus, Syst. Nat., Ed. x. 262, 1758 (after Artedi) (and of the copyists).

Xyrichthys novacula of European authors.

Coryphæna psittacus Linnæus, Syst. Nat., xii, 448, 1766 (Charleston, Dr. Garden); Gmelin, Syst. Nat. 1194, 1788; Goode & Bean, Proc. U. S. Nat. Mus., 1885, 195 (note on type).

Xyrichthys psittacus Goode & Bean, Proc. U. S. Nat. Mus., 1884, 45 (note on type of *Coryphæna psittacus*); Bean, Bull. U. S. Fish Com., 1888, 202 (Charleston, Pensacola).

Coryphæna lineata Gmelin, Syst. Nat. 1195, 1788 (Charleston, Dr. Garden).

Xyrichthys lineatus Cuv. & Val., xiv, 50, 1839 (Martinique); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 609 (Charleston); Jordan & Gilbert, l. c., 1883, 143 (Pensacola, name only); Jordan & Gilbert, Syn. Fishes N. Am., 605, 1883.

Novacula lineata Günther, iv, 171, 1862 (Caribbean Sea).

Coryphæna lineolata Rafinesque, Caratteri, 1810, 33.

Xyrichthys cultratus Cuv. & Val., xiv, 37, pl. 391, 1839 (Martigues, Montpellier, Ivica, Seide).

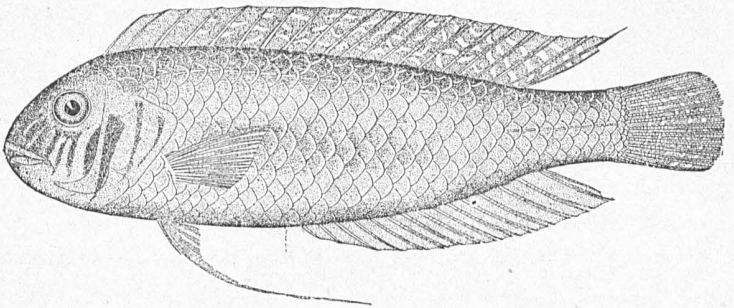


FIG. 1. XYRICHTHYS VENTRALIS Bean.

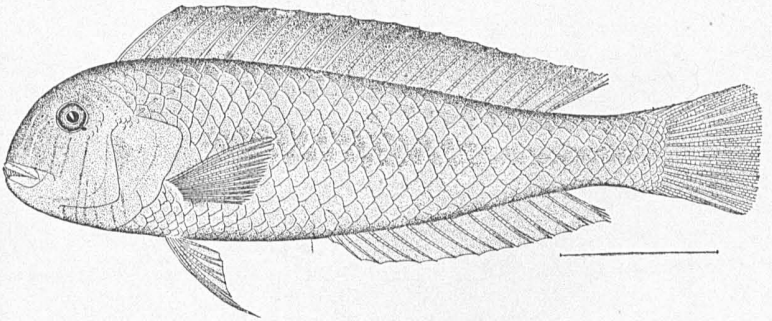


FIG. 2. XYRICHTHYS INFIRMUS Bean.

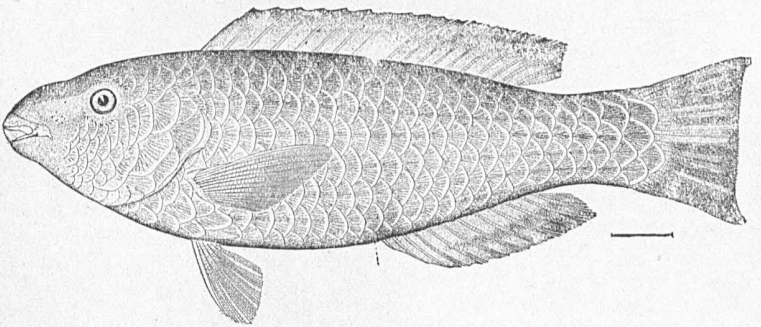
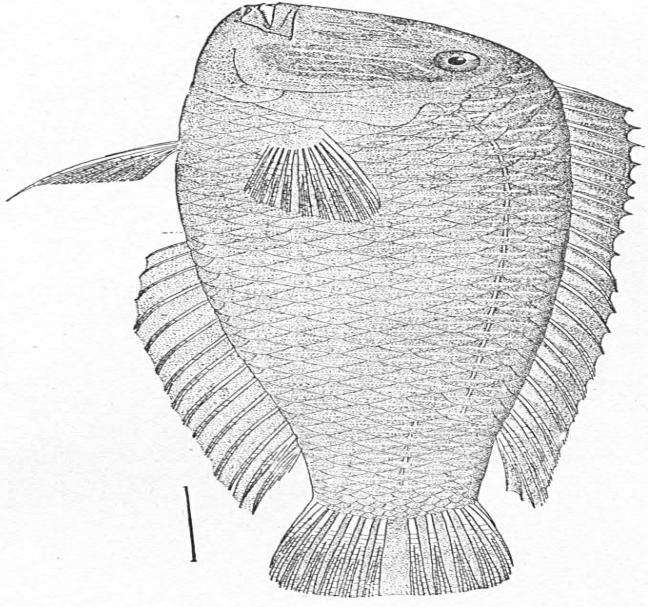


FIG. 3. SCARUS CUZAMILÆ Bean.



XYRICHTHYS NOVACULA Linnæus. Razor-fish.

(No. 5818, U. S. N. M.; from Garden Key, Florida.)

Novacula cultrata Günther, iv, 169, 1862 (Naples; Madeira; Lanzarote; Caribbean Sea; Bahia; South Africa).

Xyrichthys vermiculatus Poey, Mem., ii, 215, 1860; Poey, Repert. ii, 238, 1862; Poey, Synopsis, 336, 1868; Poey, Enumeratio, 110, 1875 (Havana); Jordan & Gilbert, Syn. Fishes N. Am., 605, 1883 (Key West); Bean, Bull. Fish Com., 1888, 202.

Xyrichthys venustus Poey, Enumeratio, 110, 1875 (Havana) (after *X. lineatus* C. & V.); Bean, Bull. U. S. Fish Com., 1888, 200 (Cozumel).

Habitat.—Mediterranean and West Indian fauna, north to Pensacola and Charleston.

Etymology: *Novacula*, razor.

We have compared numerous specimens from Pensacola and Charleston, with all the descriptions available of the Mediterranean species, and can find no difference whatever. These Charleston specimens seem to represent the *psittacus* of Linnæus and the *lineata* of Gmelin. The *vermiculatus* of Poey seems to be the same, as is also, in my opinion, his *venustus* (*lineatus* C. & V.). The white peritoneal blotch of *venustus* is evident on some of our specimens and not on others. If the above synonymy be correct, this razor-fish has a distribution unusually wide for a Labroid. Since the above was written, Dr. Bean has published an account of the American species of this genus. While recognizing the close relation of the forms in question, he admits provisionally *X. psittacus* and *X. vermiculatus* as species distinct from the common form, for which he retains the name of *X. venustus*. As, however, the types of *X. psittacus* came from Charleston, they belong, probably, to the species with the pale lateral blotch, the only species yet found in that region.

74. XYRICHTHYS MODESTUS.

Xyrichthys modestus Poey, Repert. Fis. Nat. Cuba, ii, 238, 1867; Poey, Synopsis, 336, 1868; Poey, Enumeratio, 110, 1875 (Havana).

Habitat.—West Indies.

Etymology: *Modestus*, modest.

This species is known from Poey's description only. It seems very close to *X. novacula*, of which it is probably a color variety.

Genus XXIII.—INIISTIUS.

Iniistius Gill, Proc. Ac. Nat. Sci. Phila., 1862, 143 (*pavo*).
Xyrichthys Bleeker, Atlas Ichth., 1862, 149 (*pavo*) (not of Cuvier).

TYPE: *Xyrichthys pavo* Cuv. & Val.

Etymology: Ἰνιον, nape; ἱστίον, sail, in allusion to the first dorsal fin on the nape.

This genus contains some five or six species, chiefly of the western Pacific. They are similar in most respects to the typical species of *Xyrichthys*, differing only in having the two anterior species of the dorsal fin produced, separated from the others, and placed farther forward than in *Xyrichthys*, on the occipital region. Very close to *Iniistius* is

the East Indian genus, *Hemipteronotus* Lacépède (*Novacula* Gill, not Cuvier), which differs only in having scales upon the cheeks. It is not unlikely that it will be found necessary to unite *Iniistius*, *Hemipteronotus*, *Xyrichthys*, and *Xyrula* into one genus, as Günther has done. In this case, the name to be used is *Hemipteronotus*, not *Novacula*, nor *Xyrichthys*.

ANALYSIS OF AMERICAN SPECIES OF INIISTIUS.

a. Body deep, compressed, the profile very steep; anterior dorsal fin very high, the longest spine about 1⅓ in head and 4½ in body; height of head equal to its length; eye small, 7 in head; anterior profile steep. Color of male, olivaceous, whitish below; three broad bars of dark olive on the back and sides, these bars nearly as wide as the interspaces; most of the scales of the back and sides with a vertical, light bluish stripe; in the middle of the first dark band are one or two scales of a different color, the posterior half of each jet black, the base light blue; dorsal with narrow dark stripes running obliquely downward and backward; anal pale; a conspicuous light horizontal stripe near the tips of the rays; a narrower similar stripe near the middle of the fin; bluish clouds on opercle; vertical pale blue stripes below eye, a faint dusky streak below eye; female paler, plain, yellowish or brownish; dorsal with several oblique bars between its rays; scales 24 or 25. MUNDICORPUS, 75.

INIISTIUS MUNDICORPUS.

Iniistius mundicorpus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 145 (Cape San Lucas).
Novacula mundicorpus Jordan, Proc. U. S. Nat. Mus., 1882, 367 (Cape San Lucas); Jordan, l. c., 1885, 384 (Cape San Lucas).

Habitat.—Pacific coast of Mexico.

Etymology: *Mundus*, neat; *corpus*, body.

The original types of this species (females), and later some other specimens, have been sent to the U. S. Nat. Museum from Cape San Lucas. Specimens have also been taken on the west coast of Mexico by Dr. Gilbert. The species much resembles *Iniistius pavo*, which is found in the Sandwich Islands and southward to Ceylon. Perhaps the two species are identical.

Genus XXIV.—MALAPTERUS.

Malapterus Cuv. and Val. XIII, 355, 1839 (*reticulatus*).
Malacopterus Günther IV, 88, (corrected orthography).
Neolabrus Steindachner, Ichth. Beitr. II, 19, 1875. (*fenestratus reticulatus*).

TYPE: *Malapterus reticulatus* C. & V.

Etymology: *Μαλακός*, soft; *πτερόν*, wing or fin.

This genus contains a single species, the sole representative so far as known of the subfamily *Malapterinæ*. Judging from the numbers of the fin rays, the number of vertebræ will probably be found to be increased as in the *Labrinæ*. The pharyngeal teeth have not been described, and it may be that the genus does not belong to the *Labridæ* at all.

ANALYSIS OF SPECIES OF MALAPTERUS.

a. [Body elongate; head acute; numerous scales upon cheeks in four or five rows; opercle with a series of scales upon the margin, these scales being small and ar-

ranged in three or four rows on the upper margin, large and in a single row below; center of the opercle naked; lateral line nearly parallel with base of dorsal for a distance of 30 scales, where it drops sharply, the last 10 scales being in a horizontal line; last scale of the lateral line much lengthened; scales of nape and throat small. Color reddish brown; a small, diffuse, dark blotch upon the first three dorsal rays; a second larger one, dark blue in color, generally present between the 19th and 22d soft rays of dorsal; a small, indigo-blue cross streak at base of pectoral; sides of body reticulated with dark brown lines, their junctures forming a little spot at base of each scale. Head 3¾ in length; depth 4⅔. D., III, 29; A., II, 19; scales 4-40-10.] (*Steindachner.*) .....RETICULATUS, 75.

75. MALAPTERUS RETICULATUS.

Malapterus reticulatus Cuv. & Val., xiii, 355, pl. 383, 1889 (Juan Fernandez); Gay, Hist. Chili, Zool., ii, 301; Steindachner, Ichth. Beitr. iv, 62 (Juan Fernandez).
Malacopterus reticulatus Günther iv, 88 (copied).
Neolabrus fenestratus Steindachner, Ichth. Beitr., ii, 19, 1875, with plate (Juan Fernandez).

Habitat.—Coast of Chili.

Etymology: *Reticulatus*, reticulated.

This singular species seems to be rather rare on the cost of Chili. As Steindachner states that there are constantly but three simple, flexible spines in the dorsal fin, we find it necessary to remove the genus from the *Labrinæ*, where Günther has placed it, and from the *Julidinæ*, where Steindachner has left it, and to make of it a separate group or subfamily. If, as seems probable, the number of vertebræ is more than 30, the nearest allies of the *Malapterinæ* would be the *Labrinæ*. We know this species from descriptions only.

Genus XXV.—CRYPTOTOMUS.

Calliodon Cuvier, Règne Animal, 1829, Ed. ii. (*spinidens*) (not of Gronow, nor of Bloch & Schneider).
Callyodon Cuvier & Valenciennes, xiv, 285, 1830 (*spinidens, ustus*, etc.).
Cryptotomus Cope, Trans. Am. Phil. Soc., 1871, 462 (*roseus*).

TYPE: *Cryptotomus roseus* Cope.

Etymology: Κρυπτός, hidden; τομός, cutting (teeth).

This genus is closely related to *Sparisoma*, differing from it in having the anterior teeth nearly separate at all ages and in having the dorsal spines flexible, as in *Scarus*. The dentition approaches that of a very young *Sparisoma*.

The genus *Calliodon* of Gronow and of Bloch & Schneider was based on a species which apparently belongs to the genus *Scarus*. The name was transferred by Cuvier from the type of *S. croicensis* to the present group. This transfer is inadmissible in our view, and the name *Calliodon* should not be used for the genus. *Callyodon*, a variant spelling of the same word, is apparently also inadmissible.

The name *Cryptotomus* was proposed by Cope for a fish having the "dentition of *Callyodon*, but with the numerous dorsal and anal spines of the group of *Harpe*." The fin rays are given D., XI, 8; A., III, 8. The numbers in all known species of *Scarinæ* are D., IX, 10; A., III, 9 (8).

We find on examination of the original type that Professor Cope has mistaken two of the (broken) soft rays of the dorsal and one of the anal for spines. The difference between spines and soft rays in this group is very slight. We therefore regard *Cryptotomus* as a synonym of *Callyodon* Cuvier, and the latter name being ineligible, we adopt *Cryptotomus* as the name of the genus.

ANALYSIS OF SPECIES OF CRYPTOTOMUS.

Common characters.—Lower pharyngeals, upper pharyngeals, isthmus, and lateral line precisely as in *Sparisoma;* lateral teeth of upper jaw coalescent into a more or less continuous cutting edge; the teeth more separate anteriorly; free posterior canines often present; anterior teeth separate or coalescent at base only; lower jaw with a single series of partly coalescent teeth laterally, and two or more series of nearly separate teeth anteriorly; median suture of jaws not evident externally; dorsal spines flexible; jaws subequal; scales about head large, a single row on cheeks, four or five on median line before dorsal. Species of small size, mostly of dull or olivaceous coloration.

a. Posterior canines normally present (occasionally wanting on one side or both in some species).

b. Lateral teeth of lower jaw arranged in a series continuous with the anterior teeth (thus: ||||||||||||||||||).

c. Snout long and sharp, 2 in head; the profile somewhat unevenly convex; upper lip double only posteriorly; posterior canines two, strong, recurved; anterior canines strong; teeth of lower jaw not very unequal, the anterior teeth a little longer than the middle ones, the posterior teeth little enlarged; fins rather high; head $3\frac{1}{4}$; depth $3\frac{1}{2}$; eye $5\frac{1}{8}$ in head. Color in alcohol, olivaceous, the fins much mottled, the sides of the body with conspicuous pale spots; in life, "greenish, the scales yellow at base, their edges bluish; vertical fins whitish, with rosy vertical spots; caudal wine-color, with bluish vertical markings." ..... DENTIENS, 76.

cc. Snout shortish, its length (measured along the axis) nearly 3 in head; profile strongly convex above eye, thence nearly straight to tip of snout; posterior canine usually single, very strong; anterior canines two on each side, divergent, directed forward and outwards; lateral teeth of lower jaw very unequal, the posterior much larger than those near the middle of the side of the jaw which are wholly coalescent; eye 6 in head, its distance from angle of mouth about twice its diameter; upper lip double for its whole length; depth 3; caudal truncate. Color in spirits, olive-green, each scale with a faint brown central blotch; head nearly plain; vertical fins greenish, blotched with brown, the membranes of the first two spines blackish ..... RETRACTUS, 77.

bb. Lateral teeth of lower jaw subequal, arranged in two rows which are not parallel, the posterior teeth of the anterior series standing below and outside the anterior teeth of the posterior series (thus: ||||||||||||||||||).

d. Posterior canine usually preceded by two or three smaller ones; upper lip double for its whole length; profile slightly convex above eye and somewhat concave before it; snout long, $2\frac{1}{8}$ in head; distance from eye to angle of mouth 3 in head, and $2\frac{1}{4}$ times diameter of eye; eye small, $6\frac{2}{3}$ in head; anterior canines about 4 on each side, strong and divergent; lower teeth larger than in other species; head 3 in length; depth 3. Color, in spirits, olive-gray, with irregular marblings of slaty gray; four diffuse dark blotches along base of dorsal; dorsal olive, finely mottled with darker cross-lines, the membrane of the first two spines black; caudal and anal plain olive. ..... USTUS, 78.

dd. Posterior canine usually single, sometimes wanting; teeth otherwise much as in *C. ustus*, the anterior canines smaller; upper lip not double for its whole length; snout sharp, the front not steep; snout 2¾ in head; eye 5; head 3; depth 3; color in life "greenish with small gilt spots arranged in oblique irregular bands on the vertical fins; a yellowish line from eye to mouth, and others on side of head."....AUROPUNCTATUS, 79.

aa. Posterior canines none; lateral teeth in each jaw subequal, those of the lower jaw larger than those of the upper and forming a continuous series.

e. Teeth of outer (anterior) series in upper jaw few, small, not canine-like, scarcely different from the lateral teeth; lower jaw without enlarged teeth; upper lip double for its entire course, the inner fold very narrow mesially; body moderately elongate, the depth 3⅓ in length; head 3⅙; snout rather sharp, 2¾ in head; profile gently curved, not steep; diameter of eye 4½ in head, 1½ in its distance from the angle of the mouth; caudal subtruncate. Color olive-gray, much mottled, sides with faint longitudinal whitish stripes; head with some greenish spots; fins pale, mottled with olive.....BERYLLINUS, 80.

ee. Teeth of anterior series in upper jaw long, canine-like, directed forward, separate to their bases; lower jaw with its anterior teeth long and somewhat canine like; upper lip double for all of its length ("on sides only," according to Cope); scales of breast and belly considerably enlarged, 3 scales before ventrals, 5 before dorsal; body slender, elongate, little compressed, the depth 4½ in length; head 3⅓; eye large, about 5 in head, more than half snout; snout very sharp, the profile straight to above eye. Caudal truncate; spines of dorsal long and very flexible; coloration nearly plain ("rosy purple" Cope); with four dark cross shades; the back vaguely barred; caudal barred with darker, a distinct blackish axillary spot; lower fins pale, probably yellow in life.....ROSEUS, 81.

76. CRYPTOTOMUS DENTIENS.

Calliodon dentiens Poey, Mem. ii, 422, 1860; Poey, Syn., 344, 1868; Poey, Enumeratio, 115, 1875 (Havana).

Habitat.—West Indian fauna; Havana.

Etymology: *Dentiens*, developing teeth.

We refer to this species a specimen sent by Poey to the museum at Cambridge, our own specimens formerly called *dentiens*, apparently belonging to a different species with a shorter snout, which seems to be Poey's *retractus*.

77. CRYPTOTOMUS RETRACTUS.

Calliodon retractus Poey, Syn., 345, 1868; Poey Enumeratio, 116, 1875 (Havana).
? *Cryptotomus dentiens* Jordan, Proc. U. S. Nat Mus., 1886, 45 (Havana); Jordan l. c. 227 (Pensacola).

Habitat.—West Indian fauna, Cuba, north to Pensacola.

Etymology: *Retractus*, drawn back.

We now refer to this species the two specimens—one from Havana, the other from Pensacola, which we have formerly called *Cryptotomus dentiens*. This identification is, however, somewhat doubtful, as Poey says that the upper lip is double posteriorly only.

78. CRYPTOTOMUS USTUS.

Calliodon ustus Cuv. & Val., xiv, 286, 1839 (Brazil); Günther, iv, 214, 1862 (Trinidad; Jamaica; Bahia); Guichenot, Scarides, 59, 1865 (note on types); Jordan & Gilbert, Synopsis Fish. N. A., 1883, 606 (Charleston); Jordan, Proc. U. S. Nat. Mus., 1886, 541 (note on type).

Cryptotomus ustus Jordan, Proc. U. S. Nat. Mus., 1886, 228 (Pensacola).

Habitat.—West Indian fauna; Charleston and Pensacola to Brazil.

Etymology: *Ustus*, scorched, from the color.

We have examined specimens of this species from Rio Janeiro, Pensacola, and Charleston, as well as the original type from Brazil.

79. CRYPTOTOMUS AUROPUNCTATUS.

Callyodon auropunctatus Cuv. & Val., xiv, 290, 1839 (San Domingo); Günther, iv, 214, 1862 (copied); Guichenot, Scarides, 60, 1865 (note on type); Jordan, Proc. U. S. Nat. Mus., 1886, 542 (note on type).

Cryptotomus auropunctatus Jordan, Proc. U. S. Nat. Mus., 1886, 228.

Habitat.—West Indian fauna; San Domingo.

Etymology: *Aurum*, gold; *punctatus*, dotted.

Of this species we have examined only the original types in the museum at Paris.

80. CRYPTOTOMUS BERYLLINUS. (PLATE IX.)

Cryptotomus beryllinus Jordan and Swain, Proc. U. S. Nat. Mus., 1884, 101 (Havana; Key West); Jordan, l. c. 137 (Key West); Jordan, Proc. U. S. Nat. Mus., 1886, 45 (Havana); Jordan, l. c., 1886, 228 (Jamaica).

Sparisoma sp. Bean, Bull. U. S. Fish Com., 1888, 137 (Somers Point, N. J.), (young specimen).

Habitat.—West Indian fauna; Havana, Key West, occasionally north to New Jersey.

Etymology: *Beryllinus*, color of beryl or emerald.

This species is common about Key West on muddy bottoms. Numerous specimens of various ages were obtained, the largest about 6 inches in length. A single rather large specimen was secured in the market at Havana.

Besides the original types, we have seen a specimen from Rio Janeiro, which may be the same. It has, however, the anterior profile steeper and the eye smaller, 5½ in head.

We have examined the young specimen described and figured by Dr. Bean as "*Sparisoma sp.*" It is identical with young specimens of *Cryptotomus beryllinus* from Key West. The occurrence of this tropical fish at a point so far to the northward is surprising.

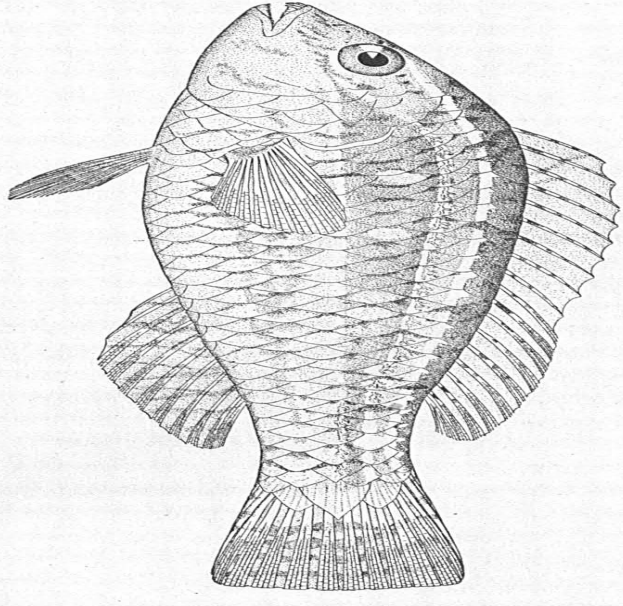
81. CRYPTOTOMUS ROSEUS.

Cryptotomus roseus Cope, Trans. Am. Phil. Soc., xiii, 462, 1869 (St. Martin's); Jordan, Proc. U. S. Nat. Mus., 1885, 545 (note on type); Jordan, Proc. U. S. Nat. Mus., 1886, 228.

Habitat.—West Indian fauna; St. Martin's; Bahia.

Etymology: *Roseus*, rosy.

Of this species we have examined the original type in the museum



CRYPTOTOMUS BERYLLINUS Jordan and Swain.

of the Academy of Natural Sciences at Philadelphia and three smaller specimens taken by the *Albatross* at Bahia.

It is the slenderest of the Scaroid fishes, recalling such forms as *Halichœres caudalis* and *Pseudojulis californicus*.

Genus XXVI.—CALOTOMUS.

Calotomus Gilbert, Proc. U. S. Nat. Mus., 1890 (*xenodon*).

TYPE: *Calotomus xenodon* Gilbert.

Etymology: *Καλός*, beautiful; *τομός*, cutting.

This genus is based on a large Scaroid of the eastern Pacific, allied to *Cryptotomus*, but differing in the arrangment of the teeth. Some of the East Indian species referred by Bleeker to *Calliodon* are probably congeneric with *Calotomus xenodon*.

ANALYSIS OF AMERICAN SPECIES OF CALOTOMUS.

Common characters.—Teeth distinct, equal, imbricated in regular oblique rows in both jaws, wholly concealing the dental plates to the anterior edge of which they are affixed. Cutting edge of both jaws formed by the outer teeth, the dental plate not reaching the edge and visible only from within. Lips double for a short distance only. Scales of cheeks in one row; lateral line continuous; bases of dorsal and anal with scaly sheaths; dorsal spines 9, soft, and flexible; gill membranes broadly joined to the isthmus.

a. Body deep, compressed, the depth 2¼ in length; head 3¼; snout short and convex; teeth pointed, arranged in quincunx order, the posterior face alone adnate to the dental plate; teeth equal and similar in both jaws, 3 to 4 in an oblique series anteriorly; about 12 such series in the upper jaw and 14 in the lower; two posterior canines in upper jaw, curved downwards and backwards; 3 or 4 scales on cheek; four before dorsal; scales 1½-25-7. D. IX, 10; A. III, 9. Dorsal spines high and flexible; caudal deeply lunate, the outer rays produced; ventrals short. Color mottled silvery, slaty, and brown, in indefinite pattern; pectorals dusky at base; vertical fins mottled, the dorsal and anal black on basal half.

XENODON, 82.

82. CALOTOMUS XENODON.

Calotomus xenodon Gilbert, Proc. U. S. Nat. Mus., 1890 (Socorro Island).

Habitat.—Revilla-Gigedos archipelago.

Etymology: *Ξενός*, strange; *ὀδούς*, tooth.

This species is known from two specimens, the largest 14 inches long, taken by Dr. Gilbert at Socorro Island.

Genus XXVII.—CALLYODONTICHTHYS.

Callyodontichthys Bleeker, Versl. in Meddeel. Akad. Wetensch. Amsterd. Natuurk. xii, Scar., 1861, 2. (*flavescens*=*bleekeri*).

TYPE: *Callyodontichthys bleekeri* Steindachner.

Etymology: *Καλός*, beautiful; *ὀδούς*, tooth; *ἰχθύς*, fish.

This genus contains a single species, of which but one specimen has been made known. We have never seen it, and do not know whether it is the representative of a distinct genus, or whether it be simply the young of a species of *Sparisoma*.

83. CALLYODONTICHTHYS BLEEKERI.

Callyodontichthys flavescens Bleeker, Scarid., 2, 1861 (Bahia), not *Scarus flavescens* Bleeker).

Callyodontichthys bleekeri Steindachner, Ichthyol., Mittheilungen, v, 1862.

Habitat.—Coast of Brazil.

Etymology: Named for Pieter van Bleeker.

This species is unknown to us, and we are unable to give any of its specific characters.

Genus XXVIII.—SPARISOMA.

Sparisoma Swainson, Nat. Hist. Class'n, Fishes, etc., 1839, ii, 227 (*abildgaardi*).
Scarus Bleeker, Versl. Akad. Wet. Amsterdam, xii, 1861, Scaroid, 3 (*cretensis*).
Scarus Günther, Poey, Guichenot et Auct. (*cretensis*).
Sparisoma Jordan & Gilbert, Syn. Fish. N. A., 1883, 938 (*abildgaardi*).

TYPE.—*Sparus abildgaardi* Bloch.

Etymology: Σπάρος, Sparus, ancient name of some Sparoid fish; σῶμα, body. Sparus is said to be from σπαίρω, to gasp.

We have elsewhere given the reasons which have led us to retain the name *Scarus* for the group (*Pseudoscarus*) to which the species originally described as *Scarus* by Forskål belong.

This being done, the only name applicable to the present group is that of *Sparisoma* Swainson. As originally defined this generic name was a useless synonym, like nearly all the other generic names of fishes proposed by Swainson. It was supposed to differ from the *Petronason* of the same author in the presence of hexagonal scales, sharp incisive teeth and obtuse canines. As, however, its type, *S. abildgaardi*, is a member of the present genus, the name should not be set aside.

ANALYSIS OF SPECIES OF SPARISOMA.

Common characters.—Lower pharyngeal broader than long, subhexagonal, its surface moderately concave or flattish; teeth in each jaw largely coalescent in the adult, their tips more or less separate in the young, the edge, especially of the lower jaw, remaining uneven; the median suture in each jaw present, but not well defined; one to four radiating canines sometimes present on each side of upper jaw above its cutting edge;* gill membranes broadly united to the isthmus; dorsal spines pungent; upper lip double for its entire length; lower jaw projecting beyond upper; lateral line not interrupted, passing gradually from its row of scales posteriorly to the series next below it; tubes of lateral line much branched; scales about head large, those on cheek in a single row, those on the median line in front of dorsal three or four in number. Species of rather small size, most of them American.

a. Upper jaw never with posterior lateral canines.

b. Caudal slightly rounded, the angles not produced.

y. Scales of lateral line and nape not black; cheeks with three scales. Color purple or purplish-brown, with brownish shade on anterior part of body, this shade forming generally a large, distinct, dark blotch between the pectoral and lateral line; caudal violet, with a white band at tip and obscure cross-bars.

CRETENSE, 84.

*In some species having normally one or more canine teeth, some or all of them are occasionally absent—on one or both sides.

yy. [Scales of the lateral line, those on the nape of the neck, and a few on the opercles, black shining violet; dorsal spines stout, the anterior not much longer than the orbit. General color, olive (in spirits); outer parts of the vertical fins, violet; posterior part of the axil, blackish violet.] (*Günther.*).....STRIGATUM, 85.

bb. Caudal lunate, or truncate with sharp angles (rounded in the very young).

c. Caudal fin distinctly barred with irregular brown spots and markings.

d. Body without distinct pale longitudinal streaks above; caudal not evidently pale-edged; spot on base of pectoral blackish and distinct; no evident pale or dark blotches on back of tail; caudal lunate or (var. *truncatus*) truncate in adult, rounded in young. General color olivaceous or reddish brown, clouded, and washed with cherry-red; lower fins mostly red; pectorals light orange; chin pale, with a whitish cross-band.....FLAVESCENS, 86.

dd. Body with three or four pale longitudinal streaks, the upper running to a faint pale blotch on back of tail between two dark brown blotches; caudal distinctly pale-edged behind and more distinctly barred than in *S. flavescens;* spot at base of pectoral brownish and very faint; about four small dusky blotches along base of dorsal, the last one most distinct at base of last ray; caudal with many cross-bars and blotches; snout dusky; chin with one or two whitish cross-bars; caudal concave, with sharp angles; dorsal and anal mottled with brown; pectorals and ventrals plain; young with dark opercular blotch and dark points about eye ...FRONDOSUM, 87.

cc. Caudal fin not cross-barred.

d. Axillary spot black, very distinct; outer rays of caudal considerably produced, the length of exserted part one-third to one-half that of head.

e. Caudal red, its outer rays green; axillary spot very distinct; body olivaceous, nearly plain, reddish below; some greenish blue on head; a faint greenish streak running backward from the angle of the mouth.....BRACHIALE, 88.

ee. [Caudal violaceous; outer rays of caudal produced to about one-half the length of the head; a dark spot at base of pectoral. General color dusky red; fins yellowish red; scales of the back and sides with many red spots.] (*Bleeker.*) MASCHALESPILOS, 89.

dd. Axillary spot faint or wanting; coloration uniform dark purplish-violet; three large scales on cheek; dorsal spines rather slender but pungent; caudal emarginate; tubes of each scale of lateral line much ramified and extending over the whole scale; teeth of moderate size, very distinct on the edges of the jaws.] (*Günther.*) ....ARACANGA, 90.

aa. Upper jaw with one or more canines above its cutting edge (these occasionally obsolete on one or both sides).

g. Caudal fin in adult deeply forked, the upper lobe about as long as the head, and twice or more the length of the inner rays; caudal fin variegated.

h. Canines 3 or 4 on each side; pores of lateral line excessively branched, each with several (6 to 8) much divided branches. Color bright greenish blue (the side sometimes with a

blue band); caudal lobe blue, the middle rays red; dorsal and anal red; pectorals yellowish, the axillary spot large, black, edged with red..CHRYSOPTERUM, 91.

hh. Canines one or two on each side; upper and lower caudal lobes greenish.

i. Opercle without black and yellow spot, pores of lateral line each with few (4 or 5) nearly simple branches. Color in life chiefly light blue, without sharp markings, fading to reddish in spirits; caudal dull greenish, the middle rays reddish; other fins mostly scarlet; axillary spot well defined.....LORITO, 92.

ii. Opercle with an inky black spot, in front of which is a golden spot; one short blunt canine; no spot at base of pectoral; axil dark within; a white blotch near root of caudal; gill membranes red; pectorals dark green posteriorly; anal green at base and at margin, brownish in the middle; caudal with a red crescent, separated by a green band from the transparent posterior margin. VIRIDE, 93.

gg. Caudal fin simply lunate, the outer rays more or less exserted, but not twice as long as the inner rays and much shorter than the head; canine single on each side (rarely obsolete or duplicated).

q. Body largely red in life; no pale blotch on back of tail.

j. Head with a scarlet stripe from below eye to angle of mouth; a small scarlet streak behind eye; color chiefly purplish brown; a round spot of yellow and black behind head, just below lateral line; fins chiefly red; angles of caudal black; axillary spot obscure. AUROFRENATUM, 94 *b*.

jj. Head unstriped; color dark reddish brown, with white mottlings; no yellow or black spot; belly abruptly red; fins mostly cherry red; axillary spot obsolete; body rather deep; scales large, their outlines well defined. ABILDGAARDI, 95.

qq. Body with little or no red in life; a pale blotch on back of tail; axillary spot faint; caudal barred; body with 3 or 4 pale lengthwise streaks.....DISTINCTUM, 95 *b*.

ggg. Caudal truncate or slightly rounded; the angles not acute.

z. Posterior canine single on each side; body rather stout. Color grayish olive, closely speckled with whitish and dusky; lower half of body abruptly paler from level of eye; upper half with a narrow whitish stripe confluent with the back from nape to end of dorsal; the part of back below this crossed by irregular dusky bars which end abruptly at level of eye; lower half with obscure pale lengthwise streaks; a black spot as large as pupil on end of opercle; axil and base of pectoral dark; dorsal gray, throughout mottled with pale and vaguely barred and spotted with blackish; caudal dark olive, with narrow pale cross-bars; a broad olive cross-bar at base; anal colored like soft dorsal; ventral faintly barred; pectoral plain; chin with two broad silvery cross-bars, and two irregular bars of dark olive.....NIPHOBLES, 96.

zz. Posterior canines 2 to 4 on each side.

l. Caudal fin without black in the adult; one or two more or less distinct whitish bars across the chin.

m. Canines 2 or 3 on each side; axillary region extensively deep blue in life, this forming a large blotch around and on base of pectoral; a curved series of small white specks around the blue on base of pectoral; body deep and robust; fins all mottled, the anal with three darker areas; body with three faint pale lengthwise streaks, more or less obscure; two of these bound a more or less interrupted dusky band from eye to base of caudal. HOPLOMYSTAX, 97.

mm. Canines 4 (rarely 3) on each side radiating horizontally; axil with little or no blue, but with a dusky blotch partly hidden by the fin; front steeper and less curved than in *hoplomystax;* body and fins mottled, but much less so than in the preceding; a distinct narrow streak of blue downward and forward from eye; caudal nearly plain, dusky olive; anal mottled.. RADIANS, 98.

ll. Caudal fin with more or less of black on posterior margin, yellowish at base; anal light bluish and reddish; its tip dusky; canines strong, 4 (rarely 3) on each side; 4 or 5 scales on cheeks. Color olive green above, mottled and speckled with red; snout with blue lines; a blue band around lower jaw; axil and base of pectoral deep blue-black; fins mostly light orange and yellow. XYSTRODON, 99.

84. SPARISOMA CRETENSE.

Scarus (*Σκάρος*) of the ancients.

Labrus ex purpureo viridi cæruleo et nigro varius Artedi, Synonomia, 55, 1738.

Labrus tetraodon virescens, cauda bifurca Artedi, Syn., 57.

Labrus cretensis Linnæus, Syst. Nat., Ed. x, 1758, 282 (after Artedi, 57) (and of the copyists).

Scarus cretensis Cuv. & Val., xiv, 164, pl. 400, 1839; Günther, iv., 209, and of most recent authors.

Labrus varius Linnæus, Syst. Nat., Ed. x, 282, 1758 (after Artedi Syn., 55).

Labrus xantherythrus Rafinesque, Caratteri, etc., 1810, 40.

Scarus rubiginosus Cuv. & Val., xiv, 171, 1839.

Scarus mutabilis Lowe, "Trans. Zool. Soc., ii, 187."

Scarus canariensis Valenciennes, "Webb & Berthelot, Ichth. Iles Canaries, pl. 17, f. 2." (Canary Islands).

Scarus sieculus Cocco, (*fide* Bonaparte).

Habitat.—Mediterranean Sea and neighboring islands.

Etymology: *Cretensis*, living in Crete.

This species, the original *Scarus* of the ancients and the only Scaroid fish found in European waters, is rather rare in the Mediterranean Sea. Our specimen was sent from Palermo by Dr. Pietro Doderlein.

85. SPARISOMA STRIGATUM.

Scarus strigatus Günther, iv, 212, 1862 (locality unknown).

Habitat.—Unknown.

Etymology: *Strigatus*, striped.

Very little is known of this species. As the genus *Sparisoma* is chiefly confined to American waters, we include the species in the present paper as possibly American.

86. SPARISOMA FLAVESCENS.

Vieja Parra, Descr. Piezas Dif. Hist. Nat., 1787, 59, pl. 28, f. 4 (Cuba).

Scarus flavescens Bloch & Schneider, Syst. Ichth., 1801, 290 (after Parra); Poey, Enumeratio, 1875, 113 (identification of *Sc. squalidus* with Parra's figure); Jordan, Proc. U. S. Nat. Mus., 1884, 137 (Key West).

Callyodon flavescens Cuv. & Val., xiv, 288, 1839 (after Parra).

Sparisoma flavescens Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 92 (Havana, Key West); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana); Bean, Bull. U. S. Fish Com., 1888, 198 (Cozumel).

Scarus rubripinnis Cuv. & Val., xiv, 199, 1839 (San Domingo); Günther, iv, 211 (copied); Guichenot, 13, 1865 (copied); ? Cope, Trans. Am. Phil. Soc., 1871, 462 (St. Croix).

? *Scarus virens* Cuv. & Val., xiv, 203, 1839 (Porto Rico; Martinique).

Scarus squalidus Poey, Mem., ii, 218, 1860 (Cuba); Poey, Synopsis, 338; Jordan & Gilbert, Syn. Fish. N. A., 1883, 938 (Garden Key); Günther, iv, 212, 1862, (copied).

? *Scarus chloris* Guichenot, Scarides, 1865, 14 (San Domingo, type of *Scarus virens*; not of Bloch & Schneider).

? *Scarus truncatus* Poey, Synopsis, 1868, 339 (Havana); Poey, Enumeratio, 1875, 114; Poey, Fauna Puerto-Riqueña, 308, 1878 (Puerto Rico).

Habitat.—West Indian fauna, Key West to Brazil.

Etymology: *Flavescens*, yellowish.

This species is excessively common at Key West, swarming everywhere about the island in the eel-grass. It rarely exceeds a foot in length. At Havana it is apparently equally common, the numbers seen in the market exceeding that of all the other species combined. It is one of the least brightly colored of the species of the genus. As a food fish, this, like the others, is held in low esteem. The flesh, although not unpleasant in flavor, is soft and rather poor. In the Havana market it is usually called *Vieja colorada*, but the species of this group are seldom distinguished by fishermen. In the museum at Cambridge are specimens of *Sp. flavescens* from St. Thomas, Jérémie, Hayti, Port au Prince, Tortugas, Nassau, and Rio Janeiro. It was found in abundance at St. Lucia by the *Albatross*.

We follow Poey in identifying with this species the *Vieja* of Parra, which is made the type of *Scarus flavescens* of Schneider. Valenciennes has made of this "Vieja" a *Calliodon*, and Bleeker a *Callyodontichthys*. Parra's figure seems not unlike this species, but we should not have ventured so to consider it except for the authority of Poey. There seems to be little doubt that this species is the original *Scarus rubripinnis*, as well as the *Scarus squalidus* of Poey. The *Scarus virens* C. & V., and *Scarus truncatus* of Poey either belong to this species or to some one very closely related to it, possibly distinguished by a truncate caudal. In the form of the caudal this species shows some variation.

If the name *flavescens* is considered too uncertain for adoption, *Sparisoma rubripinne* comes next in order of time.

There is considerable variation in the amount of redness in this species large ones being usually more rosy than the young.

87. SPARISOMA FRONDOSUM.

Scarus frondosus (Cuvier MSS.) Agassiz, Spix. Pisc. Brazil, 1829, 98 (Brazil); Cuv. & Val., xiv, 204, 1839 (Bahia, etc.); Guichenot, Scarides, 1865, 15 (Bahia); Jordon, Proc. U. S. Nat. Mus., 1886, 542 (note on type); Günther, iv, 210, (Cuba; Jamaica; Trinidad; Brazil).

? *Scarus circumnotatus* Poey, Mem., ii, 423, 1860; Poey, Repert. i, 375, 1866; Poey, Syn., 340, 1868; Poey, Enumeratio, 114, 1875 (Havana).

? *Scarus emarginatus* Poey, Syn., 340, 1868; Poey, Enumeratio, 114, 1875 (Havana).

? *Scarus distinctus* Poey, Mem., ii, 423, 1860; Poey, Repert. ii, 163, 1867; Poey, Syn., 341, 1868; Poey, Enumeratio, 114, 1875 (Havana).

Habitat.—West Indian fauna, Cuba to Bahia.

Etymology: *Frondosus*, branched.

Our description is based on specimens taken by the *Albatross* at Bahia. These seem to correspond to the species called *frondosus* by Günther and probably to the *distinctus* of Poey. The types of *frondosus* are from Bahia also and are either this species or else *flavescens*, the former supposition being the most probable. The type of *Sparisoma distinctum* has a lateral canine. It may be a distinct species from *frondosum*, or it may be that this is one of the species normally possessing canines.

I can not separate the *circumnotatus* or the *emarginatus* of Poey from *S. frondosum*, and so place them doubtfully in the synonymy.

The relations of *frondosum* to *flavescens* are very close.

88. SPARISOMA BRACHIALE.

Scarus brachialis Poey, Memorias, ii, 345, 1860 (Cuba); Poey, Synopsis, 337 (misprinted *braguialis*); Poey, Enumeratio, 113 (Havana).

? *Scarus humeralis* Poey, Mem., ii, 422, 1860; Poey, Syn., 342, 1868; Poey, Enumeratio, 113, 1875 (Havana).

Sparisoma frondosum Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 93 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana), (not *Scarus frondosus* Cuvier).

Habitat.—West Indian fauna; Havana.

Etymology: *Βραχίων*, the arm, from the axillary spot.

A single specimen of this species was obtained at Havana. Its life colors were not noticed. In spirits its colors are quite different from those of *S. flavescens*, though in other respects the two bear much resemblance.

89. SPARISOMA MASCHALESPILOS.

Scarus maschalespilos Bleeker, Notices Ichthyologiques, i–x, 5, 1862 (Surinam).

Habitat.—West Indian fauna; Surinam.

Etymology: *Μασχάλη*, arm-pit; *σπῖλος*, spot.

This species is known from the original description only. It is perhaps distinct from *S. brachiale*, though evidently closely allied.

90. SPARISOMA ARACANGA.

Scarus aracanga Günther, iv, 209, 1862 (Jamaica).

Habitat.—West Indies.

Etymology: *Aracanga*, Portuguese name of a large parrot in Brazil.

This species is known from Günther's scanty description only. We are indebted to Mr. G. A. Boulenger for the information that in the types of *Sparisoma strigatum* and *S. aracanga*, there are no posterior canines.

It is not certain that this species is distinct from *frondosum* or from *brachiale*.

91. SPARISOMA CHRYSOPTERUM.

Vieja Parra, Descr. Dif. Piezas Hist. Nat., 1787, 58, pl. 28, f. 4, (Cuba).

Scarus chrysopterus Bloch & Schneider, Syst. Ichth., 1801, 286, pl. 57 (American seas); Cuv. & Val., xiv, 185, 1839 (St. Thomas); Günther, 1862, 12 (Martinique; Jamaica); Guichenot, Scaridés Mus. Paris, 12, 1865 (San Domingo; Guadeloupe); Cope, Trans. Am. Philos. Soc., 1871, 462 (St. Croix; St. Kitts).

Sparisoma chrysopterum Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 94 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana).

Scarus chloris Bloch & Schneider, Syst. Ichth., 1801, 289 (after Parra); Goode, Bull. U. S. Nat. Mus., v, 1876, 34 (synonymy).

Scarus lateralis Poey, Memorias, ii, 219, 1860 (Cuba); Poey, Repertorio, i, 373, 375; ii, 162; Poey, Synopsis, 337; Poey, Enumeratio, 112

Scarus spinidens Guichenot, Scaridés, 15, 1865 (Bahia).

Habitat.—West Indian fauna.

Etymology: Χρυσός, golden; πτερόν, wing or fin.

A single rather large specimen was obtained by Dr. Jordan in the Havana market. We have also examined specimens from St. Thomas. There has been no disagreement among recent writers as to the synonymy of this species. Goode, in adopting for it the name *chloris*, has overlooked the slight priority of *chrysopterum*, and Poey has preferred to set both aside on account of imperfections in the description and of the error involved in the name of *chrysopterum*, none of the fins being really golden.

The identification of Parra's figure has been rendered certain by a colored drawing of the original type of Parra, sent by Graëlls to Poey, and by him presented to me.

The original figure of this species, published by Bloch & Schneider, is very incorrect as to form, but not uncharacteristic as to color or dentition. It may have been made from a dried and distorted skin.

92. SPARISOMA LORITO.

Sparisoma lorito Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 95 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana).

Habitat.—West Indian fauna.

Etymology: *Lorito*, Spanish diminutive of loro, parrot.

The single original type came from Havana. Others are in the mu-

seum at Cambridge from St. Thomas, Sombrero, Barbadoes, and Jérémie, Hayti. Although it is evidently not a rare species, we are unable to identify it with any of those described by Poey, or by Cuvier and Valenciennes.

93. SPARISOMA VIRIDE.

Piscis viridis bahamensis [the parrot fish] Catesby, Nat. Hist. Car., ii, 29, pl. 29, 1738 (Bahama).

Scarus viridis Bonnaterre, Enc. Meth., x, 96, 193, 1788 (after Catesby) (not *Scarus viridis* Bloch, 1790).

Scarus catesby Lacépède, iv, 16, 1803 (after Catesby).

Scarus catesbæi Cuv. & Val., xiv, 183, 1839.

Scarus catesbæi Poey, Repert., i, p. 372, 1867; Guichenot, Scaridés, ii, 1865 (San Domingo; Guadaloupe); Günther, iv, 210, 1862, South America, West Indies).

Scarus catesbyi Poey, Enumeratio, 110, 1875.

Sparisoma catesbyi Bean & Dresel, Proc. U. S. Nat. Mus., 1884, 153 (Jamaica).

Sparisoma catesbæi Jordan, Proc. U. S. Nat. Mus., 1884, 191.

Callyodon psittacus Gronow, ed. Gray, 84, 1854 (not of Linnæus).

Scarus melanotis Bleeker, Notices Ichthyologiques, i-x, 4, 1862 (St. Croix).

Habitat.—West Indies.

Etymology: *Viride*, green.

This is one of the largest and most strongly marked of the parrot-fishes. In the museum at Cambridge are specimens from Sombrero Key and St. Thomas.

The name *Scarus viridis* has priority over *Scarus catesby*—both names having been based on Catesby's figure, which is more exact than most of the early plates of fishes.

The *Scarus melanotis*, likewise distinguished by a black and yellow opercular spot, seems to us to be identical with *Sparisoma viride*.

94. SPARISOMA AUROFRENATUM.

Scarus aurofrenatus Cuv. & Val., xiv, 1839, 191 (San Domingo); Günther, iv, 212 (Cuba, Jamaica, Trinidad); Guichenot, Scarides Mus. Paris, 1865, 13 (San Domingo); Cope, Trans. Am. Philos. Soc., 1871, 46 (St. Croix, St. Martin's).

Sparisoma aurofrenatum Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 96 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana).

Scarus miniofrenatus Poey, Memorias, ii, 279, 393, 1860 (Cuba); Poey, Repertorio, i, 1867, 374; ii, 164, 1868; Poey, Synopsis, 337; Poey, Enumeratio, 1875, 111.

Habitat.—West Indies.

Etymology: *Aurum*, gold; *frenatus*, bridled; in allusion to the scarlet band backward from the mouth.

This species is rather common in Havana, where three specimens were obtained. Others are in the museum at Cambridge from Cuba, Sombrero, and St. Thomas. Specimens were obtained at St. Lucia by the *Albatross*. In color it is one of the most strongly marked and handsomest species. The name *aurofrenatum* is rather unfortunate, as the stripe on the head is bright vermilion in life. This, however, does not justify the substitution for *aurofrenatum* of the name *miniofrenatus* of Poey.

95. SPARISOMA ABILDGAARDI.

Vieja Parra, Descr. Dif. Piezas Hist. Nat., 1787, 58, pl. 28, f. 2 (Cuba).

Scarus abildgaardi Bloch, Ichthyol., taf. 259, 1791 ("America," from a specimen sent by Prof. Abildgaard); Lacépède, Hist. Nat. Poiss., iv, 55, 163, 1802 (copied).

Scarus abildgaardi Cuv. & Val., xiv, 175, 1839 (St. Thomas, Bahia); Günther, iv, 209 (Puerto Cabello); Guichenot, Scaridés, Mus. Paris, 10 (Bahia, San Domingo); Poey, Repertorio, i, 371, 1867, ii, 160; Poey, Synopsis, 337; Poey, Enumeratio, iii; Cope, Trans. Am. Philos. Soc., 1871, 461 (St. Croix, St. Martin's).

Sparisoma abildgaardi Swainson, Nat. Hist. Class'n, Fishes, etc., ii, 1839, 227; Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 97 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana).

Scarus coccineus Bloch & Schneider, Syst. Ichthyol., 1801, 289 (after Parra); Cuvier, Règne Animal, 1829, Ed. ii.

Scarus aureoruber Lacépède, Hist. Nat. Poiss., iv, 55, 163, 1803 (on a drawing by Plumier).

Scarus amplus Ranzani, "Nov. Comm. Acad. Scient. Inst. Bonon. t. 5, p. 324, pl. xxv, 1842" (*fide* Guichenot).

Scarus erythrinoides Guichenot, Scarides, Mus. Paris, 10, 1865 (San Domingo).

Scarus oxybrachius Poey, Synopsis, 1868, 342 (Cuba); Poey, Enumeratio, 115, lam. 14, f. 2.

Habitat.—West Indies.

Etymology: Named for Abildgaard, professor in the University of Copenhagen.

Several specimens of this species were obtained at Havana, where it is not uncommon. We have also seen specimens from St. Thomas and St. Lucia.

This is evidently the original *Sparus abildgaardi* of Bloch. The *Scarus coccineus* of Bloch & Schneider seems to belong certainly here. The description given by Guichenot of his *Scarus erythrinoides* fits our specimens well; better than his account of *Scarus abildgaardi.* We do not see that Poey's *Scarus oxybrachius* can be different. The sharpness of the pectoral is probably merely accidental. The pectoral is a little longer in proportion to the head in this species than in most others, but this difference seems to be due to the fact that the head is rather shorter.

The description of *Scarus amplus* we have not seen.

95b. SPARISOMA DISTINCTUM.

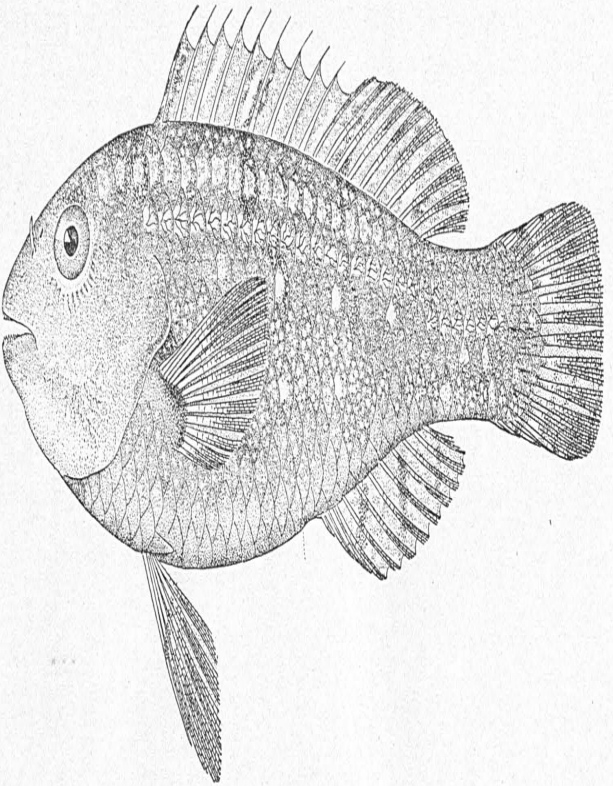
Scarus distinctus Poey, Mem., ii, 423, 1860; Poey Repertorio, ii, 163; Poey, Syn., 341; Poey, Enum., 114 (Havana).

Scarus frondosus Günther, iv, 210 (Cuba; Jamaica; Trinidad; Brazil).

Habitat.—West Indian fauna.

Etymology: *Distinctus*, distinct.

A type of *Scarus distinctus* Poey is in the National Museum. It agrees with the species called in this paper *Sparisoma frondosum*, differing only in the presence of a posterior canine and in the more sharply defined coloration. It is probable that it belongs to the same species, but in view of the uncertainty, I here give *Sparisoma distinctum* place



SPARISOMA HOPLOMYSTAX Cope.

(No. 35173, U. S. N. M.; from Key West, Florida.)

as a doubtful species. If the canine is normally present in *S. frondosum*, its relations would be rather with *S. niphobles* than with *S. flavescens*.

96. SPARISOMA NIPHOBLES.

Sparisoma niphobles Jordan & Bollman, Proc. U. S. Nat. Mus., 1889 (Green Turtle Cay, Bahamas).

Habitat.—West Indian fauna.

Etymology: *Νιφοβλής*, snowed upon, from the white spots.

This species is known from a single specimen taken by Mr. Charles L. Edwards at Green Turtle Cay, in the Bahamas. From this specimen our description is taken.

The species is very close to *S. radians* and *S. hoplomystax*, but we can not identify it with either of these.

97. SPARISOMA HOPLOMYSTAX. (PLATE X.)

Labrus radians Castelnau, Anim. Nouv., etc., Amérique du Sud., 1855, 29 (Bahia), (not *Scarus radians* Cuv. & Val.).

Scarus radians Günther, iv, 211 (Jamaica; Bahia) (not of Cuv. & Val.); Jordan & Gilbert, Synopsis Fish N. A., 1883, 906 (copied).

Scarus hoplomystax Cope, Trans. Am. Philo. Soc., 1869, 462 (St. Martin's).

Sparisoma cyanolene Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 98 (Key West); Jordan, l. c., 137 (Key West); Bean, Bull. U. S. Fish Com., 1888, 198 (Cozumel).

Habitat.—Florida Keys and southward to Bahia.

Etymology: *Ὅπλον*, weapon; *μύσταξ*, upper jaw.

This little fish is very abundant about Key West, where many specimens were taken with the seine in the kelp. None of these were more than 6 inches in length, and as they were sexually mature at that size it is not likely that they grow much larger.

The prevalence of blue around the base of the pectoral is a striking color mark which does not soon disappear in alcohol.

Specimens were also obtained by the *Albatross* at St. Lucia and at Bahia. A careful comparison of our specimens with the description of *S. hoplomystax* seems to show that the characters of *S. cyanolene* are due to the fresh condition of the types of that species.

98. SPARISOMA RADIANS.

Scarus radians Cuv. & Val., xiv, 206, 1839; Guichenot, Scarides, 17, 1865 (note on types); ? Goode, Bull. U. S. Nat. Mus., v, 1876, 32 (Bermudas).

? *Sparisoma radians* Bean & Dresel, Proc. U. S. Nat. Mus., 1884, 153 (Jamaica).

Scarus lacrimosus Poey, Mem., ii, 422, 1860; Poey, Syn., 343, 1868; Poey, Enumeratio, 113, 1875 (Havana).

? *Scarus atomarius* Poey, Mem., ii, 423, 1861; Poey, Syn., 343, 1868; Poey, Enumeratio, 115, 1875 (Havana).

Habitat.—West Indian fauna, Havana to Brazil.

Etymology: *Radians*, radiating.

Of this species we have examined three specimens taken by the *Albatross* at Bahia, the original locality of *S. radians*. These agree so well

with *S. lacrimosum* that we regard the latter species as identical, and we know of no character by which to separate *S. atomarium*.

A specimen sent by Poey to Cambridge seems to belong to *S. radians*. Color, in spirits, mottled brown, the caudal similarly mottled and faintly barred; no dark axillary spot; head plain; dorsal mottled. Caudal short, truncate, tubes of lateral line little branched; body rather elongate, the depth 3½ in length; pectoral short; two strong posterior canines, before which are several smaller pointed teeth. Another specimen has four pointed teeth on each side of upper jaw. This may represent *Sparisoma atomarium*.

Goode describes the life colors of the fish called by him *S. radians* as follows:

Above olive tinged with reddish brown, beneath rose-color; head, upper part of body, and dorsal marbled with brown; caudal irregularly banded with black, the extremity and spots on the membrane white; anal immaculate; base of pectorals black; chin white.

This is perhaps *Sparisoma xystrodon*, and doubtless *hoplomystax*, *radians*, and *xystrodon* have been confounded by authors under the name *radians*.

99. SPARISOMA XYSTRODON.

Sparisoma xystrodon Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 99 (Key West; Havana); Jordan, l. c., 137 (Key West); Bean, Bull. U. S. Fish. Com., 1888, 198 (Cozumel).

Habitat.—West Indian fauna, Florida Keys; Cuba, St. Lucia.

Etymology: Ξύστρον, a scraper; ὀδούς, tooth.

This species is found in the eel-grass and Fucus about Key West, in company with *S. hoplomystax*, and is equally abundant with the latter. It reaches a still smaller size, none of the many specimens obtained exceeding 5 inches in length. These are sexually mature.

One or two specimens of this species were seen in the market at Havana, and many specimens were obtained by the *Albatross* at St. Lucia.

Genus XXIX.—SCARUS.

Callyodon Gronow, Museum Ichthyol., ii, 8, 1764 (non-binomial) (*croicensis*).
Scarus Forskål, Descr. Animal, etc., in Orient. Observ. 1775, 25 (*psittacus*, etc.), (not of Gronow, 1764, which (non-binomial) = *Labrus L.*).
Calliodon Bloch & Schneider, Syst. Ichthyol., 1801, 312 (*lineatus* = *croicensis*).
Hemistoma Swainson, Class'n, Fishes, etc., 1839, ii, 226 (*reticulatus* Sw. = *pepo* Bennett).
Petronason Swainson, Class'n, Fishes, etc., 1839, ii, 226 (*psittacus*, etc.).
Erychthys Swainson, Class'n, Fishes, etc., 1839, ii, 226 (*croicensis*, etc.).
Chlorurus Swainson, Class'n, Fishes, etc., 1839, ii, 227 (*gibbus*).
Callyodon Gronow, Systema, Ed. Gray, 1854, 83 (*lineatus*, etc.).
Pseudoscarus Bleeker, Versl. Akad. Wet. Amsterd., xii, 1861, Scaroid, 3 (*chlorodon*, *psittacus*, etc.).
Pseudoscarus Günther, Poey, Guichenôt et Auct.
Scarus Jordan & Gilbert, Syn. Fish N. A., 1883, 938 (*psittacus*, *guacamaia*).
Calliodon Jordan, Proc. U. S. Nat. Mus., 1886, 591 (*croicensis*).

TYPE: *Scarus psittacus* Forskål.

Etymology: Σκάρος, Scarus, ancient name of *Sparisoma cretense*, said by Rondelet to be from σκαίρων, to pasture.

The name *Scarus* was used by the ancients and by some pre-Linnæan writers on zoology for the Mediterranean species of *Sparisoma*, *Labrus cretensis* L. By Gronow, a non-binomial writer, it was used in 1764 for a group substantially identical with the modern genus *Labrus*.

Its first use as a generic name in binomial nomenclature is that of Forskål in 1775. The genus *Scarus* of Forskål was based on several species obtained by him on the coasts of Arabia. A few of these are not Scaroids. The others all belong to the group called *Pseudoscarus* by Bleeker. Forskål had apparently no acquaintance with the *Labrus cretensis*, and this species can not in any proper sense be taken as the type of his genus. One of the species mentioned by him should be so taken, and as all his *Scari* belong to the same group, it makes no special difference which one is selected. Jordan and Gilbert have regarded *Scarus psittacus* Forskål as the type. If, however, *Sparisoma cretense* be taken as the type of *Scarus*, the proper name for the present genus would be *Calliodon*, and several of the useless generic names of Swainson have priority over *Pseudoscarus*.

Lately, in accordance with the rules of the American Ornithologists' Union, I had adopted the non-binomial but post-Linnæan generic names of Gronow, among them that of *Calliodon*, for the present genus. It seems better, however, *not* to use these names of Gronow. I have, therefore, retained *Scarus* as the name of the present group.

The genus *Scarus* contains the majority of the species of the subfamily of *Scarinæ*. It is more widely distributed than the other genera; its species reach for the most part a larger size, and in general they are more brightly colored than the others.

ANALYSIS OF SPECIES OF SCARUS.

Common characters.—Lower pharyngeals spoon-shaped, ovate-oblong, transversely concave; teeth in each jaw fully coalescent, appearing as tessellations on the surface; jaws with distinct median suture; edges of jaw even; upper pharyngeals each with two rows of teeth; gill membranes scarcely united to the narrow isthmus, across which they form a broad fold; dorsal spines flexible, scarcely different from the soft rays; upper lip laterally double, the interior fold becoming very narrow or obsolete mesially; lower jaw included in the closed mouth; lateral line interrupted posteriorly, commencing again on the next series of scales below; tubes of lateral line scarcely branched; scales on cheek in two to four rows; scales in front of dorsal on median line 6 to 8. Species mostly of large size, found in all tropical seas.

a. Teeth whitish.

b. Upper jaw with from one to four posterior canines.

c. Cheeks with from two to three rows of scales.

d. Head with a longitudinal band; a yellow longitudinal stripe on body; outer rays of caudal not colored like the inner; caudal subtruncate.

e. Outer rays of caudal blackish or greenish, darker than the median rays.

f. Yellow stripe above pectoral about on a level with the eye; outer rays of caudal deep greenish blue; upper jaw with one

posterior canine (rarely duplicated); two and one-half rows of scales on cheeks; head with two bluish-green stripes, the interspace reddish or yellow; dorsal and anal each with two green bands and one orange one, the anal having a roundish blue spot on the membrane between every two rays. General color bluish-green mixed with orange. PUNCTULATUS, 100.

ff. Yellow stripe above pectoral, mostly below the level of the eye; outer rays of caudal blackish, the rest of the caudal green; upper jaw with two posterior canines; two rows of scales on cheeks; upper part of head dark green, below eye bright yellowish-green, with bluish markings on opercle; dorsal bright green at base; ventrals pale; base of pectoral with a blue-black mark. General color in life, bright green; darker on the back, paler below ..... BOLLMANI, 101.

ee. Outer rays of caudal orange, lighter than the median rays, its edge blackish; yellow stripe above pectoral, below the level of the green stripes on the head, which are nearly horizontal; upper jaw with one posterior canine (rarely duplicated); two and one-half rows of scales on cheeks; head with two bluish-green stripes, the interspaces reddish or yellow; dorsal and anal each with two green bands and one orange one, the latter without blue spots; basal band of dorsal not broken into green spots. General color bluish green, mixed with orange ..... TÆNIOPTERUS, 102.

dd. Head without longitudinal bands; posterior canines 2 to 4.

g. [Caudal truncate; two series of scales on cheeks, and two scales on lower preopercular limb; canines 2 or 3 on each side. Color, uniform violet-purple; vertical fins very dark.] (*Günther*.) ..... ARACANGA, 103.

gg. Caudal fin lunate, the outer rays more or less produced; cheeks with 2½ or 3 rows of scales; posterior canines 3 or 4; color (dried skin) plain brownish, the caudal in one specimen (*quadrispinosus*) darker, in the other (*trispinosus*) paler mesially, its border and angles dark. TRISPINOSUS, 104.

cc. Cheeks with four rows of scales; angles of caudal more or less salient.

h. [Sides with a broad whitish band; fins, plain reddish; caudal square, with salient points; snout rather pointed; upper lip deep blue, lower carmine; general color, violaceous; head olivaceous above, rosy below.] (*Poey*.) ..... ACUTUS, 105.

hh. Sides without pale band; jaws nearly plain; color dusky olivaceous, some scales with a rosy blotch at base; dorsal edged with dusky; caudal dark, pale at base, and with pale shades, its angles little produced; opercle with blue blotches; canines 3; four rows of scales on cheek; snout rather acute; seven scales before dorsal ..... CUZAMILÆ, 105*b*.

hhh. Sides without distinct pale band; jaws with bright colors; fins chiefly blue, darker on pectoral and front of caudal; middle of dorsal reddish, with blue spots; a red band near the edge of the caudal, one on the base of the anal and one near the upper edge of the

pectorals; ventrals mostly red, their external border blue; caudal with very salient angles; upper jaw with red and blue edgings; snout moderate; 2 (rarely 3) lateral canines in upper jaw. General color, dark sky-blue; scales, brown-edged; eye with blue spots above and behind; a green band from the angle of the mouth, bordered above and below by red. Teeth quite small.....VETULA, 106.

bb. Upper jaw without canines; two and one-half series of scales on cheek.

i. Third (partial) row of scales of the cheek of 3 or 4 scales* of the upper row little larger than those of the second row.* Caudal slightly rounded, its outer rays not produced.

j. Sides of body with two broad dark longitudinal shades; sides of belly each with three sharply defined lines, each on a row of scales, these stripes running from the breast to beyond front of ventrals (these lines usually becoming faint or even obsolete in old specimens).

k. Stripes on side of breast, if present, whitish. Color, dark reddish brown above, paler below; back dark; sides with two dark parallel stripes of the color of the back, separated by paler interspaces, the upper one extending backward from eye; snout above bluish brown; a narrow whitish streak running from head along the middle line of belly; a faint dark spot on base of pectoral; caudal pale orange-red, the outer rays somewhat barred with brown; dorsal orange, edged with bluish; other fins nearly plain.

CROICENSIS, 107.

kk. Stripes on side of breast, if present, inky blue. Color bright green, olivaceous above, paler below, the lower half of the body becoming posteriorly more and more yellow, and on the lower half of the caudal peduncle bright light yellow, this color being brightest above front of anal; longitudinal shades on sides of body bright crimson, separated on the head by a band of green; no spot on base of pectoral; caudal fin green, its lower half yellow; dorsal, anal, and pectorals green, at least at base; ventrals yellow.

EVERMANNI, 108.

jj. [Sides of body without distinct, broad, darker stripes. Color, brown; no bands or lines upon body or head; dorsal spotted with violet and edged above and below with yellow, like the caudal; caudal without spots; a yellow line near the edge, and another along the base of the dorsal.] (*Guichenot.*)

FLAVOMARGINATUS, 109.

ii. Third (partial) row of scales on the cheek of 1 or 2 scales only; scales of the upper row much larger than those of the second row; caudal subtruncate, its outer rays more or less produced, becoming much elongate with age; adult with a fleshy hump above the snout. Color bright blue, the young more or less shaded with reddish brown; fins mostly blue. Size large.

CERULEUS, 110.

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* These two characters not verified in *S. flavomarginatus*.

aa. Teeth blue or bluish-green.

l. Upper jaw with canines; caudal fin with angles much exserted, especially in the adult: soft dorsal and anal ending in points; two and one-half rows of scales on cheeks.

m. Upper jaw usually with 1 posterior canine. Color bright blue, the edges of the scales brownish; fins dark brown, with green upon the external border of the ventrals, which are long and pointed; forehead with a fleshy hump in the adult.

n. Tubes of the lateral line considerably branched. CŒLESTINUS, 111.

nn. Tubes of the lateral line not branched..SIMPLEX, 112.

mm. [Upper jaw with from 3 to 6 posterior canines; jaws very convex. Color green under pectoral, and along the side and posterior part of the body; head, anterior and upper part of the back and belly grayish yellow; dorsal and anal brown, spotted with green along their bases; pectorals and ventrals tinted with green; caudal grayish yellow. Size large.] (*Guichenot*) .....PLEIANUS, 113.

ll. Upper jaw without posterior canines; teeth deep blue-green. Size large.

o. Caudal deeply notched, the angles much produced in the adult (the fin truncate or rounded in the young); body moderately elongate; depth 2½ to 3 in length; cheeks with 2½ rows of scales, those of the upper row larger than those of the second; one scale below the second row. Color olive green, with more or less ill-defined green markings on head; lower parts more or less reddish; vertical fins brownish orange, all edged with deep blue.....GUACAMAIA, 114.

oo. Caudal rounded, the angles not produced; body robust, the depth in adult 2⅕ in length; cheeks with two rows of scales, the lower of four, the upper of five scales; lower limb of preopercle wholly naked. Color light brownish, with some greenish shading on sides and bluish green on caudal peduncle; fins all bright blue; snout and forehead bluish; orbits surrounded by radiating dots and dashes of green. PERRICO, 115.

100. SCARUS PUNCTULATUS.

Scarus punctulatus Cuv. & Val., xiv, 1839, 195 (Martinique); Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 80 (Havana).

Pseudoscarus punctulatus Guichenot, Scaridés, Mus. Paris, 1865, 26 (Martinique).

Scarus diadema Cuv. & Val., 14, 1839 (Martinique); Cope, Trans. Am. Phil. Soc., 1871, 461 (St. Martin; St. Croix).

Pseudoscarus diadema Poey, Synopsis, 347; Poey, Enumeratio, 116; Guichenot, Scaridés, 28, 1865 (note on types).

Pseudoscarus tæniopterus Günther, iv, 226 (Trinidad; excellent description; not of Desmarest).

Scarus tæniopterus Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana).

Habitat.—West Indies.

Etymology: *Punctulatus*, dotted.

This species is one of the most brilliant of the group, and may be known by the coloration of the anal fin, which has suggested the name *punctulatus*.

Our single specimen is from Havana. Another from Porto Rico is in the museum at Cambridge. The *Scarus diadema* seems to be the same, but of this we are not quite certain.

101. SCARUS BOLLMANI.

Scarus bollmani Jordan & Evermann, Proc. U. S. Nat. Mus., 1886, 470 (off Tampa Bay).

Habitat.—Gulf of Mexico in deep water.

Etymology: Named for its discoverer, Charles Harvey Bollman.

This species is known from the original types only, taken from the stomachs of groupers (*Epinephelus*) by Mr. Charles H. Bollman.

102. SCARUS TÆNIOPTERUS.

Scarus tæniopterus Desmarest, Dict. Classique, xv, 244, pl. 12, 1831 (Cuba); Cuv. & Val., xiv, 195 (same type); Jordan, Proc. U. S. Nat. Mus., 1886, 543 (note on original type).

Pseudoscarus tæniopterus Guichenot, Scaridés Mus. Paris, 1865, 26 (same specimen).

Scarus vetula Cuv. & Val., xiv, 193, 1839 (St. Thomas; not of Bloch & Schneider, based on a figure of Parra).

Pseudoscarus psittacus Günther, iv, 225, 1862 (Cuba; Jamaica; after *Coryphæna psittacus* L., which is a species of *Xyrichthys*; not *Scarus psittacus* Forskål, an Asiatic species); Guichenot, Scaridés, Mus. Paris, 1865, 25 (Martinique: St. Lucia); Poey, Synopsis, 347 (Cuba); Poey, Enumeratio, 116.

Scarus psittacus Cope, Trans. Am. Philos. Soc., 1871, 461 (St. Martin; St. Croix).

Scarus virginalis Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 88 (Havana); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana).

Habitat.—West Indies.

Etymology: *Ταινία*, ribbon; *πτερόν*, fin.

Our specimens of this species are from Havana, and St. Thomas. Others are in the museum at Cambridge from Porto Rico and St. Thomas. The types of *Scarus tæniopterus* examined by us in Paris belong to the species called by Jordan & Swain *Scarus virginalis*. The latter name should therefore be suppressed.

The name *psittacus* has been used by recent writers for this species. The original type of *Coryphæna psittacus*, sent by Dr. Garden from Charleston, is still preserved by the Linnæan Society of London. It has been examined by Dr. Bean, who has found it to be a *Xyrichthys*.

There seems to be also no doubt that the original *Vieja* (pl. 28, f. 1), of Parra, on which the *Scarus vetula* of Bloch & Schneider is based, is identical with the *Scarus superbus* of Poey, rather than with the present species, to which it has been referred by Cuvier & Valenciennes. The name *vetula* must therefore supersede *superbus*, as already noticed by Mr. Goode (Bull. U. S. Nat. Mus., v, 32.).

103. SCARUS ARACANGA.

Pseudoscarus aracanga Günther, iv, 227, 1862 (Jamaica).

Habitat.—West Indian fauna.

Etymology: Portuguese name for some parrot.

This doubtful species is unknown to us. According to Dr. Günther "it has exactly the same coloration (as *Sparisoma aracanga*), with which it may be easily confounded."

104. SCARUS TRISPINOSUS.

Scarus trispinosus Cuv. & Val., xiv, 182, 1839 (Brazil).
Pseudoscarus trispinosus Guichenot, Scaridés, 23, 1865 (note on type).
Scarus quadrispinosus Cuv. & Val., xiv, 197, 1839 (Martinique); Guichenot, Scaridés, 27, 1865 (note on type); Jordan, Proc. U. S. Nat. Mus., 1886, 542 (note on type).
Pseudoscarus quadrispinosus Goode, Bull. U. S. Nat. Mus., v, 34, 1876.
? *Pseudoscarus chloris* Günther, iv, 227, 1862 (not *Scarus chloris* Bloch & Schneider).

Habitat.—West Indian fauna.

Etymology: *Trispinosus*, three-spined.

We know this species only from the dried skin which formed the original type of *Scarus quadrispinosus*. It is probably not distinct from *Scarus trispinosus*, likewise based on a dried skin, which, however, we have not examined.

105. SCARUS ACUTUS.

Scarus acutus Poey, Mem., ii, 216, 1861 (Havana).
Pseudoscarus acutus Poey, Syn., 350, 1868; Poey, Enumeratio, 118, 1875 (Havana).
Scarus gnathodus Poey, Repert., ii, 240, 1860 (Havana).
Pseudoscarus gnathodus Poey, Syn., 350, 1868; Poey, Enumeratio, 119, 1875 (Havana).

Habitat.—West Indies.

Etymology: *Acutus*, sharp-pointed.

We know this species from Poey's descriptions only. There seems to be little doubt that *gnathodus* is identical with *acutus*.

105*b*. SCARUS CUZAMILÆ. (PLATE VII, FIG. 3.)

Scarus cuzamilæ Bean, Bull. U. S. Fish Com., 1888, 196 (Cozumel).

Habitat.—West Indian fauna.

Etymology: "In allusion to the ancient name of the island" of Cozumel.

This species, apparently nearly allied to *S. acutus*, is known from one specimen about a foot long, taken at Cozumel, by Dr. Bean.

106. SCARUS VETULA.

(MUD-FISH; VIEJA.)

Vieja Parra, Dief. Piezas, etc., 1787, 58, lam. 28, f. 1 (Havana).
Scarus vetula Bloch & Schneider, Ichthyol., 289, 1801 (after Parra); Cuv. & Val., xiv, 193, 1839 (St. Thomas); Guichenot, Scarides, 25, 1865 (note on type); Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 90.
Pseudoscarus vetula Goode, Bull. U. S. Nat. Mus., v, 1876, 32 (Bermuda).
Scarus superbus Poey, Mem., ii, 218, 1861.
Pseudoscarus superbus Günther, iv, 218, 1862; Poey, Synopsis, 346, 1868; Poey, Enumeratio, 116, 1875 (Havana).

Habitat.—West Indies.

Etymology: *Vetula*, old woman, given in allusion to the Spanish name *Vieja;* English name, *Old Wife.*

This species is one of the most gorgeous of the parrot fishes, reaching a length of nearly two feet. The specimens examined by us were sent by Professor Poey to the museum at Cambridge.

107. SCARUS CROICENCIS.

(BULLON.)

Callyodon Gronow, Museum Ichthyol., ii, 8, 1763; Gronow, Zoöphylaceum, 244, t. 7, f. 4 (*sinepatria*).

Scarus croicensis Bloch, Ichthyol., taf. 221, 1790 (St. Croix; probably more than one species included); Jordan & Gilbert, Syn. Fish. N. A., 1883, 938 (copied); Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 87 (Havana; Key West); Jordan, l. c., 137 (Key West); Jordan, Proc. U. S. Nat. Mus., 1886, 47 (Havana); Bean, Bull. U. S. Fish Com., 1888, 198 (Cozumel).

Erythrhys croicensis Swainson, Nat. Hist. Class'n, Fishes, 1839, ii, 226 (name only).

Scarus insulæ-sanctæ-crucis Bloch & Schneider, Syst. Ichthyol., 1801, 285 (copied).

?*Calliodon lineatus* Bloch & Schneider, Syst. Ichthyol., 1801, 312, pl. 62, f. 2 (after Gronow); Gronow, Syst., ed. Gray, 1854, 84 (*sine patria*).

Scarus alternans Cuv. & Val., iv, 1839, 200 (Martinique).

Pseudoscarus sanctæ-crucis Günther, iv, 226, 1862 (Jamaica; Trinidad; Puerto Cabello); Guichenot, Scaridés, Mus. Paris, 1865, 29 (Martinique); Poey, Synopsis, 1868, 350 (Cuba); Poey, Enumeratio, 1875, 119.

Scarus sanctæ-crucis Cope, Trans. Am. Philos. Soc., 1870, 461 (St. Croix).

Pseudoscarus lineolatus Poey, Repertorio, ii, 239, 1868 (Cuba); Poey, Synopsis, 350; Poey, Enumeratio, 1875, 119.

Habitat.—West Indian fauna, north to Key West.

Etymology: *Croicensis*, living in St. Croix, where the species was discovered.

Several young specimens of this species were taken at Key West by Dr. Jordan. In Havana it is rather common, and is known as *Bullon*. Specimens are in the museum at Cambridge from Bermuda, Tortugas, St. Thomas, and St. Croix.

It seems never to reach a large size. Goode has suggested that it is perhaps the young of *Scarus vetula* (=*superbus* Poey), but we are very positive that this can not be the case. The two are very unlike in dentition, as well as in color.

There is no warrant for the change of the original name *croicensis* into *sanctæ-crucis*, and we have as a matter of course restored the original form of the word.

The *Calliodon lineatus* seems to us, as suggested by Valenciennes, to be probably this species.

Poey recognizes *Pseudoscarus lineolatus* with the three streaks along the side of the breast, and *P. sanctæ-crucis*, in which these markings are obsolete. These stripes are present in all our specimens from Cuba and Florida, but in a larger example from St. Lucia they are very faint or obsolete. Their absence is probably a matter of age, not of specific difference.

108. SCARUS EVERMANNI.

Scarus evermanni Jordan, Proc. U. S. Nat. Mus., 1886, 469 (off Tampa Bay).

Habitat.—Gulf of Mexico in deep water.

Etymology: Named for Barton Warren Evermann.

Only the original type of this handsome species is known. It was taken from the stomach of some large fish off the west coast of Florida by Mr. Charles H. Bollman. Its resemblance to *Sc. croicensis* is quite strong, but the coloration is notably different.

109. SCARUS FLAVO-MARGINATUS.

Scarus flavo-marginatus Cuv. & Val., xiv, 202, 1839 (Antilles).
Pseudoscarus flavo-marginatus Guichenot, Scaridès, 30, 1865 (note on type).

Habitat.—West Indies.

Etymology: *Flavus*, yellow; *marginatus*, margined.

We know nothing of this species except what is contained in the scanty descriptions of Valenciennes and Guichenot.

110. SCARUS CŒRULEUS.

(BLUE PARROT FISH; LORO; CLAMAGORE.)

Novacula cærulea (the *Bluefish*) Catesby, Nat. Hist. Carolina, etc., 1743, 18, tab. 18 (Bahamas).
Loro Parra, Descr. Dif. Piezas Hist. Nat., 1787, 57, Lam. 27, f. 1. (Cuba).
Trompa Parra, l. c., f. 2.
Coryphæna cærulea Bloch, Ausländische Fische, ii, 120, taf. 176, 1786 (in part, after Catesby and a figure of Aubriet, altered from a figure by Plumier); Gmelin, Syst. Nat., 1788, 1191 (copied).
Scarus cæruleus Bloch & Schneider, Systema Ichthyol., 1801, 288 (after Catesby, and Trompa of Parra); Cuv. & Val., xiv, 186, 1839 (St. Thomas); Cuvier, Règne Animal, Ed. ii, 1829; Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 85 (Havana; Key West); Jordan, Proc. U. S. Nat. Mus., 1884, 137 (Key West); Jordan, l. c., 1886, 48 (Havana).
Pseudoscarus cæruleus Günther, iv, 1862, 227 (copied); Guichenot, Scaridés, Mus. Paris (Proc. Soc. Imp. Nat. Cherbourg), 1865, 24 (St. Thomas, San Domingo); Poey, Repertorio, i, 373, 1867; Poey, Synopsis, 1868, 348; Poey, Enumeratio, 1875, 117 (Cuba); Goode, Bull. U. S. Nat. Mus., v, 33, 1876 (Bermuda).
Scarus loro Bloch & Schneider, Systema Ichthyol., 1801, 288 (after *Loro* of Parra).
? *Scarus trilobatus* Lacépède, Hist. Nat. Poiss., iv, 1803, 21 (on a drawing by Plumier).
? *Scarus holocyaneos* Lacépède, Hist. Nat. Poiss., iv, 1803, 45, on a copy by Aubriet of a drawing of Plumier; the copy colored entirely blue in order to represent this species; the original drawing probably intended for *Sparisoma chrysopterum*; the same copy by Aubriet, the original of Bloch's engraving of *Scarus cæruleus*.
Scarus obtusus Poey, Memorias Cuba, ii, 1860, 217 (Cuba).
Pseudoscarus obtusus Poey, Synopsis, 349; Poey, Enumeratio, 117.
Scarus nuchalis Poey, Memorias, ii, 1860, 220 (Cuba).
Pseudoscarus nuchalis Poey, Synopsis, 348; Poey, Enumeratio, 117.
Pseudoscarus chloris Günther, iv, 1862, 227 (Jamaica; Excl. Syn.).
Pseudoscarus quadrispinosus Goode, Bull. U. S. Nat. Mus., v., 34 (not *Scarus quadrispinosus* Cuv. & Val. ?).

Habitat.—West Indies, north to Key West.

Etymology: *Cæruleus*, blue.

This species is common in the Havana markets. A single young specimen was taken at Key West. Specimens from St. Thomas are in the museum at Cambridge.

No specimens of more than a foot in length were obtained by me, and these show but slight traces of the fleshy hump on the snout, which is said to be very conspicuous in the adult fish. They correspond fairly

to the *Loro* of Parra and to the *Scarus obtusus* of Poey. It is possible that these specimens are not the young of the large-humped *cæruleus*, but as no differences other than in the development of the hump and of the lobes of the caudal are to be found we refer them without much hesitation to *S. cæruleus*. The same opinion is expressed by Günther, who considers his *chloris* as probably the young of *cæruleus*. His *chloris* is evidently our fish, though not the *chloris* of Bloch.

There is some confusion in regard to the original *Coryphæna cærulea* of Bloch, which must be regarded as in part only based on this species. The *Scarus cæruleus* of Bloch & Schneider is, however, free from any confusion with *chrysopterum* or related species. *Scarus trilobatus* Lacépède is somewhat doubtful, and *Sparus holocyaneos* Lac. is involved in confusion with *Sparisoma chrysopterum*. The *obtusus* and *nuchalis* of Poey are probably forms of *cæruleus*.

111. SCARUS CŒLESTINUS.

Scarus cœlestinus Cuv. & Val., xiv, 180, 1839 (St. Thomas); Jordan, Proc. U. S. Nat. Mus., 1886, 543 (St. Thomas), (note on original type).

Pseudoscarus cœlestinus Guichenot, Scaridés, 22, 1865 (note on type); Poey, Syn., 349, 1868; Poey, Enumeratio, 118, 1875 (Havana).

Habitat.—West Indies.

Etymology: *Cœlestinus*, heavenly (blue).

This species is known to us only from the examination of the original type, a dried skin in the museum at Paris. It is apparently distinct both from *Sc. cæruleus* and *Sc. guacamaia*.

112. SCARUS SIMPLEX.

Pseudoscarus simplex Poey, Repert., i, 185, 1867; Poey, Syn., 349, 1868; Poey, Enumeratio, 118, 1875 (Havana).

Habitat.—West Indies.

Etymology: *Simplex*, simple.

We know this species from Poey's description only. It is very close to *Sc. cœlestinus*, and may not be different from the latter.

113. SCARUS PLEIANUS.

Scarus guacamaia Cuv. & Val., xiv, 178, 1839 (St. Thomas).

Pseudoscarus guacamaia Guichenot, Scaridés, 21, 1865 (note on type), (not *Scarus guacamaia* Cuvier).

Scarus pleianus Poey, Mem. Cub., ii, 393, 1860 (based on *Sc. guacamaia* C. & V.).

Habitat.—West Indies.

Etymology: Named for M. Plée, who collected for Cuvier in the West Indies.

It is evident that *Scarus guacamaia* C. & V., the "Grand Scare aux machoires bleus," with 3 to 6 posterior canines, can not be the original *Scarus guacamaia* of Cuvier, which has no canines at all. No other writer (except Guichenot) has examined any specimens referable to the *guacamaia* of Valenciennes, but Poey has given to these descriptions the name of *Scarus pleianus*, which species must keep if it be really valid.

114. SCARUS GUACAMAIA. (PLATE XI.)

(GUACAMAIA; PARROT-FISH.)

Guacamaia Parra, Descr. Dif. Piezas Hist. Nat., 1787, p. 54, pl. 26 (Cuba).

Scarus guacamaia Cuvier, Règne Animal, Ed. ii, 1829, 265. (No description; based on Parra. Not *Scarus guacamaia* Cuv. & Val. = *Scarus pleianus* Poey.) Jordan & Gilbert, Syn. Fish. N. A., 1883, 938; Bean, Bull. U. S. Fish. Com., 1888, 198 (Cozumel).

Pseudoscarus guacamaia Günther, iv, 233 (Jamaica; Puerto Cabello; Bahia); Poey, Synopsis, Pisc. Cubens., 1868, 348, 463; Poey, Enumeratio, Pisc. Cubens., 1875, 177.

Hemistoma guacamaia Jordan & Gilbert, Syn. Fish. N. A., 1883, 607 (Key West).

Scarus guacamaia Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 84 (Havana; Key West); Jordan, l. c., 137 (Key West); Jordan, Proc. U. S. Nat. Mus., 1886, 48 (Havana).

Scarus turchesius Cuv. & Val., xiv, 181, 1839 (Porto Rico); Guichenot, Scaridés, 23, 1865 (note on type); Jordan, Proc. U. S. Nat. Mus., 1886, 543 (note on original type).

Pseudoscarus turchesius Poey, Repert., i, 317, 1861; Poey, Syn., 348, 1868; Poey, Enumeratio, 118, 1875 (Havana); Poey, Fauna Puerto Riqueña, 337, 1895 (Havana).

Scarus rostratus Poey, Mem., ii, 221, 1867; Poey, Repert., 163, 1867 (Havana).

Pseudoscarus rostratus Poey, Syn., 349, 1868; Poey, Enumeratio, 118, 1875 (Havana).

Habitat.—West Indies.

Etymology: *Guacamaia*, a Spanish word for parrot.

This species is abundant about rocks at Key West, and is also not uncommon in the Havana market, where it is known still as *Guacamaia*. Our fish appears to be the *Guacamaia* of Parra, on which, so far as the printed record shows, the *Scarus guacamaia* of Cuvier was based. The specimens in Cuvier's possession, afterwards described by Valenciennes under the name of *Scarus guacamaia*, have canines in the upper jaw, and apparently belong to a distinct and (to us) unknown species, to which Poey has given the name *Scarus pleianus*. We have seen no specimens a yard in length, as mentioned by Parra, nor have we seen any with the caudal lobes prolonged to the extent shown in his figures.

None of our specimens, young or old, show traces of canines.

We have examined the type of *Scarus turchesius* in Paris. It seems to be the same as our *guacamaia*. Poey's *Scarus rostratus* seems to be based on young examples with rather sharper snout than usual.

A specimen of *Sc. guacamaia* from Rio Janeiro is in the museum at Cambridge. Another was taken by the *Albatross* at Bahia.

115. SCARUS PERRICO.

(PERRICO; LORO.)

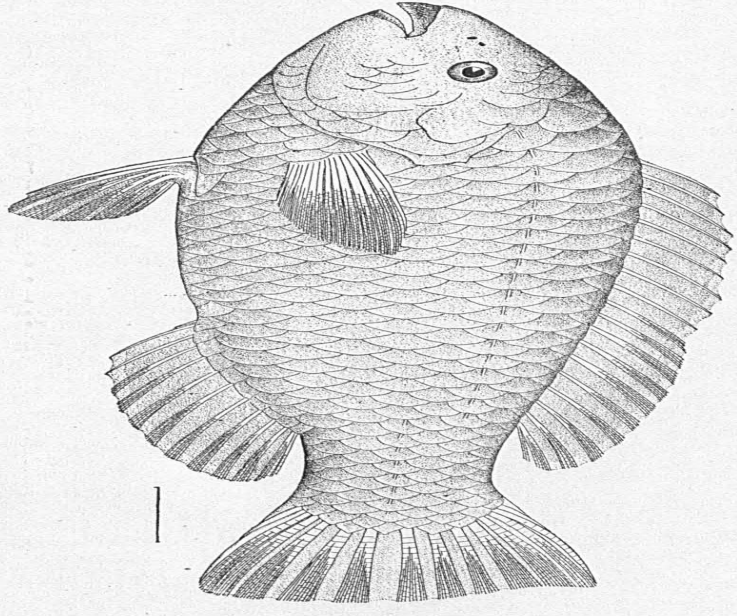
Scarus perrico Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 357 (Mazatlan).

Habitat.—Pacific coast of tropical America.

Etymology: *Perrico*, a Spanish word for parrot.

This large species is very common in the rocks about Mazatlan. It is seldom caught, and is not eaten. The type in the U. S. National Museum (No. 28328) is 23 inches in length.

It is remarkable that this single species and *Calotomus xenodon* are the only Scaroid fishes yet described from the eastern Pacific.



SCARUS GUACAMAIA Cuvier. Guacamaia; Parrot-fish.

(No. 3680, U. S. N. M., from Garden Key, Florida.)

RECAPITULATION.

The following is the list of Labridæ recognized by us as occurring in the waters of America and Europe. The distribution, in general, of each species is indicated by the use of the following letters:

E. Europe.
I. Islands of eastern Atlantic.
N. North Atlantic coast, north of Cape Hatteras
S. South Atlantic and Gulf coast.
W. West Indies and Brazil.
C. Southern California.
P. Pacific coast of tropical America.
V. Pacific coast of South America.

Family LABRIDÆ.

Subfamily A.—LABRINÆ.

Genus 1.—**Centrolabrus** Günther.

1. *Centrolabrus exoletus* (Linnæus). E.
2. *Centrolabrus trutta* (Lowe). I.

Genus 2.—**Acantholabrus** Cuvier & Valenciennes.

3. *Acantholabrus palloni* (Risso). E., I.

Genus 3.—**Labrus** (Artedi) Linnæus.

4. *Labrus berggylta* Ascanius. E.
5. *Labrus comber* Gmelin. E. (Probably a variety of the preceding.)
6. *Labrus livens* Linnæus. E. (Perhaps to be called *Labrus merula*.)
7. *Labrus nubilus* Valenciennes. E., I. (Doubtful species.)
8. *Labrus viridis* Linnæus. E.
9. *Labrus bimaculatus* Linnæus. E.

Genus 4.—**Symphodus** Rafinesque.

§ *Crenilabrus* Cuvier.

10. *Symphodus mediterraneus* (Linnæus). E.
11. *Symphodus tinca* (Linnæus). E.
12. *Symphodus melops* (Linnæus). E.
13. *Symphodus melanocercus* (Risso). E.
14. *Symphodus cinereus* (Bonnaterre). E.
15. *Symphodus doderleini* Jordan. E.
16. *Symphodus pirca* (Walbaum). E. (Perhaps to be called *S. bailloni*.)
17. *Symphodus ocellaris* (Linnæus). E. (Possibly to be called *S. caruleovittatus* or *S. unimaculatus*.)
18. *Symphodus ocellatus* (Forskål). E.

§ *Symphodus*.

19. *Symphodus scina* (Forskål). E.

Genus 5.—**Ctenolabrus** Cuv. &. Val.

§ *Lappanella* Jordan.

20. *Ctenolabrus iris* Cuv. & Val. E.

§ *Ctenolabrus*.

21. *Ctenolabrus suillus* (Linnæus). E.

§ *Tautogolabrus* Günther.

22. *Ctenolabrus adspersus* (Walbaum). N.
23. *Ctenolabrus brandaonis* (Steindachner). B.

Genus 6.—**Hiatula** Lacépède.

24. *Hiatula onitis* (Linnæus). N.

Subfamily B.—HARPINÆ.

Genus 7.—**Lachnolaimus** Cuvier.

25. *Lachnolaimus maximus* (Walbaum). W., S.

Genus 8.—**Harpe** Lacépède.

26. *Harpe diplotænia* Gill. P.
27. *Harpe rufa* (Linnæus). W., B.
28. *Harpe eclancheri* (Valenciennes). V.
29. *Harpe tridecemspinosa* (Günther). (Doubtful species; perhaps to be called *H. jagonensis.*)
30. *Harpe pulchella* Poey. W.

Genus 9. - **Lepidaplois** Gill.

31. *Lepidaplois scrofa* (Cuv. & Val.). I.

Genus 10.—**Decodon** Günther.

32. *Decodon puellaris* (Poey). W.

Genus 11.—**Trochocopus** Günther.

§ *Trochocopus.*

33. *Trochocopus maculatus* (Perez). V.

§ *Pimelometopon* Gill.

34. *Trochocopus pulcher* (Ayres). C.
35. *Trochocopus darwini* (Jenyns). V.

Genus 12.—**Graus** Philippi.

36. *Graus nigra* Philippi. V.

Subfamily C.—CLEPTICINÆ.

Genus 13.—**Clepticus** Cuv. & Val.

37. *Clepticus genizara* (Bloch & Schneider). W.

Subfamily D.—JULIDINÆ.

Genus 14.—**Pseudolabrus** Bleeker.

§ *Pseudolabrus.*

38. *Pseudolabrus gayi* (Cuv. & Val). V.

Genus 15.—**Julis** Cuvier. (Perhaps a subgenus under *Coris.*)

39. *Julis julis* (Linnæus). E.

Genus 16.—**Leptojulis** Bleeker.

40. *Leptojulis bimaculatus* Kner & Steindachner. V.

Genus 17.—**Halichœres** Rüppell.

§ *Ichthycallus* Swainson.

41. *Halichœres radiatus* (Linnæus). W., S.
42. *Halichœres nicholsi* (Jordan & Gilbert). P.
43. *Halichœres sellifer* Gilbert. P.
44. *Halichœres semicinctus* (Ayres). C.
45. *Halichœres garnoti* (Cuv. & Val.). W.

46. *Halichœres dimidiatus* (Agassiz). W., B.
47. *Halichœres maculipinna* (Muller & Troschel). W.
48. *Halichœres bivittatus* (Bloch). W., S.
49. *Halichœres dispilus* (Günther). P.
50. *Halichœres poeyi* (Steindachner). B. (Synonymy doubtful.)
51. *Halichœres caudalis* (Poey). W. (Synonymy doubtful.)

Genus 18.—**Pseudojulis** Bleeker.

§ ——.

52. *Pseudojulis adustus* Gilbert. P.
53. *Pseudojulis notospilus* Günther. P.
54. *Pseudojulis venustus* Jenkins & Evermann. P.

§ *Oxyjulis* Gill.

55. *Pseudojulis californicus* (Günther). O.

§ *Pseudojulis.*

56. *Pseudojulis inornatus* Gilbert. P.
57. *Pseudojulis melanotis* Gilbert. P.

Genus 19.—**Thalassoma** Swainson.

58. *Thalassoma lucasanum* (Gill). P.
59. *Thalassoma socorrocense* Gilbert. P.
60. *Thalassoma nitidum* (Günther). W.
61. *Thalassoma pavo* (Linnæus). E., I.
62. *Thalassoma steindachneri* Jordan. P. (Perhaps a variety of *T. melanochir.*)
63. *Thalassoma bifasciatum* (Bloch). W.
64. *Thalassoma grammaticum* Gilbert. P.
65. *Thalassoma virens* Gilbert. P.

Genus 20.—**Doratonotus** Günther.

66. *Doratonotus megalepis* Günther. W., S.

Genus 21.—**Xyrula** Jordan.

67. *Xyrula jessiæ* Jordan. W.

Genus 22.—**Xyrichthys** Cuvier.

§ *Noraculichthys* Bleeker.

68. *Xyrichthys rosipes* Jordan & Gilbert. W.
69. *Xyrichthys splendens* Castelnau. B.
69 *b* *Xyrichthys ventralis* Bean. W. (Perhaps identical with *X. rosipes.*)
70. *Xyrichthys martinicensis* Cuv. & Val. W., B.
70 *b* *Xyrichthys infirmus* Bean. W.

§ *Xyrichthys.*

71. *Xyrichthys uniocellatus* Agassiz. B.
72. *Xyrichthys mundiceps* Gill. P.
73. *Xyrichthys novacula* (Linnæus). S., W., E. (Perhaps includes two or three species, *X. novacula*, *psittacus*, and *vermiculatus.*)
74. *Xyrichthys modestus* Poey. W. (Doubtful species.)

Genus 23.—**Iniistius** Gill.

75. *Iniistius mundicorpus* Gill. P.

Subfamily E.—MALAPTERINÆ.

Genus 24.—**Malapterus** Cuv. & Val.

75. *Malapterus reticulatus* Cuv. & Val. V.

Subfamily F.—SCARINÆ.

Genus 25.—**Cryptotomus** Cope.

76. *Cryptotomus denticns* Poey. W. (Synonymy doubtful.)
77. *Cryptotomus retractus* Poey. W., S. (Synonymy uncertain.)
78. *Cryptotomus ustus* Cuv. & Val., W., S., B.
79. *Cryptotomus auropunctatus* Cuv. & Val. B.
80. *Cryptotomus beryllinus* Jordan & Swain. W.
81. *Cryptotomus roseus* Cope. W., B.

Genus 26.—**Calotomus** Gilbert.

82. *Calotomus xenodon* Gilbert. P.

Genus 27.—**Callyodontichthys** Bleeker.

83. *Callyodontichthys bleekeri* Steindachner. W.

Genus 28.—**Sparisoma** Swainson.

84. *Sparisoma cretense* (Linnæus). E.
85. *Sparisoma strigatum* (Günther). W.
86. *Sparisoma flavescens* (Bloch & Schneider). W., S.
87. *Sparisoma frondosum* (Cuvier). W., B. (Species perhaps including more than one.)
88. *Sparisoma brachiale* (Poey). W.
89. *Sparisoma maschalespilos* (Bleeker). W.
90. *Sparisoma aracanga* (Günther). W. (Doubtful species.)
91. *Sparisoma chrysopterum* (Bloch & Schneider). W.
92. *Sparisoma lorito* Jordan & Swain. W.
93. *Sparisoma viride* (Bonnaterre). W.
94. *Sparisoma aurofrenatum* (Cuv. & Val.). W.
95. *Sparisoma abildgaardi* (Bloch). W.
95 *b*. *Sparisoma distinctum* (Poey). W. (Doubtful species.)
96. *Sparisoma niphobles* Jordan & Bollman. W.
97. *Sparisoma hoplomystax* (Cope). S., W., B.
98. *Sparisoma radians* (Cuv. & Val.). W.
99. *Sparisoma xystrodon* Jordan & Swain. W., S.

Genus 29.—**Scarus** Forskål.

100. *Scarus punctulatus* Cuv. & Val. W.
101. *Scarus bollmani* Jordan & Evermann. S.
102. *Scarus taniopterus* Desmarest. W.
103. *Scarus aracanga* (Günther). W. (Doubtful species.)
104. *Scarus trispinosus* Cuv. & Val. W.
105. *Scarus acutus* Poey. W.
105 *b*. *Scarus cuzamilæ* Bean. W.
106. *Scarus retula* Bloch & Schneider. W.
107. *Scarus croicensis* Bloch. W., S.
108. *Scarus evermanni* Jordan. S.
109. *Scarus flavomarginatus* Cuv. & Val. W.
110. *Scarus caruleus* Bloch. W., S.
111. *Scarus cœlestinus* Cuv. & Val. W.
112. *Scarus simplex* Poey. W.
113. *Scarus pleianus* Poey. W.
114. *Scarus guacamaia* Cuvier. W., S.
115. *Scarus perrico* Jordan & Gilbert. P.

UNIVERSITY OF INDIANA,
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