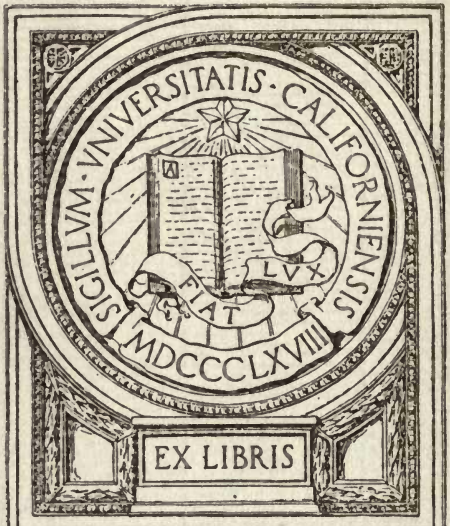

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# PAPERS FROM THE HOPKINS–STANFORD GALAPAGOS EXPEDITION, 1898–1899.

## XVII.

# SHORE FISHES OF THE REVILLAGIGEDO, CLIPPERTON, COCOS AND GALAPAGOS ISLANDS.

BY ROBERT EVANS SNODGRASS AND EDMUND HELLER.

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R = Revillagigedo, Cl = Clipperton, C = Cocos, G = Galapagos, (A) = American, (W) = Western Pacific, (C) = wide ranging or cosmopolitan.

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## INTRODUCTION.

In the fish-fauna of these islands there is a very conspicuous element formed of species that belong to the islands of the western part of the Pacific. These are:

*Galeocerdo triginus.* G.
*Triænodon obesus.* C.
*Euleptoramphus longirostris.* G.
*Evolantia microptera.* G.
*Myripristis murdjan.* C, G.
*Holotrachys lima.* C.
*Kuhlia tæniura.* R, C, G.
*Caranx melamphygus.* R, C, G.
*Forcipiger longirostris.* R.
*Zanclus canescens.* R, C, G.
*Ctenochætus strigosus.* C.
*Hepatus triostegus.* R, C.

*Hepatus aliala.* R, Cl, C.
*Canthidermis angulosus.* C.
*Cantherines sandwichensis.* R.
*Osbeckia scripta.* R.
*Ostracion lentiginosum.* C, G.
*Chilomycterus affinis.* G.

Of these 18 species only *Galeocerdo tigrinum*, *Osbeckia scripta* and *Chilomycterus affinis* are known from the American mainland coast.

There is a small number of species that are peculiar to the islands as a group, *i. e.*, that occur at 2 or more of them but are not known elsewhere. These are:

*Amia atradorsata.* C, G.
*Lutianus viridis.* R, C, G (Tres Marias Ids.)
*Pomacentrus leucorus.* R, C, G.
*Pomacentrus arcifrons.* C, G.
*Ichthycallus nicholsi.* R, G.
*Melichthys bispinosus.* R, C.
*Xesurus laticlavius.* R, C, G.

These may be termed Eastern Pacific Insular species. Two of them, *Pomacentrus leucorus* and *Xesurus laticlavius*, may be regarded as diagnostic of the islands as a group. They are known from all the islands except Clipperton, but the Clipperton fishes are too little known to be here considered. *Lutianus viridis*, although occurring at all the islands, is known also from the Tres Marias Islands near the coast of Mexico and is, therefore, likely to be taken also along the mainland shore.

| | R. | Cl. | C. | G. |
|---|---|---|---|---|
| Widely ranging species | 9 | 1 | 1 | 10 |
| American species | 35 | 5 | 18 | 59 |
| Western Pacific species | 8 | 2 | 11 | 9 |
| Eastern Pacific Insular species | 5 | | 6 | 6 |
| Peculiar species | 15 | 1 | 2 | 42 |
| Totals | 72 | 9 | 38 | 126 |

*Amia atradorsata* and *Pomacentrus arcifrons* are represented at the Revillagigedo Archipelago by the related species *Amia atricauda* and *Pomacentrus redemptus.*

Omitting the 2 deep-sea Galapagos species, *Galeagra pammelas* and *Pontinus strigatus*, of whose distribution nothing is known, the derivation of the fauna of each island or group of islands may be indicated by the tabulation of species on page 339.

Of the Revillagigedo fauna, as shown by this table, 12.5 % is composed of widely ranging species; slightly less than 50 % is American; 11 % is Polynesian; about 7 % is Eastern Pacific Insular, and nearly 21 % is peculiar.

The peculiar Clipperton species, *Ostracion clippertonense* is very closely related to *O. camurum* of the Hawaiian Islands. Hence, of the 9 species known from this island, 4 are of Western Pacific origin.

Of the Cocos fauna a little less than 50 % belongs to the American mainland; about 30 % is Polynesian; a little less than 16 % is Eastern Pacific Insular; and about 5 % is peculiar.

In the Galapagos fauna about 8 % is composed of widely ranging species; slightly less than 47 % is American continental; 7 % is Polynesian; 5 % is Eastern Pacific Insular; and 33 % is peculiar.

It is interesting to note that the American faunal element of Cocos Island is much more closely related to that of the Galapagos Archipelago than to that of the Revillagigedo Archipelago. There are 5 species of this class that occur at the Galapagos but not at the Rivillagigedo Islands, while there are no species that occur at Cocos and the Revillagigedo islands and not at the Galapagos. Furthermore, *Amia atradorsata* and *Pomacentrus acrifrons* are peculiar to Cocos and the Galapagos islands. *Melichthys bispinosus* is peculiar to Cocos and the Revillagigedo islands, but is very closely related to the Polynesian species *M. radula*. The Western Pacific fauna of Cocos is about equally distributed between the Galapagos and the Revillagigedo archipelagos. The Galapagos Islands lie in the cold Peruvian current flowing northwest from Cape Horn, while both Cocos and the Revillagigedos lie in the warm equatorial and counter equatorial currents.

Of the 56 Galapagos species that belong to the American mainland, only 17 occur also at the Revillagigedo Islands.

Only 4 of these mainland forms are South American. Hence, one set of Central American species populates the Revillagigedo Islands and another set the Galapagos Islands, the 2 sets intermingling along the mainland. The fish-faunas of the different islands of the Galapagos Archipelago differ greatly in the number of species and the relative number of individuals of the same species found at each, and in many cases different parts of the same island show differences of an equal degree.

This paper is the first report on the Cocos and Clipperton shore fishes, and the majority of the Galapagos species listed have not heretofore been recorded from these islands. Many imperfectly known species are redescribed, and numerous color notes are given taken from freshly captured specimens. Two species are described as new. Twenty-three other new species were described in Paper XV of the Hopkins-Stanford Galapagos series.[1] This paper, though in part compiled, is based mainly on specimens now in the ichthyological collection of Stanford University. The Revillagigedo specimens were collected by Dr. C. H. Gilbert during the *Albatross* expedition of 1889, and by Mr. R. C. McGregor in 1897. The Galapagos, Cocos and Clipperton specimens were nearly all collected by the authors during 1898 and 1899.

The zoölogical sequence adopted is that used by Jordan and Evermann in their *Fishes of North and Middle America*. Measurements of length are given in millimeters; other measurements are in hundredths of the length to the end of the caudal vertebræ, except where stated otherwise.

The authors express their obligation to Dr. David Starr Jordan for assistance in the identification of species, and especially for help in the determination of synonymy; and to Dr. Charles Henry Gilbert for invaluable aid in procuring the fish collecting equipment with which the expedition was provided, and, later, for assistance while working with the material obtained.

[1] Proc. Wash. Acad. Sci., Vol. V, 1903 (Sept. 12), 189–229.

## Family BRANCHIOSTOMIDÆ.

### 1. BRANCHIOSTOMA ELONGATUM Sundevall.

*Branchiostoma elongatum* SUNDEVALL, Vet. Akad. Förh. 1853, 147, Chinchas Islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, note, 4, 1896. — STEINDACHNER, Fauna Chilensis, 334, 1898 (Cavancha Bay, Iquique).

*Range.* — Coast of Peru, Chinchas Islands, Galapagos Islands.

Not hitherto reported from the Galapagos; 13 specimens, the largest 20 mm. long, dredged in about 10 fathoms on a bottom of fine black sand in Tagus Cove, Albemarle.

## Family GALEIDÆ.

### 2. GALEOCERDO TIGRINUS Müller & Henle.

*Galeocerdo tigrinus* MÜLLER & HENLE, Plagiostomen, 59, 1838. — JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, 32, 1896.

*Range.* — India, Australia, Polynesia, Galapagos Islands, west coast of tropical America.

Individuals of this species frequently seen in Tagus Cove, Albemarle and in the straits between Albemarle and Narboro. Generally solitary or associated with *Carcharias galapagensis.* Easily distinguished from the latter by the greater size and by the vertical stripes on the sides of the body.

We have the jaws and skin of the head of one specimen 9 feet long (2,700 mm.), and all that we saw were of about this length. The upper lobe of the caudal fin is about one-fourth of the total length, and is considerably shorter than the space between the dorsal fins.

Color: above, grayish, spotted with obscure dusky which runs into vertical bars on the sides of the body; below whitish.

Snout to first dorsal 33 mm.; snout to second dorsal 78; snout to pectoral 26; snout to ventral 44; snout to anal 80; upper lobe of caudal 25; first dorsal to second dorsal 33; pectoral 15. Snout short, length from tip to front of mouth about 1½ in width of mouth. Nostril 3 in snout. A groove along the base of each jaw, the two continuous around the angle, upper about twice length of lower. Nostril with large triangular flap on inner half of anterior margin.

Teeth all of same shape, being flat and triangular with a deep notch on outer side — a notch so large as to give the tooth a bilobed appearance, the lobes being one basal and the other apical, both directed outwardly; free edge of basal lobe roundly convex with coarse serrations;

apical lobe acute, directed outward and upward or backward, serrated on both sides, the serrations largest on inner side near base; teeth arranged in several series; a single row in front vertical, the others horizontal; back of each anterior vertical tooth is a longitudinal row of horizontal overlapping teeth; five well developed teeth in each longitudinal row mesially, but laterally decreasing gradually to one; teeth of lower jaw smaller than those of upper and in fewer longitudinal rows.

### 3. CARCHARIAS GALAPAGENSIS Snodgrass & Heller, new species.

*Eulamia lamiella*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 179 (Chatham Island); not of Jordan & Gilbert.

*Eulamia* (*Platypodon*) *platyrhynchus* GILBERT (in part), Proc. U. S. Nat. Mus. 1891, 543, Galapagos Islands.

*Carcharhinus platyrhynchus*, JORDAN & EVERMANN (in part), Fishes North and Mid. Amer., I, 36, 1896.

*Type.* — No. 12324, Stanford Univ. Mus.

*Diagnosis.* — The same in every respect as *Carcharias platyrhynchus* (Gilbert) except that the fins are at all ages of uniform coloration with the body, being never margined with white.

*Range.* — Galapagos Islands.

*Description of the Type* (embryo, 650 mm. long). — Length from tip of snout to front of mouth less than width of mouth by one-half diameter of eye; length from angle of mouth to symphysis of lower jaw equal to length of snout from mouth less one-half diameter of eye; distance between outer ends of nostrils a little less than width of mouth; eye a little less than one-fourth width of mouth; base of pectoral about 3 in its own length; base of first dorsal $1\frac{1}{5}$ in its height; ventrals as long as base of dorsal, equal to length of snout from mouth; base of anal 2 in entire length of ventral, equal to base of second dorsal; height $\frac{1}{2}$ greater than that of second dorsal; lower lobe of caudal a little less than $\frac{1}{2}$ of upper lobe; two gill-slits above front of base of pectoral.

The proportions differ somewhat in different sized specimens. In one 550 mm. long some of the above measurements are as follows: Length from snout to mouth equal to width of mouth; length from angle of mouth to pectoral a little greater than width of mouth; length from angle of mouth to symphysis of lower jaw less than length from symphysis to snout by $\frac{3}{4}$ diameter of eye; distance between outer ends of nostrils equals width of mouth; lower lobe of caudal $\frac{2}{3}$ of upper lobe.

Extremely abundant about the Galapagos Islands, especially about Wenman and Culpepper and between Albemarle and Narboro. The

adults average 6 to 8 feet in length. We examined a large number of them, several hundred being taken aboard the schooner, and we saw probably thousands in the water. None of them had the fins marked with white. They feed on fish and are probably dangerous enemies of the young fur-seals and sea-lions of the Galapagos Islands, for they closely patrol the shores about the seal rookeries. We often found in their stomachs pieces of sea-lions, but they may have been feeding on the carcasses left by the sealers.

MEASUREMENTS OF *Carcharias galapagensis*.

| No. Stanford University Museum. | 12326 | 12325 | 12324 |
|---|---|---|---|
| Length to base of caudal fin in mm | 470 | 553 | 650 |
| Snout to pectoral | 32 | 37 | 27 |
| Snout to first dorsal | 44 | 48 | 43 |
| First dorsal to second dorsal | 30 | 28 | 31 |
| Upper lobe of caudal | 37 | 40 | 35 |
| Base of pectoral to base of ventral | 30 | 34 | 21 |
| Pectoral | 21 | 26 | 22 |
| Height of first dorsal | 11 | 16 | 13 |

## 4. CARCHARIAS PLATYRHYNCHUS (Gilbert).

*Eulamia* (*Platypodon*) *platyrhynchus* GILBERT (in part), Proc. U. S. Nat. Mus. 1891, 543, Clarion and Socorro islands and Magdalena Bay, Lower California.

*Carcharhinus platyrhynchus*, JORDAN & EVERMANN (in part), Fishes North and Mid. Amer., I, 36, 1896.

*Range.* — Coast of Lower California (Magdalena Bay); Revillagigedo Islands; Clipperton Island.

The collection contains one specimen from Clarion Island and one taken at sea between Clarion and Clipperton islands, 13° 12′ N.; 111° 45′ W. The Clarion specimen, which is about 3½ feet long, has the dorsal and pectoral fins tipped and posteriorly bordered with white, and all others seen in the water about the island were similarly marked. The specimen taken near Clipperton Island has the marginal parts of the fins pale. In the original description of the species Dr. Gilbert assigns this fin coloration to the largest specimens only.

## 5. TRIÆNODON OBESUS (Rüppell).

*Carcharias obesus* RÜPPELL, Neue Wirbel., Fisch., 64, pl. 18, fig. 2, 1837.

*Triænodon obesus*, MÜLLER & HENLE, 55, pl. 20. — DUMÉRIL, Elasmobr., 386. — GÜNTHER, Cat., VIII, 383, 1870.

*Range.* — Red Sea, Indian Ocean, New Hebrides, Cocos Island.

One specimen, about 5 feet long, taken at Cocos Island. This is the only record of the species from the Eastern Pacific.

Snout very short, 2.7 in width of mouth; angle of mouth to symphysis of lower jaw 1.33 in width of mouth; width of nostril 2.4 in snout; eye longitudinally elongate-oval; teeth in several series in each jaw, the outer ones most nearly erect, but all inclined backward, especially the inner ones, which, in the upper jaw, are almost horizontal; all tricuspid, having a long slender median cusp and a much smaller one on each side at base; nostrils with a double flap on inner half of anterior edge forming a sort of tubular appendage; posterior gill-slit over the base of pectoral; no grooves about the mouth.

Length to base of caudal fin 911 mm.; snout to first dorsal 36; first dorsal to second dorsal 29; second dorsal to caudal 10; upper lobe of caudal 31; pectoral 20; base of first dorsal $1\frac{1}{5}$ in its height; base of second dorsal equal to height; height of anal $1\frac{1}{7}$ in height of second dorsal; ventral $1\frac{2}{3}$ in pectoral; lower lobe of caudal 2 in upper lobe.

Color: dark uniform slate above, below livid-yellowish slate; tip of first dorsal and of upper lobe of caudal creamy white.

## Family SPHYRNIDÆ.

### 6. SPHYRNA TUDES (Cuvier).

*Zygæna tudes* CUVIER in Valenciennes, Mém. Mus., IX, 225, 1822, Nice.
*Sphyrna tudes*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 44, 1896.

*Range.* — Tropical parts of the ocean in general.

We saw several small individuals of a *Sphyrna*, probably *S. tudes*, in Tagus Cove, Albemarle, but we were not able to secure any specimens.

## Family RHINOBATIDÆ.

### 7. RHINOBATUS PLANICEPS Garman.

*Rhinobatus planiceps* GARMAN, Bull. Mus. Comp. Zoöl., VI, 168, 1880, Peru; Galapagos. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 64, 1896.

*Range.* — Coast of Peru; Galapagos Islands.

Numerous skates were seen about the Galapagos Islands, some of which may have been this species, but we did not obtain any specimens of it. Reported from the Galapagos Islands by the Hasslar expedition.

## Family DASYATIDÆ.

### 8. DASYATIS LONGA (Garman).

*Trygon longa* GARMAN, Bull. Mus. Comp. Zoöl., VI, 170, 1880, Acapulco; Panama. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 85, 1896.

*Range.* — Gulf of California to Panama; Galapagos Islands.

One specimen taken at Mangrove Point on the east coast of Narboro. Individuals numerous in the shallow sandy-bottomed lagoons of the mangrove swamps at Mangrove Point, Narboro.

Length to root of tail, 460 mm.; tail 287 mm. (apparently not entire); width of disc 534 mm. Caudal spine very slightly less than distance from tip of snout to mouth, about two-thirds longer than middle of mouth; five papillæ in mouth, the median 3 large and conspicuous, the lateral ones small; an elongate patch of spine-like tubercles on middle of back; a median series of similar tubercles beginning a little back of central dorsal patch and extending along back and tail to caudal spine; a short longitudinal series of similar tubercles on each side of central dorsal patch.

## Family MOBULIDÆ.

### 9. MANTA BIROSTRIS (Walbaum).

*Raia birostris* ARTEDI, Piscium, 535, 1792.
*Manta birostris*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 92, 1896.

*Range.* — Both shores of tropical and subtropical America.

We frequently saw, amongst the islands of the Galapagos Archipelago, enormous rays probably belonging to this species, but no specimens were obtained.

## [Family SILURIDÆ.

### NETUMA INSULARUM Flora Hartley Greene.

*Tachysurus elatturus* (var. ?), JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 179, Gulf of Panama.
*Netuma insularum* FLORA HARTLEY GREENE in Gilbert, Proc. U. S. Nat. Mus. 1896, 439, Galapagos Islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2770, 1898.

The specimen from which this species was described was taken by the *Albatross*, in 1888, in the Gulf of Panama. The subsequent reference of the species to the Galapagos Islands is a mistake.]

## Family OPHICHTHYIDÆ.

### 10. MYRICHTHYS PANTOSTIGMIUS Jordan & McGregor.

*Myrichthys pantostigmius* JORDAN & MCGREGOR in Jordan & Evermann, Fishes North and Mid. Amer., III, Addenda, 2802, 1898, Clarion Island. — JORDAN & MCGREGOR, Rep. U. S. Fish. Comm. for 1898 (1899), 274, pl. 4 (Clarion Island).

*Range.* — Clarion Island, Revillagigedo Archipelago. (Collected by Mr. R. C. McGregor.)

### 11. OPHICHTHUS TRISERIALIS (Kaup).

*Murænopsis triserialis* KAUP, Apodes, 12, 1856, Pacific.
*Ophichthys rugifer* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 155 and 180, Charles Island.
*Ophichthus triserialis*, GILBERT, Proc. U. S. Nat. Mus. 1889, 450 (Chatham Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 384, 1898.

*Range.* — West coast of tropical America, Galapagos Islands.

Known from Charles and Chatham islands of the Galapagos Archipelago, it having been taken at both places by the *Albatross*.

## Family MURÆNIDÆ.

### 12. RABULA MARMOREA (Valenciennes).

*Muræophis marmoreus* VALENCIENNES, Voy. Vénus, Zoöl., 347, pl. 10, fig. 1, 1855, Galapagos Archipelago.
*Rabula marmorea*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 391, 1896.

*Range.* — Galapagos Islands.

"A doubtful species." (Jordan & Evermann.) Reported only by the *Vénus*.

### 13. GYMNOTHORAX PICTUS (Ahl).

*Muræna picta* AHL, De Muræna et Ophichtho, VI, 8, pl. 2, fig. 2, 1789.
*Lycodontis pictus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2805, 1898.—JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 274.

*Range.* — Western Pacific, and Revillagigedo Islands.

This is a common species of the East Indies and has been obtained at Clarion Island, Revillagigedo Archipelago, but nowhere else in the eastern Pacific.

### 14. GYMNOTHORAX CHLEVASTES (Jordan & Gilbert).

*Sidera chlevastes* JORDAN & GILBERT, Proc. U. S. Nat. Mus. 1883, 208, Galapagos Islands.
*Lycodontis chlevastes*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 398, 1896.

*Range.* — Galapagos Archipelago.

Known only from the Galapagos Islands, where one specimen was taken by the *Albatross*.

### 15. GYMNOTHORAX DOVII (Günther).

*Muræna dovii* GÜNTHER, Cat., VIII, 103, 1870, Panama.
*Lycodontis dovii*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 397, 1896 ("Gulf of California to Galapagos").

*Range.* — West coast of tropical America; Galapagos Archipelago.

### 16. MURÆNA INSULARUM Jordan & Davis.

*Muræna insularum* JORDAN & DAVIS, Apodal Fishes, 609, 1892, Chatham Island.—JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 400.

*Range.* — Galapagos Islands.

We have one specimen 390 mm. long collected on a rocky beach near Iguana Cove, Albemarle Island.

### 17. MURÆNA LENTIGINOSUM Jenyns.

*Muræna lentiginosa* JENYNS, Voy. Beagle, Zoöl., 143, 1842, Galapagos Islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 402, 1896.

*Range.* — Galapagos Islands.

One specimen from Turtle Point Reef, near Tagus Cove, Albemarle

### 18. ECHIDNA NOCTURNA (Cope).

*Pœcilophis nocturnus* COPE, U. S. Geol. Surv. Mont., 484, 1871, Rio Grande, Costa Rica.
*Echidna nocturna*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 402, 1896. — JORDAN & MCGREGOR, Rept. U. S. Fish. Comm. 1898, 275 (Clarion and Socorro islands).

*Range.* — Costa Rica; Cape San Lucas; Clarion and Socorro islands, Revillagigedo Archipelago.

## Family CLUPEIDÆ.

### 19. CLUPANODON LIBERTATIS (Günther).

*Meletta libertatis* GÜNTHER, Proc. Zoöl. Soc. Lond. 1866, 603, Libertad, Central America.
*Opisthonema libertate*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 433, 1896.

*Range.* — Pacific coast of Mexico and Central America; Galapagos Islands.

We obtained this species at Seymour Island near Indefatigable and in Wreck Bay, Chatham Island. At the latter place it was found in immense schools.

## Family CHAULIODONTIDÆ.

### 20. ZALARGES LUCETIUS (Garman).

*Maurolicus lucetius* GARMAN, Mem. Mus. Comp. Zoöl., XXIV, Rep. Expl. U. S. S. Albatross during 1891, xxvi, Fishes, 242, pl. J, fig. 2, 1899, Albatross Station 3428, at 21° 36′ 30″ N., 106° 25′ W. in 238 fathoms.

*Range.* — Panamic region of the Eastern Pacific, ranging vertically from 100 to 2,000 fathoms.

One mutilated specimen taken from the stomach of a *Thunnus* caught a few degrees north of the Galapagos Archipelago. It agrees with Garman's description of *Maurolicus lucetius*, but differs from the figure in the possession of an adipose fin. A few patches of thin cycloid scales are present on the caudal peduncle and back.

The species is close to *Zalarges nimbarius* Jordan & Williams, differing from it in the larger head, the shorter and deeper body, and in the larger ventral photophores, which are crowded and juxtaposed. We have examined the *type* of *Z. nimbarius* and find that it possesses a well developed adipose fin and a few large cycloid scales. Neither of these characters is shown in the figure of the *type*. The fins are not well preserved, but the anal has apparently 15 rays, as in *Z. lucetius*.

On the strength of the absence of pseudobranchiæ and of the presence of scales, we have placed this genus in the Chauliodontidæ. It is closely related to the Maurolicidæ, and it is doubtful whether these 2 families are really distinct.

MEASUREMENTS OF *Zalarges lucetius*.

| | |
|---|---|
| Length in mm | 31 |
| Head | .31 |
| Depth | .23 |
| Eye | .10 |
| Snout | .10 |
| Maxillary | .23 |
| Interorbital width | .05 |
| Pectoral | .15 |
| Base of anal | .19 |
| Caudal | .22 |
| Depth of caudal peduncle | .09 |
| Length of caudal peduncle | .12 |

## Family HEMIRHAMPHIDÆ.

### 21. HYPORHAMPHUS ROBERTI (Cuvier & Valenciennes).

*Hemirhamphus roberti* Cuvier & Valenciennes, Hist. Nat. Poiss., xxi, 24, 1886, Cayenne. — Jordan & Bollman, Proc. U. S. Nat. Mus., xii, 1899, 180 (James Island).

*Hyporhamphus roberti*, Jordan & Evermann, Fishes North and Mid. Amer., i, 721, 1896.

*Range.* — Both coasts of tropical America; Galapagos Islands.

Taken at James Island by the *Albatross*.

## 22. HEMIRHAMPHUS SALTATOR Gilbert & Starks.

*Hemirhamphus balao*, JORDAN, Proc. U. S. Nat. Mus., VIII, 1885, 370 (Panama); not of Le Sueur.

*Hemirhamphus saltator* GILBERT & STARKS, Mem. Cal. Acad. Sci., IV, 1904, 53, pl. IX, fig. 16, Panama.

*Range.* — Panama; Galapagos Islands.

One specimen taken between Albemarle and Narboro islands near Tagus Cove, Albemarle. It was secured by Captain W. P. Noyes, who stated that a school of the Hemiramphids was pursued by some porpoises past the boat in which he was rowing and that this one leaped into the boat.

Length 480 mm.; entire head in total length 37; depth in total length 12; lower jaw beyond tip of upper in total length 20; length of body from tip of upper jaw 382 mm.; depth in length without lower jaw 15; head in length from tip of upper jaw 22; pectoral in length without lower jaw 16; last ray of ventral in head without lower jaw 45; pectoral in head without lower jaw 74; eye in head without lower jaw 19; interorbital space in head without lower jaw 23. D. 14; A. 11; P. 11; teeth of the upper jaw simple, conical; those of the lower jaw tricuspid.

We have also 8 young individuals of a *Hemirhamphus*, about 70 mm. long, seined in the surf on the beach north of Tagus Cove, Albemarle, which apparently belong to this species. They are marked by a black lateral band from base of pectoral to middle of caudal peduncle; by 2 black dorsal lines on the back, one on each side of the median line; and by numerous transverse black lines crossing the back, not reaching laterally the lateral bands but broken into 3 segments by the longitudinal dorsal lines; lower jaw about 4.5 in the total length.

## 23. EULEPTORHAMPHUS LONGIROSTRIS (Cuvier).

*Hemirhamphus longirostris* CUVIER, Règne Animal, Ed. 2, Vol. 2, 286, 1829, Pondicherry; ibid., Ill. Poiss., pl. 98. — CUVIER & VALENCIENNES, Hist. Nat. Poiss., XIX, 52. — GÜNTHER, Cat., VI, 276.

*?Euleptorhamphus brevoorti* GILL, Proc. Acad. Nat. Sci. Phila. 1859, 131, no locality.

*Euleptorhamphus longirostris*, JENKINS, Bull. U. S. Fish Comm. 1902, 434 (Hawaiian Islands).

*Range.* — East Indies; Hawaiian Islands; Galagapos Islands.

Two specimens taken at Hood Island, the first record of the species from the Eastern Pacific. We have compared them with specimens from the Hawaiian Islands.

MEASUREMENTS AND FIN RAYS OF *Euleptorhamphus longirostris*.

| No. Stanford University Museum. | 12322 | 12333 |
|---|---|---|
| Total length in mm | 420 | 427 |
| Length without lower jaw in mm | 305 | 301 |
| Lower jaw beyond upper jaw | 37 | 41 |
| Head | 15 | 15 |
| Depth | 8 | 5 |
| Pectoral | 29 | 29 |
| Eye : Head | 30 | 29 |
| Number of dorsal rays | 24 | 23 |
| Number of anal rays | 22 | 21 |

We have also numerous young examples of a long-finned Hemiramphid, apparently a *Euleptorhamphus* and perhaps *Euleptorhamphus longirostris*, taken from the stomach of a horse mackerel (*Thunnus thynnus*) about 7° 26′ N.; 100° 26′ W., in December; and from the stomach of an ocean bonito (*Gymnosarda pelamis*) at about 4° 30′ N.; 87° W., in July. During July these young individuals were extremely abundant between Clipperton and Cocos islands, but we saw no adults. Those collected are about 75 mm. long; depth about 7; sides flat and parallel; pectorals $3\frac{2}{3}$; beak very short, about 9 in body, but perhaps broken in all, entirely gone in many.

## Family EXOCŒTIDÆ.

### 24. EVOLANTIA MICROPTERA (Cuvier & Valenciennes).

*Exocœtus micropterus* CUVIER & VALENCIENNES, Hist. Nat. Poiss., XIX, 92, 1846.

*Evolantia microptera*, HELLER & SNODGRASS, Proc. Wash. Acad. Sci., V, 1903, 189. — JENKINS, Bull. U. S. Fish Comm. 1902 (1903), 434 (Hawaiian Islands).

*Range.*—East Indies; Hawaiian Islands; Eastern Pacific north of Galapagos Islands.

One specimen, 150 mm. long, taken at 4° N., 90° W., July 12, in warm water about 250 miles north of the Galapagos Islands.

### 25. EXOCŒTUS VOLITANS Linnæus.

*Exocœtus volitans* LINNÆUS, Syst. Nat., Ed. X, 316, 1758. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2835 and 2836, 1898.

*Exocœtus evolans* LINNÆUS, Syst. Nat., Ed. XII, 521, 1766 (based on Gronow); Günther, Cat., VI, 282, 1866.

*Halocypselus evolans*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 729, 1896.

*Range.* — Widely distributed in the tropics.

Numerous specimens taken in the warm water between 4° N. and 21° N. and 90° W. and 116° W. Comparatively scarce in the cooler water of the Humboldt current immediately to the south of this region, and none seen about the Galapagos Islands.

### 26. EXONAUTES SPECULIGER (Cuvier & Valenciennes).

*Exocœtus speculiger* CUVIER & VALENCIENNES, Hist. Nat. Poiss., XIX, 93, 1846. — GÜNTHER, Cat., VI, 287, 1866.
*Exocœtus volitans*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 734, 1896.
*Exonautes speculiger*, JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2835 and 2836, 1898.

*Range.* — Widely spread in the tropics.

One specimen taken at about 17° 23′ N.; 114° 9′ W., southwest from the Revillagigedo Islands.

### 27. CYPSILURUS XENOPTERUS (Gilbert).

*Exocœtus xenopterus* GILBERT, Proc. U. S. Nat. Mus. 1890, 58, Clarion Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 738, 1896.
*Exonautes xenopterus*, JORDAN & MCGREGOR, Rept. U. S. Fish Comm. 1898, 275 (Clarion Island; Moro Hermosa, Lower California).
*Cypsilurus xenopterus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2836, 1898.

*Range.* — Eastern tropical Pacific.

This species was first obtained by Dr. C. H. Gilbert from the stomach of a booby (*Sula*) at Clarion Island, and later by Mr. R. C. McGregor at the same locality and off Moro Hermosa, Lower California.

### 28. CYPSILURUS CYANOPTERUS (Cuvier & Valenciennes.)

*Exocœtus cyanopterus* CUVIER & VALENCIENNES, Hist. Nat. Poiss., XIX, 98, 1846, Bahia, Rio de Janeiro. — GÜNTHER, Cat., VI, 294. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 180 (James Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 739, 1896.
*Exocœtus albidactylus* GILL, Proc. Acad. Nat. Sci. Phila. 1863, 167, Caribbean Sea.
*Cypsilurus cyanopterus*, JORDAN & EVERMANN, Check-list Fishes, 323, 1896. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2836, 1898.

*Range.* — Caribbean Sea, coast of Brazil; Galapagos Islands.

Taken at James Island by the *Albatross* (1887–'88).

## Family MUGILIDÆ.

### 29. MUGIL CEPHALUS Linnæus.

*Mugil cephalus* LINNÆUS, Syst. Nat., Ed. X, 316, 1758, Europe. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 180 (Chatham Island, Hood Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 811, 1896.

*Range.* — Cosmopolitan.

This widely distributed species was taken by the *Albatross* (1887–'88) at Chatham and Hood islands, Galapagos Archipelago.

### 30. MUGIL THOBURNI Jordan & Starks.

*Mugil thoburni* JORDAN & STARKS in Jordan & Evermann, Fishes North and Mid. Amer., I, 812, 1896, Galapagos Islands.

*Range.* — Pacific coast of tropical America; Galapagos Islands.

Specimens taken in Tagus Cove and Elizabeth Bay, Albemarle; and in shallow lagoons of the mangrove swamps on the east coast of Narboro.

We have numerous young individuals taken in a seine from the surf on a beach north of Tagus Cove, Albemarle. These are certainly the young of *Mugil thoburni*; they have the same number of fin rays, and the black base of the pectoral, characteristic of the adult, is conspicuously present in all. The head, however, is very strikingly different in shape from that of the adult, being compressed and deep rather than wide and depressed; but the specimens present a perfect gradation in this respect from the smallest to the largest. In a specimen 27 mm. long, the interorbital space is .22 of the length of the head; in a specimen 38 mm. long .25; in one 62 mm. long .31; and in an adult 159 mm. long .38. The ridges on the rows of scales are present on specimens 40 mm. long, but on specimens smaller than this they are not yet developed. The adipose eye-lids are slightly developed in specimens 65 mm. long; the smaller ones have the eye-lids simple.

### 31. MUGIL CUREMA Cuvier & Valenciennes.

*Mugil curema* CUVIER & VALENCIENNES, Hist. Nat. Poiss., IX, 87, 1836, Brazil, Martinique, Cuba. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 813, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. 1898, 275 (Socorro Island).

*Range.* — Common along both shores of tropical America, but known from only Socorro of the eastern Pacific islands.

### 32. MUGIL SETOSUS Gilbert.

*Mugil setosus* GILBERT, Proc. U. S. Nat. Mus. 1891, 549, Clarion Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 815, 1896.

*Range.* — Known from Clarion Island, and from the American mainland at Mazatlan.

### 33. CHÆNOMUGIL PROBOSCIDEUS (Günther).

*Mugil proboscideus* GÜNTHER, Cat., III, 459, 1861, Cordova Island.
*Chænomugil proboscideus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 816, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 275 (Socorro Island).

*Range.* — West coast of tropical America; Socorro Island.

### 34. QUERIMANA HARENGUS (Günther).

*Myxus harengus* GÜNTHER, Cat., III, 467, 1861, Pacific coast of Central America.
*Querimana harengus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 817.

*Range.* — West coast of America from Mazatlan to Peru; Galapagos Islands.

Seven specimens from Tagus Cove, Albemarle, the first reported from the Galapagos. The largest is 38 mm. long.

## Family SPHYRÆNIDÆ.

### 35. SPHYRÆNA IDIASTES Heller & Snodgrass.

*Sphyræna idiastes* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., V, 1903, 190, pl. II, Seymour Island.

*Range.* — Galapagos Islands.

Two adults, one from Seymour the other from the north coast of Narboro; several young from Tagus Cove, Albemarle, and from Hood.

## Family HOLOCENTRIDÆ.

### 36. MYRIPRISTIS OCCIDENTALIS Gill.

*Myripristis occidentalis* GILL, Proc. Acad. Nat. Sci. Phila. 1863, 87, Cape San Lucas. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 847, 1898.

*Range.* — Cape San Lucas to Panama; Cocos Island; Galapagos Islands.

Abundant at Cocos Island and at Galapagos Archipelago; not known from the Revillagigedo Islands. Over 50 specimens taken at Duncan, Seymour, Barrington, Hood and Tower islands. We have compared these specimens with specimens of *M. occidentalis* in the Stanford University collection from Panama. Since the species has not been well described we give the following

*Description of a typical specimen.* — Head 3; depth 2.5; eye 2.5 in head; interorbital width 4.3; snout 5; maxillary 1.75. D. X–I, 14; A. IV, 12; scales 3–36–6.

Body elliptical, compressed posteriorly, dorsal and ventral outlines nearly equal; head flattened above at interorbital region; snout short and blunt; opercle with a small spine at angle; suborbital, preopercle, both limbs of opercle, interopercle, lower edge of subopercle, shoulder-girdle and occiput with their edges serrate; mouth oblique; lower jaw included; maxillary extending to vertical from posterior border of eye, posterior margin without serrations; supplemental maxillary moderate; teeth in villiform bands in both jaws, in a diamond-shaped patch on the vomer and in club-shaped patches on the palatines; gill-rakers 10 + 20, long, length slightly less than diameter of pupil; eye large, diameter 2 in snout.

Dorsal fin divided, first part of 10 spines, separated from the second part by an interval equal to half interorbital width; third to fifth spines longest; first spine slender, equal to sixth; last spine united with soft dorsal; first soft rays longest, equaling longest spines; anal spines shorter than height of soft anal; first spine short, the third and fourth longest and of equal length, but the third much thickened; soft anal similar to soft dorsal and of same height; pectoral pointed, of 15 rays, the upper ones longest, 1.5 in head; ventral pointed, 1.6 in head; caudal rather deeply forked, the lobes equal and pointed, twice the diameter of the eye.

Scales sharply serrated, those on the lateral line with enlarged serrations mesially. Cheek and opercle scaled, the former with 4 vertical rows; lateral line continuous, parallel with contour of back.

*Color in life.* — Cardinal on sides of body, becoming darker olive-red on snout and before spinous dorsal; belly and throat lighter and more silvery-red; sides with faint longitudinal dusky stripes produced by the over-lapping of the scales; fins red like the sides of the body, and without dark bands or spots.

MEASUREMENTS OF *Myripristis occidentalis*.

| No. Stanford University Museum. | 12317 | 12318 | 12319 | 12320 |
|---|---|---|---|---|
| Length in mm | 152 | 120 | 131 | 124 |
| Head | 34 | 35 | 34 | 34 |
| Depth | 41 | 42 | 38 | 39 |
| Pectoral | 22 | 25 | 24 | 24 |
| Ventral | 21 | 22 | 21 | 21 |
| Eye | 14 | 14 | 15 | 15 |
| Interorbital width | 7 | 8 | 8 | 8 |
| Snout | 7 | 7 | 7 | 7 |
| Maxillary | 20 | 22 | 21 | 20 |
| Longest dorsal spine | 16 | 18 | 18 | 17 |
| Longest anal spine | 12 | 14 | 13 | 13 |

## 37. MYRIPRISTIS CLARIONENSIS Gilbert.

*Myripristis clarionensis* GILBERT, Proc. U. S. Nat. Mus. 1896, 441, pl. 69, Clarion Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2842, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. 1898 (1899), 275 (Clarion Island, Socorro Island).

*Range.* — Clarion and Socorro islands, Revillagigedo Archipelago.

## 38. MYRIPRISTIS MURDJAN (Forskål).

*Sciæna murdjan* FORSKÅL, Desc. Anim., 48, 1775, Red Sea.
*Myripristis murdjan*, RÜPPELL, Atlas Nordl. Afr., 86, pl. 23, fig. 2; Günther, Fische der Südsee, II, 92, pl. 61, 1873–75. — DAY, Fishes of India, 170, 1878–88, Supplement, 788, pl. 41, fig. 2. — JENKINS, Bull. U. S. Fish Comm. for 1902 (1903), 440 (Hawaiian Islands).

*Range.* — East coast of Africa; Red Sea; India; Malay Archipelago; Polynesia; Hawaiian Islands; Cocos Island; Galapagos Islands.

We have numerous large specimens taken at Cocos Island, and one specimen taken at Duncan Island of the Galapagos Archipelago, the only record of the species from the Western Pacific.

The descriptions of the species vary somewhat in regard to the coloration of the fins, and the development of the external teeth of the anterior end of the mandible and of the angles of the premaxillaries. Since the species is not elsewhere described in American literature we give the following description based on Cocos specimens:

*Description of a typical specimen.* — Length 350 mm. Dorsal profile ascending from snout to nape at an angle of about 45°, here slightly angulated, running backward at greater inclination to front of spinous dorsal; from here to front of soft dorsal almost horizontal, then somewhat abruptly curved downward to caudal peduncle; both dorsal and ventral outlines of peduncle concave; ventral profile with about same amount of convexity as dorsal, but more evenly curved — the belly being less angulated than the back; mouth very oblique; snout transversely truncate, so that the upper jaw presents a wide, straight, anterior margin, causing each premaxillary to present laterally a prominent angle where the transverse and longitudinal parts meet; upper jaw considerably exceeded by tip of lower projecting part 2 in length of snout, 4 in horizontal diameter of eye (varying much in different specimens); maxillary reaching vertical from posterior border of eye; supplemental maxillary large and projecting a little beyond the posterior end of the maxillary; angle of opercle with a short blunt spine; preopercle notched just above angle, interopercle notched near lower end; opercle, preopercle, subopercle, interopercle

below, notch, and posterior lower edge of maxillary serrate; gill-rakers 12 + 21, a little greater than 2 in eye.

Angle of each premaxillary and each side of symphysis of lower jaw with an elevation bearing about 12 (number variable in different specimens) hard, papillar, tooth-like projections, forming in adults a very conspicuous character; teeth of inside of mouth small, in villiform bands in both jaws, in a triangular patch on the vomer and in elongated club-shaped patches on the palatines; an outer series of enlarged blunt conical teeth in each jaw similar in shape and appearance to those on the exterior of the jaws.

Dorsal fin with 11 spines, third and fourth longest, deeply emarginate before the last; soft dorsal elevated, somewhat falcate, much higher than the spinous dorsal, 14 rays, the anterior longest; anal spines 4, the first very short, the third thickened but shorter than the fourth, fourth longest; soft anal similar to the soft dorsal; caudal forked, the lobes equal and bluntly rounded; pectoral rather pointed, rays 15, the upper longest; ventral pointed, slightly longer than the maxillary; scales large, sharply serrate, $2\frac{1}{2}$–30–6; lateral line nearly horizontal anteriorly, with a slight upward curve on the caudal peduncle.

*Variations.* — The external teeth of both jaws vary greatly in individuals of different ages, being much smaller and fewer in numbers in the young than in adults. In a specimen 125 mm. long they are scarcely conspicuous on the upper jaw, and on the lower only 3 small teeth are present on each side. In some adults all 4 sets are large and prominent, while in others of the same size they are much smaller. The degree to which the lower jaw projects beyond the upper varies with the development of the external teeth.

MEASUREMENTS OF *Myripristis murdjan.*

| | | | | | |
|---|---|---|---|---|---|
| Length in mm | 141 | 205 | 210 | 220 | 225 |
| Head | 35 | 35 | 35 | 35 | 34 |
| Depth | 44 | 43 | 43 | 43 | 39 |
| Pectoral | 26 | 24 | 24 | 24 | 25 |
| Ventral | 22 | 22 | 21 | 22 | 23 |
| Eye | 14 | 13 | 13 | 13 | 13 |
| Interorbital width | 7 | 7 | 7 | 7 | 7 |
| Maxillary | 22 | 20 | 22 | 20 | 21 |
| Longest dorsal spine | 15 | 15 | 14 | 15 | 13 |
| Longest dorsal ray | 21 | 19 | 17 | 17 | 19 |
| Longest anal ray | 14 | 13 | 11 | 10 | 11 |
| Longest anal ray | 21 | 19 | 18 | 19 | 20 |

*Color in life.* — Above bright cherry-red, lighter on sides, fading to silvery-red on belly; opercular flap and axil of dorsal dusky olive-

brown (dusky in alcohol); spines of dorsal like back, membranes yellowish, with bluish base; soft dorsal and anal cherry-red with first ray white-edged, a black blotch at tip of first rays; caudal fin like back, with upper and lower rays white-edged, a dark blotch just within the tip of each lobe; pectoral like side; ventrals lighter red with the first ray white-edged; iris silvery and cardinal.

The specific identification here given is based on a direct comparison of the Cocos and Galapagos specimens with Hawaiian specimens.

### 39. HOLOTRACHYS LIMA (Cuvier & Valenciennes).

*Myripristis lime* CUVIER & VALENCIENNES, Hist. Nat. Poiss., VII, 493, Ile de France. — CUVIER, Règne animal, III, Poiss., pl. 14, fig. 2.

*Myripristis lima*, GÜNTHER, Cat., I, 28, 1859. — KNER & STEINDACHNER, Sitz. Akad. Wissen. Wien, LIV, 375, pl. I, fig. I, 1866 (Samoa). — GÜNTHER, Fische der Südsee, 93, pl. 63, fig. A, 1875 (Mauritius, Samoan, Hawaiian and Kingsmill islands).

*Holotrachys lima*, JENKINS, Bull. U. S. Fish Comm., XXII, 1902 (1903), 439 (Honolulu).

*Range.* — Isle of France, Mauritius, Samoan, Gilbert, Hawaiian and Cocos islands.

Two specimens of this species secured in Chatham Bay at Cocos Island, the first taken in American waters.

*Description.* — Head $2\frac{1}{2}$; depth 2; eye 4 in head; snout $4\frac{1}{2}$; interorbital $5\frac{1}{2}$; maxillary $1\frac{2}{3}$; D. XII, 15; A. IV, 11; scales 5–40–9. Body ovoid, not much compressed; profile roundly convex from snout to front of dorsal, from here to front of soft dorsal slightly descending posteriorly, then abruptly curved downward to caudal peduncle, making nearly a right angle with the dorsal edge of the latter; ventral profile similar to dorsal; mouth large, slightly oblique; lower jaw included and armed at symphysis with a prominent knob; upper edge of premaxillary on level with lower margin of eye; angle of opercle armed with 2 short, rather stout, spines, of about equal length, 3 in eye; these spines followed below angle by smaller spines on margins of opercle and subopercle; preopercle with a short spine at angle; interopercle with a very small spine at its angle; subopercle, preopercle, opercle, occipit, interopercle, and shoulder-girdle with their edges serrate: lower edge of maxillary and of subopercle entire; gillrakers 8 + 12, of moderate length, those at angle as long as the gill-filaments; teeth small, villiform in bands in both jaws, a transverse oval patch on vomer and club-shaped patches on palatines.

Dorsal fin deeply emarginate before soft part; spinous part beginning above base of pectoral, margin rounded, fourth and fifth spines highest, 3 in head, slightly less than height of soft dorsal; spines het-

eracanthous and depressible in a groove; soft dorsal higher and more convex than spinous dorsal, longest ray $2\frac{5}{7}$ in head; first anal spine very short, scarcely projecting beyond its sheath; third considerably enlarged, much stouter than fourth which it equals in length; soft anal rounded and similar in shape to soft dorsal, but exceeding it slightly in height; caudal forked, the lobes rounded and equal; scales at base of caudal, above and below, forming sharp serrations; pectoral broad, somewhat rounded, of 17 rays of which the upper ones are longest. Scales closely imbricate, and armed on their posterior edges with long, slender, spine-like serrations, the bases of which project on the scales as low ridges; spines of scales on posterior part of body longer than those of anterior parts, and almost obscuring the scales themselves; caudal fin scaled on basal half, otherwise fin-membranes naked; lateral line continuous and extending the entire length of body, concurrent with back anteriorly, less curved posteriorly.

*Variations.* — The other specimen differs from the one just described in having 2 spines on the angle of the preopercle, longer serrations on the scales of the posterior part of the body, fewer (38) scales on the lateral line, and serrations on the posterior edge of the supplemental maxillary.

*Color in life.* — Above bright cardinal-red, lower part of sides and belly silvery-red; iris and fin-rays like the back, the membranes of the latter yellowish; ventrals silvery-red like the belly.

MEASUREMENTS, FIN RAYS AND SCALES OF *Holotrachys lima*.

| Locality. | Cocos Island. | | Hawaiian Islands. | |
|---|---|---|---|---|
| Length in mm | 112 | 107 | 107 | 105 |
| Depth | 52 | 47 | 43 | 42 |
| Head | 39 | 38 | 36 | 36 |
| Pectoral | 20 | 22 | 21 | 21 |
| Ventral | 17 | 21 | 20 | 20 |
| Eye | 9 | 10 | 10 | 11 |
| Interorbital | 7 | 7 | 7 | 7 |
| Snout | 9 | 10 | 8 | 8 |
| Number of dorsal spines | XII | XII | XII | XII |
| Number of second dorsal rays | 15 | 15 | 15 | 15 |
| Number of second anal rays | 11 | 12 | 12 | 11 |
| Scales on lateral line | 40 | 43 | 44 | 42 |

The 2 Cocos specimens are greatly swollen, to which fact is probably due the difference in depth between the Cocos and Hawaiian specimens.

### 40. HOLOCENTRUS SUBORBITALIS Gill.

*Holocentrum suborbitale* GILL, Proc. Acad. Nat. Sci. Phila. 1863, 86, Cape San Lucas.

*Holocentrus suborbitalis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 850, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 275 (Clarion and Socorro islands.)

*Range.* — Cape San Lucas to Panama; Revillagigedo, Cocos and Galapagos islands.

A very abundant species at Cocos Island but not so abundant at the Galapagos Islands. At the latter place taken at Albemarle, Charles and Tower. Three young individuals, 45 mm. in length, secured in tidepools at Charles are scarcely different from the adults. The opercular spines are shorter and the coloration is more greenish.

## Family MULLIDÆ.

### 41. PSEUDUPENEUS DENTATUS (Gill).

*Upeneus dentatus* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 256, Cape San Lucas. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 859, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish. Comm. for 1898 (1899), 275 (Clarion Island).

*Range.* — Cape San Lucas; La Paz; Tres Marias Islands; Clarion Island.

## Family SCOMBRIDÆ.

### 42. SCOMBER JAPONICUS Houttuyn.

*Scomber japonicus* HOUTTUYN, Verh. nit. Holland. Mattsch. der Weet., XX, 2, 1872, Japan.

*Scomber colias* GMELIN, Syst. Nat., Ed. XIII, 1329, 1788, Sardinia. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 866, 1896. — ABBOTT, Proc. Acad. Nat. Sci. Phila. 1899, 344 (Peru).

*Range.* — Cosmopolitan.

Four specimens taken in Tagus Cove, Albemarle, Galapagos Archipelago.

### 43. GYMNOSARDA PELAMIS (Linnæus).

*Scomber pelamis* LINNÆUS, Syst. Nat., Ed. X, 297, 1758.

*Gymnosarda pelamis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 868, 1896.

*Range.* — Intertropical. Two specimens from Wenman Island, Galapagos Archipelago. The species is abundant in the warm currents north of the equator as far north as the Revillagigedo Islands. Both this species and the horse mackerel (*Thunnus thynnus*) were

specially numerous from about 3° N. to 11° N., between Cocos and Clipperton islands. We observed them here for about 3 weeks during July in great numbers, the ocean appeared to be everywhere filled with them. They fed principally on a young Hemirhamphid which greatly exceeded its enemies in numbers and on all sides both fugitives and pursuers were to be seen leaping from the water. The bonitos and horse mackerels often throw themselves a considerable distance through the air.

### 44. THUNNUS THYNNUS (Linnæus).

*Scomber thynnus* LINNÆUS, Syst. Nat., Ed. x, 297, 1758, Europe.
*Thunnus thynnus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, 870, 1896.

*Range.* — Tropical and temperate seas.

Two specimens from Wenman Island and one N. E. off Point Albemarle, Albemarle Island, Galapagos Archipelago. Common in warm water from about 3° N. to 11° N. (See under *Gymnosarda pelamis*.) This fish is not uncommon in the Humboldt current about the Galapagos Islands, but does not occur in these colder waters in any such abundance as in the warmer currents a little farther north. Nearly all the individuals that we saw were each about 2 feet long.

### 45. GERMO ALALUNGA (Gmelin).

*Scomber alalunga* GMELIN, Syst. Nat., 1, 1330, 1788, Sardinia.
*Germo alalunga*, JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, 871, 1896.

*Range.* — Tropical and subtropical seas in general.

We obtained one specimen of this species during August, at about 26° 10′ N., 123° 25′ W., but the species was not observed south of here where *Gymnosarda pelamis* and *Thunnus thynnus* were so abundant, nor did we meet with it about Clarion, Clipperton, Cocos or the Galapagos islands.

### 46. SCOMBEROMORUS SIERRA Jordan & Starks.

*Scomberomorus sierra* JORDAN & STARKS in Jordan, Proc. Cal. Acad. Sci., 2d series, 428, 1895, Mazatlan. — JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, 874, 1896.

*Range.* — Pacific coast of tropical America; Galapagos Islands. One specimen taken in Tagus Cove, Albemarle.

## Family CARANGIDÆ.

### 47. ELAGATIS BIPINNULATUS (Quoy & Gaimard).

*Seriola bipinnulata* QUOY & GAIMARD, Voy. Uranie, Zoöl., I, 363, pl. 61, fig. 3, 1824, Keeling Islands.
*Elagatis bipinnulatus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 906.

*Range.* — Intertropical.

One specimen taken in July between the Galapagos and Clipperton islands, 4° 30′ N.; 97° 30′ W. Length 785 mm.

### 48. DECAPTURUS SCOMBRINUS (Valenciennes).

*Caranx scombrinus* VALENCIENNES, Voyage de la Vénus, 332, pl. 7, fig. 1, 1846, Galapagos Islands.
*Decapterus hypodus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 180.
*Decapterus scombrinus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 908, 1896.

*Range.* — Galapagos Islands.

Three adult examples of this species, two taken at Tagus Cove, Albemarle, and the other at Hood Island; and numerous young from Chatham Island.

Since the only description extant of this species is that of Valenciennes we give the following description based on our specimens:

Profile regularly fusiform; caudal peduncle wide, depressed; caudal fin deeply forked. Head $3\frac{2}{3}$; depth $4\frac{1}{3}$. D. VIII–I, 27–1 (= IX, 28); A. II–I, 23–1. Maxillary 3 in head, reaching front of eye; tip of lower jaw very slightly projecting; eye 4 in head, somewhat narrower than interorbital space, with concentric adipose eyelid before, and one behind; first dorsal spine about $\frac{1}{3}$ of second, shorter than the third which is longest; the eighth very short; the ninth, detached from the others and united with the soft dorsal, $\frac{1}{2}$ length of first soft ray and of fifth spine; anterior rays of soft dorsal longest; anal with two detached spines, the first equal to one half of interorbital space, longer than the second; the third attached to soft part of anal fin, slightly longer than the first; soft anal similar to soft dorsal; upper jaw almost toothless, there being only a few minute teeth in the front of the jaw; lower jaw with a series of larger, but very small teeth; vomer and palatines toothless; a median longitudinal patch of small teeth on the tongue.

Head and body everywhere scaly except before eyes, anterior five eighths of lateral line convex dorsally, posterior part straight; its entire length marked by a row of prominent scales, each with a trifid tubule; scales of posterior part of lateral line enlarged, each bearing

a ridge-like spine, these increasing in size posteriorly, forming on caudal peduncle a high sharp lateral crest; spine-bearing scales not more than thirty in number (30 in one specimen, 28 in another). Posterior ones lapping over one another, forming a high hard longitudinal ridge along the side of the caudal peduncle; in front of the caudal peduncle they decrease regularly in size, and the most anterior is a mere rudimentary projection on the posterior margin of the scale the most anterior of the spine-bearing scales scarcely at all enlarged; posteriorly they increase in size with increase in the size of the spines.

Valenciennes represents about 40 enlarged plates on the straight posterior part of the lateral line; his figure, however, does not show the spines of the scales. Jordan and Evermann (*Fishes N. & M. A., I, pp. 907, 908*) have grouped *Decapterus scombrinus* with *D. punctatus*, the 2 being characterized by having 40 or more enlarged plates on the lateral line. *D. hypodus* Gill, has 30 enlarged plates on the lateral line and is otherwise very similar to *D. scombrinus*, but it has been described by Gill (*Proc. Acad. Nat. Sci. Phila. 1862, 26*) and by Jordan and Gilbert (*Proc. U. S. Nat. Mus. 1882, 358*) as being very closely related to *D. macarellus*. There can be no doubt, however, that *hypodus* and *scombrinus* are very closely related and it is not improbable that *hypodus* (1862) may prove to be a synonym of *scombrinus* (1846). *D. hypodus* is recorded only from Cape San Lucas.

*Color of fresh specimen.* — Above, light olive-green, fading to silvery-white on the sides; fins dusky; upper half of caudal olive-yellow; dusky below; a dark semilunar spot on posterior margin of opercle above posterior angle.

MEASUREMENTS, FIN RAYS AND SCALES OF *Decapterus scombrinus*.

| | | |
|---|---|---|
| Length in mm | 304 | 308 |
| Depth | 23 | 22 |
| Head | 27 | 28 |
| Pectoral | 24 | 22 |
| Eye | 6 | 7 |
| Number of dorsal spines | VIII–I | VIII–I |
| Number of second dorsal rays | 31–1 | 33–1 |
| Number of second anal rays | 26–1 | 27–1 |
| Number of spine-bearing scales of lateral line | 30 | 28 |

## 49. TRACHURUS SYMMETRICUS (Ayres).

*Caranx symmetricus* AYRES, Proc. Cal. Acad. Sci., 1, 1855, 62, San Francisco.
*Caranx* (*Trachurus*) *cuvieri* STEINDACHNER, Ichthyol. Beitr., II, 16, 1875, Talcahuano, Callao, Juan Fernandes, Galapagos.

*Trachurus picturatus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 909, 1896; not of Bowdich.

*Range.* — West coast of America; Galapagos Islands. Known from the Galapagos only through Steindachner's report.

## 50. TRACHUROPS CRUMENOPHTHALMA (Bloch).

*Scomber crumenophthalmus* BLOCH, Ichthyol., 343, 1793, Guinea.
*Trachurops crumenophthalmus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 911, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. 1898, 276 (Socorro Island).

*Range.* — Atlantic and Pacific coasts of tropical America; West Indies; west coast of Mexico; Socorro Island, Revillagigedo Archipelago.

## 51. ZALOCYS STILBE Jordan & McGregor.

*Zalocys stilbe* JORDAN & MCGREGOR, Rep. U. S. Fish Comm. 1898, 277, pl. 5, Clarion Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2848, 1898.

*Range.* — Clarion Island, Revillagigedo Archipelago.

One specimen taken by Mr. R. C. McGregor.

## 52. CARANX CABALLUS (Günther).

*Caranx caballus* GÜNTHER, Fishes Cen. Amer., 431, 1869, Panama. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 921, 1896.

*Range.* — Pacific coast of tropical America; Galapagos Islands.

One specimen from James Island. A common species of the mainland coast.

## 53. CARANX MARGINATUS (Gill).

*Caranx marginatus* GILL, Proc. Acad. Nat. Sci. Phila. 1866, 166, Panama. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 923, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898, 277 (Socorro Island).

*Range.* — Mazatlan; Panama; Socorro Island, Revillagigedo Archipelago.

## 54. CARANX LATUS (Agassiz).

*Caranx latus* AGASSIZ, Pisc. Bras., 105, 1829, Brazil. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 180 (Panama; Chatham Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 923, 1896.

*Range.* — Intertropical.

Chatham Island, Galapagos Archipelago, taken only by the *Albatross* (1887–1888).

### 55. CARANX LUGUBRIS (Poey).

*Caranx lugubris* POEY, Memorias Hist. Nat. de Cuba, II, 222, 1860. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 924.

*Range.* — Intertropical.

One specimen taken at Clarion Island, but the species was not met with at either Cocos or the Galapagos Islands.

### 56. CARANX MELAMPYGUS (Cuvier & Valenciennes).

*Caranx melampygus* CUVIER & VALENCIENNES, Hist. Nat. Poiss., IX, 116, 1833, East Indies. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 925, 1896.

*Range.* — Tropical parts of the Pacific Ocean.

Obtained at Cocos Island, where it occurs in large numbers; and one specimen secured at Tower Island, Galapagos Archipelago.

### 57. CARANX ORTHOGRAMMUS (Jordan & Gilbert).

*Caranx orthogrammus* JORDAN & GILBERT, Proc. U. S. Mus. 1881, 226, Clarion Island.

*Carangoides orthogrammus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 928. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898, 277 (Clarion and Socorro islands).

*Range.* — Revillagigedo Archipelago.

Known from Clarion and Socorro islands. Perhaps identical with *Caranx ferdau*, as suggested by Jordan and Evermann, and of general tropical Pacific distribution.

## Family CORYPHÆNIDÆ.

### 58. CORYPHÆNA HIPPURUS Linnæus.

*Coryphæna hippurus* LINNÆUS, Syst. Nat., Ed. X, 261, 1758, open seas. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 952, 1896.

*Range.* — Pelagic: Atlantic and Pacific.

One adult, 890 mm. long, taken at 13° 12′ N.; 111° 45′ W., between the Revillagigedo Archipelago and Clipperton Island; also another of about the same size captured near Cocos Island, 4° 32′ N.; 89° 17′ W.

There is in the Stanford University collection a young *Coryphæna*, 185 mm. long, from Clarion Island, which is probably this species, although it is too young to show the characters of either *hippurus* or *equisetis*. There are about 50 rays in the dorsal and 22 in the anal. The profile before the eyes is convex but scarcely prominently elevated.

Our adult example has the profile of the head rising almost vertical from the snout, forming a large, rounded prominent angle above a point midway between snout and nostril, from which it runs steeply upward and backward to front of dorsal fin, which latter arises above posterior margin of eye; maxillary reaching halfway from pupil to posterior rim of orbit. Head $4\frac{1}{2}$; depth $5\frac{1}{2}$; D. 56; A. I, 25.

The color of the specimen when fresh was as follows: Above greenish-golden, below yellow, everywhere except on belly and throat spotted with purple spots as large as a pea and placed about one inch apart; head yellowish; iris black with a golden blotch on the ball above the pupil; pectoral fins purplish above, yellow beneath and with tips purple; ventrals yellow below, deep green above; dorsal purplish, spotted with violet; anal yellow, with a row of purple spots; caudal greenish.

### 59. CORYPHÆNA EQUISETIS Linnæus.

*Coryphæna equisetis* LINNÆUS, Syst. Nat., Ed. x, 261, 1758. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 953, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 276 (San Benedicto Island).

This species, like the last, is one of wide tropical distribution. Jordan and McGregor report one specimen from San Benedicto Island. Their specimen, however, is a young one, 9 inches long, and it may be doubted that it belongs to this species rather than to *C. hippurus*.

## Family NOMEIDÆ.

### 60. GOBIOMORUS GRONOVII (Gmelin).

*Gobius gronovii*, GMELIN, Syst. Nat., XIII, 1205, 1788, Tropical America.
*Nomeus gronovii*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 949, 1896.

*Range.* — Tropical parts of the Atlantic and Pacific.

We have a few small specimens, about 35 mm. in length, taken with Portuguese men-of-war (*Physalia*) at about 7° 26′ N.; 100° 36′ W.

## Family KUHLIIDÆ.

### 61. KUHLIA TÆNIURA (Cuv. & Val.).

*Dules tæniura* CUVIER & VALENCIENNES, Hist. Nat. Poiss., III, 114, 1829.
*Kuhlia arge* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 159, Chatham Island. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 277 (Clarion and Socorro islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1014, 1896.
*Kuhlia tæniura*, BOULENGER, Cat. Fishes Brit. Mus., 2d Ed. I, 39, 1895.

*Range.* — Indian Ocean, East Indies, Polynesia, Revillagigedo, Cocos and Galapagos islands.

This species was taken by the Albatross (1887–'88) at Chatham Island and later (1888–'89) at Clarion Island. Mr. R. C. McGregor obtained it at both Clarion and Socorro islands. Finally we secured specimens of it at Cocos Island. It has not yet, however, been reported from the mainland coast.

## Family APOGONICHTHYIDÆ.

### 62. AMIA ATRADORSATA Heller & Snodgrass.

*Apogon atradorsatus* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 192, pl. III, Charles Island.

*Range.* — Cocos Island; Galapagos Archipelago.

Very common about the Galapagos Islands where secured at Chatham, Barrington, Charles, Seymour, Duncan, Hood, James, Albemarle, Narboro and Tower.

Distinguished from *A. atricauda* Jordan & McGregor by having the second dorsal tipped with black.

### 63. AMIA ATRICAUDA Jordan & McGregor.

*Apogon atricaudus* JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 277, Socorro, Clarion and San Benedicto islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2853, 1898.

*Range.* — Revillagigedo Islands.

### 64. GALEAGRA PAMMELAS Heller & Snodgrass.

*Galeagra pammelas* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 193, pl. IV, Wenman Island.

One specimen secured near Wenman Island, Galapagos. A deep sea form.

## Family SERRANIDÆ.

### 65. EPINEPHELUS ANALOGUS Gill.

*Epinephelus analogus* GILL, Proc. Acad. Nat. Sci. Phila. 1863, 163, Panama. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 181 (Charles Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1152, 1896.

*Range.* — Pacific coast of tropical America; Galapagos and Revillagigedo islands.

This species was taken by the *Albatross* at Charles Island, and by Mr. R. C. McGregor at Clarion Island.

### 66. EPINEPHELUS LABRIFORMIS (Jenyns).

*Serranus labriformis* JENYNS, Zoöl. Voy. of Beagle, Fishes, 8, pl. 3, 1840, Galapagos Islands.

*Epinephelus labriformis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, 1155, 1896.

*Range.* — Pacific coast of tropical America from Cape San Lucas to Ecuador; Socorro, Clipperton, Cocos and the Galapagos islands.

We have 9 specimens from Albemarle Island, Tagus Cove and Elizabeth Bay, Seymour Island, Cocos Island and Clipperton Island. It has been taken by the *Albatross* also at Charles and Indefatigable islands of the Galapagos group.

## 67. DERMATOLEPIS PUNCTATUS Gill.

*Dermatolepis punctatus* GILL, Proc. Acad. Nat. Sci. Phila. 1861, 54, and 250, 1862, Cape San Lucas. — JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, 1169, 1896.

*Epinephelus dermatolepis*, BOULENGER, Cat. Fishes Brit. Mus., 2d Ed. 1, 256, 1895.

*Range.* — Cape San Lucas, west coast of Mexico, the Venados, Revillagigedo, Cocos and Galapagos islands.

We have specimens of this species from Clarion, Cocos, and the Galapagos islands.

Specimens of different sizes vary somewhat in appearance. In small specimens about 30 mm. long, the tips of the ventrals reach slightly beyond the anus. In large specimens the anus is far behind the tips of the ventrals. A specimen from Barrington Island, 520 mm. in length, has the anus 26 mm. back of the ventrals, while one from Clarion Island 650 mm. long has a space of 83 mm. between the anus and the tips of the ventrals. In some the maxillary reaches considerably beyond the eye, in others it ends slightly in front of the eye. The spots vary from simple circular black areas to irregular dark blotches surrounded by broad white marginal fields each having the same outline as the dark spot it encloses.

## 68. MYCTEROPERCA XENARCHA Jordan.

*Mycteroperca xenarcha* JORDAN, Proc. Acad. Nat. Sci. Phila. 1887, 387, James Island, Galapagos Archipelago. — JORDAN & EVERMANN, Fishes N. and Mid. Amer., 1, 1180, 1896. — ABBOTT, Proc. Acad. Nat. Sci. Phila. 1899, 348 (Peru).

*Epinephelus xenarchus*, BOULENGER, Cat. Fishes Brit. Mus., 2d Ed., 1, 266.

*Range.* — Vanados Islands, off the west coast of Mexico; Payta, Peru; Galapagos Islands.

Taken at the Galapagos only by the Hasslar Expedition.

## 69. MYCTEROPERCA OLFAX (Jenyns).

*Serranus olfax* JENYNS, Zoöl. of Beagle, Fishes, 9, pl. 4, 1840, Galapagos Archipelago.

*Epinephelus olfax*, BOULENGER, Cat. Fishes Brit. Mus., 2d Ed., I, 263.
*Mycteroperca olfax*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1183, 1896.

*Range.* — Panama, Cocos Island and the Galapagos Islands.

Our specimens, about 30 in number, are from Cocos, Albemarle, Tagus Cove and Elizabeth Bay, Narboro, Duncan, Barrington, Wenman and Culpepper.

About Albemarle, Narboro, Wenman, and Culpepper the species is extremely abundant, but very rare about the southern and eastern Galapagos Islands. It is an excellent food-fish, the individuals often associate in large schools, and are easily taken with a hook and line.

The typical coloration of the species is as follows: above dark olivaceous brown spotted with purplish and lighter brown; sides of head same; belly grayish-brown; maxillary and lower jaw lighter olive-brown; fins dusky; iris golden with brown mottlings.

Seven specimens 65 to 82 mm. in length and one 133 mm. long, are colored plain dark brown, lighter below, with the fins dusky, the soft dorsal and anal and the caudal pale-edged, there being no trace of spots on the body. These specimens are from shallow sandy lagoons at Mangrove Point, Narboro. Two specimens, 165 mm. long, and one 195 mm. long, from Elizabeth Bay, Albemarle, have the body covered with faint circular dark brown spots most distinct on the paler ventral half of the body. These were taken also in shallow sandy lagoons. Another, from much deeper water at Tagus Cove, 190 mm. long, is spotted above and below, although the spots on the dorsal half are obscured by the dark brown color. Adults again lose the spots with age, and become of a plain brown color, but the age at which the spots disappear varies, large specimens being often very distinctly spotted.

Specimens 65 and 82 mm. in length have the posterior nostril no larger than the anterior, and the anterior nostril provided with a membranous tube. In specimens 230 mm. long the posterior nostril is the size of the anterior. In specimens 350 mm. long the posterior nostril has almost twice the dorso-ventral diameter of the anterior and is much elongated in the same direction. Specimens 480 mm. in length have the anterior nostril about two-fifths as wide dorso-ventrally as the posterior, the latter being somewhat semilunar, embracing the anterior nostril.

The very small specimens have the tips of the ventral fins reaching only slightly past the anus, being the same in this respect as specimens a foot long. Beyond this size the ventrals lengthen more rapidly than the body.

## 70. MYCTEROPERCA RUBERRIMA (Jordan & Bollman).

*Mycteroperca olfax ruberrima* JORDAN & BOLLMAN in Jordan & Eigenmann, Review *Serranidæ*, Bull. U. S. Fish Comm., VIII, for 1888, 367. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1183, 1896.

*Range.* — Galapagos Archipelago.

Associating with the brown *M. olfax*, yellow individuals are frequently met with exactly resembling the others in all respects except color. It is hence doubtful whether these individuals represent a distinct species or whether they form a chromatic variety of *M. olfax*. We have such specimens from Wenman, Culpepper, Albemarle, Tagus Cove, and Duncan islands. They are colored in life as follows: Sides of body chrome-yellow, back orange, lower parts lighter lemon-yellow; head orange-yellow; fin-membranes chrome-yellow; iris in some specimens orange, in others carmine.

The specimen from which Jordan and Bollman described their variety *Mycteroperca olfax ruberrima* (named *ruberrima* because supposed by them to have been red in life), is one of these yellow individuals. We have no evidence indicating whether it is a deep-water variety of *M. olfax* or not. No very young yellow examples nor any of an intermediate or mixed coloration were seen. Along the shore the yellow individuals are not nearly so common as the brown *M. olfax*, but where the latter was most abundant there occurred the greatest number of *M. ruberrima*.

The *type* of *M. ruberima* was taken by the *Albatross* at Abingdon Island, Galapagos, and similar specimens have not been found outside of the Archipelago.

## 71. CRATINUS AGASSIZII Steindachner.

*Cratinus agassizii* STEINDACHNER, Ichth. Beitr., VII, 19, 1878, Galapagos Islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1189, 1896.

*Serranus agassizi*, BOULENGER, Cat. Fishes Brit. Mus., 2d Ed., I, 282, 1895.

*Range.* — Galapagos Archipelago.

Known only from the Galapagos Islands. It is not a common fish. We have 7 specimens from Tagus Cove, Albermarle, Narboro, Barrington, and Seymour.

## 72. PARALABRAX ALBOMACULATUS (Jenyns).

*Serranus albomaculatus* JENYNS, Zoöl. Beagle, Fishes, 3, pl. 2, 1840, Galapagos Archipelago.

*Paralabrax albomaculatus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 181 (Albemarle Island, Charles Island).

*Serranus humeralis* BOULENGER, Cat. Fishes Brit. Mus., 1, 2d Ed., 278, 1895.
*Paralabrax humeralis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., 1, 1196, 1896.
*Paralabrax albomaculatus*, ABBOTT, Proc. Acad. Nat. Sci. Phila. 1899, 348.

*Range.* — Galapagos Archipelago.

If this species is distinct from *Paralabrax humeralis*, it is known only from the Galapagos Islands. We have numerous specimens from Tagus Cove, Albemarle, and from Barrington.

The synonymy given above shows that this species has been by some authors regarded as distinct, while others have included it in *P. humeralis*. Abbott (1899), comparing some young examples from Callao, Peru, with young examples from the Galapagos Islands in the Stanford University collection, concluded that the 2 should be retained as separate species. We have examined these same specimens, together with the numerous adults that we obtained at the Galapagos Islands, and likewise cannot regard the specimens from the 2 localities as the same species, although if adult material from the mainland were at hand this might be possible.

MEASUREMENTS AND FIN RAYS OF:

| No. Stanford University Museum. | *Paralabrax albomaculatus* from Galapagos Islands. | | | | | | | *Paralabrax humeralis* from Callao, Peru. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 374 | | 66 | 12265 | 12266 | 12267 | 12268 | 11958 | 11958 | 11943 | 11943 |
| Length in mm | 196 | 153 | 145 | 375 | 365 | 290 | 372 | 178 | 175 | 148 | 157 |
| Head | 39 | 39 | 39 | 42 | 40 | 39 | 38 | 40 | 41 | 40 | 41 |
| Depth | 29 | 32 | 30 | 31 | 31 | 31 | 26 | 28 | 27 | 29 | 28 |
| Eye | 7½ | 8 | 8½ | 6 | 5½ | 6½ | 5½ | 5½ | 6 | 6 | 6 |
| Interorbital | 6 | 5½ | 5 | 8 | 8½ | 7½ | 7 | 5½ | 5½ | 5½ | 6 |
| Width of base of pectoral | 5½ | 6 | 5½ | 6 | 6 | 6½ | 6 | 5½ | 5½ | 5½ | 5½ |
| Number of pectoral rays | 17 | 17 | 16 | 17 | 17 | 17 | 17 | 18 | 18 | 18 | 19 |
| Number of dorsal spines | X | X | X | X | X | X | X | X | X | X | X |
| Number of second dorsal rays | 15 | 13 | 14 | 14 | 14 | 14 | 14 | 13 | 13 | 13 | 13 |
| Number of second anal rays | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |

The above figures show that the Galapagos specimens, representing *Paralabrax albomaculatus*, compared with specimens of approximately the same size from Peru, that may be taken to represent the typical *P. humeralis* of Cuvier & Valenciennes (their specimen being from Chile) have a somewhat larger eye, a wider interorbital space, a wider base for the pectoral fin, fewer pectoral rays, and a greater number of dorsal rays. The figures show also that in the adult of *P. albomaculatus* the interorbital space is proportionally much wider and the eye smaller than in the young.

Other characters of the species are as follows: Snout rather pointed,

length of snout from nostril $3\frac{3}{4}$ in head; mouth not very oblique; maxillary $2\frac{1}{4}$ in head; posterior edge of preopercle finely serrated, the serrations coarser on the lower limb, first dorsal spine shortest, a little more than $\frac{1}{2}$ of eye; second $\frac{3}{4}$ longer than first; third longest, about equal to maxillary; the following spines rapidly shorter to seventh, beyond which they are about equal; caudal peduncle about twice eye in depth; posterior margin of caudal fin slightly lunate, upper angle a little prolonged, the lower rounded.

*Color.* — Above dark olive-brown; belly grayish; several large grayish spots along sides (a very characteristic mark of the species, absent in *P. humeralis*); opercles bronze-yellow, lower lip light yellow; pectorals bronze above, dusky beneath; dorsal spines dusky, membrane saffron; caudal grayish dusky, angles with orange tips; posterior rays of anal orange-tipped, the rest grayish dusky; ventrals pale dusky with rays orange-tipped.

### 73. PRIONODES FASCIATUS Jenyns.

*Prionodes fasciatus* JENYNS, Voy. Beagle, Fishes, 46, 1840, Chatham Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1213, 1896.
*Serranus psittacinus*, BOULENGER, Cat. Fishes Brit. Mus., 2d Ed., 295.

*Range.* — Pacific Coast of Mexico, Panama, Revillagigedo Islands, Galapagos Islands (Chatham, Hood, Indefatigable, Albemarle).

### 74. PRIONODES STILBOSTIGMA Jordan & Bollman.

*Prionodes stilbostigma* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 158 (Galapagos Archipelago). — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1216, 1896.

*Range.* — Galapagos Archipelago.

One specimen dredged in 45 fathoms by the *Albatross* (1887–'88) near Hood Island, 0° 50′ S.; 89° 36′ W.

### 75. PARANTHIAS FURCIFER (Cuvier & Valenciennes).

*Serranus furcifer* CUVIER & VALENCIENNES, Hist. Nat. Poiss., II, 264, 1828, Brazil.
*Serranus colonus* VALENCIENNES, Voyage Vénus, Zoöl., 300, pl. 2, fig. 1, 1846, Galapagos Islands.
*Paranthias furcifer*, BOULENGER, Cat. Fishes, Brit. Mus., 2d Ed., I, 273. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1221, 1896.

*Range.* — Both coasts of tropical America; Revillagigedo and Galapagos islands.

This fish is very abundant about the Galapagos Islands. We have specimens from Tagus Cove, Albemarle; James; Charles; Seymour;

Chatham; Duncan, and Hood. At Cocos it was not seen. It is known from Clarion, Socorro and San Benedicto islands of the Revillagigedo Archipelago.

### 76. PRONOTOGRAMMUS MULTIFASCIATUS Gill.

*Pronotogrammus multifasciatus* GILL, Proc. Acad. Nat. Sci. Phila. 1863, 81, Cape San Lucas. — JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1226, 1896. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898, 278 (Clarion Island).

*Anthias multifasciatus*, BOULENGER, Cat. Fishes Brit. Mus., 2d Ed., I, 323, 1895. — GARMAN, Mem. Mus. Comp. Zoöl., XXIV, Rep. Expl. U. S. S. *Albatross* during 1891, XXVI, Fishes, 47, 1899.

*Range.* — Cape San Lucas, Lower California; Revillagigedo and Cocos islands.

Taken by Mr. R. C. McGregor at Clarion Island, and dredged near Cocos Island by the Albatross (Agassiz Expedition, 1891) in 66 fathoms.

### 77. RYPTICUS BICOLOR (Valenciennes).

*Smecticus bicolor* VALENCIENNES, Voyage de la Vénus, Poissons, 307, pl. I, fig. 2, 1855, Galapagos Islands.

*Rypticus bicolor*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1231, 1896.

*Range.* — Galapagos Archipelago.

This species is known only from the description and figure of Valenciennes, whose specimen was taken at the Galapagos Islands by the Vénus. We did not meet with the species.

## Family PRIACANTHIDÆ.

### 78. PRIACANTHUS CRUENTATUS (Lacépède).

*Labrus cruentatus* LACÉPÈDE, Hist. Nat. Poiss., III, 522, 1800, Martinique.

*Priacanthus carolinus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., III, Addenda, 2858, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 278 (Socorro and Clarion islands).

*Priacanthus cruentatus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., I, 1238, 1896.

*Range.* — West Indies; Revillagigedo, Cocos and Galapagos islands.

We have 14 specimens of a *Priacanthus* taken at the Galapagos and Cocos islands, which we cannot distinguish from the West Indian species, *P. cruentatus*. It was most abundant at Cocos Island where most of our specimens were obtained, but we have 1 specimen from Tagus Cove, Albemarle, and 2 from Barrington of the Galapagos. We have further compared these specimens with those

from the Revillagigedo Archipelago identified by Jordan and McGregor as *Priacanthus carolinus*, and can find no constant difference among the specimens from the 3 localities.

The length of the preopercular spine varies, in some it reaches the edge of the opercle and in others it does not. In a specimen in the Stanford University collection from Jamaica, 190 mm. long, the spine is short, not reaching the edge of the opercle, while in a specimen from Bahia 93 mm. in length, the tip of the spine projects beyond the opercle. The depth also varies, the smaller specimens being the more slender and duplicating the proportions of the Jamaica specimen (see below).

*Color in life.* — Bright metallic red, darkening to crimson on back; head and belly silvery-red; membrane of spinous dorsal blotched with olive and red; soft dorsal and ventrals red; anal crimson with faint dusky bars, black-tipped; pectorals pale red; lips and snout olive-red; iris red. (Barrington specimen.)

MEASUREMENTS, FIN RAYS AND SCALES OF *Priacanthus cruentatus*.

| Locality. | Albemarle. | Barrington. | Cocos. | Cocos. | Jamaica. | Bahia. |
|---|---|---|---|---|---|---|
| No. Stanford University Museum | 12327 | 12328 | 12329 | 12330 | 4816 | 1596 |
| Length in mm | 245 | 240 | 215 | 200 | 195 | 92 |
| Depth | 40 | 39 | 37 | 37 | 37 | 43 |
| Head | 33 | 33 | 35 | 33 | 34 | 37 |
| Eye | 13 | 13 | 14 | 13 | 14 | 15 |
| Pectoral | 18 | 18 | 19 | 18 | 19 | 20 |
| Ventral | 20 | 21 | 21 | 19 | 22 | 24 |
| Number of dorsal spines | X | X | X | X | X | X |
| Number of second dorsal rays | 13 | 13 | 13 | 13 | 13 | 13 |
| Number of second anal rays | 14 | 14 | 14 | 14 | 14 | 14 |
| Scales on lateral line | 63 | 67 | 60 | 62 | 62 | 66 |

## Family LUTIANIDÆ.

### 79. LUTIANUS VIRIDIS (Valenciennes).

*Diacope viridis* VALENCIENNES, Voyage de la Vénus, 303, pl. 1, fig. 2 (poor representation of the species), 1845, Galapagos Islands.

*Evoplitis viridis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1246, 1898.

*Range.* — Tres Marias, Revillagigedo, Cocos and Galapagos islands.

We have 50 specimens taken at James, Tower, Barrington and Seymour islands of the Galapagos Archipelago and at Cocos Island. The species was described by Valenciennes from specimens taken at the Galapagos Islands and has since been taken at the Tres Marias and Revillagigedo islands.

We found the species very abundant at James, Seymour and Cocos, but about Tagus Cove, Albemarle, where most species were numerous, we saw only a very few and were not able to secure any specimens.

### 80. LUTIANUS JORDANI (Gilbert).

*Neomænis jordani* GILBERT in JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1251, 1898, Panama.
*Lutianus jordani*, GILBERT & STARKS, Mem. Cal. Acad. Sci., IV, 1904, 102.

*Range.* — Panama, Cocos Island.

Seventeen specimens from Cocos Island. They are about 230 mm. in length. The vomerine teeth form a diamond-shaped patch of which the posterior sides are considerably longer than the anterior.

### 81. LUTIANUS ARGENTIVENTRIS (Peters).

*Mesoprion argentiventris* PETERS, Berlin. Monatsbr. 1869, 704, Mazatlan.
*Neomænis argentiventris*, JORDAN & EVERMANN, Fishes North & Mid. Amer., II, 1260, 1898.
*Lutianus argentiventris*, GILBERT & STARKS, Mem. Cal. Acad. Sci., IV, 1904, 103.

*Range.* — Pacific coast of tropical America; Cocos and Galapagos islands.

Six small specimens from Chatham, about 55 mm. long, have a distinct bright blue subocular band reaching from below anterior part of eye almost to posterior angle of opercle, and a dark postocular band reaching from eye as far as the beginning of lateral line. Specimens in the Stanford University collection from Guaymas, 130 mm. long, have the subocular band somewhat broken posteriorly while the upper one is obsolete. In specimens up to this size the eye is on a line with the snout and the angle of the opercle, but in specimens 400 mm. in length, the eye is considerably above a line connecting these 2 points. The subocular band in specimens of this size is either absent or apparently represented by a row of spots which bends downward in front of the eye and extends forward toward the snout on a lower level.

### 82. XENOCYS JESSIÆ Jordan & Bollman.

*Xenocys jessiæ* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 160, Charles Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1285, 1898.

*Range.* — Galapagos Archipelago.

Known only from the Galapagos Islands. Our specimens from Tagus Cove, Turtle Point and Elizabeth Bay, Albemarle; Tower; South Seymour and Mangrove Point, Narboro. The species is generally found in large numbers when met with at all, forming schools of great size. We did not often obtain specimens, but sometimes with 1 discharge of dynamite we killed many hundreds of them.

### 83. XENICHTHYS AGASSIZI Steindachner.

*Xenichthys agassizi* STEINDACHNER, Ichth. Beiträge, III, 6, 1875, Galapagos Islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1287, 1898.

*Range.* — Galapagos Archipelago.

This fish, like the last, which it resembles, is known only from the Galapagos Archipelago. It is rather rare. We obtained specimens only at Tagus Cove, Albemarle, and at Mangrove Point on the east side of Narboro.

## Family HÆMULIDÆ.

### 84. ANISOTREMUS SURINAMENSIS (Bloch).

*Lutjanus surinamensis* BLOCH, Ichthyol., 253, 1791, Surinam.
*Anisotremus bilineatus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 181 (Hood and Indefatigable islands).
*Anisotremus interruptus* (in part), JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1319, 1898.
*Anisotremus surinamensis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1318, 1898.

*Range.* — Eastern shore of tropical America; Galapagos Islands.

The 2 species, *Anisotremus surinamensis* and *A. interruptus*, are distinguishable from each other by scarcely any other character than the presence in *A. surinamensis* generally of 9 rows of scales in an oblique series from the first dorsal spine to the lateral line, and the presence generally of only 7 in *A. interruptus*. The 1 species inhabits the eastern shores of tropical America and the other the western shores and the Revillagigedo Islands. The Galapagos specimens very curiously appear to belong to the former species rather than to the latter, the number of scales in an oblique row in the majority of our specimens being 9, in a few 8. This same fact is stated by Jordan and Evermann as being true of their specimens. They, however regard the Galapagos specimens as belonging to the west coast species.

Our specimens are from Tagus Cove and Elizabeth Bay, Albemarle; Charles and Seymour. The species was taken by the Albatross also at Hood and Indefatigable.

*Color in life.* — Above silvery dusky, shading into golden about caudal peduncle; mouth whitish; pectoral dusky at base, fin amber; ventrals olive; caudal olive with the rays tipped with orange.

## 85. ANISOTREMUS INTERRUPTUS (Gill).

*Genytremus interruptus* GILL, Proc. Acad. Nat. Sci. Phila. 1861, 256, Cape San Lucas.

*Anisotremus interruptus*, JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 278 (Clarion and Socorro islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1319, 1898.

*Range.* — Magdalena Bay to Panama; Clarion and Socorro islands of the Revillagigedo Archipelago.

We have compared Revillagigedo specimens with the Galapagos specimens of *Anisotremus surinamensis* and find that the 2 are certainly different in the respect stated under *A. surinamensis.*

## 86. ANISOTREMUS SCAPULARIS (Tschudi).

*Pristipoma scapulare* TSCHUDI, Fauna Peruana, 12, 1844, Huacho.

*Anisotremus scapularis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1320.

*Range.* — Mazatlan (?), coast of Peru, Cocos and Galapagos islands.

We have 27 specimens of this species taken at the Galapagos Islands and one from Cocos Island. The Galapagos specimens are from Tagus Cove, Albemarle; James; Duncan; and Hood. This is the first record of the species from the Galapagos Archipelago. The specimens differ from 2 of *Anisotremus scapularis* in the Stanford University collection from Callao, Peru, merely in being of a general darker shade of color on the upper half, and in having the black of the axis and base of the pectoral not so dark and less definitely outlined.

*Color in life of a typical Galapagos specimen.* — Above silvery greenish-blue, below white; fins dark bluish-gray; a few broad indistinct dusky vertical bands on sides; preopercles and snout purplish; iris white or silvery. The bands on the sides are not very definite markings and disappear soon after the fish is taken from the water.

## 87. ORTHOPRISTIS FORBESI Jordan & Starks.

*Orthopristis forbesi* JORDAN & STARKS in Gilbert, Proc. U. S. Nat. Mus. 1896 (1897), 443, Albemarle Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1336, 1898.

*Range.* — Galapagos Archipelago.

Described from 2 specimens taken at Albemarle. We have 10 specimens from Chatham and one from Charles.

*Orthopristis forbesi*, according to Jordan and Starks and Jordan and Evermann, differs from the other American species of the genus principally in having smaller scales and a greater number of them — 80 to 95 in longitudinal series. Our specimens, however, all about a foot long, do not agree in this respect with the type description — the number of scales varying from 66 to 78 (66, 67, 68, 70, 72, 73, 74, 75, 76, 78). The dorsal rays are XII, 15; XII, 16; XIII, 15; anal rays III, 11; III, 12.

*Color in life.* — Above dusky brownish; belly and sides grayish with faint purplish and bluish-green iridescence; several faint dusky vertical bars on sides, disappearing soon after death; lips grayish-white; membrane of spinous dorsal livid bluish, spines blue-green; membrane of soft dorsal dusky; pectoral pale dusky; caudal dark with pale border posteriorly; opercular flap dark brown; iris brown. A specimen in the Stanford University collection, taken by the *Albatross* at Albemarle, has faint spots on the membranes of the soft dorsal as described by Jordan and Starks for the *type*. None of our specimens shows these spots.

## 88. ORTHOPRISTIS LETHOPRISTIS Jordan & Fesler.

*Orthopristis lethopristis* JORDAN & FESLER, Proc. Acad. Nat. Sci. Phila. 1889, 36, Galapagos Islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1340, 1898.

*Range.* — Galapagos Archipelago.

Heretofore only the *type* of this species known. We have 4 specimens, the longest 330 mm. in length, from Tagus Cove, Albemarle, and Duncan.

All of our specimens have a slight serration on the bony posterior margin of the preopercle, being not "strictly entire" as described by Jordan and Evermann. Each has a wide band of scales on the membrane of the soft dorsal and of the anal back of each ray reaching to the margin of the fin.

MEASUREMENTS, FIN RAYS AND SCALES OF *Orthopristis lethopristis*.

| | | | | |
|---|---|---|---|---|
| Length in mm | 265 | 270 | 265 | 320 |
| Depth | 35 | 34 | 36 | 32 |
| Dorsal spines | XII | XII | XIII | XII |
| Second dorsal rays | 15 | 16 | 15 | 16 |
| Second anal rays | 11 | 8 | 11 | 11 |
| Scales on lateral line | 70 | 64 | 69 | 69 |

*Color in life.* — Above grayish-olive, bluish iridescence before dorsal fin, greenish on sides of back; sides dusky grayish; belly lighter brownish-gray; center of each scale dusky brown, the spots forming longitudinal streaks following the rows of scales, most distinct above the lateral line; snout and sides of head dusky-olive with greenish iridescence; opercular flap dark brown or black; lips livid grayish; iris golden; fins dusky, spines bluish, rays of soft dorsal and of anal greenish; caudal dark at tip, lighter olive in middle; pectorals and ventrals dark; their rays dark bluish-gray.

### 89. ORTHOPRISTIS CHALCEUS (Günther).

*Pristipoma chalceum* GÜNTHER, Proc. Zoöl. Soc. Lond. 1864, 146, Panama.
*Orthopristis chalceus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 181 (Albemarle, Chatham, Charles islands). — EVERMANN & JENKINS, Proc. U. S. Nat. Mus., XIV., 1891, 149 (Guaymas). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1337, 1898.

*Range.* — Pacific coast of tropical America; Galapagos Archipelago.

Taken at Charles, Chatham, and Albemarle by the *Albatross*.

### 90. ORTHOPRISTIS CANTHARINUS (Jenyns).

*Pristipoma cantharinum* JENYNS, Zoöl. of the Beagle, Fishes, 49, 1842, Galapagos Islands.
*Orthopristis cantharinus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1339, 1898.

*Range.* — Galapagos Archipelago.

Obtained by Darwin and by the Hasslar Expedition.

## Family SPARIDÆ.

### 91. CALAMUS TAURINUS (Jenyns).

*Chrysophrys taurina* JENYNS, Zoöl. of Beagle, Fishes, 56, pl. VII, fig. 12, 1842, Galapagos Islands.
*Chrysophrys cyanoptera* VALENCIENNES, Voyage Vénus, V, pl. 4, fig. 2, 1846, Charles Island.
*Calamus taurinus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 181 (Charles Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1354, 1898.

*Range.* — Peru; Galapagos Archipelago.

We have 10 specimens from Mangrove Point, Narboro, and from Seymour. Not common anywhere. A number were taken with hook and line in about 15 fathoms off the west shore of the southern Seymour Island, but only 1 or 2 specimens taken with dynamite in shallow water.

## 92. ARCHOSARGUS POURTALESII (Steindachner).

*Sargus portalesii* STEINDACHNER, Fische Afrikas, 39, 1881, Galapagos Islands.
*Archosargus pourtalesii*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 181 (Chatham Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1360, 1898.

*Range.* — Galapagos Archipelago.

We have 10 specimens all taken at Elizabeth Bay, Albemarle. The *Albatross* obtained one specimen at Chatham.

Body very deep, much compressed, dorsal profile evenly convex from snout to base of caudal peduncle, a rounded elevation before eyes; mouth much below the longitudinal axis of the body, lower profile evenly rounded but less convex than dorsal profile; pectoral long and narrow, base as wide as eye, upper rays longest; caudal deeply forked; dorsal spines all short, those back of the third, of equal length, the first 3 shorter, the first shortest, the second and third of equal length, the second much thicker than the third; enlarged incisors in front of jaws $\frac{6}{8}$, wide, flat, constricted at base; smaller molar teeth on sides of jaws.

*Color in life.* — Above and on sides metallic green-blue; sides with 7 longitudinal gold stripes, a black spot above base of pectoral; snout mottled olive and brown, sides of head silvery-copper; underparts white; iris golden-brown; pectorals light dusky; ventrals white, dusky at tips; dorsal spines dark brown, membrane of spinous dorsal amber, with bluish area basally back of each spine; anal brownish, spines amber, membrane and rays pale; caudal dusky.

MEASUREMENTS, FIN RAYS AND SCALES OF *Archosargus pourtalesii*.

| | | | | | | |
|---|---|---|---|---|---|---|
| Length in mm | 154 | 159 | 147 | 144 | 121 | 133 |
| Depth | 46 | 47 | 50 | 50 | 52 | 46 |
| Head | 26 | 29 | 28 | 29 | 28 | 28 |
| Pectoral | 40 | 40 | 44 | 43 | 42 | 41 |
| Ventral | 19 | 20 | 21 | 20 | 21 | 20 |
| Eye | 19 | 16 | 17 | 16 | | 29 |
| Number of dorsal spines | XIII | XII | XII | XIII | XIII | XIII |
| Number of second dorsal rays | 10 | 11 | 11 | 10 | 10 | 10 |
| Number of second anal rays | 10 | 10 | 10 | 10 | 12 | 10 |
| Scales on lateral line | 46 | 44 | 46 | 49 | 44 | 45 |

## Family GERRIDÆ.

## 93. EUCINOSTOMUS DOWI (Gill).

*Diapterus dowii* GILL, Proc. Acad. Nat. Sci. Phila. 1863, 162, Panama.
*Gerres dovii*, STEINDACHNER, Ichthyologische Beiträge (IV), Sitzb. der k. Akad. Wissensch., vol. LXXII, part I, Dec., 1875, 13 (Callao, Peru; Galapagos Islands).

*Gerres dowi*, EVERMANN & MEEK, Proc. Acad. Nat. Sci. Phila. 1886, 259.
*Eucinostomus dowi*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1367, 1898.

*Range.* — Panama, Callao, Peru; Galapagos Islands.

One specimen taken at Chatham Island which differs somewhat from descriptions of *E. dowi* also from specimens of the same in the Stanford University collection from Panama, in being less deep, in having the ventral profile of the body almost straight, and in having a more angulated profile from the snout to the dorsal. These are characters, however, subject to much variation. This one specimen is all that we saw, but Steindachner states that the species is present in great numbers about the shores of the Galapagos Islands. *Xystæma cinerus* is in external appearance extremely similar to *Eucinostomus dowi*, and is a common Galapagos fish. Hence it might be possible that Steindachner mistook this species for the other, for only on dissecting out the second interhæmal bone would one suspect the two to be different if the specimens were mixed together and not examined carefully. Since, however, the characters by which our specimen differs from the mainland specimens of *Eucinostomus dowi* are such that one specimen would not suffice for the determining of a species we simply give the following description of it. More material must be obtained to show whether the Galapagos form is *E. dowi* or an undescribed form:

Length 160 mm.; depth 3; head $3\frac{1}{3}$; eye $2\frac{6}{7}$ in head; pectoral very slightly longer than head; ventral $2\frac{1}{2}$ in head; depth of caudal peduncle $3\frac{1}{3}$ in head; snout from eye $3\frac{1}{2}$ in head; first dorsal spine $1\frac{8}{9}$ in head; third anal spine $3\frac{1}{2}$ in head; upper lobe of caudal $1\frac{1}{6}$ in head; dorsal IX, 10; anal III, 7.

General shape somewhat elongate, mouth placed below longitudinal axis of body, oblique; profile of head straight from tip of snout to top of supraoccipital crest, from here to front of dorsal straight forming an obtuse angle with the part in front; lower profile of body straight and horizontal from first anal spine to isthmus of gill-opening; mental profile slightly concave; first, second and third dorsal spines highest, equal, those back of the third graduated decreasingly to the last; first soft ray abruptly higher, the following successively shorter to the last; first soft ray of anal a little longer than the third spine, about same length as first soft dorsal ray, the following rays graduated to last, which equals last dorsal ray; caudal deeply forked, the upper lobe somewhat the longer; nostrils unequal, the anterior the smaller; maxillary reaching the front of the orbit, exposed part elongate ovate,

the forward end acute; preopercle entire, its upper limb inclined very slightly back of perpendicular; space between orbits equal to vertical diameter of eye; premaxillary groove about 5 in interorbital space; eye elliptical, the longer axis longitudinal; teeth very small, a very narrow band along sides of jaws, a larger group in front of each jaw; snout, premaxillary grooves, preorbitals, jaws and chin naked, rest of head scaled; scales all large on body, especially below lateral line; ridges along middle of scales forming conspicuous longitudinal series on sides of body, 10 below lateral line; dorsal and anal each with rather high membranous sheath at base, that of dorsal with scales indistinct except posteriorly, that of anal densely scaled throughout; lateral line gently and regularly curved on the body, straight on the caudal peduncle; crossed by 47 rows of scales.

*Color.* — Plain silvery, dorsal fin punctate with minute spots of black pigment.

### 94. XYSTÆMA CINEREUM (Walbaum).

*Trudus cinereus peltatus* CATESBY, Nat. Hist. Carolinas, 1731, Bahamas.
*Mugil cinereus* WALBAUM, Artedi Piscium, 228, 1792, Bahamas.
*Gerres cinereus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 181 (Chatham Island).
*Xystæma cinereum*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1372, 1898.

*Range.* — Both shores of tropical America; Galapagos Islands.

We have specimens of this species from Narboro; Elizabeth Bay and Tagus Cove, Albemarle; Chatham; and some very small ones from a salt lake in an old crater near Tagus Cove, now entirely shut off from the ocean.

## Family KYPHOSIDÆ.

### 95. DOYDIXODON FREMINVILLEI Valenciennes.

*Doydixodon freminvillei* VALENCIENNES, Voyage de la Vénus, v, 323, pl. 5, 1855, Galapagos Islands.
*?Doydixodon fasciatum* KNER & STEINDACHNER, Neue Fische aus Mus. Godeffroy, Sitzb. d. k. Akad. d. Wissensch. Wien, LIV, Pt. I, 3, 1866, pl. II, fig. 2, Iquique, Peru.
*Doydixodon freminvillei*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1382, 1898. — ABBOTT, Proc. Acad. Nat. Sci. Phila. 1889, 351.

Valenciennes first described and figured this species from a specimen taken at the Galapagos Islands by the *Vénus*. Since then, 1855, very little more has been known of the species. In 1866 Kner and Steindachner described a *Doydixodon* from Iquique, Peru, which they named *fasciatum*. Their description and figure are, however, from a very small specimen having broad vertical bands on the sides, and it

may be probable that it is a young individual of *Doydixodon fremin-villei*, for the other differences between it and the adults of the latter species are shown by different-aged specimens in our collection.

We have about 50 specimens from Tagus Cove and Iguana Cove, Albemarle; from the east side and Mangrove Point of Narboro, James; Duncan; Chatham; Charles; and Seymour. About Tagus Cove the species was very abundant, occurring in large schools along the shore in shallow water and feeding at the surface.

*Description of a typical specimen.* — General appearance thick, deep and heavy; head especially large, being wider than the body. profile of snout straight and steep, forming a prominent obtuse angle with the profile from the eyes to the front of the dorsal. Lips thick; premaxillary and maxillary both thick, the latter deeply concealed beneath the suborbital; distal part of premaxillary rudimentary being cartilaginous and fibrous, the bony part forming only front of jaw; a strong process from near outer end of posterior margin hooks upward around the lower margin of maxillary. Teeth only in front of jaws, similar, in several rows; each tooth consisting of 2 parts, one short, flat, vertical, forming the cutting part of the tooth, the other elongate, slender and horizontal, forming a right angle with the first and directed backward from it to its insertion posteriorly; each nostril somewhat tubular, the 2 equal, placed below the center of the pupil; preopercle entire, its angle rounded, the upper limb inclined a little backward; opercle with a short, wide, flat spine. Spinous dorsal very low, spines short and thick, depressed in a groove, alternating, one more to right, next more to left, etc.; twelfth longest, $\frac{1}{6}$ greater than eye; last closely united to the soft dorsal; soft dorsal compared with spinous dorsal rather high, evenly rounded, the middle rays longest; anal spines short, thick and evenly graduated; soft anal higher than soft dorsal, acutely angulated, the fourth and fifth rays longest; both fins much thickened at their bases; dorsal XII, 15; anal III, 15; caudal short, wide, posterior margin lunate, the upper lobe a little the longer, somewhat shorter than the head; pectoral wide, reaching to near tip of ventral; lateral line rather high, concurrent with the back; scales large, cycloid, 51 in lateral line; head naked except occipital region, supra-opercular region and median part of preopercle; membranes of soft dorsal, soft anal, pectoral and caudal with small scales on their margins.

The description quoted by Jordan and Evermann (*Fishes of North and Middle America*, II, p. 1382) for *Doydixodon* is from Günther, but belongs to another genus. The teeth are not "tricuspid."

MEASUREMENTS, FIN RAYS AND SCALES OF *Doydixodon freminvillei.*

| No. Stanford University Museum. | 12308 | 12309 | 12310 | 12311 | 12312 |
|---|---|---|---|---|---|
| Length in mm | 310 | 290 | 333 | 305 | 348 |
| Depth | 47 | 46 | 43 | 47 | 45 |
| Head | 32 | 31 | 31 | 32 | 32 |
| Eye | 18 | 18 | 18 | 18 | 17 |
| Pectoral | 74 | 76 | 75 | 70 | 77 |
| Ventral | 57 | 62 | 56 | 56 | 61 |
| Number of first dorsal spines | 12 | 12 | 12 | 12 | 12 |
| Number of second dorsal rays | 18 | 15 | 16 | 15 | 16 |
| Number of second anal rays | 12 | 12 | 12 | 12 | 12 |
| Scales in lateral line | 54 | 55 | 51 | 52 | 51 |

### 96. KYPHOSUS ANALOGUS (Gill).

*Pimelepterus analogus* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 245, Cape San Lucas.

*Kyphosus analogus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1385, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. 1898, 278 (Clarion and Socorro islands).

*Range.* — Pacific coast of Mexico, Panama, Clarion and Socorro islands.

### 97. KYPHOSUS ELEGANS (Peters).

*Pimelepterus elegans* PETERS, Berliner Monatsberichte, 707, 1869, Mazatlan.

*Kyphosus elegans*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1387, 1898.

*Range.* — West coast of Mexico; Revillagigedo, Cocos and Galapagos islands.

One adult of this species taken at Cocos Island, and one young one taken at Mangrove Point, Narboro. The species is known from both Clarion and Socorro islands of the Revillagigedo Archipelago.

### 98. KYPHOSUS LUTESCENS (Jordan & Gilbert).

*Pimelepterus lutescens* JORDAN & GILBERT, Proc. U. S. Nat. Mus. 1881, 229, Socorro Island.

*Kyphosus lutescens*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1388, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. 1898, 278 (Clarion Island).

*Range.* — Revillagigedo Archipelago.

## Family SCIÆNIDÆ.

### 99. CORVULA EURYMESOPS Heller & Snodgrass.

*Corvula eurymesops* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., V, 1903, 195, Charles Island.

*Range.* — Galapagos Archipelago.

100. SCIÆNA PERISSA Heller & Snodgrass.

*Sciæna perissa* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 197, Tagus Cove, Albemarle Island.

*Range.* — Galapagos Archipelago.

101. UMBRINA GALAPAGORUM Steindachner.

*Umbrina galapagorum* STEINDACHNER, Ichth. Beitr., VII, 20, 1888, James Island, Galapagos. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1468, 1898.

*Range.* — Galapagos Archipelago.

Known only from Steindachner's specimens.

## Family CIRRHITIDÆ.

102. CIRRHITUS RIVULATUS Valenciennes.

*Cirrhites rivulatus* VALENCIENNES, Voyage de la Vénus, Poiss., 309, pl. 3, fig. 1, 1855, Galapagos Islands. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898, 283 (Clarion and Socorro islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1491, 1898.

*Range.* — Pacific coast of tropical America; Revillagigedo and Galapagos islands.

This species was taken first at the Galapagos Islands by the *Vénus*, and has since been found at Clarion and Socorro islands and along the Pacific Coast of Tropical America as far north as Cape San Lucas. We have one specimen, about 12 inches long, taken in a tide-pool by Captain W. P. Noyes at Tower Island. Depth of body $2\frac{2}{3}$; D. X, 11; A. III, 6.

## Family POMACENTRIDÆ.

103. AZURINA EUPALAMA Heller & Snodgrass.

*Azurina eupalama* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 198, pl. v, Hood Island.

*Range.* — Galapagos Archipelago (Charles and Hood).

## Genus POMACENTRUS.

The following is the history of the Pacific American species of *Pomacentrus*. In 1845, Tschudi (*Fauna Peruana, Ichthy.*, *17*) described the species *Pomacentrus latifrons*, from Huacho. We have not seen this species but according to Tschudi's description it must differ from all the other Pacific-American forms in having the dorsal rays XIII, 20, instead of XII, 15.

In 1862, Gill (*Proc. Ac. Nat. Sci. Phila. 1862*, 148) described 2 species of *Pomacentrus* from Cape San Lucas — *P. rectifrænum* and *P. flavilatus*, the *type* of each being an immature specimen.

Later in the same year, Günther (*Cat., IV*, 27, 1862) published, from Gill's manuscript, the description of a third species, *Pomocentrus analiguttata* Gill. This species Gill himself in the following year retracted.

In 1863, Gill (*Proc. Acad. Nat. Sci. Phila. 1863*, 215) redescribed *P. rectifrænum* and *P. flavilatus*. In these descriptions, based on a greater number of specimens, the difference described between the *types* of the 2 species is much less prominent.

Günther, in 1866 (*Fishes of Central America*, 445) regarded Gill's 2 types, *Pomacentrus rectifrænum* and *P. flavilatus*, as simply 2 color forms of the same species, *P. rectifrænum*.

In 1891, Gilbert (*Proc. U. S. Nat. Mus. 1891*, 554) described the species *P. leucorus*, distinguished from the other species by having the pectorals tipped with orange (white in alcohol) and posteriorly bordered with white. The *type* specimens of this species are from the Revillagigedo Archipelago, but the species is abundant also at both Cocos and the Galapagos islands.

Jordan, 1896 (*Fishes of Sinaloa*, *Proc. Cal. Acad. Sci.*, 2d Series, Vol. v, 1895 (1896), 474, described as *Eupomacentrus flavilatus*, a very young example from Mazatlan, about $\frac{3}{4}$ inch in length.

In 1899 Jordan and McGregor (*Fishes of Revillagigedo Archipelago and neighboring Islands*, *Rep. U. S. Fish Comm. for 1898*, 282, 1899) recorded from Clarion and Socorro islands, 6 specimens of a *Pomacentrus* that they identified as *P. rectrifrænum*, and 12 others that they identified as adults of *P. flavilatus*.

We have examined this Revillagigedo material and find that, excluding *P. leucorus* with orange-tipped pectorals, it includes only one species — not 2 as identified by Jordan and McGregor. Furthermore, we have examined both young and adult examples from Panama which are certainly *P. rectifrænum* Gill. The Revillagigedo adults are not the same species as the Panama adults, and the young are neither *P. rectifrænum* Gill nor *P. flavilatus* Gill. Hence, we have described the Revillagigedo form as a distinct species — *Pomacentrus redemptus* (*Proc. Wash. Acad. Sci.*, v, 1903, 200, pl. vi).

At Cocos and the Galapagos islands there occur 2 species of *Pomacentrus* — one is *P. leucorus*, the other we have described as *P. arcifrons* (*ibid*, 202, pl. vii).

In 1904, Gilbert and Starks (Mem. Cal. Acad. Sci., iv, 141, pl. xxi) described the species *P. gilli* from Panama.

Adults that are surely *P. flavilatus* have, thus far never been reported. If *P. gilli* Gilbert & Starks is not the adult of *P. flavilatus* Gill, it is probably likely that *P. rectifrænum* Gill and *P. flavilatus* Gill are the same species, as Günther concluded.

There are, therefore, 6 species of *Pomacentrus* in the Eastern Pacific — *P. latifrons* Tschudi along the coast of South America; *P. rectifrænum* Gill and *P. gilli* Gilbert & Starks along the coast of Mexico and Central America; *P. leucorus* Gilbert at the Revillagigedo, Cocos and Galapagos islands; *P. redemptus* Heller and Snodgrass at the Revillagigedo Islands; and *P. arcifrons* Heller and Snodgrass at Cocos and the Galapagos Islands.

## 104. POMACENTRUS LEUCORUS Gilbert.

*Pomacentrus leucorus* GILBERT, Proc. U. S. Nat. Mus. 1891, 554, Socorro Island.

*Eupomacentrus leucorus*, JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 282 (Socorro, Clarion, San Benedicto islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1551, 1898.

*Range.* — Revillagigedo, Cocos and Galapagos islands.

This is the first record of the species from Cocos and the Galapagos Islands. Somewhat rare at the former locality, extremely abundant at the latter, where, together with *P. arcifrons*, probably outnumbering any other species of the islands. The young are hard to obtain since they live amongst the rocks at the bottom of shallow water and scarcely ever float when killed with dynamite. Their bright colors, however, make them conspicuous objects and, when dead, they can be picked up with a long-handled spear.

*Diagnosis.* — Easily distinguished from all the other species by the white and orange tip of the pectoral; forehead evenly retreating from snout to front of dorsal, and preopercle narrow, both as in *P. redemptus*; serrations of opercle minute; lips dark, same color as head; young without blue mark on scales, posterior half of caudal peduncle pale.

*Color in life of a typical adult.* — Above reddish-brown, belly and sides pale dusky; lips and snout livid grayish; iris purple, a golden spot above pupil; opercle with bluish black spot at upper margin; dorsal and anal like sides, with black tips; caudal black; pectoral light brown at base, black beyond, posteriorly white bordered with tip orange, caudal peduncle paler than rest of body; the white posterior border and orange tip of the pectoral forming a conspicuous mark of the species. The orange tip is not mentioned by Gilbert whose description is from alcoholic material.

*Color in life of a typical young example.* — Above bright coppery-

red; sides bluish-black; belly bluish-gray; tip of snout dark blue; chin like belly; cheeks coppery; opercle black-bordered; iris silvery-dusky with an inner red ring; spinous dorsal with spines cardinal, membrane dusky; rays of soft dorsal blackish, purple spot at base, membrane black; a large ocellus on side of soft dorsal with red margin and dark blue center; pectorals, ventrals and anal dark, the last with blue spots at the base posteriorly; caudal lighter dusky, peduncle very light; pectoral with light olive spot at tip.

The young of different ages show the following changes:

I. (Specimen 54 mm. long.) General color like that of adult. Posterior part of caudal peduncle pale yellowish; a large round black spot on base of anterior part of soft dorsal; a large quadrate white spot (orange in life?) at tip of pectoral, ventrally dark color extending between white spot and edge of fin.

II. (Specimen 38 mm. long.) Color same as last with exception of white on pectoral, which here forms a large oval spot, having longer diameter longitudinal, very slightly in front of tip of fin.

III. (Specimen 31 mm. long.) White spot on pectoral very small, considerably in front of tip of fin, same shape as in last; spot on base of anterior part of soft dorsal conspicuously ocelliform, having a wide pale border around the dark center (this character, however, probably, simply faded from others), the whole encroaching much on the side of the back.

MEASUREMENTS, FIN RAYS AND SCALES OF *Pomacentrus leucorus*.

| No. Stanford University Museum. | 12269 | 12270 | 12271 | | 12272 |
|---|---|---|---|---|---|
| Length in mm | 118 | 107 | 105 | 104 | 103 |
| Depth | 51 | 48 | 52 | 53 | 52 |
| Head | 30 | 30 | 31 | 32 | 31 |
| Pectoral | 27 | 25 | 27 | 28 | 27 |
| Ventral | 29 | 28 | 29 | 32 | 32 |
| Eye | 27 | 28 | 30 | 28 | 27 |
| Interorbital | 30 | 30 | 30 | 31 | 30 |
| Preorbital | 17 | 14 | 13 | 14 | 14 |
| Number of dorsal spines | XII | XII | XII | XII | XII |
| Number of second dorsal rays | 15 | 15 | 15 | 15 | 15 |
| Number of second anal rays | 13 | 13 | 13 | 13 | 13 |
| Scale rows | 27 | 26 | 25 | 25 | 26 |
| Scales on lateral line | 20 | 20 | 20 | 20 | 20 |

*Description of adult examples.* — Almost identical in every respect, except color, with *Pomacentrus redemptus*, the only differences between specimens of equal length being as follows: Upper profile of

head conspicuously not so steep, in *P. leucorus* evenly retreating from snout to front of spinous dorsal or but gently curved, never steep and bulging in front or almost vertical before eyes; serrations on preopercle and suborbital much finer, especially those on the preopercle; preorbital less deep, being about $\frac{2}{3}$ of eye while in *P. redemptus* it is almost as deep as eye; fins and profile of body same in the 2 species.

### 105. POMACENTRUS REDEMPTUS Heller & Snodgrass.

*Eupomacentrus rectifrænum*, JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 282 (Clarion and Socorro islands).
*Eupomacentrus flavilatus*, JORDAN & MCGREGOR, ibid., 282 (Clarion, Socorro and San Benedicto islands).
*Pomacentrus redemptus* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 200, pl. VI, Clarion Island.

*Range.* — Revillagigedo Archipelago.

Similar in shape to *Pomacentrus jenkinsi* Jordan & Evermann[1] of the Hawaiian Islands. Differs from this species in having the suborbital serrated and in having (in alcohol) a yellow color diffused over the caudal peduncle and the posterior part of the body.

### 106. POMACENTRUS ARCIFRONS Heller & Snodgrass.

*Pomacentrus arcifrons* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 202, pl. VII, Barrington Island.

*Range.* — Cocos and Galapagos islands.

A very abundant species; easily recognized by the strongly arcuate profile of the forehead and top of head, and by the bright orange color of the lips.

### 107. NEXILARIUS CONCOLOR (Gill).

*Euchistodus concolor* GILL, Proc. Acad. Nat. Phila. 1862, 145, Panama.
*Nexilarius concolor*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1559, 1898.

*Range.* — West coast of tropical America and Galapagos Archipelago.

We have one specimen of this species taken at Elizabeth Bay, Albemarle Island, Galapagos. Length, 137 mm.

*Color in life.* —Above dark brownish-olive; sides with 4 broad, vertical bars of dark brown, a yellowish tinge on areas between the bars; a straw-yellow blotch behind pectoral; dorsal and anal fins tipped with bright greenish-blue; ventrals bright green; other fins dusky.

[1] Rep. U. S. Fish Comm. for 1902 (1903), 189.

## 108. ABUDEFDUF MARGINATUS (Bloch).

*Chætodon marginatus* BLOCH, Ichthyol., VI, 73, pl. 207, 1788, Martinique.
*Abudefduf saxatilis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1561, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898, 282 (Clarion Island).
*Glyphisodon saxatilis*, GILBERT & STARKS, Mem. Cal. Acad. Sci., IV, 1904, 143 (Panama).

*Range.* — Both coasts of tropical America; West Indies; Revillagigedo, Cocos and Galapagos islands.

Very similar to Hawaiian specimens recorded by Jenkins[1] and by Jordan and Evermann[2] as *Abudefduf abdominalis* (C. & V.) Differs from this species in having the band on the caudal peduncle more distinct and in lacking the spots on the base of the soft dorsal and the anal opposite the ends of this band.

We have specimens from Charles Island and from Tagus Cove, Turtle Point, Elizabeth Bay and Iguana Cove, Albemarle.

A small specimen 16 mm. long has the soft dorsal, soft anal, caudal and pectoral fins very pale, strongly contrasting with the other parts. Specimens larger than this, up to 25 mm., have these fins pale but darker than in the smaller ones. The vertical bars are present on specimens as small as 16 mm. in length. Specimens 10 mm. long, however. have no stripes at all.

## 109. MICROSPATHODON BAIRDII (Gill).

*Pomacentrus bairdii* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 149, Cape San Lucas.
*Microspathodon bairdii*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1566, 1898.

*Range.* — Pacific coast of Mexico and Central America; Revillagigedo and Galapagos islands.

We have 4 large specimens of this species, the largest 270 mm. long, taken at Seymour, Charles and Hood islands.

*Color in life.* — Above dark brown with purplish iridescence; throat and belly lighter brownish; fins like back; pectorals and ventrals with distinct livid spots on membranes; other fins with the spots very faint; iris purple.

## 110. MICROSPATHODON DORSALIS (Gill).

*Hypsypops dorsalis* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 147, Cape San Lucas.

[1] Bull. U. S. Fish. Comm. for 1902 (1903), 458.
[2] Hawaiian Report.

*Microspathodon dorsalis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1568, 1898.

*Range.* — Pacific coast of Mexico and Central America; Revillagigedo, Cocos and Galapagos islands.

Of this species we have 17 specimens, the largest 200 mm. long, from Seymour, Barrington, Duncan and Charles islands and from Cocos Island. This species, as the last, has before this been known only from the Pacific coast of Mexico and Panama and from the Revillagigedo Islands.

*Color in life.* — Above and on sides bluish-black; belly light grayish-blue; fins like back, edged with lavender.

### 111. NEXILOSUS ALBEMARLEUS Heller & Snodgrass.

*Nexilosus albemarleus* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 204, pl. VIII, Tagus Cove, Albemarle Island.

*Range.* — Galapagos Archipelago.

This species, constituting the genus *Nexilosus*, differs from the genus *Hypsypops* in the same way that the genus *Nexilarius* Gilbert differs from *Abudefduf*, viz., in having the suborbital fused with the cheek.

We have several specimens from Tagus Cove, Elizabeth Bay and Iguana Cove, Albemarle.

## Family LABRIDÆ.

### 112. BODIANUS DIPLOTÆNIUS (Gill).

*Harpe diplotænia* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 140, *female*, Cape San Lucas. — JORDAN & MCGREGOR, Rep. U. S. Comm. for 1898, 181 (Clarion and Socorro islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1582, 1898.

*Range.* — Cape San Lucas to Panama, Revillagigedo, Clipperton, Cocos and Galapagos islands.

We have 26 specimens from Cocos, Clipperton and the Galapagos islands — at the last locality from Tagus Cove and Elizabeth Bay, Albemarle; James; Charles; Duncan; Seymour; Barrington; Hood and Bindloe.

*Color of adult male in life.* — Head lake-red, grayish on snout; tip of under lip yellow; lower jaw pinkish; dorsum slate-greenish; dorsal spines green-blue, purple at tip; soft dorsal at base greenish, purple at tip, posterior rays cherry-red; sides of body and belly light brownish-purple; outer rays of tail purple, inner with greenish base, tips maroon; chrome spot on side above pectoral; pectoral blue on

upper rays, rest bright red, upper angle black-tipped; outer rays of ventrals purple, inner green, maroon-tipped; iris golden and red.

*Color of adult female in life.* — Above olive, scales on sides with lake-red centers and olive borders; 2 dark brown stripes on sides, 2 spots of same color on caudal peduncle, an olive maxillary stripe; belly lighter lake-red, a narrow faint purplish-olive border on scales; snout mottled pinkish and olive; iris whitish with inner yellow ring; first and second dorsal spines bluish with red tips, others lake-red, membrane Indian-red; last rays of soft dorsal orange, lighter at tips; anal like dorsal; caudal orange; peduncle olive yellow; pectoral light lake-red; spine of ventral purplish-red, rays with crimson tips, fin lake and olive at base.

The males of different ages vary much in shape and in contour of the fins. The smallest specimens, 270 mm. long, much resemble in shape the females. The snout is pointed, the swelling before the eye very slight and the angle of the caudal but little produced; profile gradually rising from snout to first dorsal except for slight rise before eyes; soft dorsal and anal prolonged as far as base of caudal; tips of pectorals each with a large prominent black spot just as in large specimens. As age increases the elevation before the eye becomes larger and the angles of the caudal and soft anal and dorsal increase. The largest specimens, 400 mm. long, have the snout very blunt, a large thick swelling before the eye having, in some specimens, the front surface very slightly receding. The soft anal and soft dorsal prolonged posteriorly into long streamers reaching considerably past the median rays of the caudal, that of the anal generally longer than that of the dorsal. The caudal angles are also greatly produced and are tapering.

All of our Galapagos specimens differ from a specimen from Clarion Island in having the snout blunter and the hump on the face smaller. Also the flap on the lower lip is smaller in most of our specimens, but this character is very variable and is not dependent on age — in some its width is but little more than half the diameter of the eye, while in others it is wider than the eye.

### 113. BODIANUS ECLANCHERI (Valenciennes).

*Cossyphus eclancheri* VALENCIENNES, Voyage de la Vénus, Zoöl., 340, Poiss., pl. 8, fig. 2, plates 1846, text 1855, Galapagos Islands.

*Harpe eclancheri*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1583, 1898, ibid. Check-list, 412.

*Range.* — Galapagos Archipelago.

Found very common about Tagus Cove, Albemarle, but rare elsewhere about the islands. Obtained at Albemarle, Charles, Chatham and Barrington. Heretofore not reported since Valenciennes's description of the *type* in 1855.

Depth $2\frac{1}{3}$ to $2\frac{2}{3}$. Hence Valenciennes's figure with a depth somewhat more than 3 is not correct. Head 3; D. XII, 10.

The males and females apparently do not differ much and both present the same variations. All of our specimens have the hump on the face larger than is shown in Valenciennes's figure and the snout is not so sharp, the dorsal profile of the head being steeper.

*Description of a typical specimen.* — Profile of snout and lower jaw forming a large angle with each other, very obtuse and symmetrically rounded; hump before and above eye, its anterior face almost vertical; profile from summit of hump to nape a little concave; soft dorsal and anal (in all cases) prolonged behind, but not reaching beyond base of caudal rays; caudal truncate, the upper angle slightly produced, the lower rounded. (Both angles of caudal not equally produced as in Valenciennes's figure.) Outer rays of ventral long, slightly shorter than pectoral, latter fin wide; eye small, 5 to 7 in head.

*Color in life.* — Scarcely any 2 specimens are colored alike. The color of Valenciennes's figure is only one phase of the coloration of the species and is not typical. Some specimens are of a uniform dusky color; others are entirely pale-colored or have a few irregularly scattered blotches of black. A specimen of this sort was colored as follows: color above reddish-orange, purplish on sides of head, lighter below; pectoral with blackish spot at base, above this dusky-grayish; anal spines black; ventral spine black; caudal grayish, black on middle rays. Between these 2 extremes are all degrees of mixture of black and orange. In one specimen the entire fish is black except the head and a longitudinal band on upper half of tail, these parts being pale orange. Others have the head and most of the tail orange, with this color also running ventrally from each toward middle of belly. In others the paler color encroaches on the sides so that only the back and upper parts of the sides are black. In still others only a small amount of black is left — this being on the back about the base of the dorsal fin. Here is where the black appears always to make either its last resistance against the encroachment of the orange, or its beginning in replacing the orange. Our specimens are all of the same size and we have no way of knowing whether the black replaces the orange or *vice versa*, or whether the coloration changes at all with growth or is permanent throughout life. The position of the 2

colors, however, would seem to indicate that one color replaces the other during the life of the individual. All grades from black to orange found at the same time of the year and at the same place.

## 114. PIMELOMETOPON DARWINII (Jenyns).

*Cossyphus darwinii* JENYNS, Voy. Beagle, Fishes, 100, pl. 20, 1842, Chatham Island, Galapagos.

*Labrus aper* VALENCIENNES, Voy. de la Vénus, Zoöl., Poiss., 338, pl. 8, fig. 1, plates 1846, text 1855, Galapagos Islands.

*Pimelometopon darwinii*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1586, 1898.

*Range.* — Galapagos Archipelago.

Of this species we have 8 specimens from Tagus Cove and Elizabeth Bay, Albemarle Island.

Description of an adult male: Length 420 mm.; head 3; depth 3; eye 7 in head; profile of head from eye to tip of snout very steep, rising at an angle of 45 degrees; lower jaw large, thick, regularly rounded in ventral profile, so that snout and lower jaw are very blunt; profile of head above eye to first dorsal spine gently rising, frontal hump present, but although large, not forming a prominent and abrupt swelling; body deepest through middle of pectoral; back of this regularly and symmetrically decreasing in depth to middle of caudal peduncle, back of middle of caudal peduncle enlarging again slightly; dorsal XII, 10; third to sixth rays of soft dorsal elongated, reaching to posterior third of caudal peduncle; anal III, similar in shape to soft dorsal; caudal lunate, upper rays the more produced (not equal as in Valencienne's figure); pectoral wide; outer rays of ventral produced, about equal to pectoral, $1\frac{2}{3}$ in head; flap on lower lip small, $\frac{2}{3}$ of eye in depth.

*Color of male in life.* — Above purplish-gray, below grayish-green; a large golden blotch on side behind opercle above pectoral; tip of lower jaw white; fins light grayish olive.

All of the males have the large yellow spot above the pectoral, and the character remains well on specimens kept in alcohol, so that it forms a very good distinguishing mark of the species.

The females are much smaller than the males, the snout is pointed, the soft dorsal and anal fins and the ventrals are not prolonged, and the caudal lobes are generally equal (one has the upper longer).

*Color of females in life.* — Following are the color descriptions of 2 females: (1) Ridge of back dark, sides reddish-purple, belly grayish; upper surface of snout blue-gray, chin whitish; vertical fins like back, ventrals like belly; iris purple. (2) Above light brownish

ridge of back grayish-lavender, pinkish tinge on sides, below whitish; ventrals and anal light olive; caudal brownish; iris green with inner ring of red.

## 115. HALICHŒRES NICHOLSI (Jordan & Gilbert).

*Platyglossus nicholsi* JORDAN & GILBERT, Proc. U. S. Nat. Mus. 1881, 231, Socorro Island. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 182 (Charles Island, Galapagos).
*Iridio nicholsi*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1591, 1898; ibid., Check-list, 412.

*Range.* — Revillagigedo and Galapagos archipelagos.

One specimen, 280 mm. long, from Charles Island.

Depth a little greater than 3; head, to end of opercular flap, a little less than 3; D. IX, 13; A. III, 12; ventrals and pectorals about equal, $1\frac{3}{7}$ in hand; first anal spine very small, concealed by the skin; posterior border of caudal straight, angles not at all produced; lateral line with tubes on 27 scales; bent downward over 4 scales on the 19th oblique series of scales, and then again running on 5 others, so that it crosses only 24 oblique series; anterior canines $\frac{1}{2}$–$\frac{1}{2}$; upper ones straight, directed forward, outward and downward; middle lower ones at symphysis of jaw, straight, projecting upward and forward between upper ones; outer lower ones projecting upward, outward and forward and then curving backward; two small posterior canines in the upper jaw, each conical, directed downward.

*Color in life.* — Above light olive, belly pale grayish, back darker than sides; a blackish blotch behind head, brick-red below it; sides of head with bright blue spots about eye, lavender spots below level of mouth; lips pinkish; lower jaw barred with straw-yellow; pectoral bluish-black, base light olive with blue blotches; three chrome-yellow blotches on sides above pectoral; spine and border of first ray of ventral blue, rest of first ray hazel-brown, posteriorly bordered with blue, the other rays pale, transparent; dorsal dusky brick-red near margin, at base spotted with green, just above base blue, edge of fin light blue; membrane of caudal dusky-olive, spotted with blue, posterior border of fin red.

## 116. HALICHŒRES SELLIFER (Gilbert).

*Halichœres sellifer* GILBERT, Proc. U. S. Nat. Mus. 1890, 67, Clarion Island.
*Iridio sellifer*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1592, 1898.

*Range.* — Revillagigedo Archipelago.

Only the *type* is known, from Clarion Island of the Revillagigedo Archipelago. Collected by the *Albatross* in 1889.

### 117. PSEUDOJULIS ADUSTUS Gilbert.

*Pseudojulis adustus* GILBERT, Proc. U. S. Nat. Mus. 1890, 66, Socorro Island.
*Julidio adustus*, JORDAN & EVERMANN, Fishes North and Mid. Amer. II, 1602, 1898.

*Range.* — Revillagigedo Archipelago.

Taken by the *Albatross* at Clarion Island, in 1889. No specimens recorded since.

### 118. PSEUDOJULIS NOTOSPILUS Günther.

*Pseudojulis notospilus* GÜNTHER, Proc. Zoöl. Soc. Lond. 1864, 26, Panama.
*Julidio notospilus*, JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 283 (Clarion Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1603, 1898.

*Range.* — Pacific coast of Mexico, Panama and Clarion Island of the Revillagigedo Archipelago.

Taken at the last locality in 1897 by Mr. R. C. McGregor.

### 119. THALASSOMA SOCORROENSE Gilbert.

*Thalassoma socorroense* GILBERT, Proc. U. S. Nat. Mus. 1890, 69, Socorro Island.
*Chlorichthys socorroensis*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1607, 1898.

*Range.* — Revillagigedo Archipelago.

Known only from Socorro Island, the type taken by the *Albatross* in 1889, and no other specimens obtained since.

### 120. THALASSOMA GRAMMATICUM Gilbert.

*Thalassoma grammaticum* GILBERT, Proc. U. S. Nat. Mus. 1890, 68, Socorro and Clarion islands. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. 1898, 283 (Clarion Island).
*Chlorichthys grammaticus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1610, 1898.

*Range.* — Revillagigedo Archipelago.

Collected in 1889 at Clarion and Socorro islands by the *Albatross*, and in 1897 at Clarion by Mr. R. C. McGregor.

### 121. THALASSOMA VIRENS Gilbert.

*Thalassoma virens* GILBERT, Proc. U. Nat. Mus. 1890, 68, Socorro Island.
*Chlorichthys virens*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1610, 1898.

*Range.* — Revillagigedo Archipelago.

Taken at Socorro Island by the *Albatross* in 1889 and not reported since.

## Family SCARIDÆ.

### 122. CALOTOMUS XENODON Gilbert.

*Calotomus xenodon* GILBERT, Proc. U. S. Nat. Mus. 1890, 70, Socorro Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1626, 1898.

*Range.* — Revillagigedo Archipelago.

Known only from Socorro Island, where taken by the *Albatross* in 1889.

### 123. CALLYODON NOYESI (Heller & Snodgrass).

*Scarus noyesi* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., V, 1903, 206, Tagus Cove, Albemarle Island.

*Range.* — Galapagos Archipelago (Albemarle, Narboro, Duncan and Seymour).

### 124. CALLYODON PERRICO (Jordan & Gilbert).

*Scarus perrico* JORDAN & GILBERT, Proc. U. S. Nat. Mus. 1881, 357, Mazatlan.

*Pseudoscarus perrico*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1658, 1898.

*Range.* — West coast of Mexico and Galapagos Archipelago.

This species has previously been known only from the west coast of Mexico. We have 3 specimens from Seymour Island, the longest 400 mm. in length.

*Color in life.* — Above brown, darkest on back, lighter on sides; belly whitish; dental plates, spots above eye, pectorals, dorsal, anal and ventral bright blue-green; light green spot before eye; lips same; iris golden; middle of pectoral olive-brown; caudal with faint maroon bar near tip; membranes of dorsal and anal olive, spotted with blue-green; first rays of ventral olive.

## Family OPLEGNATHIDÆ.

### 125. OPLEGNATHUS INSIGNE (Kner).

*Scaristoma insigne* KNER, Sitz. d. k. Akad. d. Wissensch. Wien, LVI, 7, pl. 2, 1867, West coast of South America.

*Oplegnathus insignus*, ABBOTT, Proc. Acad. Nat. Sci. Phila. 1899, 359.

*Range.* — West coast of South America, Galapagos Islands.

The species of the genus *Oplegnathus* are few: one occurs on the west coast of South America and at the Galapagos Islands, the others in the western part of the Pacific. We have 9 adult examples of *O.*

*insignis* from Tagus Cove, Albemarle and Duncan Island, and 3 young ones from Iguana Cove. The species was described by Kner from an immature individual collected on the west coast of South America, and no others have until now been reported. Since this species undergoes, as do the other known members of the genus, striking changes in color during growth from the very young to the adult, we give the following descriptions, based on our specimens.

I. Specimen 20 mm. long. Ground color pale yellow; side crossed by 5 black vertical bars, the first passing through eye, above which it turns backward to nape where it meets the one of opposite side; the second runs from base of pectoral over posterior margin of opercle to ridge of back just in front of dorsal fin, meeting here the one on opposite side; the third begins just beyond middle of pectoral, runs upward to base of sixth dorsal spine and then to margin of fin on sixth and seventh spines; the fourth begins on front of soft anal, extends to margin of front of soft dorsal; the fifth crosses base of caudal peduncle and is connected with fourth by black longitudinal band on soft dorsal and another on anal; a very faint indication of a sixth bar at base of caudal fin; ventrals black; axil dusky.

II. Specimen 32 mm. long. Longitudinal black bands on soft dorsal and anal fins much wider than in I, appearing as dorsal and ventral anterior continuations of vertical stripe on base of caudal peduncle, connecting anteriorly with stripe from front of soft dorsal to front of anal; stripe on base of caudal fin well marked, almost as broad as the others.

III. Specimen 66 mm. long. All the markings of II present on this specimen. In addition soft dorsal and anal entirely dusky; a black spot on nape between stripes 1 and 2; a broken black vertical stripe between stripes 2 and 3, another between 3 and 4, and another between 4 and 5; a large circular black spot on middle of side of caudal peduncle; indistinct spots on caudal beyond basal band.

IV. Specimen 280 mm. long. Ground color above and on sides black, beneath pale yellowish; sides, back (except snout) and all the fins closely covered by small oval yellow spots; ventrals black apically. There is certainly a great difference in the coloration of specimens III and IV, and neither of them resembles the *type* of *Oplegnathus insignis*. There is also, however, a great difference in their ages as indicated by the sizes. The following is Kner's color description of the *type*; it will be seen that it is intermediate both in size and color between our specimens III and IV.

Length 190 mm. "The ground color appears black, on the ven-

tral side whitish; on the sides and rump vertical areas of white spots and short bars form wide vertical bands much broken into by the black ground color; the first of these stripes begins beneath the third and fourth spines and ends over the ventral fin; the second runs from the last 3 dorsal spines to the anus and the beginning of the anal fin; the third extends from the middle of the soft dorsal to the middle of the anal; the fourth, smaller than the others, surrounds the caudal peduncle just in front of the caudal fin; the fins in part have a pale ground color spotted with black, and in part a dusky ground color spotted with white." (*Sitz. Akad. Wiss. Wien*, LVI, 8).

It is evident from the preceding that the pale vertical bands broken with black of Kner's *type* represent the yellow (white in alcohol) interspaces between the black bands of our specimens I and II, which in III are invaded by secondary developments of black in the form of broken bars. During growth from the age of the *type* to that of the evenly spotted adult, the spreading process of the black must continue until there is nothing left of the original yellow ground color but small spots; but also the yellow must invade the original black stripes forming in them also similar spots; so that, what was the pervading color of the young, in the adult appears as punctate markings on a ground color that appeared as striate markings in the young.

A young example of *Oplegnathus fasciatus* from Japan in the Stanford University collection agrees in coloration with our specimen I, as far as the fifth stripe. The fifth stripe, however, extends from the middle of the soft dorsal to the middle of the anal, thus having the position of the broken interpolated stripe that appears in our specimen III, between stripes 4 and 5. Stripe 5 on the anterior end of the caudal peduncle and stripe 6 on the base of the caudal fin are lacking in the specimen of *O. faciatus*, but on it there is present a continuous band around the middle of the caudal peduncle on the position of the lateral peduncle spots of our specimen III of *O. insignis*.

The American species apparently differs from the species of the western Pacific in having only 11 dorsal spines. Our largest specimen is 450 mm. in length.

## Family CHÆTODONTIDÆ.

### 126. FORCIPIGER LONGIROSTRIS (Broussonet).

*Chætodon longirostris* BROUSSONET, Dec. Ichthyol, 1, 23, pl. 7, 1782, Society and Sandwich islands.

*Chelmon longirostris*, CUVIER & VALENCIENNES, Hist. Nat. Poiss., VII, 89, pl. 175, 1831.

*Chelmo longirostris*, GÜNTHER, Cat., II, 38.

*Forcipiger flavissimus* JORDAN & MCGREGOR, Rep. U. S. Fish. Comm. for 1898 (1899), 279, Revillagigedo Archipelago. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1671, 1898.

*Forcipiger longirostris*, JENKINS, Bull. U. S. Fish Comm. for 1902 (1903), 471 (Honolulu).

*Range.* — Polynesia, Hawaiian Islands, Revillagigedo Islands.

We have examined 2 of the 4 specimens from Clarion Island on which Jordan and McGregor based their species *Forcipiger* (*Chelmon*) *flavissimus*, thus separating the American specimens as a different species from the Polynesian species, *Forcipiger longirostris*, and we have compared with them specimens from the Hawaiian Islands. There is no specific difference between the 2 sets of specimens. The black triangle on the head occupies the same area in each, the posterior edge of the soft dorsal is bordered with dusky, and the black spot on the posterior end of the anal has the same shape and size, covering 7 rays in the larger specimens, only 6 in the smaller ones. The following table shows, also, that the proportions and numbers of fin rays are the same in specimens from the 2 localities.

MEASUREMENTS AND FIN RAYS OF *Forcipiger longirostris*.

| Locality. | Clarion Id. | Clarion Id. | Honolulu. | Honolulu. | Honolulu. | Honolulu. |
|---|---|---|---|---|---|---|
| Length in mm | 160 | 158 | 138 | 125 | 118 | 110 |
| Depth | 53 | 54 | 49 | 50 | 48 | 52 |
| Head | 42 | 42 | 43 | 42 | 44 | 44 |
| Pectoral | 34 | 36 | 35 | 38 | 36 | 35 |
| Ventral | 27 | 30 | 31 | 27 | 29 | 32 |
| Eye | 17 | 16 | 18 | 18 | 15 | 20 |
| Longest dorsal spine | 58 | 57 | 52 | 58 | 55 | 53 |
| Longest anal spine | 50 | 47 | 40 | 43 | 41 | 47 |
| Snout | 60 | 61 | 61 | 62 | 60 | 61 |
| Number of dorsal spines | XII | XII | XII | XIII | XII | XII |
| Number of second dorsal rays | 23 | 23 | 23 | 24 | 23 | 22 |
| Number of second anal rays | 17 | 18 | 18 | 16 | 17 | 18 |

## 127. CHÆTODON NIGRIROSTRIS (Gill).

*Sarathrodus nigrirostris* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 243, Cape San Lucas.

*Chætodon nigrirostris*, JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 279 (San Benedicto, Socorro and Clarion islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1673, 1898.

*Range.* — Cape San Lucas, Lower California; Revillagigedo and Galapagos islands.

One specimen taken at Seymour, the only record of the species from the Galapagos.

### 128. HOLOCANTHUS PASSER Valenciennes.

*Holocanthus passer* VALCIENNES, Voyage de Vénus, 327, pl. 6, 1846, Galapagos Archipelago. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1682, 1898.

*Holocanthus strigatus* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 243, Cape San Lucas.

*Range.* — West coast of tropical America, Cocos and Galapagos islands.

We have 36 specimens from Tagus Cove and Elizabeth Bay, Albemarle, Duncan, Seymour, Barrington, Chatham and Bindloe islands of the Galapagos Archipelago, and from Cocos Island.

Depth about $1\frac{2}{5}$, much greater than given by Jordan and Evermann. Valenciennes's figure is not nearly deep enough. The vertical stripe on the side back of the pectoral is generally widest at the upper end, not thickest in the middle and symmetrically tapering at each end, as figured by Valenciennes. Young examples 90 mm. long, have the soft dorsal and anal less attenuated than in the adults, the pectoral very slightly wider, the depth about the same, while the stripe on the side is not so much widened above.

The young differ considerably in color from the adults. Vertical bar back of shoulder light blue, body posterior to this bar hazel-brown, crossed by narrow deep-blue vertical stripes one scale wide, anterior to the shoulder bar body and head darker brown without the stripes; belly lighter brown; throat dark bluish to base of pectoral; snout rufous, chin lighter; iris golden-hazel; a blue band from isthmus to before eye, another free from first dorsal spine to spine of preopercle; opercle blue-bordered; spinous dorsal orange, blue-tipped; base of soft dorsal colored like back, border blue except at tip where blue is lacking; pectoral light orange; spine and first ray of ventral orange, other rays yellow; anal rufous, striped with blue; caudal deep orange, chrome-yellow stripe at base, posterior border of fin bluish.

### 129. HOLOCANTHUS CLARIONENSIS Gilbert.

*Holocanthus clarionensis* GILBERT, Proc. U. S. Nat. Mus. 1890, 72, Clarion, Socorro and San Benedicto islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1683, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 279 (Clarion and Socorro islands).

*Range.* — Revillagigedo Archipelago (Clarion, San Benedicto and Socorro islands).

### 130. HOLOCANTHUS IODOCUS Jordan & Rutter.

*Holocanthus iodocus* JORDAN & RUTTER in Gilbert, Proc. U. S. Nat. Mus. 1896, 445, Galapagos Islands.
*Angelichthys iodocus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1686, 1898, ibid., Check-list, 421, 1896.

*Range.* — Galapagos Archipelago.

This species is known from one specimen collected by the *Albatross* at the Galapagos Islands.

## Family ZANCLIDÆ.

### 131. ZANCLUS CANESCENS (Linn.).

*Chætodon canescens* LINNÆUS, Syst. Nat. Ed. x, 272, 1758, East Indies.
*Zanclus cornutus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1687, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 280 (Revillagigedo Islands).

*Range.* — East Indies, Polynesia, Hawaiian Islands, Revillagigedo, Cocos and Galapagos islands.

We have 2 specimens of this species taken at Cocos Island. It has never yet been taken along the American mainland.

## Family TEUTHIDIDÆ.

### 132. CTENOCHÆTUS STRIGOSUS (Bennett).

*Acanthurus strigosus* BENNETT, Zoöl, Jour., IV, 41, 1828, Hawaiian Islands.
*Ctenochætus strigosus*, JENKINS, Bull. U. S. Fish Comm. for 1902 (1903), 480, (Honolulu).

*Range.* — East Indies, Polynesia, Hawaiian Islands, Cocos Island.

We have 7 specimens of this western Pacific species from Cocos Island, which is the first record of the species from the eastern Pacific. The specimens have been compared with Hawaiian specimens.

MEASUREMENTS AND FIN RAYS OF *Ctenochætus strigosus*.

| No. Stanford University Museum. | 12279 | 12280 | 12281 | 12282 |
|---|---|---|---|---|
| Length in mm | 163 | 200 | 230 | 245 |
| Depth | 56 | 52 | 52 | 49 |
| Head | 28 | 27 | 27 | 28 |
| Pectoral | 32 | 26 | 32 | 28 |
| Ventral | 32 | 29 | 32 | 36 |
| Eye | 23 | 32 | 21 | 23 |
| Caudal spine | 34 | 40 | 46 | 40 |
| Number of dorsal spines | VIII | VIII | VIII | VIII |
| Number of second dorsal rays | 29 | 28 | 26 | 27 |
| Number of second anal rays | 25 | 27 | 25 | 24 |

The teeth are freely movable and have each a slender peduncle and a flat, expanded distal part bent almost at a right angle to the other, and serrated on the outer edge; scapula and opercle striated; caudal angles moderately produced; ventrals with rather long, filamentous terminations in the larger specimens; three anal spines; both the first dorsal and first anal spines concealed in the skin; anterior profile blunt, steep and about straight from below eye to snout.

### 133. HEPATUS TRIOSTEGUS (Linnæus).

*Chætodon triostegus* LINNÆUS, Syst. Nat., Ed. x, 274, 1758.
*Teuthis triostegus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1690, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 280 (Revillagigedo Islands).

*Range.* — Australasia, Polynesia, Revillagigedo and Cocos islands.

Hitherto known in the eastern Pacific only from the Revillagigedo Islands. We have 37 specimens from Cocos Island, but did not find the species at the Galapagos Islands. All of the Revillagigedo and Cocos specimens differ from Hawaiian specimens of the very closely related *Hepatus sandvicensis* (Streets) in lacking the black band reaching from the base of the pectoral to the base of the ventral. There is a dark spot on the outer side of the base of the pectoral and in some a similar spot below this one.

### 134. HEPATUS CRESTONIS Jordan & Starks.

*Teuthis crestonis* JORDAN & STARKS, Proc. Cal. Acad. Sci. 1895, 485, pl. 47, Mazatlan. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1692, 1898.

*Range.* — Mazatlan, Panama and Cocos Island.

We have one specimen from Cocos Island 275 mm. long.

*Color in life.* — Sides, head and back wood-brown, marked everywhere with faint wavy purplish bands; belly grayish; snout lighter gray; a golden band through eye to opercle; dorsal fin yellowish anteriorly, seal-brown on soft part, marked whole length with 3 to 4 blue bands, whole fin orange-bordered; anal like dorsal, but bands continuous and border of fin golden instead of orange; pectoral olive, whole broadly tipped with cream-color; ventrals with membranes gray, rays creamy; caudal like back, becoming black at tip.

### 135. HEPATUS ALIALA (Lesson).

*Acanthurus aliala* LESSON, Voyage Coquille, Zoöl., II, 150, 1830, Aulan.
*Teuthis aliala* JORDAN & EVERMANN Fishes North and Mid. Amer., II, 1693, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 280 (Revillagigedo Islands).

*Teuthis elegans* GARMAN, Mem. Mus. Comp. Zoöl., XXIV, Rep. Expl. U. S. S. *Albatross* during 1891, XXVI, Fishes, 70, pl. L, fig. 2, 1899, young form, Cocos Island.

*Range.* — East Indies, Polynesia, Hawaiian Islands; Revillagigedo, Clipperton and Cocos islands.

We have 10 specimens of this species from Cocos Island and one from Clipperton Island. It is another East Indian species taken heretofore in American waters only at Clarion and Socorro islands of the Revillagigedo Archipelago.

## 136. XESURUS PUNCTATUS (Gill).

*Prionurus punctatus* GILL, Proc. Acad. Nat. Sci. Phila. 1862, 242, Cape San Lucas.

*Xesurus punctatus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1694, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 280 (Socorro Island).

*Range.* — Pacific coast of Mexico and the Revillagigedo Archipelago.

There appear to be but 3 species of this genus, all inhabiting the eastern tropical Pacific. *X. punctatus* is a mainland form occurring also at the Revillagigedo Archipelago, *X. hopkinsi* Gilbert & Starks is known only from Panama, while *X. laticlavius* is exclusively an island form known from the Revillagigedo, Clipperton, Cocos and Galapagos islands.

## 137. XESURUS LATICLAVIUS (Valenciennes).

*Prionurus laticlavius* VALENCIENNES, Voyage de la Vénus, 337, pl. 7, fig. 2, 1846, Galapagos Islands.

*Xesurus clarionis* GILBERT & STARKS, Proc. U. S. Nat. Mus. 1896. 445, pl. 51 (Clarion Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1695, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish. Comm. for 1898 (1899), 280 (Revillagigedo Islands).

*Xesurus laticlavius*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1695, 1898.

*Range.* — Revillagigedo, Cocos and Galapagos islands, Valenciennes, in 1846, figured, and later described, the species *Xesurus* (*Prionurus*) *laticlavius* from the Galapagos Archipelago. We have numerous (37) specimens from Cocos and the Galapagos islands of a species that is certainly the same as that figured by Valenciennes. His figure, however, is very inaccurate, being of a depth much less than that of most of our specimens, none of which also has the longitudinal yellow band on the side shown in his figure.

Gilbert and Starks, in 1896, described and figured the species *Xesurus clarionis* from the Revillagigedo Archipelago. This species

as described differs from *X. laticlavius* in having a greater depth and in being of a uniform dark brown coloration. Our specimens show clearly that there is no specific difference between the Galapagos, Cocos and Revillagigedo specimens, that the *types* of the 2 species *X. laticlavius* and *X. clarionis* are simply 2 extremes of variation in form of the same species, and that the 2 extremes may occur at the same locality.

*Description of a typical specimen.* — Length 355 mm.; head $3\frac{4}{7}$; depth about 2; D. VII, 26; A. III, 22; eye 3 in snout; pectoral 4 in length; ventral $7\frac{1}{8}$ in length; snout prominent, rounded; profile from snout to eye concave, bulging before eye, slightly concave from eye to top of head where profile becomes prominently convex to front of dorsal; greatest depth at middle of body; dorsal profile almost evenly rounded, being but slightly more convex in front than behind; ventral profile with about same convexity as dorsal, but less convex in front, outline here being about straight from chin to base of ventrals; lower jaw included; least depth of caudal peduncle $3\frac{1}{2}$ in length of head, equal to its ventral side.

Dorsal of almost uniform height except first 2 spines which are smaller than the others; anal highest in front where slightly higher than dorsal, ending in front of end of soft dorsal; first anal spine rudimentary; caudal fin large, upper and lower margins convex, truncate posteriorly, slightly notched at middle; teeth large, one series in each jaw; each tooth expanded terminally where it overlaps the one on the outer side of it; distal margin of each oblique with inner or anterior angle highest, divided into 5 rounded lobes; caudal peduncle with 3 large median plates on each side, each bearing a large hard knife-like longitudinal ridge having the anterior angle elevated and acute, each plate black; in front of these numerous other dusky colored plates, each conspicuous as a black spot, some bearing a very small spine; a groove in front of eye running forward and downward immediately below nostrils, becoming obsolete in front of nostrils; all parts covered with minute asperities; lateral line high, closer to back posteriorily than anteriorly.

Color, plain dark gray with black spots on caudal peduncle.

*Variations.* — The depth in different specimens varies greatly, in some being greater than half length while in others it is much less. A few of the specimens present a very marked divergence from the others in having the profile from snout to eye very deeply concave, forming a prominent convex angle in front of the eye with that part of the profile behind eye. One of these specimens is also very low for the

length, and has a shape very similar to that of Valenciennes's figure of *Xesurus laticlavius*, while others duplicate in every way the type of *Xesurus clarionis* Gilbert & Starks. These 2 extremes certainly have a very different appearance, but our specimens show a closely graded series of differences from one to the other. Since this is the case we recognize only one species, *X. laticlavius* by priority.

The pectoral fin varies much in shape; in some the posterior margin is almost straight, in others the tip is conspicuously bent backward. The greatest depth of body is generally much in front of the middle, being at the vertical through base of ventrals, or even in front of this in specimens of least depth. In small specimens (23 mm. long) the spines of the lateral caudal plates are proportionally smaller than in adults, the anterior angle not elevated nor produced forward, and the margin serrate. On most of the smaller specimens there are only slight traces of spine-bearing plates in front of caudal peduncle; on the large specimens such plates are large and prominent; caudal lunate with median rays the length of the ventrals, the lower lobe often longer than upper. In most specimens the lateral line is distinct, in others of the same size it is entirely lacking.

Most of the variations described above are not dependent on age, nor has the locality or the season any influence in their production, for we found all extremes in specimens of the same size, taken at the same time at the same island.

MEASUREMENTS AND FIN RAYS OF *Xesurus laticlavius*.

| Locality. | James Id. | Charles Id. | Albemarle Id. | Tower Id. | Cocos Id. | Cocos Id. | Cocos Id. |
|---|---|---|---|---|---|---|---|
| No. Stanford University Museum. | 12283 | 12284 | 12285 | 12286 | 12287 | 12288 | 12289 |
| Length in mm | 225 | 240 | 340 | 240 | 250 | 202 | 245 |
| Depth | 55 | 49 | 55 | 43 | 50 | 55 | 55 |
| Head | 29 | 30 | 27 | 29 | 32 | 30 | 32 |
| Pectoral | 27 | 27 | 24 | 26 | 27 | 27 | 26 |
| Ventral | 14 | 14 | 14 | 16 | 15 | 16 | 15 |
| Number of dorsal spines | VII | VII | VIII | VIII | VII | VIII | VIII |
| Number of second dorsal rays | 27 | 27 | 26 | 26 | 27 | 26 | 26 |
| Number of anal rays | 22 | 23 | 23 | 23 | 22 | 23 | 23 |

## Family BALISTIDÆ.

### 138. BALISTES VERRES (Gilbert & Starks).

*Pachynathus capistratus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1704, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 280 (Revillagigedo Islands); not of Shaw.

*Balistes verres* GILBERT & STARKS, Mem. Cal. Acad. Sci., IV, 153, pl. XXVI, fig. 49, 1904, Panama; Mazatlan.

*Range.* — Pacific coast of Central America; Revillagigedo, Clipperton, Cocos and Galapagos islands.

We have 13 specimens from Cocos, Clipperton, Albemarle, Charles, Chatham, Seymour, Barrington and Bindloe islands. They agree in number of scale rows and numbers of fin-rays with mainland specimens, having a slightly greater number of both than specimens of *Balistes capistratus*, with which Polynesian species *B. verres* is otherwise almost identical.

## 139. CANTHIDERMIS ANGULOSUS (Quoy & Gaimard).

*Balistes angulosus* QUOY & GAIMARD, Voyage Uranie, Zoöl., 210. — HOLLARD, Monograph des Balistides, Pt. 2, An. Sci. Nat. 1854, 2d Pt., 57 (Pacific Ocean).

*Balistes longissimus* HOLLARD, An. Sci. Nat., 1854, 2d Pt., 60, pl. III, fig. (4); Pacific Ocean.

*Balistes longus* GORNOW MS. in Gray, Cat. Fishes Brit. Mus., 37, 1854, American Ocean.

*Range.* — Western Pacific; Cocos Island.

We have 1 specimen of a *Canthidermis* from Cocos Island. It is the first species of the genus reported from the eastern Pacific. Günther placed a large number of similar forms together in the synonymy of *Canthidermis* (*Balistes*) *maculatus*. It is undoubtedly true that a large number of the forms thus condensed are the same species, but it is also probable that his list includes the names of several distinct species. The characters that have been assigned to these various forms are principally differences in number of dorsal and anal rays, and of color. Of those species that have approximately 24 or 25 dorsal and 21 or 22 anal rays, some are spotted (representing probably *maculatus*) while others have a plain coloration. Of these latter, the name *angulosus* of Quoy and Gaimard appears to be the first under which they were described. Our specimens we identify as being probably the same as the *type* of *Canthidermis angulosus*. In 1871, Gill described a young example (4 inches long) as *Balistes melanopterus* from "Darien" (Isthmus of Panama), which, if it came from the Pacific side, may be the same as our specimen, although it was spotted, for spots might easily be characteristic of the young of a species that is plain when adult.

*Description of the specimen.* — Length 360 mm.; head $3\frac{4}{7}$; depth $2\frac{2}{3}$; longest dorsal spine $3\frac{1}{3}$; caudal $3\frac{1}{3}$; pectoral 2 in head; eye $4\frac{1}{3}$ in head; D. III, 25; A. 22; pectoral rays 14; scales 45; scales in

series from first dorsal spine to anal 32. Dorsal and ventral outlines symmetrical, body elongate, ovate; teeth strong, flat, obliquely inclined forward, notched outer angle most prominent, lower median teeth largest; teeth white and pale green; eye oval, longitudinal diameter the longer, 2 in interorbital space; first dorsal spine strong, tuberculate on outer surface; second short, $\frac{1}{3}$ of first; third about $\frac{1}{2}$ of second; soft dorsal and anal similar to each other, each high, no rays projecting beyond membranes, posterior borders concave; caudal angles produced, median rays $\frac{3}{5}$ of lower lobe, which is a little the longer; scales roughened each by a central group of tubercles, each of the posterior ones with a median carina forming about 9 longitudinal rows on caudal peduncle, some of which continue forward on body extending faintly even past the middle of the body; pectoral small, upper rays longest; front of anal beneath front of posterior two-thirds of dorsal; first dorsal spine a little back of base of pectoral; ventral spine short and blunt, midway between front of anal and vertical from base of pectoral; entire body scaled, except preorbital groove, space about nostrils, lips, and dorsal ridge bearing rays of dorsal fin.

*Color in life.* — Above light purplish-brown, whitish on belly, darkest on snout; iris olive; fins all dusky.

### 140. XANTHICHTHYS MENTO (Jordan & Gilbert).

*Balistes mento* JORDAN & GILBERT, Proc. U. S. Nat. Mus. 1881, 228, Clarion Island.

*Xanthichthys mento*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1710, 1898. — JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 280, (Clarion and Socorro islands).

*Range.* — Revillagigedo Archipelago.

Known only from Clarion and Socorro islands, Revillagigedo Archipelago.

### 141. MELICHTHYS BISPINOSUS Gilbert.

*Melichthys bispinosus* GILBERT, Proc. U. S. Nat. Mus. 1890, 125, Clarion and Socorro islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1711, 1898; ibid, Check-list, p. 423.

*Range.* — Revillagigedo Archipelago and Cocos Island.

We have 6 specimens from Cocos Island.

*Color in life.* — Sides, back and belly emerald-green, each series of scales with a dark brown band mesially; a large light bronze cheek patch extending from below eye to mouth; top of head and snout irregularly banded with dark brown; caudal with fine blue stripes near tip; dorsal and anal like back, with narrow light blue stripe at base; pectorals like sides; iris black.

## Family MONOCANTHIDÆ.

### 142. CANTHERINES SANDWICHIENSIS (Quoy & Gaimard).

*Balistes sandwichiensis* QUOY & GAIMARD, Voyage Uranie, Zoöl., 214, 1824.
*Cantherines nasutus* SWAINSON, Fishes, Amphibians and Reptiles, II, 327, 1839.
*Monocanthus pardalis*, in part, GÜNTHER, Cat., VIII, 230, 1870.
*Cantherines carolæ* JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 281, Socorro Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1713, 1898.

*Range.* — Polynesia, Hawaiian Islands, Revillagigedo Islands.

There is 1 specimen of this species in the Stanford University collection, taken by Mr. R. C. McGregor at Socorro Island. It is the type of *Cantherines carolæ* of Jordan and McGregor. We have compared this Revillagigedo specimen with 1 adult and several young of *C. sandwichiensis* from the Hawaiian Islands, and we find no specific character separating it from the latter species.

MEASUREMENTS AND FIN RAYS OF *Cantherines sandwichiensis*.

| Locality. | Socorro Id. | Honolulu. |
|---|---|---|
| Length in mm | 250 | 230 |
| Depth | 49 | 54 |
| Head | 31 | 31 |
| Eye | 18 | 19 |
| Dorsal spine | 68 | 59 |
| Longest soft dorsal ray | 45 | 43 |
| Longest anal ray | 45 | 42 |
| Median caudal rays | 54 | 59 |
| Pectoral | 40 | 36 |
| Number of dorsal rays | 37 | 32 |
| Number of anal rays | 32 | 31 |

The discrepancy between the number of fin rays in the Revillagigedo and Hawaiian specimens shown by the above table has no significance, for the rays of the dorsal fin in the other smaller Hawaiian specimens vary from 33 to 36. All of the young have the posterior rays of the soft dorsal proportionally higher than in the adults. In the young also the teeth are slenderer and more pointed than in the large specimens and the vertical dusky bars, present on the sides of the posterior half of the body in the adults, are entirely lacking. Both of the larger specimens have 2 pairs of anteriorly-curved spines on each side of the caudal peduncle, but no trace of these is present on any of the smaller specimens, which are about 140 mm. long.

In the Stanford University collection there are 2 small specimens of a *Cantherines* from Jamaica labelled *C. pullus*. These specimens are of the same size as the small Hawaiian specimens, and they differ

from the latter only in having a somewhat larger membrane back of the dorsal spine.

*Cantherines sandwichiensis* is the same as *C. nasutus*, Swainson's *type* of the genus *Cantherines*. Swainson formed this genus to include species without spines on the caudal peduncle. The lack of these spines, however, is due to immaturity, and they are perhaps developed on adult males only. Hence, the genus is not a valid one on this character, but it may be retained on the character of the smooth or only slightly roughened dorsal spine. It, then, includes *C. sandwichiensis*, *C. pardalis*, *C. pullus*, *C. scopas*, and *C. longirostris*. *C. pardalis* and *C. pullus* may prove to be synonyms of *C. sandwichiensis*. In addition to having the dorsal spine non-serrated, *Cantherines* has also an immovable ventral spine.

### 143. OSBECKIA SCRIPTA (Osbeck).

*Balistes scriptus* OSBECK, Iter Chin., I, 144, 1757, China.
*Ceratacanthus scriptus*, JORDAN & MCGREGOR, Rep. U. S. Fish Comm. for 1898 (1899), 281 (Clarion and Socorro islands).
*Alutera scripta*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1719, 1898.
*Osbeckia scripta*, JENKINS, Bull. U. S. Fish Comm. for 1902 (1903), 484, (Honolulu).

*Range.* — Of general tropical distribution; known in the Eastern Pacific from the west coast of Mexico and from Clarion and Socorro islands of the Revillagigedo Archipelago.

## Family OSTRACIIDÆ.

### 144. OSTRACION LENTIGINOSUM Bloch & Schneider.

*Ostracion lentiginosum* BLOCH & SCHNEIDER, Syst. Ichthy., 501, 1801. — JENKINS, Bull. U. S. Fish Comm. for 1902 (1903), 487 (Honolulu).
*Ostracion punctatum* BLOCH & SCHNEIDER, Syst. Ichthy., 501, 1801. — JENYNS, Voy. *Beagle*, Fishes, 158, 1842. — GÜNTHER, Cat., VIII, 261.

*Range.* — Tropical Pacific in general; Hawaiian Islands, Clipperton Island, Galapagos Islands.

One specimen from Hood of the Galapagos Islands and one from Clipperton Island, the first record of the species from the Eastern Pacific.

### 145. OSTRACION CLIPPERTONENSE Snodgrass & Heller, new species.

*Range.* — Clipperton Island.

*Type* in Stanford University Museum; Clipperton Island.

*Diagnosis.* — Differs from *Ostracion camurum* Jenkins[1] of the Hawaiian Islands only in having the spots of the back black instead of white.

*Description of the type.* — Head $3\frac{2}{3}$ in length; depth $2\frac{3}{4}$; eye $2\frac{3}{4}$ in head; interorbital width $1\frac{1}{4}$; snout $1\frac{1}{3}$ in head. D. 9; A. 9; P. 10. Length 113 mm. Profile of front of head steep, forming a prominent angle before front of eye, back of which gently ascending to occiput; body deepest through base of pectoral, tapering regularly posteriorly with gently rounded outlines; angles of carapace rounded; no spines anywhere; sides with slight convexity; gill-slit not very oblique, $2\frac{1}{4}$ in interorbital width, a groove extending forward from its lower end toward the snout; eye a little greater than length of gill-slit, $2\frac{1}{2}$ in head; mouth small; lips large, concealing the teeth; teeth brown, 10 in each jaw, in a single series.

Dorsal fin short, highest anteriorly, longest rays $1\frac{2}{3}$ in head; anal similar to dorsal but not so high and more rounded; pectoral rounded, third and fourth rays longest, $1\frac{1}{2}$ in head; caudal fin truncate, the angles rounded, 5 in length.

Scutes of carapace covered with small tubercles, arranged most thickly in center of each; 12 scutes in a line between eye and caudal peduncle, 13 in a longitudinal series on belly, 10 in a transverse series.

Color (in alcohol), back and sides blackish, belly pale greenish yellow; snout anteriorly, large spot below eye, and broad interorbital band, yellow; dusky color of head before interorbital band darker than that back of it; caudal peduncle brown, with a few rather large white spots; fins pale yellowish with dark-brown bases; basal half of caudal fin brown, the brown with concave crescentic posterior margin; carapace spotted above with small round black spots, these spots situated on center of each scute except on occiput where the position is generally eccentric; a few whitish spots on sides.

Proportional measurements: Head 28; depth 36; interorbital width 24; eye 11; snout 24; gill-slit 10; longest dorsal ray 15; longest anal ray 13; length of pectoral 21; median caudal rays 23; length of dorsal edge of caudal peduncle 14; depth of caudal peduncle 10.

We have only 1 specimen from Clipperton Island.

The Hawaiian specimens of *O. camurum* differ in shape from our specimen of *O. clippertonense* only in having the sides concave instead of slightly convex; the latter may be swollen.

The pattern of the ground-color is exactly the same in all, the inter-

[1] Bull. U. S. Fish Comm. 1899 (1901), 397, fig. 9 (Honolulu). Type, No. 49697, U. S. Nat. Mus. Coll. Dr. O. P. Jenkins.

orbital band and the contrast of the darker color before it with the paler color behind it are characteristic marks. The only difference is in the maculation. The Hawaiian specimens all have white spots instead of black ones. In some, these spots are confined to the back of the carapace as are the black ones in the Clipperton specimen, the sides being plain. Others are spotted above and on the sides. In 2 the spots on the side are ocelli, having (in alcohol) a white center and a wide black marginal ring. One has the spots of the upper parts of the sides black like those on the back of the Clipperton specimen. The latter may, of course, prove to be simply a color variation of *O. camurum*.

## Family TETRAODONTIDÆ.

### 146. SPHEROIDES ANGUSTICEPS (Jenyns).

*Tetrodon angusticeps* JENYNS, Voyage Beagle, Fishes, 154, pl. 28, 1842, Galapagos Islands.

*Spheroides angusticeps*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889 (1890), 183 (Chatham Island; Charles Island; Panama). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1731, 1898.

*Range.* — Pacific coast of tropical America, Galapagos Islands.

We did not meet with this species, but it was obtained by Darwin and by the *Albatross* at the Galapagos Archipelago.

### 147. SPHEROIDES LOBATUS (Steindachner).

*Canthigaster lobatus* STEINDACHNER, Ichthyol. Notizen, X, 18, pl. 5, fig. 3, 1870, Altata.

*Spheroides lobatus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1731, 1898.

*Range.* — Pacific coast of tropical America, from the Gulf of California to Panama; Galapagos Islands.

There is one small specimen of this species in the Stanford University collection from the Galapagos Archipelago collected by the *Albatross*, but the only *Spheroides* that we obtained is *S. annulatus*.

### 148. SPHEROIDES ANNULATUS (Jenyns).

*Tetrodon annulatus* JENYNS, Zoöl. Beagle, 153, 1842, Chatham Island.

*Spheroides annulatus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 183 (Indefatigable, Albemarle and Chatham islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1735, 1898.

*Range.* — Pacific coast of tropical America and the Galapagos Islands.

We have 17 specimens from Tagus Cove and Turtle Point, Albemarle, Hood, Seymour and Chatham islands.

The color of the different specimens varies considerably but they appear to be all 1 species. Two specimens, when fresh, were colored as follows: (1) above dusky, sides stone gray spotted with blackish; belly white; lips faint pinkish; iris golden; pectoral yellow-olive; caudal bluish-dusky; dorsal dark like back; anal pinkish-white; (2) above olive, banded with grayish-green; sides brownish olive; iris orange-golden; anal pinkish-white; everywhere except on belly spotted with small dark olive spots.

### 149. TETRAODON SETOSUS (Smith).

*Tetraodon setosus* SMITH, Bull. Cal. Acad. Sci., II, 6, Nov. 13, 1886, Mexico.
*Ovoides setosus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1739, 1898; ibid., Check-list, 426.

*Range.* — West coast of Mexico; Revillagigedo, Clipperton, Cocos and Galapagos islands.

We have 7 specimens of an *Ovoides* which differ somewhat from one another, but all appear to be *O. setosus*. One is from Seymour Island of the Galapagos Archipelago, and the others from Clipperton and Cocos islands.

Head 3 in length (not 4 as in Jordan and Evermann). The specimen from Seymour is almost smooth, the skin having inconspicuous asperities, and is larger than the others, being 250 mm. in length. Some of the others have the ventral surface thickly covered with small, short, stiff setæ, while still others have almost the entire body beset with setæ of this sort.

The color is very variable; the following are some of the varieties: (Seymour specimen) above deep orange, back blackish, belly cream-yellow, sides, top of head and snout spotted with black; lips grayish, livid-spotted; fins inky-black with livid white spots; above eye spots like those on fins; (Cocos specimen) above dark brown, grayer on belly, fins same; anal, dorsal and pectoral light-tipped, all fins spotted with white; body covered with minute purplish spots. Another specimen is everywhere regularly and closely spotted with small round equal-sized, white spots on a plain dark ground. Some are almost plain dusky, the spots being obsolete. Still others are plain pale yellow with a few (12 to 15) small black spots scattered over the body, mostly on the dorsal surface.

## Family DIODONTIDÆ.

### 150. DIODON HYSTRIX Linnæus.

*Diodon hystrix* LINNÆUS, Syst. Nat., Ed. x, 335, 1758, India. — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1745, 1898.

*Range.* — Occurs everywhere in tropical parts of both the Atlantic and the Pacific; Revillagigedo and Galapagos islands.

We have 1 specimen, 280 mm. long, taken from the stomach of a shark (*Carcharias platyrhynchus*) caught in Tagus Cove, Albemarle Island. The color is entirely gone, but in other respects the specimen differs in no way from a specimen of *D. hystrix* in the Stanford University collection.

### 151. CHILOMYCTERUS AFFINIS Günther.

*Chilomycterus affinis* GÜNTHER, Cat., VIII, 314, 1870, no locality.
*Chilomycterus californiensis* EIGENMANN, Amer. Nat., V, 25, 1891, San Pedro, California; *ibid.*, Proc. U. S. Nat. Mus. 1892, 485, pl. 81, (figure poor). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1751, 1898.

*Range.* — Japan, Hawaiian Islands, Galapagos Islands, coast of southern California.

One specimen found dead and floating on the surface of the water in Tagus Cove, Albemarle, probably killed by dynamite we had exploded in the neighborhood. The species has been reported from San Pedro, California, and in the Stanford University collection are specimens from Japan and Honolulu.

General color brown, paler below; fins all closely spotted with small round black spots, each smaller than the pupil; sides of body and forehead spotted with larger black spots; in front of pectoral a dusky vertical band, another running downward from in front of eye to ventral side of head just back of symphysis of lower jaw where those of the 2 sides are confluent; dark area behind pectoral. The Japanese specimen has the same black bands, post-pectoral black area, and fin spots as the Galapagos specimen, but there are no spots on the body.

## Family SCORPÆNIDÆ.

### 152. SEBASTOPSIS XYRIS Jordan & Gilbert.

*Sebastopsis xyris* JORDAN & GILBERT, Proc. U. S. Nat. Mus. 8182, 369, Cape San Lucas, Lower California. — JORDAN & EVERMANN, Fishes North and Mid. Amer., 1835, 1898. — JORDAN & MCGREGOR, U. S. Fish Comm. Rep. 1898, 283 (Socorro Island, Revillagigedo Archipelago).

*Range.* — Pacific coast of Mexico and neighboring islands, Revillagigedo and Galapagos archipelagos.

A large number of specimens taken at Albemarle, Narboro, Seymour, Duncan, Chatham and Barrington. Taken by Mr. R. C. McGregor at Socorro Island, Revillagigedo Archipelago.

The specimens show considerable variation in coloration which is apparently due to age. The larger specimens are much more olive-spotted and darker than the smaller ones which are lighter and more reddish with the subopercular blotch more pronounced.

Most of our specimens were secured about rocks near shore in shallow water. A few were dredged in 14 fathoms. Length of the largest specimen 94 mm.

### 153. SCORPÆNA HISTRIO Jenyns.

*Scorpæna histrio* JENYNS, Zoöl. Voy. Beagle, Fishes, 35, 1842, pl. VIII, Chatham Island. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889, 182, Charles and Hood islands, Galapagos Archipelago). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 1843, 1898.

*Scorpæna fucata* VALENCIENNES, Voy. Vénus, V, Zoöl., 313, 1855, pl. 3, fig. 2, Galapagos Archipelago.

*Range.* — Panama south to Juan Fernandez; Galapagos Islands.

Common in the Galapagos Archipelago where the species has been taken at Chatham, Charles, Hood and Albemarle islands. Represented in the collection by 2 small specimens dredged in 14 fathoms in Tagus Cove, Albemarle Island.

Valenciennes's figure of *S. fucata*, while not agreeing exactly with *S. histrio*, shows no greater inaccuracies than many of his other figures of Galapagos species and we have therefore put it in synonymy with *S. histrio* which is the only authentic species known from the archipelago. In the figure the dorsal is figured as XI, 11 which is evidently a mistake for XII, 10.

### 154. PONTINUS STRIGATUS Heller & Snodgrass.

*Pontinus strigatus* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 208, Wenman Island.

*Range.* — Galapagos Islands.

Known from 1 specimen taken from the stomach of a shark caught near Wenman Island.

## Family GOBIIDÆ.

### 155. ELEOTRIS TUBULARIS Heller & Snodgrass.

*Eleotris tubularis* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 210, Cocos Island.

*Range.* — Cocos Island.

### 156. COTYLOPUS COCOENSIS Heller & Snodgrass.

*Cotylopus cocoensis* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 211, pl. XI, Cocos Island.

*Range.* — Cocos Island.

### 157. ZONOGOBIUS RHIZOPHORA (Heller & Snodgrass).

*Gobius rhizophora* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 212, pl. XII, Galapagos.

*Range.* — Galapagos Islands (Albemarle, Narboro, Seymour).

### 158. ZONOGOBIUS ZEBRA (Gilbert).

*Gobius zebra* GILBERT, Proc. U. S. Nat. Mus. 1890, 73, west coast of Lower California. — JORDAN & MCGREGOR, U. S. Fish Com. Rep. 1898, 284 (Todos Santos and Clarion islands). — JORDAN & EVERMANN, Fishes North & Mid. Amer., III, 2226, 1898.

*Range.* — West coast of Lower California, and Clarion Island of the Revillagigedo Archipelago.

We have examined a specimen taken by Mr. R. C. McGregor at Todos Santos Island, which differs from the description of the *type* in the distinctly ctenoid scales, in the fin formula, the dorsal being VI–I, 12, the anal I, 9, and in the teeth of the lower jaw, which are in a double series, the outer enlarged and spaced, followed by a series of much smaller and more numerous inner teeth. The discrepancies between this specimen and the *type* are undoubtedly errors due to the small size, 12 mm., of the latter.

MEASUREMENTS OF *Zonogobius zebra*.

| | |
|---|---|
| Length in mm. | 32 |
| Head | 29 |
| Depth | 23 |
| Eye | 7½ |
| Interorbital width | 2½ |
| Maxillary | 12 |
| Snout | 8 |
| Height spinous dorsal | 18 |
| Pectoral | 15 |
| Ventral | 24 |
| Caudal | 20 |

### 159. ODONTOGOBIUS GILBERTI (Heller & Snodgrass).

*Gobius gilberti* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 214, pl. XIII, Galapagos.

*Range.* — Galapagos Islands (Albemarle and Narboro).

### 160. MAPO SOPORATOR (Cuvier & Valenciennes).

*Gobius soporator* CUVIER & VALENCIENNES, Hist. Nat. Poiss., XII, 56, 1837, Martinique. — JORDAN & MCGREGOR, U. S. Fish Com. Rep. 1898, 284 (Socorro and Clarion islands, Revillagigedo Archipelago). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2216, 1898.

*Gobius arundelii* GARMAN, Proc. New Eng. Zoöl. Club, I, 63, 1899, Clipperton Island.

*Range.* — Intertropical.

This is the most abundant tide-pool fish in the Galapagos Islands. We have specimens from Albemarle, Charles, Narboro and Seymour. Equally abundant at Cocos and Clipperton islands, at the latter island taken only in the lagoon where it was the only species. Common at Socorro and Clarion islands of the Revillagigedo Archipelago.

We have compared a considerable series of Clipperton Island specimens of *M. arundelii* (Garman), with specimens taken near the type locality of *M. soporator*, and are unable to find any specific differences though they show greater variation from the *type* than do any others we have examined. Garman's specimen possessed 7 spines in the first dorsal but this number is merely a variation not recorded in specimens from any other locality. Of the 8 specimens from Clipperton Island which are in the collection, 2 have 7 spines in the first dorsal and 6 have the usual number of 6. The variations in the series from Clipperton Island is as follows: D. VI or VII–I, 9 or 10; A. I, 8 or 9. Specimens from Santa Lucia Island, West Indies, give the following variations: D. VI–I, 8 or 9; A. I, 7 or 8.

## Family MALACANTHIDÆ.

### 161. CAULOLATILUS PRINCEPS (Jenyns).

*Latilus princeps* JENYNS, Zoöl. Beagle, Fishes, 52, pl. 11, 1842, Chatham Island.

*Caulolatilus princeps*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 182 (Charles and Albemarle islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2276, 1898.

*Range.* — California coast from Monterey southward to Cape San Lucas, Lower California; Galapagos Archipelago.

Common at the Galapagos Archipelago, where known from Chatham, Charles and Albemarle. Not yet known from localities intermediate between Cape San Lucas and the Galapagos.

## Family DACTYLOSCOPIDÆ.

### 162. MYXODAGNUS OPERCULARIS Gill.

*Myxodagnus opercularis* GILL, Proc. Acad. Nat. Sci. Phila. 1861, 270, Cape San Lucas, Lower California. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2305, 1898.

*Range.* — Cape San Lucas, Lower California; San Luis Gonzales Bay in the Gulf of California; Albemarle Island, Galapagos Archipelago.

Six specimens secured at Turtle Point, Albemarle Island, the longest 43 mm. long. In coloration they are much darker than described by

Gill from Cape San Lucas specimens. A specimen in the Stanford University museum from San Luis Gonzales Bay shows indications of the dark markings of the Galapagos specimens. In the Galapagos specimens the body color is light yellowish-brown, the tip of the lower jaw, snout, interorbital and median line of the back dark-brown, nape and occiput spotted with dark brown; sides from pectoral to caudal with a broad band, 3 scales wide, of dusky-brown following the lateral line; a lighter brown band beginning at anal and extending on each side of fin to caudal; these lateral bands separated by light stripes of the body-color about one and one half scales wide; sides of head above the level of opercle brown-spotted; cheek with a golden spot below the eye; caudal, pectoral and dorsal fins dusky spotted. Scales 1–46 to 49–8. Some of the specimens, presumably males, have the pectorals greatly elongated extending much past the curve of the lateral line to about the middle of the body.

## Family BATRACHOIDIDÆ.

### 163. PORICHTHYS MARGARITATUS (Richardson).

*Batrachus margaritatus* RICHARDSON, Voy. Sulphur, Fishes, 67, 1845, Pacific Coast of Central America.

*Porichthys nautopœdium* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889, 182, Indefatigable Island.

*Porichthys margaritatus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2322, 1898.

*Range.* — West coast of Colombia; Galapagos Archipelago (Indefatigable Island).

## Family BLENNIIDÆ.

### 164. DIALOMMUS FUSCUS Gilbert.

*Dialommus fuscus* GILBERT, Proc. U. S. Nat. Mus., XIII, 1890, 452, Duncan and Albemarle islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2868, 1898.

*Range.* — Galapagos Archipelago (Duncan and Albemarle islands).

### 165. EMMNION BRISTOLÆ Jordan.

*Emmnion bristolæ* JORDAN, Proc. U. S. Nat. Mus. 1896, 454, pl. 55, fig. 1, Galapagos Islands. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2375, 1898.

*Range.* — Galapagos Archipelago.

One specimen taken by the *Albatross* in the Galapagos. Not seen by us.

### 166. RUNULA AZALEA Jordan & Bollman.

*Runula azalea* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889, 171, Indefatigable Island. — GILBERT, Proc. U. S. Nat. Mus., XIII, 1890, 453 (Indefatigable Island). — JORDAN, Proc. Cal. Acad. Sci. 1896, 233, pl. 37 (Indefatigable Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2377, 1898.

*Range.* — Galapagos Archipelago.

One specimen taken at Barrington Island. Seen in tide-pools at most of the other islands of the Galapagos and at Cocos Island.

Our specimen differs somewhat in proportions and coloration from the *type*. Length 37 mm.; head 5 in length; depth $7\frac{3}{4}$; eye 3 in head; interorbital $3\frac{1}{3}$.

*Color in life.* — Above olive; the side with a bright golden band as wide as the eye extending from snout to tail, below the stripe grayish-blue; belly bluish; head and snout above dark olive, below the level of the eye bluish like the lower part of the side; a black streak on caudal peduncle running through the fin; dorsal fin golden with a wide black band running through the middle; caudal fin red; anal lighter red; pectoral yellowish; ventrals white; iris emerald, teeth tawny-yellow.

This specimen differs from those taken by the *Albatross* at Indefatigable Island in the absence of dark transverse bars on the sides of the body and in the lesser depth.

### 167. ALTICUS ATLANTICUS (Cuvier & Valenciennes).

*Salarias atlanticus* CUVIER & VALENCIENNES, Hist. Nat. Poiss., XI, 321, 1836, Madeira.

*Rupiscartes atlanticus*, JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2397, 1898.

*Range.* — Both coasts of tropical America, north on the Pacific side to Todos Santos; Galapagos Archipelago (Albemarle, Narboro, Charles and Duncan).

*Color in life.* — Above and on sides liver-brown; the side with 7 or 8 dark brown transverse bars; the belly grayish; an olive, black centered ocellus behind the eye; dorsal fin dark brown, red bordered; caudal medially brown, the upper rays red, lower yellow; pectorals and anal brown like the body; ventrals like the belly in coloration; nuchal tentacles red; iris pea-green.

### 168. ALTICUS CHIOSTICTUS (Jordan & Gilbert).

*Salarias chiostictus* JORDAN & GILBERT, Synopsis, 363, 1883, Mazatlan, Mexico.

*Entomacrodus chiostictus*, JORDAN & MCGREGOR, U. S. Fish Com. Rep. 1898, 284 (Clarion and Socorro islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2398, 1898.

*Range.* — Pacific coast of Mexico and the Revillagigedo Islands.

Taken by Mr. R. C. McGregor at Clarion and Socorro islands of the Revillagigedo Archipelago.

169. MALACOCTENUS ZONOGASTER Heller & Snodgrass.

*Malacoctenus zonogaster* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 217, pl. xv, Galapagos.

*Range.* — Galapagos Archipelago (Tagus and Iguana Coves, Albemarle).

170. LEPISOMA JENKINSI Heller & Snodgrass.

*Lepisoma jenkinsi* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 219, pl. xvi, Galapagos.

*Range.* — Galapagos Archipelago (Iguana Cove, Albemarle).

171. ENCHELIOPHIS JORDANI Heller & Snodgrass.

*Encheliophis jordani* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 220, pl. xvii, Galapagos.

*Range.* — Galapagos Archipelago (Tagus Cove, Albemarle).

## Family OPHIDIIDÆ.

172. CHILARA TAYLORI (Girard).

*Ophidium taylori* GIRARD, Pac. R. R. Sur., x., Fishes, 138, 1858, Monterey, California.

*Chilara taylori*, JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2489, 1898.

*Range.* — Coast of California from Monterey to San Diego, Galapagos Archipelago.

One mutilated specimen taken from the stomach of a tunny at Tagus Cove, Albemarle Island. The specimen has lost by maceration the skin and the vertical and pectoral fins which are represented only by their bases. It agrees with specimens of *C. taylori* from Monterey, differing only in the slightly shorter body. The absence of the skin leaves the coloration in doubt. On account of the great break in the distribution, San Diego to Galapagos, the specimen is doubtfully referred to this species. The air-bladder is well preserved and is without posterior foramen thus separating it from *Otophidium indefatigabile*.

MEASUREMENTS OF *Chilara taylori*

| | |
|---|---|
| Length in mm | 65 |
| Head | 18 |
| Depth | 12 |
| Eye | 4 |

| | |
|---|---|
| Interorbital width | 3 |
| Snout | 4 |
| Maxillary | 8 |

173. OTOPHIDIUM INDEFATIGABILE Jordan & Bollman.

*Otophidium indefatigabile* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889, 172, Indefatigable Island. — GILBERT, Proc. U. S. Nat. Mus., XIII, 1890, 453 (Gulf of Panama). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2490, 1898.

*Range.* — Gulf of Panama and Galapagos Archipelago.

One specimen taken by the *Albatross* at Indefatigable Island. Not seen by us in the Galapagos Archipelago.

## Family BROTULIDÆ.

174. PETROTYX HOPKINSI Heller & Snodgrass.

*Petrotyx hopkinsi* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., V, 1903, 222, pl. XVIII, Galapagos.

*Range.*—Galapagos Archipelago (Barrington).

175. EUTYX DIAGRAMMUS Heller & Snodgrass.

*Eutyx diagrammus* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., V, 1903, 224, pl. XIX, Galapagos.

*Range.* — Galapagos Archipelago (Tagus Cove, Albemarle; Seymour).

## Family TRIGLIDÆ.

176. PRIONOTUS MILES Jenyns.

*Prionotus miles* JENYNS, Zoöl. Beagle, Fishes, 29, pl. 6, 1842, Chatham Island. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. XII, 1889, 182 (Charles and Albemarle islands). — JORDAN & EVERMANN, Fishes North and Mid. Amer., II, 2160, 1898.

*Range.* — Galapagos Archipelago (Chatham, Charles and Albemarle islands).

## Family ECHENEIDIDÆ.

177. ECHENEIS REMORA Linnæus.

*Echeneis remora* LINNÆUS, Syst. Nat., Ed. X, 260, 1758.

*Remora remora*, GILBERT, Proc. U. S. Nat. Mus. 1890, 450 (Albemarle Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2271, 1898.

*Range.* — Tropical and subtropical seas in general. North in the eastern Pacific to San Francisco.

Common at the Galapagos Archipelago where specimens were taken at Albemarle, James and Wenman, attached to sharks (*Carcha-*

*rias platyrhynchus*). At Clipperton Island taken on *Carcharias* and green turtle (*Chelonia*).

All the specimens in the collection are small, the largest 130 mm. in length. Dorsal laminæ varying from 17 to 18.

## Family GOBIESOCIDÆ.

### 178. GOBIESOX PŒCILOPHTHALMUS Jenyns.

*Gobiesox pœcilophthalmus* JENYNS, Zoöl. Beagle, Fishes, 141, pl. 27, figs. 2, 2*a*, 2*b*, 1842, Chatham Island. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2335, 1898.

*Range.*—Galapagos Archipelago (Chatham and Albemarle islands).

Three specimens secured at Iguana Cove, Albemarle Island, the largest 45 mm. in length.

*Color in life.* — Above reddish with pale blotches and transverse stripes of olive and bluish; sides of head saffron-spotted; below whitish, reddening toward the caudal peduncle; fins ruby.

### 179. GOBIESOX ADUSTUS Jordan & Gilbert.

*Gobiesox adustus* JORDAN & GILBERT, Proc. U. S. Nat. Mus. 1881, 627, Mazatlan, Mexico. — JORDAN & MCGREGOR, U. S. Fish Com. Rep. for 1898 (1899), 284 (Clarion Island).

*Range.* — Pacific coast of Mexico, and Revillagigedo Archipelago.

Taken by Mr. R. C. McGregor at Clarion Island, Revillagigedo Archipelago.

### 180. ARBACIOSA TRUNCATA Heller & Snodgrass.

*Arbaciosa truncata* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., V, 1903, 216, pl. XIV, Galapagos.

*Range.* — Galapagos Islands (Tagus Cove and Iguana Cove, Albemarle).

## Family PLEURONECTIDÆ.

### 181. PLATOPHRYS CONSTELLATUS Jordan.

*Platophrys constellatus* JORDAN, U. S. Fish Com. Rep. 1886, 266, James Island. — JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889, 183 (Gulf of Panama). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2663, 1898.

*Range.* — Gulf of Panama and Galapagos Archipelago (James and Albemarle).

Two specimens taken at Turtle Point, Albemarle Island, the largest 58 mm. in length. These differ somewhat in proportions and coloration from the *type*. Head $3\frac{3}{4}$ in length; depth $1\frac{3}{4}$; eye $3\frac{1}{3}$ in head;

maxillary 3; interorbital 3½: D. 83; A. 64; scales 78. Compared with larger specimens taken by the *Albatross* in the Gulf of Panama they are much darker, with the light spots more variable in size and the interorbital width one-half less. Coloration, dark brown on the eyed side with lighter yellowish and dusky spots; the spots rounded and very unequal in size. Body darkest centrally, the disc near the margin with large light spots, the spots smaller centrally.

### 182. PLATOPHRYS LEOPARDINUS (Günther).

*Rhomboidichthys leopardinus* GÜNTHER, Cat. Fishes, IV, 434, 1862, locality unknown.

*Platophrys leopardinus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889, 183 (Chatham Island). — JORDAN & MCGREGOR, U. S. Fish Com. Rep. 1898, 284 (Clarion Island). — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2666, 1898. — GARMAN, Mem. Mus. Comp. Zoöl., XXIV, Rep. Expl. U. S. S. *Albatross* during 1891, XXVI, Fishes, 225.

*Range.* — Gulf of California (Guaymas); Revillagigedo, Cocos and Galapagos islands.

Taken at Catham Island by the *Albatross*. Three small specimens secured by Mr. R. C. McGregor at Clarion Island; not taken by us. Dredged near Cocos Island in 66 fathoms by the *Albatross* in 1891.

[PARALICHTHYS WOOLMANI Jordan & Williams.

*Paralichthys adspersus*, JORDAN & BOLLMAN, Proc. U. S. Nat. Mus., XII, 1889, 183 (Panama).

*Paralichthys woolmani* JORDAN & WILLIAMS, Proc. U. S. Nat. Mus., XIX, 1896, 457. (Referred by mistake to the Galapagos Archipelago.)

The type of *Paralichthys woolmani* was taken in the Bay of Panama and was at first doubtfully referred to *P. adspersus*, but later described as *P. woolmani* and erroneously recorded as taken at the Galapagos Archipelago. Known only from the *type*.]

## Family SOLEIDÆ.

### 183. SYMPHURUS ATRAMENTATUS Jordan & Bollman.

*Symphurus atramentatus* JORDAN & BOLLMAN, Proc. U. S. Nat. Mus. 1889, 177, Coast of Colombia. — JORDAN & EVERMANN, Fishes North and Mid. Amer., III, 2706, 1898.

*Range.* — Gulf of Panama and Galapagos Archipelago.

One specimen, 68 mm. in length, taken in 14 fathoms at Tagus Cove, Albemarle Island. This specimen differs slightly from the description of Panama specimens. Head 5 in length; depth 3½; D. 100; A. 75; scales 103. Coloration, light brown with 7 faint darker cross bars becoming darker posteriorly; dorsal and anal fins dark-barred for their entire length, the bars confluent on the caudal fin.

## Family ANTENNARIIDÆ.

### 184. ANTENNARIUS TAGUS Heller & Snodgrass.

*Antennarius tagus* HELLER & SNODGRASS, Proc. Wash. Acad. Sci., v, 1903, 226, pl. xx, Galapagos.

*Range.* — Galapagos Archipelago (Tagus Cove, Albemarle).

## LISTS OF SPECIES KNOWN FROM EACH ISLAND OR GROUP OF ISLANDS.

### I. REVILLAGIGIDO ARCHIPELAGO.

*Carcharias platyrhynchus*,
*Gymnothorax pictus*,
*Exocœtus volitans*,
*Mugil curema*,
*Mugil setosus*,
*Myripristis clarionensis*.
*Gymnosarda pelamis*,
*Coryphæna equisetis*,
*Zalocys stilbe*,
*Caranx marginatus*,
*Caranx melampygus*,
*Amia atricaudus*,
*Epinephelus analogus*,
*Dermatolepis punctatus*,
*Paranthias furcifer*,
*Priacanthus cruentatus*,
*Anisotremus interruptus*,
*Kyphosus elegans*,
*Cirrhitus rivulatus*,
*Pomacentrus leucorus*,
*Microspathodon dorsalis*,
*Bodianus diplotœnius*,
*Halichœres sellifer*,
*Pseudojulis notospilus*,
*Thalassoma grammaticum*,
*Calotomus xenodon*,
*Chætodon nigrirostris*,
*Zanclus canescens*,
*Hepatus aliala*,
*Xesurus punctatus*,
*Myrichthys pantostigmius*,
*Echidna nocturna*
*Exonautes xenopterus*,
*Chœnomugil proboscideus*,
*Holocentrus suborbitalis*,
*Pseudupeneus dentatus*,
*Coryphœna hippurus*,
*Trachurops crumenophthalma*,
*Caranx orthogrammus*,
*Caranx latus*,
*Caranx lugubris*,
*Kuhlia tæniura*,
*Epinephelus labriformis*,
*Prionodes fasciatus*,
*Pronotogrammus multifasciatus*,
*Lutianus viridis*,
*Kyphosus analogus*,
*Kyphosus lutescens*,
*Abudefduf marginatus*,
*Pomacentrus redemptus*,
*Microspathodon bairdi*,
*Halichœres nicholsi*,
*Pseudojulis adustus*,
*Thalassoma socorroense*,
*Thalassoma virens*,
*Forcipiger longirostris*,
*Holocanthus clarionensis*,
*Hepatus triostegus*,
*Xesurus laticlavius*,
*Balistes verres*,

*Osbeckia scripta*,
*Xanthichthys mento*,
*Tetraodon setosus*,
*Sebastopsis xyris*,
*Zonogobius zebra*,
*Alticus chiostictus*,
*Melichthys bispinosus*,
*Cantherines sandwichiensis*,
*Diodon hystrix*,
*Mapo soporator*,
*Gobiesox adustus*,
*Platophrys leopardinus*.

II. CLIPPERTON ISLAND.

*Carcharias platyrhynchus*,
*Bodianus diplotænius*,
*Balistes verres*,
*Ostracion clippertonense*,
*Mapo soporator*.
*Epinephelus labriformis*,
*Hepatus aliala*,
*Ostracion lentiginosum*,
*Tetraodon setosus*,

III. COCOS ISLAND.

*Triænodon obesus*,
*Myripristis murdjan*,
*Holocentrus suborbitalis*,
*Kuhlia tæniura*,
*Epinephelus labriformis*,
*Mycteroperca olfax*,
*Priacanthus cruentatus*,
*Lutianus jordani*,
*Anisotremus scapularis*,
*Pomacentrus leucorus*,
*Abudefduf marginatus*,
*Bodianus diplotænius*,
*Zanclus canescens*,
*Hepatus triostegus*,
*Hepatus aliala*,
*Balistes verres*,
*Melichthys bispinosus*,
*Eleotris tubularis*,
*Mapo soporator*,
*Holotrachys lima*,
*Myripristis occidentalis*,
*Caranx melampygus*,
*Amia adradorsatus*,
*Dermatolepis punctatus*,
*Pronotogrammus multifasciatus*,
*Lutianus viridis*,
*Lutianus argentiventris*,
*Kyphosus elegans*,
*Pomacentrus arcifrons*,
*Microspathodon dorsalis*,
*Holocanthus passer*,
*Ctenochætus strigosus*,
*Hepatus crestonis*,
*Xesurus laticlavius*,
*Canthidermis angulosus*,
*Tetraodon setosus*,
*Cotylopus cocoensis*,
*Platophrys leopardinus*.

IV. GALAPAGOS ARCHIPELAGO.

*Branchiostoma elongatum*,
*Carcharias galapagensis*,
*Rhinobatus planiceps*,
*Manta birostris*,
*Rabula marmorea*,
*Gymnothorax dovii*,
*Galeocerdo rayneri*,
*Sphyrna tudes*,
*Dasyatis longa*,
*Ophichthys triserialis*,
*Gymnothorax chlevastes*,
*Muræna insularum*,

*Muræna lentiginosa*,
*Zalarges lucetius*,
*Hemiramphus saltator*,
*Evolantia microptera*,
*Mugil cephalus*,
*Querimana harengus*,
*Myripristis occidentalis*,
*Holocentrus suborbitalis*,
*Gymnosarda pelamis*,
*Scomberomorus sierra*,
*Trachurus symmetricus*,
*Caranx latus*,
*Kuhlia tæniura*,
*Galeagra pammelas*,
*Epinephelus labriformis*,
*Mycteroperca xenarcha*,
*Mycteroperca ruberrima*,
*Paralabrax albomaculatus*,
*Prionodes stilbostigma*,
*Rypticus bicolor*,
*Lutianus viridis*,
*Xenocys jessiæ*,
*Anisotremus surinamensis*,
*Orthopristis forbesi*,
*Orthopristis chalceus*,
*Calamus taurinus*,
*Eucinostomus dowi*,
*Doydixodon freminvillei*,
*Corvula eurymesops*,
*Umbrina galapagorum*,
*Azurina eupalama*,
*Pomacentrus arcifrons*,
*Abudefduf marginatus*,
*Microspathodon dorsalis*,
*Bodianus diplotænius*,
*Pimelometopon darwinii*,
*Callyodon noyesi*,
*Oplegnathus insigne*,
*Holocanthus passer*,
*Zanclus canescens*
*Balistes verres*,

*Clupanodon libertatis*,
*Hyporhamphus roberti*,
*Euleptorhamphus longirostris*,
*Cypsilurus cyanopterus*,
*Mugil thoburni*,
*Sphyræna idiastes*,
*Myripristis murdjan*,
*Scomber colias*,
*Thunnus thynnus*,
*Decapterus scombrinus*,
*Caranx caballus*,
*Caranx melampygus*,
*Amia atradorsatus*,
*Epinephelus analogus*,
*Dermatolepis punctatus*,
*Mycteroperca olfax*,
*Cratinus agassizi*,
*Prionodes fasciatus*,
*Paranthias furcifer*,
*Priacanthus cruentatus*,
*Lutianus argentiventris*,
*Xenichthys agassizi*,
*Anisotremus scopularis*,
*Orthopristis lethopristis*,
*Orthopristis cantharinus*,
*Archosargus pourtalesii*,
*Xystæma cinereum*,
*Kyphosus elegans*,
*Sciæna perissa*,
*Cirrhitus rivulatus*,
*Pomacentrus leucorus*,
*Nexilarius concolor*,
*Microspathodon bairdii*,
*Nexilosus albemarleus*,
*Bodianus eclancheri*,
*Halichæres nicholsi*,
*Callyodon perrico*,
*Chætodon nigrirostris*,
*Holocanthus iodocus*,
*Xesurus laticlavius*,
*Ostracion lentiginosum*,

*Spheroides angusticeps*,
*Spheroides annulatus*,
*Diodon hystrix*,
*Sebastopsis xyris*,
*Pontinus strigatus*,
*Mapo soporator*,
*Caulolatilus princeps*,
*Porichthys margaritatus*,
*Emmnion bristolæ*,
*Alticus atlanticus*,
*Lepisoma jenkinsi*,
*Chilara taylori*,
*Petrotyx hopkinsi*,
*Prionotus miles*,
*Gobiesox pœcilophthalmus*,
*Platophrys constellatus*,
*Symphurus atramentatus*,
*Spheroides lobatus*,
*Tetraodon setosus*,
*Chilomycterus affinis*,
*Scorpæna histrio*,
*Zonogobius rhizophora*,
*Zonogobius gilberti*,
*Myxodagnus opercularis*,
*Dialommus fuscus*,
*Runula azalea*,
*Malacoctenus zonogaster*,
*Encheliophis jordani*,
*Otophidium indefatigabile*,
*Eutyx diagrammus*,
*Echeneis remora*,
*Arbaciosa truncata*,
*Platophrys leopardinus*,
*Antennarius tagus*.