

# FISHES FROM ISLANDS OF THE PHILIPPINE ARCHIPELAGO

By DAVID STARR JORDAN and ROBERT EARL RICHARDSON

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In 1906 Mr. Richard Crittenden McGregor, a naturalist employed by the government of the Philippine Islands, brought to Stanford University a large collection of fishes made by him in outlying islands of the Philippine group. He was unable to work up this collection himself, as he had intended to do, and it was presented by him to the Museum of Stanford University. In the present paper is given an account of the species thus obtained. A series of these specimens has been presented through the Bureau of Fisheries to the United States National Museum. The localities represented in the collection are the islands of Calayan, Ticao, Lubang, Mindoro, Sibuyan, Romblon, and Cuyo; Aparri, Cagayancillo, and Manila, on the island of Luzon, and Iloilo, on the island of Mindanao.

The following species are thought to be new to science. The numbers in parentheses apply to the type specimens in Stanford University Museum.

*Pisodonophis macgregori* (20210).

*Leiuranus lithinus* (20211).

*Cœcula mindora* (20209).

*Muraenichthys thompsoni* (20201).

*Barbodes hemictenus* (20213).

*Atherina panatela* (20203).

*Doryrhamphus macgregori* (20202).

*Hippocampus barbouri* (20205).

*Gnathypops dendritica* (20313).

*Abudefduf sapphirus* (20207).

*Aparrius* (new genus) (*acutipinnis*).

*Antennarius lithinostomus* (20204).

The notes on life colors and the vernacular names are given on the authority of Mr. McGregor.

### Family CARCHARIIDÆ.

#### SCOLIODON Müller & Henle.

1. *Scoliodon walbeehmii* (Bleeker).

Three specimens from Manila, 8 inches long.

### Family DASYATIDÆ.

#### HIMANTURA Duméril.

2. *Himantura uarnak* (Forskål). *Pagi*.

One specimen from Manila, 10 inches long to base of tail; length of tail, 25 inches; spots blackish, on olive ground.

### Family ELOPIDÆ.

#### ELOPS Linnæus.

3. *Elops saurus* Linnæus. *Bitbit*.

One specimen from Manila, 7.50 inches.

## Family CHIROCENTRIDÆ.

## CHIROCENTRUS Cuvier.

4. *Chirocentrus dorab* (Forskål).  
One specimen from Manila, 14.50 inches; depth, 6.75 inches.

## Family CHANIDÆ.

## CHANOS Lacépède.

5. *Chanos chanos* (Forskål). *Bangos*.  
One specimen from Manila, 8.75 inches.

## Family CLUPEIDÆ.

## DUSSUMIERIA Cuvier &amp; Valenciennes.

6. *Dussumieria elopsoides* (Bleeker).  
One specimen, 2.60 inches long, from Iloilo. Depth 5.20; head 3.50; eye 3.20; maxillary equal to eye.
7. *Dussumieria hasseltii* Bleeker.  
Depth 5.20 to 5.90; head 3.50; eye 3.75; maxillary 1.25 to 1.40 times diameter of eye. This species differs distinctly from *Dussumieria elopsoides* in its longer maxillary and its smaller scales. Eleven specimens from Manila, 2.75 inches long.

## HARENGULA Cuvier &amp; Valenciennes.

8. *Harengula sundaica* (Bleeker). *Sardina*.  
Depth 3.16 to 3.33. Color silvery; upper third dark blue; dorsal and caudal dusky; other fins clear. In alcoholic specimens there are traces of a row of black spots along upper part of side, though much fainter than in *Harengula gibbosa*.  
Specimens as follows: Manila, six, 3.50 to 4.50 inches; Iloilo, one, 2.60 inches; Aparri, one, 4.25 inches.
9. *Harengula gibbosa* (Bleeker). *Sardina*.  
Depth 3.83. Life colors as in *Harengula sundaica*. This is a slightly slimmer fish than *Harengula sundaica*, and shows much more plainly the row of dark spots on the upper portion of the side.  
Two specimens from Manila, 3.30 and 4.50 inches long.
10. *Harengula moluccensis* (Bleeker).  
Depth 4.25; head 4.20. Spots on upper portion of sides faint.  
Two specimens from Manila, 3.50 inches.

## ILISHA Gray.

11. *Ilisha hoevenii* (Bleeker). *Sardina*.  
One specimen from Manila, 3.20 inches.

## Family DOROSOMATIDÆ.

## ANODONTOSTOMA Bleeker.

12. *Anodontostoma chacunda* (Hamilton-Buchanan). *Cabase*.  
One specimen from Manila, 5.25 inches, and one from Iloilo, 3.85 inches long.

## Family ENGRAULIDÆ.

## ANCHOVIA Jordan &amp; Evermann.

(*Stolephorus* Bleeker, not of Lacépède.)

13. *Anchovia hamiltonii* (Gray). *Dumpilas*.  
Depth 3.50; head 4.50; dorsal 12; anal 38; backward process of maxillary extending beyond opercular opening and nearly to base of pectoral fin.  
One specimen, 6 inches long, from Manila, and one, 3.60 inches long, from Iloilo.
14. *Anchovia boelama* (Forskål).  
Depth 4.33; head 3.75; dorsal 13; anal 30; scales 31-44. Life color metallic silvery, specked with brown above; a small blood-colored spot behind upper margin of opercle; caudal washed with pale yellow and red; occiput with a touch of red; muzzle red, with many small black dots. The maxillary process is short, not extending beyond gill-opening.

Seven specimens from Cagayancillo and one from Iloilo, 2.50 to 3.50 inches long. This species occurs near the shore in schools. Great numbers are taken at Cagayancillo with circular casting nets. (McGregor.)

15. *Anchovia setirostris* (Broussonet).

Depth 4.30; head 4.30; eye 3.60; dorsal II, 12; anal I, 31; scales 35. Maxillary with an extremely long backwardly directed process, reaching almost to the vent.

One specimen from Aparri, 3.50 inches long.

Family SYNODONTIDÆ.

*SYNODUS* Bloch & Schneider.

16. *Synodus japonicus* (Houttuyn). (*Synodus varius* (Lacépède).)

General color gray, mottled and finely speckled with dark brown; white below. One specimen 3.75 inches long and one 6 inches, from Cuyo.

SAURIDA Cuvier.

17. *Saurida argyrophanes* Richardson.

Depth 7; head 4.50; eye 5.30; dorsal I, 11; anal I, 10; scales 57; pectoral 1.6 in head. Color in life brown above with a silvery spot on each scale; sides silvery; belly dead white with but little sheen; ventral and anal white; other fins dusky.

Four specimens from Manila, 3 to 9 inches long.

18. *Saurida gracilis* (Quoy & Gaimard).

One specimen, 3 inches long, from Cuyo.

Family ANGUILLIDÆ.

ANGUILLA Thunberg.

19. *Anguilla mauritiana* Bennett. *Kiwit*.

Color in life olive green, mottled with dark brown; belly white.

One specimen from a brackish estuary at Calayan, 16 inches long, and one from Mindoro Island, 15 inches long. Mr. McGregor records a specimen 31 inches long, whose stomach contained a snake nearly as long as the fish.

Family MURÆNESOCIDÆ.

MURÆNESOX McClelland.

20. *Murænesox cinereus* (Forskål). *Pindanga*.

Two specimens from Manila, 10 inches long.

Family MYRIDÆ.

MURÆNICHTHYS Bleeker.

21. *Murænichthys thompsoni* Jordan & Richardson, new species.

Head 6.60; depth equal to distance from tip of snout to back of orbit; length of head and trunk equal to .80 of tail; snout 1.33 times eye; cleft of mouth 2.75 in head, the maxillary extending a distance

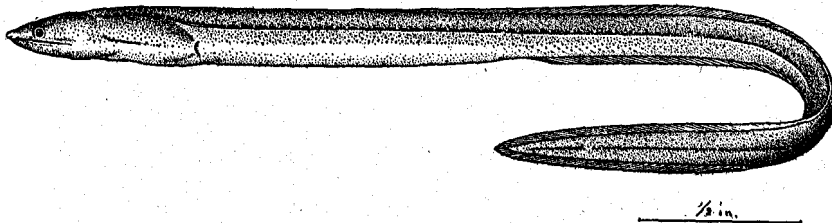


FIG. 1.—*Murænichthys thompsoni*, new species. Type.

behind orbit equal to length of snout; eye 18 in head; dorsal origin almost exactly midway between vent and gill-opening, the fin very low anteriorly; tail tapered to a sharp point, tipped with a short

caudal fin continuous with dorsal and anal; no pectorals; gill-openings a distance behind eye equal to 2.25 times length of maxillary; vomerine teeth in two rows; teeth in jaws uniserial. Color in spirits light brownish, everywhere specked finely with darker, except on belly, which is pale.

This species is known to us from a single specimen, 3.75 inches long, collected in Manila Bay by Dr. J. C. Thompson, of the United States Navy, for whom the species is named. The type is no. 20201, Stanford University.

In its large mouth and in many other features this eel resembles *Murzenichthys macrostomus* Bleeker, but the insertion of the dorsal fin is different.

#### Family OPHICHTHYIDÆ.

##### PISOODONOPHIS Kaup.

#### 22. *Pisoodonophis cancrivorus* Richardson. *Igot.*

Depth 32; head 8.5; cleft of mouth 2.8 in head; eye 1.75 in snout; pectoral 3.75; head in distance from gill-opening to vent 2.5; trunk equal to head and body equaling .78 of tail, in which it is contained 1.37 times; dorsal inserted over middle of pectoral. Color in life light brown above; white below; chin and throat pale yellow; pectoral yellowish; dorsal edged with black; anal edged with black on posterior border.

One specimen from Cuyo, 20 inches long, and one from Manila, 28 inches.

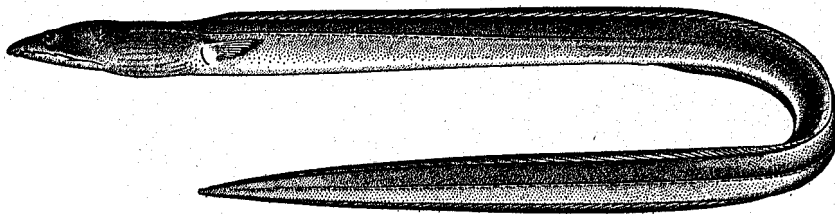


FIG. 2.—*Pisoodonophis macgregori*, new species. Type.

#### 23. *Pisoodonophis macgregori* Jordan & Richardson, new species.

Depth 33; head 7.90 in total length; head in distance from gill-opening to vent 2; combined length of head and trunk equal to .66 of tail; cleft of mouth 2.75 in head; eye 1.50 in snout; pectoral 3.50; dorsal inserted over first fifth of pectoral; teeth molar in irregular double bands on jaws and vomer.

Color brown above and on sides, finely punctulated; under parts paler; dorsal and anal rather broadly margined with blackish.

This species has the body shorter and the dorsal inserted farther forward than in *Pisoodonophis cancrivorus*.

One specimen, 10 inches long, from Manila; no. 20210, Stanford University.

##### OPHICHTHUS Ahl.

#### 24. *Ophichthus tapeinopterus* (Bleeker).

One specimen from Manila, 10.75 inches long.

#### 25. *Ophichthus grandoculis* (Cantor).

Depth 28; head 9.8 in total length; head in distance from gill-opening to vent 2.9; combined length of head and trunk equal to .66 of tail; cleft of mouth 3.75 in head; pectoral 3.20; dorsal inserted over middle of reflexed pectoral; teeth in jaws uniserial; teeth on vomer in a double row anteriorly.

Body very finely and uniformly punctulated with brownish above and below and on sides, except for lateral part of abdomen, which is whitish; dorsal and anal edged with black.

One specimen, 10 inches long, from Manila.

##### LEIURANUS Bleeker.

#### 26. *Leiuranus lithinus* Jordan & Richardson, new species.

Depth 32; head 10.5 in total length; tail equal to trunk and head; length of head 5 in distance from gill-opening to vent; head and trunk equal to tail; cleft of mouth 3.50 in head; pectoral 4.15; dorsal

inserted over middle of reflexed pectoral; nose rather rounded, scarcely twice eye; teeth in jaws uniserial, those in the upper jaw not so sharp as those in the lower; no teeth on vomer behind front of maxillaries.

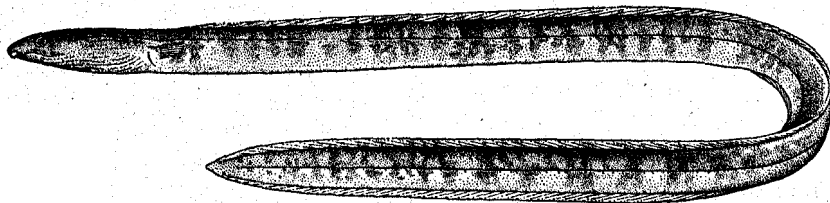


FIG. 3.—*Leluranus lithinus*, new species. Type.

Color brownish, mottled with darker above and on sides, the dark color in places tending to form vague crossbands, which do not extend on belly. (*lituros*, marbled, like stone.)

Here described from a single specimen, 12 inches long, from Cuyo; no. 20211, Stanford University.

#### CŒCULA Vahl.

27. *Cœcula mindora* (= *Dalophis* Rafinesque) Jordan & Richardson, new species.

Head 2.60 in distance from gill-opening to vent; depth 25 in total length; eye 25 in head; snout 7; cleft of mouth very wide, extending far behind eye, 2.50 in head; teeth in jaws fine, uniserial; a lengthwise row of about 6 large sharp teeth in a single row on the vomer, behind the junction of the maxillaries; tip of upper jaw with 3 large teeth in a transverse series, behind them a wide shallow cross notch into which the tip of the mandible closes; dorsal inserted one-quarter of the head's length behind the gill-openings; pectorals wholly wanting.

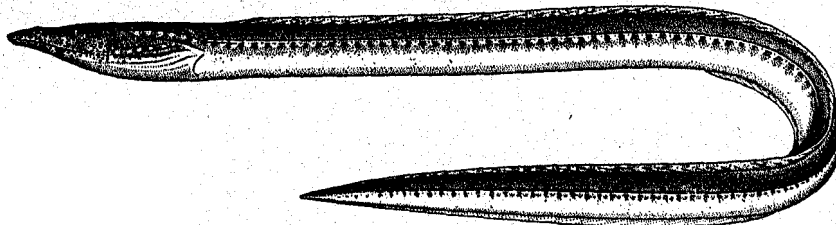


FIG. 4.—*Cœcula mindora*, new species. Type.

Color above lateral line a uniform finely punctulated dark brown; scattered punctulations extending a short distance below lateral line on trunk, a nearly sharp line separating upper from lower color on the tail; lateral line with a series of small more or less stellate whitish spots, about size of eye; belly pale; top and tip of snout blue-black; under jaw specked and splashed with bluish black.

One specimen, 15 inches long, from Mindoro Island; no. 20209, Stanford University.

#### Family MURÆNIDÆ.

##### GYMNOTHORAX Bloch.

28. *Gymnothorax pictus* (Ahl).

Life colors dark olive green, with mottlings of whitish olive in fine pattern; larger light areas on sides; no black at angle of mouth and none at gill-opening.

One specimen, 8 inches long, from Cagayancillo, and one, 4.50 inches long, from Ticao Island.

29. *Gymnothorax litus* (Richardson).

In life finely mottled with gray and brown; almost pure gray below. This species has no black at corners of mouth or on gill-openings.

One specimen from Cuyo, 9.75 inches long, and one from Cagayancillo, 10 inches.

**30. *Gymnothorax flavomarginatus* (Rüppell).**

A young specimen, 8 inches long, from Calayan. In this specimen, as in young individuals of the same size from Apia, Samoa, the ground color is very dark, the small spots being scarcely distinguishable in the nearly uniform blackish of the ground. There is a dark streak at the angle of the mouth and the gill-opening is in the middle of a black spot; tip of caudal white.

**31. *Gymnothorax richardsonii* (Bleeker).**

*Gymnothorax richardsonii*, Bleeker, Atlas, Muræn., 100, pl. XLII, fig. 2, 1864.

*Gymnothorax scoliodon*, Bleeker, op. cit., 101, pl. XL, fig. 2.

*Gymnothorax ceramensis*, Bleeker, Ned. Tijds. Dierk., I, 1863, 261; Atlas, Muræn., 101, pl. XXXIII, fig. 3, 1864.

† *Murænophis lineatus* Lesson, Voy. Coquille, 127, pl. II, fig. 1, 1830; Oualan (figure very poor).

*Muræna richardsonii* Bleeker, Nat. Tijds., III, 1852, 296; Wahai, Ceram, Padang, Sumatra.

Body slender, compressed, the depth at vent and at middle of tail about same, 18 in total length; tail a little longer than body; dorsal beginning a little in advance of gill-opening, not conspicuously higher on tail than on trunk, its greatest height considerably less than half the depth of the tail directly beneath; tail long, slender, and tapering, the dorsal and anal bordering it symmetrically and meeting in the middle line behind in an acute tip.

Body and fins crossed by many narrow vertical broken streaks or bands of dark color, more or less broken into vermiculations, especially forward; corner of mouth with a dark streak, above and below (in front) which is a larger light spot; chin pale.

One specimen, 8 inches long, from Sibuyan.

This species seems to be different from Lesson's *flaveolus*,<sup>a</sup> and perhaps also from his *lineatus*,<sup>b</sup> both of which species are said by Lesson to have an especially elevated dorsal fin. Specimens from Apia, Samoa, referred by Jordan & Seale to *Gymnothorax lineatus*, have the height of the dorsal more than half the depth of the tail underneath, and the body is less slender and the tail stouter and much less tapered than in *Gymnothorax richardsonii*, as shown in Bleeker's figure of both this and *ceramensis*. In the Apia specimens the caudal border, also, is broadly and asymmetrically rounded, not pointed, being most developed ventrally. Lesson's figures, though evidently very poor in details, show two eels of quite different relative length. It seems that the Apia specimens are more likely to be *flaveolus* than *lineatus*, the latter being represented as the slenderer fish in the figure. It seems quite possible that *lineatus* may not be different from Bleeker's *richardsonii*. *Gymnothorax detactus* Bryan & Herre appears likewise to be scarcely, if at all, different from the present species.

**32. *Gymnothorax petelli* (Bleeker).**

*Muræna petelli* Bleeker, Nat. Tijds., XI, 1855, 84; Java. Günther, Cat., VIII, 1870, 105; Java, Mauritius.

*Gymnothorax petelli* Bleeker, Atlas, Muræn., 99, tab. XXXII, fig. 1, 1864. Jordan & Seale, Bul. U. S. Fish Comm., XXV, 1905, Samoa.

(?) *Muræna interrupta* Kaup, Apodes, 67, fig. 51, 1854; Red Sea.

*Gymnothorax leucacme* Jenkins, Bul. U. S. Fish Comm., XXII, 1902, 427, fig. 7; Honolulu.

*Gymnothorax waiialua* Snyder, Bul. U. S. Fish Comm., XXI, 1902, 520, pl. 6; Waiialua (near Honolulu).

A very young specimen of this species, 3 inches long, from Calayan, agrees perfectly with the figure and description of *Gymnothorax waiialua* Snyder. The black crossbands are 17 or 18 in number, are complete below, and mostly wider than the adjacent pale interspaces. There is a black half band across the occiput, which reaches forward in a broad point between the eyes. The side of each upper jaw is black as far back as the eye. The tip of the nose is white, and from it a white band extends backward over the muzzle to the forehead, where it sends a branch outward and downward to each eye, forming a Y on forehead and muzzle. Adults of *Gymnothorax petelli* from Apia, Samoa, show the essentials of this color pattern, including the white Y on nose. The black crossbands on the body seem to become relatively wider (than the interspaces) with age.

"*Gymnothorax rüppellii*" McClelland (= *reticularis*, Bleeker, not of Bloch) has the black cross bands much narrower than the interspaces, both in adults and young, and has no black on the nose. It is evidently distinct from *Gymnothorax petelli*, as thought by Doctor Günther, who had both adult and young specimens, from Borneo and the Moluccas. *Gymnothorax reticularis* Bloch (not of Bleeker) has the cross bands broader than the interspaces and the nose without band, but the head and back are spotted and vermiculated (as is shown in the figures by Bloch, Temminck & Schlegel, and Kaup). Specimens of this moray obtained by Messrs. Jordan & Snyder in Japan in 1901 establish apparently beyond question the identity of Bloch's species, and its distinctness from both *petelli* and *rüppellii*.

<sup>a</sup> Lesson & Garnot, Voy. Coquille, 128, pl. 11, fig. 2, 1830.

<sup>b</sup> Lesson & Garnot, op. cit., 127, pl. 11, fig. 1.



## ECHIDNA Forster.

33. *Echidna polyzona* (Richardson).

*Muraena polyzona* Richardson, Voy. Sulphur, Ichth., III, 1845, 112, pl. 55, fig. 11-14; no locality.

*Echidna zonophæa* Jordan & Evermann, Bul. U. S. Fish Comm., XXII, 1902, 167. Ibid., XXIII, pt. I, 1903, 109, pl. 21; Honolulu

*Echidna vineta* Jenkins, *ibid.*, XXII, 1902, 429; Hawaii.

*Echidna obscura* Jenkins, *ibid.*, XXII, 1902, 430, fig. 11; Honolulu.

*Echidna psalion* Jenkins, *ibid.*, XXII, 1902, 431, fig. 12; Honolulu.

(f) *Echidna leihala* Jenkins, *ibid.*, XXII, 1902, 428, fig. 9 (body not barred except at tip of tail).

(?) *Pacilophis tritor* Vallant & Sauvage, Rec. et Mag. Zool. (3), III, 287, 1875; Hawaii. Not barred.

Adults (*E. zonophæa*) have the interspaces between the 24 or 25 broad rich brown bands more or less broken up by mottlings, the plain (white?) interspaces appearing only on the tail. Young specimens have both the bands and the interspaces plain. The cross bands are obsolete on the belly. Life colors of young, white and dark brown; of adults,<sup>a</sup> brown of different shades, and golden yellow.

Crabs were found in the stomach of a large specimen.

Three specimens from Calayan, one 21 inches long and two under 5 inches. The numerous synonyms of this species seem to represent color variations, chiefly in young specimens. All of the nominal species have the white band on the snout as originally figured by Sir John Richardson.

34. *Echidna nebulosa* (Ahl).

Ground color cream in life, regularly marked with large stellate blotches of dark brown, with smaller spots of light yellow; nasal tubes orange.

One specimen from Calayan, 14 inches long.

## Family MORINGUIDÆ.

## MORINGUA Gray.

35. *Moringua abbreviata* (Bleeker).

One specimen from Ticao Island, 8 inches long.

## Family CYPRINIDÆ.

## BARBODES Bleeker.

36. *Barbodes hemictenus* Jordan & Richardson, new species.

Body moderately elongate, compressed, the back elevated, its highest point being at front of dorsal fin; head 3.60; depth 3; width of body 1.6 in head; depth of caudal peduncle 2 in head; dorsal III, 8; anal II, 6; scales  $4\frac{1}{2}$  or  $5\frac{1}{2}$ -24-2 $\frac{1}{2}$ ; scales before dorsal 9; snout 3.3 in head; eye 3.9; maxillary 3.6, reaching scarcely to front of orbit; interorbital distance 2.5 in head; mouth subterminal, very little oblique, the lips thin, the lower jaw overhung by the upper lip; upper jaw protractile; 2 barbels at each angle of upper jaw, the longest reaching to posterior margin of preopercle; nostrils separated by a small flap; head without tubercles or conspicuous pores; interorbital space gently convex; gill-membranes united to the isthmus at a point directly under the angle of the preopercle, the breadth of the isthmus about equal to diameter of eye; teeth, 2, 3, 4, or 5-4 or 5, 3, 2, slightly hooked, with narrow grinding surface; tongue adnate; origin of dorsal over third ray of ventrals, slightly nearer base of caudal than end of snout; dorsal base 1.8 in head; third dorsal spine enlarged, moderately strong, 1.2 in head, rather weakly serrated along the posterior edge of its outer half; anal equidistant between base of ventrals and base of caudal; anal base 2.8 in head; pectoral 1.25, weakly falcate, reaching within about one pupil's length of base of ventrals; ventrals 1.5, within one eye-length or less of vent; caudal forked, its middle rays but little less than half the length of its outer; scales large, cycloid; a single elevated range of scales along each side of base of dorsal and anal; accessory scale of ventral pointed, as long as eye; lateral line complete, decurved at middle, where its distance from base of ventral fin is nearly exactly twice its distance from the mid-dorsal line.

Color in spirits olivaceous, darker above; a dark lateral stripe, wider than pupil, reaching from upper corner of gill-opening to just above middle of base of caudal fin; a conspicuous roundish black spot, as large as eye, at middle of tip of caudal peduncle, immediately in front of base of caudal fin;

<sup>a</sup> The accuracy of Bloch's figure of *Gymnothorax reticularis* was affirmed by Doctor Günther more than thirty years ago (Cat., II, 106) and the relationships of the three species *reticularis*, *petelli*, and *ruppelli* outlined essentially as above.

an indistinct dark blotch on each side of front of dorsal fin, extending a very little on the base of the fin; all of the fins faintly marked with dusky in the rays; none of the fins dark edged.

Of this species we have five specimens, 3 to 4 inches long, from Mindoro Island. The type is no. 20213, Stanford University; cotypes are no. 61685, U. S. National Museum. One of the specimens was taken at Camp Balete, Rio Baco, Mindoro. The exact locality for the others is not recorded, the label reading merely "Mindoro Island."

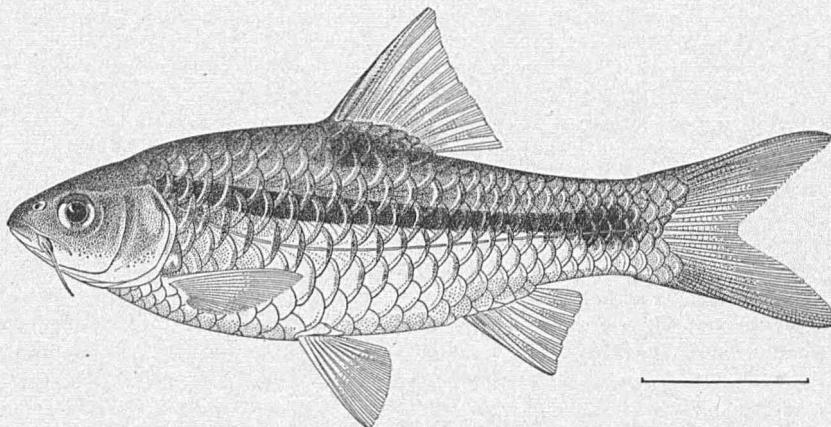


FIG. 5.—*Barbodes hemictenus*, new species. Type.

This species is near *Barbodes maculatus* Cuvier & Valenciennes (?=*B. binotatus* C. & V.), but seems to differ in its slenderer third dorsal spine, with weaker and fewer serratures, and in coloration. Specimens from Sumatra identified as *Barbodes maculatus* by Mr. Fowler agree with Bleeker's figure of the species in having the third dorsal spine strongly serrate to its base, in having the dorsal and caudal blotch indistinct, and in lacking a lateral body stripe. Mr. Fowler's specimens have the dorsal and anal distinctly tipped with dusky, which is lacking in our specimens and in Bleeker's figure of *Barbodes maculatus*. (*ήμι*, half; *κρείς*, *κρενός*, a comb.)

#### Family SILURIDÆ.

##### NETUMA Bleeker.

#### 37. *Netuma thalassina* (Rüppell).

One specimen, 3.50 inches long, with Mr. McGregor's Philippine collection, but without exact locality label.

#### Family PLOTOSIDÆ.

##### PLOTOSUS Lacépède.

#### 38. *Plotosus anguillaris* (Bloch).

Two examples from Cuyo, 5 inches long.

#### Family BELONIDÆ.

##### TYLOSURUS Cocco.

#### 39. *Tylosurus caudimaculatus* (Cuvier).

One specimen from Iloilo, 9 inches long.

#### 40. *Tylosurus giganteus* (Schlegel). *Batalay*.

Depth 3.20 in snout; head 3.15; snout 4.75; eye 2.50 in postorbital part of head; dorsal 20; anal 1, 21; dorsal inserted over third ray of anal; a slight caudal keel; no teeth on vomer; breadth of body .80 of depth.

One specimen from Manila, 15 inches long, and one from Iloilo, 7 inches.

**41. Tylosurus leiurus** Bleeker.

Depth 12 in body without head and snout; eye in postorbital part of head 2.70; dorsal 18; anal 24; dorsal inserted over seventh ray of anal; breadth of body .66 its depth; no caudal keel.

One specimen from Aparri, about 15 inches long.

**HEMIRAMPHUS** Cuvier.**42. Hemiramphus marginatus** (Forskål). *Buging*.

One example from Manila, 9 inches long.

**43. Hemiramphus limbatus** Cuvier & Valenciennes.

A specimen, 4 inches long, from Cuyo. Scales 53; head 2.70; lower jaw, beyond tip of upper, 5.50; ventrals inserted considerably nearer base of caudal than eye. In life silvery; a light green median line on side; top of head bright blue and green; beak with a small red tip.

**44. Hemiramphus neglectus** Bleeker.

A specimen, 4.50 inches long, from Aparri, agrees with Bleeker's description and figure of this species. It has scales 51; head 2.70; lower jaw, beyond tip of upper, 5.75; ventrals equidistant between base of caudal and front of pupil; teeth tricuspid; each side with a narrow silvery band, about as wide as a scale.

Doctor Günther considers this species to be identical with *H. unifasciatus* from the tropical Atlantic.

## Family EXOCETIDÆ.

**PAREXOCETUS** Bleeker.**45. Parexocetus mento** (Cuvier & Valenciennes).

Depth 4.60; head 3.75; eye 2.60 in head; dorsal 10; anal 11; pectoral half of total length without caudal. Color in life: Lower half silvery white; deep blue black above, changing to deep blue on upper part of sides, the color of which is sharply separated from the lower silvery color; pectoral white, finely speckled with dusky; dorsal dusky at tip.

Five specimens from Manila, 4 inches long.

**CYPSELURUS** Swainson.**46. Cypselurus spilonopterus** (Bleeker).

Depth 5; head 4.40; eye 3; dorsal 12; anal 9; pectoral reaching beyond middle of anal.

A single specimen, 6 inches long, taken at sea off the west coast of Negros.

## Family ATHERINIDÆ.

**ATHERINA** Linnaeus.**47. Atherina (P) lacunosa** Forster.

A specimen, 2.75 inches long, from Iloilo has the head 3.75; depth 4.3; eye 2.25; snout 4; interorbital 2.75; maxillary 2.30; dorsal v-i, 9; anal 13; scales 38-6; origin of spinous dorsal slightly nearer anal than base of ventrals; vent a pupil's length in front of tips of ventrals; in spirits straw-colored, with a silvery side stripe as wide as pupil; no trace of dusky color on pectorals.

This specimen seems to have the depth slightly greater and the scales fewer than the specimens recently recorded under this name by Evermann & Seale. We do not think it likely that the two are different. We are by no means certain of the identity of Forster's *A. lacunosa*. It is probable that the name *lacunosa* should replace *pinguis*, applied by Lacépède to specimens with a black-tipped pectoral. In such a case a new name would need to be supplied for the specimens from the Philippines. We have a specimen of an *Atherina* (labeled *lacunosa*) from Sydney, Australia, collected by Dr. D. H. Campbell, which corresponds well with the description of *Atherina pinguis*. It has the depth 4.6, scales 42, and a distinctly black-tipped pectoral. It is evidently distinct from our specimens from the Philippines and is with little doubt the *A. pinguis* of Lacépède.

**48. Atherina panatela** Jordan & Richardson, new species.

Head 4.25; depth 6.8; greatest width nearly equal to greatest depth, the body being subcylindrical, but the back broader and flatter than the belly; head as wide as deep; eye 3.1; snout 3.75; interorbital space equal to eye, flat; maxillary equal to nose, its tip under anterior margin of orbit; gillrakers 23

on lower limb of first gill-arch; teeth in upper jaw minute, in an imperfect band, with an irregular outer row, larger than the rest; teeth in lower jaw scarcely appreciable; vomer and palatines with patches of minute teeth; dorsal vi-1, 9; anal i, 11; scales 38-6; origin of spinous dorsal over nineteenth scale of lateral line; base of soft dorsal 2.60 in head; base of anal 2; longest rays of soft dorsal and anal equal to eye; pectoral 1.66 in head; axillary scale three-fifths of length of pectoral; ventral 2.2; caudal forked, its middle rays half the length of the outer; 19 rows of scales in front of spinous dorsal; margins of scales entire; vent nearer base of ventrals than anal.

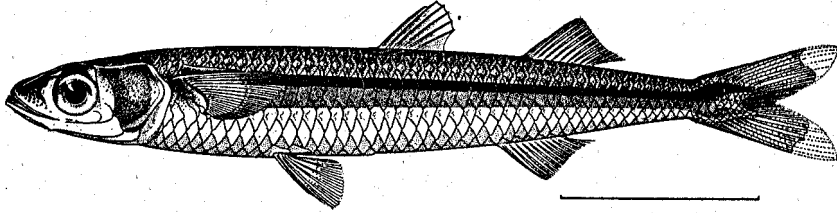


FIG. 6.—*Atherina panatela*, new species. Type.

Color in spirits dark straw; scales of back and sides with dark punctulations, forming a more or less distinct dark edge, or a submarginal dark line; each scale in third row from mid-dorsal row with a roundish black spot behind its center and just in front of an abrupt convexity in the submarginal dark line; middle of side traversed by a blackish (silvery?) band of a width equal to that of a scale; belly paler straw; top of nose, interorbital edges, and opercles blackish.

Known from a single specimen, the type, 4 inches long, no. 20203, Stanford University, from Calayan Island.

This species is close to *Atherina uisila* Jordan & Seale, from Samoa, but the position of the vent is different and the scales are smaller. In *A. uisila* the vent is nearer the base of the anal than the insertion of the ventrals, while in the present species it is nearer the ventral base.<sup>a</sup>

(*Panatela*, Spanish, the name of a long and slender cigar.)

#### Family MUGILIDÆ.

##### MUGIL Linnæus.

#### 49. *Mugil cephalus* Linnæus.

One example, 6 inches long, from Calayan.

##### LIZA Jordan & Swain.

#### 50. *Liza troscheli* (Bleeker).

A specimen each, 3.50 inches long, from Lubang and Aparri, and two specimens from Iloilo, 3 inches.

#### 51. *Liza oligolepis* (Bleeker).

One specimen, 4 inches long, from Iloilo. Scales 26; anal iii, 9; tip of maxillary hidden when mouth is closed.

##### ÆSCHRICHTHYS Macleay.

#### 52. *Æschrichthys goldiei* Macleay. *Banac*.

*Æschrichthys goldiei* Macleay, Proc. Linn. Soc. N. S. Wales, 1883, 5, fig. 1 and 2; Goldie River, New Guinea.

One fine specimen 7 inches long and two between 4 and 5 inches from Mindoro Island. The genus *Æschrichthys* is easily recognized by the transverse groove at the back of the mandibles and the

<sup>a</sup> While the extremes of a series of species of the genus *Atherina* differ widely in the position of the vent, we find such complete intergradation that it is impossible to make use of this feature as a generic distinction. In five species before us, all of which have the vent situated behind the tips of the ventrals, the position varies as follows: (1) Exactly halfway between base of anal and base of ventrals, *tsurugæ*; (2) slightly nearer anal than ventral base, *uisila*; (3) slightly nearer ventral than anal base, *panatela*; (4) much nearer anal than ventral base, being almost equidistant between tips of ventrals and base of anal, *hepsetus* and *mochon*.

In five species which have the vent in front of tips of ventrals its different positions are as follows: (1) Barely in front of tips of ventrals, *insularum*; (2) one pupil-length in front of ventral tips, *bleekeri*, *pinguis*, and (?) *lacunosa*; (3) one eye-length in front of tips of ventrals, *woodwardi*.

smooth, toothless lower jaws. Our specimens doubtless came from fresh water, though this is not stated on the locality label.

Family SPHYRÆNIDÆ.

SPHYRÆNA Linnæus.

53. *Sphyræna jello* Cuvier & Valenciennes.

One specimen, 4 inches long, badly broken, from Iloilo.

54. (P) *Sphyræna commersonii* Cuvier & Valenciennes.

A specimen, 6 inches long, from Aparri, agreeing with *S. snodgrassi*, from Honolulu, Hawaii, in every respect except that there is a slight tentacle at tip of chin. Scales 80; head 2.80; depth 7.50; nose 2.20; eye 2.70 in snout; maxillary 2.25, not reaching front of eye; opercle with a single flexible point; sides with about 12 indistinct cross bands.

From *S. commersonii* as understood by Günther and Day, this specimen differs in its shorter maxillary. We are not certain that it is possible to determine satisfactorily what species was meant by Cuvier & Valenciennes in their original description of *S. commersonii*. Lacépède's figure of "*le Sphyrène chinoise*," on which the original description of Cuvier & Valenciennes was in part based, is poor to the point of wretchedness.

Family POLYNEMIDÆ.

POLYDACTYLUS Rafinesque.

55. *Polydactylus zophomus* Jordan & McGregor.

*Polydactylus zophomus* Jordan & McGregor, in Jordan & Seale, Bul. U. S. Fish Comm., xxvi, 1906, p. 11, fig. 4; Cavite, P. I.

Two examples, 5 inches long, from Manila, and one from Iloilo, 3 inches. In life white, with metallic golden and green reflections; dorsal and caudal dusky pale greenish; pectoral, ventral, and anal dusky, with wash of yellow; a dusky blotch behind upper margin of opercle.

56. *Polydactylus tetradactylus* (Shaw). *Mamalay*.

Two specimens, 4.50 inches long, from Manila.

Family FISTULARIIDÆ.

FISTULARIA Linnæus.

57. *Fistularia petimba* Lacépède. *Torotot*.

A specimen, 10 inches long, from Cuyo, and one from Lubang, 9 inches. In life dark greenish; under side of head and a line along belly to vent white.

58. *Fistularia serrata* Cuvier.

Two specimens, 6 to 7 inches, from Manila. In life light brown above and white below.

Family CENTRISCIDÆ.

ÆOLISCUS Jordan & Starks.

59. *Æoliscus strigatus* (Günther).

Seventeen specimens from Cagayancillo, 4 to 5 inches long.

Family SYNGNATHIDÆ.

CORYTHOICHTHYS Kaup.

60. *Corythoichthys spicifer* (Kaup).

Five specimens, 4 to 5.50 inches long, from Aparri.

## CÆLONOTUS Peters.

61. *Cælonotus leiaspis* (Bleeker).

One example from Mindoro Island, 6 inches long, and one from Sibuyan, 4.50 inches. These have the dorsal rays 55, situated on 13 rings, 4 of which belong to the body; body rings 17; tail rings 31; body smooth and rounded except for the dorsal ridges, on which character, combined with the long dorsal fin, Kaup's genus *Cælonotus* was founded. Doctor Günther's specimen of *C. leiaspis* had the dorsal fin standing on twelve rings.

## DORYRHAMPHUS Kaup.

62. *Doryrhamphus macgregori* Jordan & Richardson, new species.

Head 5.2 in length without caudal, greatest depth of body equal to length of postorbital portion of head; length of tail less than body, equal to length of last 17 body rings; rings of trunk 19, of tail 22; dorsal rays 27; the base of the fin .80 of head; spines at edges of body rings evident, but not prominent; lateral line continuous, passing into the lower caudal edge; snout 1.25 times postorbital part of head, the eye twice in same distance; interorbital space concave; behind the eyes, on occiput and nape, an

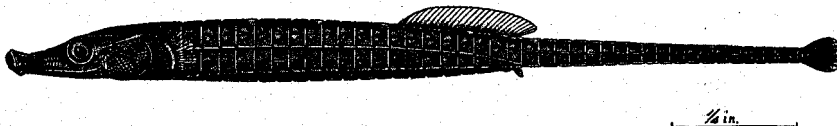


FIG. 7.—*Doryrhamphus macgregori*, new species. Type.

elevated median longitudinal ridge; lower sides of snout with two longitudinal raised edges, connected by numerous low and slight transverse keels; operculum with a slightly oblique median raised keel, from which radiate obliquely downward about 8 lesser raised lines; pectoral fin short, about equal to eye; color in spirits uniform dark brown; caudal with a whitish posterior edge.

Here described from a single specimen, 1.50 inches long, the type, no. 20202 U. S. National Museum, from Calayan. The specimen is probably a female.

Except for the much larger number of tail rings, this species seems closely to resemble *Doryrhamphus pleurotænia* (Günther).

## GASTEROTOKEUS Heckel.

63. *Gasterotokeus biaculeatus* (Bloch). *Dumdam*.

Three examples from Cuyo, 6 and 7 inches long. General color in life grass green, finely speckled with pale blue; along side of head and tube some mottling of pink; eggs pale brown.

## HIPPOCAMPUS Linnæus.

64. *Hippocampus kuda* Bleeker.

One example, 5 inches long, from Mindoro Island, agreeing with the specimen recorded by Jordan & Seale from Cavite. The specimens we have called *H. kuda* differ from *H. aterrimus* Jordan & Snyder in color, in their smoother body, with less prominent tubercles and without tentacles, in their longer snout and relatively longer body; and in the form of the coronet and lesser prominence of the head tubercles, which bear no tentacles. The length of the snout is nearly exactly equal to the distance from the front of the orbit to the anterior rim of the nuchal pore. In *H. aterrimus* the snout is shorter, though apparently variable in length, being never greater in our specimens than the distance from the posterior (not anterior) rim of the orbit to the nuchal pore. In *H. aterrimus* the depression on the top of the coronet is distinctly 5-sided, being bounded in front by two prominent points, while in *H. kuda* the rim of the depression is triangular, the two anterior points not being developed. The head and snout of *H. aterrimus* is striped with gray, in *H. kuda* speckled with black. The difference in relative length of the body, while difficult to measure, is evident to the eye on comparison of specimens of the same size. The specimens from southern Negros called *H. kuda* by Jordan & Seale are not that species,

but *H. aterrimus*. *Hippocampus kelloggi* Jordan & Snyder resembles *H. kuda*, but seems to be well distinguished by its smoother body, the spines of which are not enlarged at intervals. The coronet of *H. kelloggi* resembles that of *H. aterrimus*, rather than that of *H. kuda*, but the posterior point is double.

**65. *Hippocampus barbouri* Jordan & Richardson, new species.**

Head 1.25 in trunk; trunk in tail 2.50; depth 1.50 in head; body rings 11; tail rings 35; dorsal rays 19 or 20, the fin situated on  $1\frac{1}{2}$  body and  $1\frac{1}{2}$  tail rings; snout equal to distance from anterior margin of orbit to upper posterior corner of operculum; eye 2.50 in snout; supraorbital spines prominent, simple, acute; nasal spine sharp, directed obliquely forward; coronet moderately low, its depression bounded by five points, two anterior, one posterior, and two postero-lateral; lower breast spines and cheek spines double on each side; spines of body prominent, larger at intervals, mostly acute, the larger ones sometimes rather rounded, but sharp-edged; spines of both head and body without tentacles.

Color light brown, the body more or less marbled and everywhere speckled or reticulated with darker; snout and top of head crossed by numerous wavy lines of blackish; eye with similar wavy lines of dusky arranged radially; dorsal crossed submarginally by a prominent longitudinal dusky bar and at middle by a fainter one.

Three specimens, two males and one female, 4 inches long, from Cuyo. The type is no. 61683 U. S. National Museum; the cotypes no. 20205, Stanford University.

On the life colors of the specimens from Cuyo, Mr. McGregor writes as follows: "General color dark dull green, lighter and more yellowish on ventral surface; interorbital, sides of face, chin, throat, and upper part of neck clear light yellow, speckled with rows of fine black dots; on the tube the dots are in transverse rows, on the body the rows are broken up or wanting."

This species appears to be near *Hippocampus angustus*, described by Doctor Günther from Freycinet Harbor, Northwest Australia, but the body is deeper and the coloration is somewhat different.

This species is named for Thomas Barbour, of Harvard University, in recognition of his work on the fishes of the Indies.

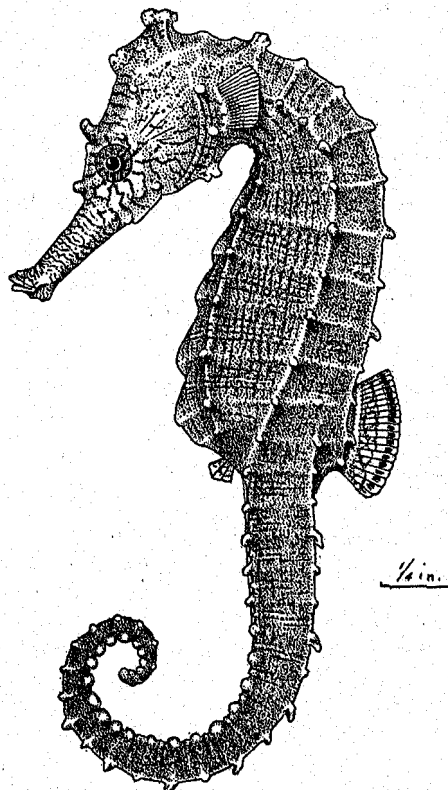


FIG. 8.—*Hippocampus barbouri*, new species. Type.

Family HOLOCENTRIDÆ.

**MYRIPRISTIS Cuvier.**

**66. *Myripristis murdjan* (Forskål). *Mangoc*.**

One example, 4.50 inches long, from Cagayancillo. Color in life crimson; under parts strongly washed with rosy; a dark spot behind opercular spine and another in axil of pectoral; dorsal membranes light colored and without opaque white spots.

**67. *Holocentrus lacteoguttatus* Cuvier & Valenciennes.**

*Holocentrum lacteoguttatum* Cuvier & Valenciennes, Hist. Nat. Poiss., III, 1829, 214; Indian Ocean, Voy. Peron.

*Holocentrum punctatissimum* Cuvier & Valenciennes, op. cit., p. 215; Caroline Islands (et al. acct.).

*Holocentrum stercus-muscarum* Cuvier & Valenciennes, op. cit., VII, 1831, 503; Guam.

*Holocentrum diploziphus* Günther, Proc. Zool. Soc., 1871, 660, pl. 60; Samoa Islands. Günther, Fische der Südsee, 97, 1873-75; Samoa, Marshall Islands, Tahiti, Paumotu, Aneiteum.

*Holocentrus gracilispinis* Fowler, Proc. Ac. Nat. Sci., Phila., 1904, 228; Honolulu.

*Holocentrus gladispinis* Fowler, *ibid.*, p. 225; Tahiti.

*Holocentrum argenteum* Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 502, 1831; New Guinea. Quoy & Gaimard, Voy. Astrolabe, Zool., 677, pl. xiv, fig. 2, 1834; New Guinea. Klunzinger, Fische des Rothen Meeres, I, 721, 1871; Red Sea.

A single specimen, 4 inches long, from Calayan. The back and sides are sparsely punctulated with minute specks. The spinous dorsal has a single row of opaque wedge-shaped white blotches.

A reexamination of the cotypes of *Holocentrus gracilispinis*, 18 in number, and ranging in size from 2 to 5.50 inches, seems to bear out Doctor Günther's view of the relations of part of the nominal species in this synonymy. The smaller specimens which are least faded are profusely covered with coffee-grain-like specks, like the specimens obtained by Jordan & Kellogg in Samoa, and the spinous dorsal has a series of conspicuous dusky blotches, above each of which is a diffused spot of opaque white. In more faded young specimens the coarser coffee-grainlike specks and the dark markings on the spinous dorsal have nearly disappeared. In specimens over 4 inches long, all of which are more or less faded, the side flecks and punctulations have almost completely disappeared in the largest, in which also the dark spots on the spinous dorsal are wanting. In one of these, 5 inches long, the opaque white blotches of the spinous dorsal, which take the place of the black and white spots of the young, form two series on the anterior part of the fin, as stated by Cuvier in the original description of *H. lacteoguttatum*. The *Holocentrum argenteum* of Cuvier & Valenciennes and of Quoy & Gaimard, described as without spots on the spinous dorsal, is doubtless not distinct from the present species, and has been so regarded by Doctor Klunzinger, who examined the types. The specimens recorded by Doctor Klunzinger from the Red Sea under the name *H. argenteum* had a row of opaque white spots on the spinous dorsal. The figure of *H. argenteum* by Quoy & Gaimard, in slight disagreement with their description, shows an opaquish blotch behind each dorsal spine.

**68. *Holocentrus ruber* Forskål. *Sugac*.**

One specimen, 5 inches long, from Cagayancillo, two from Cuyo, 2 inches, and one from Calayan, 1.50 inches. Side stripes black; outer soft ray of ventral blackish from base to tip. In life reddish with darker stripes; belly speckled; pectoral rays dark yellow; a dark blotch in upper portion of each spinous dorsal membrane. These specimens belong to the highly colored (coral reef) type called *Holocentrus prasin*.

A single specimen from Cuyo, 3 inches long, has the color much paler than in *H. prasin*. The ventrals are broadly tipped with blackish, not with the outer ray dusky and the rest pale, as in the form called *prasin*. This specimen evidently belongs to the form called *Holocentrus ruber* by authors.

**69. *Holocentrus microstomus* Günther. *Sugac*.**

One example, 4.50 inches long, from Cagayancillo. General color in life crimson; several longitudinal lines of pure white on sides; belly and chin white; flags of first dorsal crimson in membranes; a deeper colored blotch on first and second membrane; pectoral, ventral, caudal, and anal crimson.

**70. *Holocentrus sammara* (Forskål). *Sugac*.**

One specimen from Cagayancillo, 5 inches long. In life chiefly metallic silvery; scales with dusky spots forming nine longitudinal lines; head dark on top; opercle rosy; preopercle silvery; pectoral rosy; ventral white; first dorsal with deep red-brown spots in the membranes, and with an opaque (white?) spot above and below; first three membranes of spinous dorsal each with a spot of dark crimson; second dorsal with first three rays and membranes dark red, the others yellow; caudal dark reddish brown above and below; middle yellow; third spine and first ray of anal red, the rest yellow.

Family SCOMBRIDÆ.

SCOMBER Linnæus.

**71. *Scomber microlepidotus* Rüppell.**

Six specimens from Manila, 4 to 6 inches long.



## Family CARANGIDÆ.

## SCOMBEROIDES Lacépède.

This genus is distinguished from the American genus *Oligoplites* by having teeth on the pterygoids, the maxillary broad behind (probably with well-developed supplemental bone), and more numerous dorsal spines. The jaws are without anterior canines as in *Oligoplites*.

It is clear from the statement of Cuvier & Valenciennes that all of their species, except the elongate *Chorinemus tol*, and the deep-bodied *Chorinemus farkhari*, possess the small-ovate evident scales usual in this genus. *Ch. tol* has slender, needle-like<sup>a</sup> or vermiculate scales as in the species of the American genus *Oligoplites*. The difference between the pointed ovoidal scales of *S. sancti-petri* and the needle-like scales of *S. tol* is, however, apparently much more a matter of degree than that between the scales of *sancti-petri* and the nearly orbicular ones of the two known species of the genus *Eleria*.

72. *Scomberoides tol* (Cuvier & Valenciennes). *Pipicao*.

*Chorinemus tol* Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 385, 1831; Pondcherry. Gunther, Cat. Fishes, II, 473, 1860.  
*Chorinemus moadetta*, Day, Fishes India, 230, pl. LIB. fig. 1, 1876 (not of Cuvier & Valenciennes, which—*Scomberoides sancti-petri*, a species with pointed ovoidal scales, and with two rows of spots on each side).  
*Scomberoides toloo-parah*, Jordan & Seale, Bul. U. S. Fish Comm., xxvi, 1906, 13; Cavite, P. I. (not of Rüppell).

Two specimens from Manila, 6 and 8 inches. This species is well distinguished from others of its genus by its slender form and narrow needle-like scales. The specimens from Giran, Formosa, identified by Jordan & Evermann as *Scomberoides orientalis*, belong to *Scomberoides tol*.

73. *Scomberoides toloo-parah* Rüppell.

Two specimens, 10 inches long, from Cavite, taken by Dr. G. A. Lung, and recorded by Jordan & Seale as *Scomberoides tala*, evidently belong to this species of Rüppell. They are marked by the long vertical fingermark-like blotches on each side, the anterior three of which cross the lateral line. The scales are ovate, pointed behind as in *Scomberoides sancti-petri*. The teeth are in two rows in the lower jaw, those of the inner row somewhat enlarged in the back half of the jaw; there are no anterior canines. The *toloo parah* of Russell, with spots above lateral line, and the *Chorinemus toloo* of Cuvier & Valenciennes, though both poorly characterized, are probably identical and distinct from Rüppell's species. The name *toloo* is here consequently retained for the species with anterior canines in lower jaw and with narrow maxillaries, first adequately described by Day under that name, and in the present paper recorded as *Eleria tala*.

The specimens from Hawaii described by Jordan & Evermann as *Scomberoides toloo-parah* are referable rather to *Scomberoides sancti-petri*. The specimens taken in Samoa are properly identified as *Scomberoides sancti-petri*, of which *Chorinemus moadetta* Cuvier & Valenciennes is clearly a synonym. Klunzinger's *Chorinemus moadetta* is plainly *Scomberoides tol*.

## ELERIA Jordan &amp; Seale.

This genus, originally based on *Eleria philippina* Jordan & Seale (= *Chorinemus tala* of Day, but probably not *Chorinemus tala* of Cuvier & Valenciennes), is distinguished from *Scomberoides* by its narrow maxillaries (much as in the American genus *Oligoplites*), its nearly orbicular scales, and by the presence of outwardly directed canine teeth in the front of the lower jaw. Teeth are present on the pterygoids as in *Scomberoides*. Only the original types of *Eleria philippina* are known to us.

74. *Eleria tala* Cuvier & Valenciennes.

(?) *Scomber aculeatus* Bloch, Ichthyologia, pl. 336, 1797; no locality.  
*Chorinemus tala* and *C. toloo* Cuvier & Valenciennes, Hist. Nat. Poiss., VII, p. 37., 1831; Malabar.

A single specimen, 6.50 inches long, from Manila, and one, 4.50 inches, from Iloilo. This species differs from *Eleria philippina* in having the teeth weaker and the four anterior canines of the lower jaw directed outward at each edge of the symphysis. In *Eleria philippina* there are also two pairs of anterior canines, the posterior pair being situated inside the jaw at the symphysis and directed upward. We here follow Day in identifying the present species with the *Chorinemus toloo* of Cuvier & Valen-

<sup>a</sup> On parts of the body these become quite short and are scarcely distinguishable in form from the scales of *S. sancti-petri*.

ciennes. *Chorinemus tala*, also described as having the teeth stronger in proportion than in *Ch. lysan*, is doubtless the same. Although the dentition was not adequately described by those authors, the agreement of the specimens with the remaining details of their description is satisfactory. Two small specimens from Cavite, collected by Doctor Lung and recorded by Jordan & Seale under the name of *Scomberoides tala*, belong to the present species. *Scomber aculeatus*, scantily described by Bloch, is nearer *Scomberoides tala* than any other form.

#### TRACHUROPS Gill.

75. *Trachurops crumenophthalma* (Bloch). *Matambaca* (= "Cow-eye").  
One specimen from Manila, 5 inches long, and one from Lubang, 3.50 inches.

#### MEGALASPIS Bleeker.

76. *Megalaspis cordyla* (Linnæus). *Ureles*.  
One example from Manila, 7 inches.

#### CARANX Lacépède.

77. *Caranx forsteri* Cuvier & Valenciennes.  
Four small specimens, 2.50 to 3.50 inches, one each from Lubang, Manila, Iloilo, and Cagayancillo.
78. *Caranx ignobilis* Forskål.  
One example from Iloilo and one from Lubang, 3 inches long. This species is very close to *Caranx forsteri*, differing from it in having the breast naked except for a small central patch of scales.
79. *Caranx ire* Cuvier & Valenciennes. *Salay salay*.  
One example from Manila, 6 inches long, and one from Iloilo, 2.50 inches.
80. *Caranx affinis* Rüppell.  
A fine specimen, 6 inches long, from Cavite, taken by Doctor Lung, and recorded by Jordan & Seale as *Caranx hasseltii*, belongs to this species of Rüppell, which is distinguished from *Caranx leptolepis*, *djeddaba*, and *calla* by its more slender form. Depth 4.20 in total length, including caudal; lateral line becoming straight under seventh soft dorsal ray.
81. *Caranx leptolepis* Cuvier & Valenciennes.  
A small specimen, 3 inches in length, taken at Cavite by Doctor Lung. The lateral line becomes straight under the twelfth dorsal ray. Depth 3.60 in total length, including caudal.
82. *Caranx calla* Cuvier & Valenciennes.  
Four specimens, 3 inches long, from Manila and a single small specimen from Iloilo. This species is close to *Caranx djeddaba*, but the lower profile is more convex than the upper, and the lateral line becomes straight under the fourth or fifth soft dorsal ray. Depth 3.25 in total length. Four small specimens from Cavite, taken by Doctor Lung and recorded by Jordan & Seale as *Caranx nigripinnis*, belong to this species.
83. *Caranx djeddaba* (Forskål).  
One example, 6 inches long, from Manila. The upper and lower profile are equally curved and the lateral line becomes straight under the second soft dorsal ray. Depth 3.60 in total length. Color in life, silvery white, washed with pale yellow along lateral line; caudal strongly lemon yellow, the upper fork edged with dusky; upper parts deep blue; snout brown; a black blotch on upper posterior edge of opercle; pectoral, anal, and ventrals pure white; dorsals edged with dusky.
84. *Caranx deani* Jordan & Seale.  
A specimen 4 inches long, from Cavite, taken by Doctor Lung and recorded by Jordan & Seale as *Caranx nigripinnis* apparently belongs to this species.
85. *Caranx armatus* Forskål.  
One specimen, 4 inches long, and one 2 inches, from Manila.
86. *Caranx altissimus* Jordan & Seale.  
Three specimens, 3 to 4 inches long, from Manila.  
Color in life, silvery white; a wash of pale blue on upper half; pectoral and caudal faintly washed with yellow; caudal edged with dusky; a small spot on posterior part of opercle, and another in axil of pectoral.

## ALECTIS Rafinesque.

87. *Alectis major* Cuvier & Valenciennes.

*Zeus gallus* Bloch, Ichthyologia, taf. 192, fig. 1, 1786; East Indies. (Not of Linnaeus, which = *Selene vomer*.)

?*Zeus virescens* Lacépède, Hist. Nat. Poiss., iv, 583, 1803; Atlantic, Mediterranean, East Indies. (Description insufficient.)

*Gallichthys major* Cuvier & Valenciennes, Hist. Nat. Poiss., ix, 169, pl. 254, 1833; East Indies.

*Scyris indica* Rüppell, Atlas, 128, taf. 33, fig. 1, 1826; Red Sea.

*Alectis ciliaris*, Jordan & Seale, Bul. U. S. Bureau of Fisheries, xxvi, 1906 (1907), 14. Cavite, P. I. Jordan & Evermann, Proc. U. S. Nat. Mus., xxv, 1902, 338; Formosa. (Not *Zeus ciliaris* of Bloch.)

Seven specimens from Manila, 3.50 to 4.50 inches long.

Color in life, silvery white, with blue and bronze reflections, especially on lower half; upper half, dorsal, and anal washed with yellow; a dusky line from interorbital to dorsal, and along base of dorsal on each side; dorsal fin streamers and ventrals dusky brown; pectoral clear; caudal slightly washed with yellow.

Comparison of adult specimens of *Alectis major* recently received from Formosa with specimens of *Alectis ciliaris* of the same size obtained by Doctor Gilbert at Panama leaves no doubt that the two are distinct species. They are well distinguished in Rüppell's figures (Atlas, pl. 33, fig. 1 and 2) of *Blepharis fasciatus* (= *A. ciliaris*) and *Scyris indica* (= *A. major*). Bloch's figure of *Zeus ciliaris* shows the ventrals too long, but there is no serious reason for doubting that it is the same as *Blepharis fasciatus*, distinguished as it is from Bloch's *Zeus gallus* (= *Gallichthys major* C. & V.) by its convex profile, shorter nose, longer fin streamers, and basal blotch on dorsal fin.

## Family MENIDÆ.

## MENE Lacépède.

88. *Mene maculata* (Bloch). *Zapatero*.

One specimen from Manila, 5.50 inches long.

## Family RACHYCENTRIDÆ.

## RACHYCENTRON Kaup.

89. *Rachycentron canadum* (Linnaeus).

(*Elacate pondicerriana* Cuvier & Valenciennes.)

One young specimen from Manila.

It appears that this species undergoes considerable changes in form and coloration with age. The example before us, which is 10 inches long, has the caudal scarcely emarginate, tipped both above and below with white. The median lateral band is nearly twice as wide as the eye, and prominent. The specimen agrees in all respects with Russell's figure, no. 153, called by him *Peddamottah*, and taken from a specimen 1 foot 5 inches long. An apparently excellent figure of the Atlantic form was published by Doctor Holbrook in his Ichthyology of South Carolina (pl. 14, fig. 2), evidently from an adult specimen, as the tail is deeply notched and without white edges. Doctor Holbrook had seen specimens as long as 4 feet. We do not know the length of the specimen figured by Jordan & Evermann (Fishes of North & Middle America, pl. 148, fig. 401). Professor Rüppell's figure of an adult specimen from the Red Sea (Neue Wirbelthiere, pl. 12, fig. 3) does not appear to differ essentially from the figures of Holbrook and Jordan & Evermann of the Atlantic form, except that the dusky lateral stripes are wanting, doubtless due to age. Rüppell's specimens were 2 to 2½ feet in length. Bloch's figure of *Scomber niger* was based on an old manuscript drawing by Prince Maurice of Nassau, and is extremely poor, although doubtless representing the present species.

## Family TRICHIURIDÆ.

## TRICHIURUS Linnaeus.

90. *Trichiurus haumela* (Forskål).

One specimen, 15 inches long, and three under 9 inches, from Manila. Color in life silvery white; dorsal pale yellow, edged with dusky; a dusky line along base of dorsal on each side; pectoral pale yellow, speckled with dusky.

This species differs from *Trichiurus savala* Cuvier in its much larger eye, which is contained 2.50 in the snout. *Trichiurus savala* is stated by Doctor Günther, who had specimens, to have the eye 3.50 in snout and is so figured by Cuvier & Valenciennes. Specimens recorded by Jordan & Seale from Cavite as *T. savala* are not that species, but are *Trichiurus haumela*.

#### Family STROMATEIDÆ.

##### APOLECTUS Cuvier & Valenciennes.

#### 91. *Apolectus niger* (Bloch).

Three specimens from Manila, 2.50 inches long.

#### Family EQUULIDÆ.

##### EQUULA Cuvier.

#### 92. *Equula insidiator* (Bloch).

Four specimens from Manila, 3 inches long.

##### LEIOGNATHUS Lacépède.

#### 93. *Leiognathus ensiferus* (Cuvier & Valenciennes).

*Equula ensifera* Cuvier & Valenciennes, Hist. Nat. Poiss., x, 66, 1835; Pondicherry.

(?) *Scomber edentulus* Bloch, Ichth., pl. 428, 1785; Tranquebar.

*Equula dussumieri* Cuvier & Valenciennes, Hist. Nat. Poiss., x, 77, pl. 283, 1835; Coromandel. Günther, Cat. Fishes, II, 500, 1860; Borneo. (Not *Leiognathus dussumieri* of Jordan & Seale, except in part, or of Evermann & Seale.)

? *Equula edentula*, Günther, Cat. Fishes, II, 498, 1860; in part.

Depth 1.80 (2.33 in total length); head 3.2 (4.16 in total length); nose short, rather deep, hardly equaling eye; eye 28 in head; nuchal spine straight, its length from the base of its median ridge  $1\frac{1}{2}$  times eye, the tip of the spine reaching much more than halfway from its base to the first dorsal spine; supraocular ridges distinctly convergent posteriorly; mandible very little concave; lower margin of preopercle with a few indistinct and discontinuous fine serratures; teeth evident; second dorsal spine broken off; ventral spine short, not more than  $\frac{3}{4}$  length of second anal spine; pectoral 1.25 in head; scales larger than in allied species of *Leiognathus*, about 22 series before origin of spinous dorsal; color silvery, bluish above; anterior rays and membranes of spinous dorsal with dusky tinge; axil of pectoral blackish; sides of muzzle rather heavily punctulated with blackish.

Color in life silvery; lateral line and edge of dorsal and anal bright lemon yellow; base of pectoral dusky, basal half of fin yellow; caudal washed with yellow, edged with dusky; sides of snout dusky.

This species is most readily distinguished from those we have called *Leiognathus caballus* and *coma* by its less concave mandible and its larger scales. We do not believe that the *Equula ensifera* and *E. dussumieri* of Cuvier & Valenciennes are distinct, those authors stating that *E. dussumieri* is merely a little more oblong and has the second dorsal spine a little shorter. Cuvier's characterization of *Equula ensifera* by its second dorsal spine, which is said to be "compressed, broad, and curved like the blade of a saber," applies more or less equally to any of the three allied species with which we are here concerned. If there is any difference in this respect, the specimens we have called *L. caballus* have the second dorsal spine broadest and most saber-like of the three species. But *E. caballa* is explicitly contrasted by Cuvier & Valenciennes with *E. ensifera* and (by implication) with *E. dussumieri*, as a species differing from both in its longer head and its strongly concave mandibular outline. We are not at all certain of the identity of Bloch's *Scomber edentulus*, which is evidently both poorly described and poorly figured. It seems to us most likely that it is the fish we have here called *Leiognathus coma*, although we doubt if it is possible satisfactorily to determine it without examination of the type. Valenciennes's verification of the synonymy of *S. edentulus* with Cuvier's *E. ensifera* we can not admit to hold, this having apparently gone little, if any, further than an examination of the teeth, in order to controvert Lacépède's position in establishing his genus *Leiognathus*. The *Leiognathus argenteus* of Lacépède was founded on Bloch's description in the entire absence of specimens. The present species seems not to have been known to Russell.

Two specimens, 2.75 and 4 inches long, from Manila, and one from Iloilo, 1.75 inches. Three young specimens, 2.50 inches long, from Cavite, taken by Doctor Lung and recorded by Jordan & Seale

as *Leiognathus dussumieri* are also of this species. The *Leiognathus dussumieri* of Evermann & Seale, which has the "spine-shaped crest on nuchal region not reaching halfway to base of first dorsal spine," is evidently not this species, but probably *Leiognathus coma*.

**94. *Leiognathus caballa* (Cuvier & Valenciennes).**

*Equula caballa* Cuvier & Valenciennes, Hist. Nat. Poiss., x, 73, 1835; Indian Ocean and Red Sea. Günther, Cat. Fishes, II, 499, 1860.

(?) *Scomber equula* Forskål, Descr. Animal., 58, 1775; Red Sea.

*Totah-Karah*, Russell, Fishes Coromandel, pl. 62, 1803.

*Leiognathus dussumieri*, Jordan & Seale, Bul. U. S. Fish Comm., xxvi, 1906, 15; Cavite, P. I. (in part only, some of the specimens being *L. ensifera*; not *Equula dussumieri* of Cuvier & Valenciennes, or of Günther, or of Evermann & Seale).

*Leiognathus edentulus*, Evermann & Seale, Bul. U. S. Fish Comm., xxvi, 1906, 69; San Fabian, P. I. (not at all certainly the *Scomber edentulus* of Bloch).

Depth 1.66 (2.16 to 2.25 in total length); head 3 (3.66 to 3.75 in total length); nose longer and less deep than in *L. ensifera*, about 1.2 times eye; eye 3.1 in head; nuchal spine strongly curved, and the profile prominently concave in front of its base; length of the median nuchal ridge fully 1.5 times eye, the tip of the spine reaching considerably more than halfway to base of first dorsal spine; supraocular ridges nearly straight, or slightly divergent posteriorly; lower outline of mandible very strongly concave, lower margin of preopercle scarcely serrated; teeth minute; second dorsal spine broad and sharp-edged anteriorly, its length about 1.4 in head; ventral spine .75 of length of second anal spine; pectoral 1.25 in head; scales smaller than in *L. ensifera*, about 32 series in front of spinous dorsal; color in spirits silvery, bluish above; dorsal and caudal faintly edged with dusky; axil of pectoral blackish; sides of muzzle weakly punctulated with blackish. In life the anal fin is washed with chrome yellow.

This species may be known by its long head, very deep body, highly arched back and deeply concave profile, and its strongly concave mandibular outline. It is well described by Cuvier & Valenciennes. Our specimens, ranging in size up to 5.50 inches, give the head measurement as stated by the authors of the *Histoire Naturelle de Poissons* and quoted with interrogation by Doctor Günther. Specimens of *L. ensifera* and *L. coma* invariably have the head distinctly shorter. It is likely that Forskål's *Scomber equula*, "5 poll. long, 3 poll. latum; labium—inferius curvum, retusum," is this species, and that the name *equula* should replace *caballa*.

We have two examples, 4.50 inches long, from Manila; one from Iloilo, 2.50 inches, and one from Aparri, 2.50 inches. Three specimens from Cavite, 1.50 to 5.50 inches long, recorded by Jordan & Seale as *Leiognathus dussumieri*, belong to this species; as also one from Keerun, Formosa, 2.50 inches long, from among specimens recorded by Jordan & Evermann as *Leiognathus splendens*; and one of the same size from southern Negros, recorded by Jordan & Seale under the latter name.

**95. *Leiognathus coma* (Cuvier & Valenciennes).**

*Komah-Karah*, Russell, Fishes Coromandel, pl. 63.

*Equula coma* Cuvier & Valenciennes, Hist. Nat. Poiss., x, 76, 1835 (after Russell).

*Leiognathus dussumieri*, Evermann & Seale, Bul. U. S. Fish Comm., xxvi, 1906, 67; San Fabian, P. I. (not *Equula dussumieri* of Cuvier & Valenciennes or of Günther).

(?) *Scomber edentulus* Bloch, Ichth., pl. 428, 1785; Tranquebar.

Depth 1.9 (2.45 in total length); head 3.2 (4 in total length); nose 1.2 times eye, noticeably less deep than in *L. caballa*; eye 3.3; nuchal spine short and somewhat curved, its length not greater than eye, the tip of the spine reaching less than halfway from the base of its median ridge to the base of the first dorsal spine; supraocular ridges convergent posteriorly; mandibular outline slightly less concave than in *L. caballa*; lower margin of preopercle strongly serrate; teeth distinct; second dorsal spine longer than head; second anal spine 1.4 in head; ventral spine .6 of second anal spine; pectoral pointed, 1.3 in head; scales very small, about 35 series in front of origin of spinous dorsal; color as in *L. caballa*, but with the sides and front of muzzle with more black, and with 6 or 8 indistinct transverse bands of dusky between lateral line and dorsal outline.

We have little doubt that our specimens, one from Iloilo and two from Manila, 3 inches long, are the *Komah-Karah* of Russell. They differ from those that we have called *L. caballa* in their distinctly more slender body, slightly smaller scales, slightly less concave profile and mandibular outline, and much shorter nuchal ridge. The shortness of the nuchal ridge alone will separate them at once from *Leiognathus ensiferus*, *caballa*, *splendens*, and *fasciatus*, the two last species being, however, well enough distinguished by other characters. In form *Leiognathus coma* very much resembles *L. nuchalis*, which approaches *L. coma* in the shortness of its nuchal spine. But *L. nuchalis* is easily separated

by its nuchal blotch and much shorter second dorsal and second anal spine. We have no doubt that the *Leiognathus dussumieri* of Evermann & Seale, said to have the nuchal spine reaching less than halfway to base of first dorsal spine, is this species.

It is not impossible that this may be the *Scomber edentulus* of Bloch. Both our *L. coma* and Bloch's species have transverse bands, which are lacking in our specimens of *L. ensiferus* and *L. caballa*. Of the three species *L. coma* also agrees with Bloch's figure most nearly in its slenderness of form. Cuvier's figure of *Equula dussumieri* (= *ensiferus*), however, also shows indistinct cross bands, and it is barely possible that *Scomber edentulus* is the same as *L. ensiferus*. But the evident poorness of Bloch's figure and utter lack of specific characterization in his description stand badly in the way of any satisfactory conclusion.

**96. *Leiognathus splendens* (Cuvier).**

One specimen from Aparri, 2.50 inches long, and one from Manila, 2.25 inches.

**GAZZA Rüppell.**

**97. *Gazza minuta* (Bloch).**

Two examples, 3 inches long, from Manila; one from Lubang, 2.50 inches; and one from Iloilo, 2.50 inches.

**Family PEMPHERIDÆ.**

**PEMPHERIS Cuvier.**

**98. *Pempheris oualensis* Cuvier & Valenciennes.**

Two examples, 5.50 inches long, from Calayan.

**Family KUHLIIDÆ.**

**KUHLIA Gill.**

**99. *Kuhlia rupestris* (Lacépède).**

A single example, 7 inches in length, from Mindoro Island.

**100. *Kuhlia marginata* (Cuvier & Valenciennes). *Damagan*.**

Three specimens from Mindoro Island, 4 to 7 inches long, and one 4 inches long from Aparri. One of the smaller Mindoro specimens was taken from the Rio Baco, above tide, at Camp Balete.

**Family APOGONICHTHYIDÆ.**

**AMIA Gronow.**

**101. *Amia lateralis* (Valenciennes).**

Dorsal vi-i, 9; anal ii, 8; a narrow black line on each side from opercle to base of caudal, just before which is a small round black spot. Bleeker's *Apogon ceramensis*, from Ceram, and Day's specimens from Nicobars, called by him *Apogon ceramensis*, appear to be in no way distinguishable from the present species. The types of Valenciennes were from Vanicolo.

Of this species we have one specimen, 3 inches long, from Cuyo.

**102. *Amia novæ-guinæ* (Valenciennes).**

A single specimen, 2 inches long, from Iloilo.

**103. *Amia novemfasciata* (Cuvier & Valenciennes).**

Of this well-marked species we have four specimens from Calayan, 3 to 3.50 inches long, and a single specimen each from Cuyo and Ticao Island.

**104. *Amia quadrifasciata* (Cuvier & Valenciennes).**

Three specimens from Manila, 2.25 to 3 inches. Color in life silvery, with blue and green reflections; pectoral clear; other fins reddish; caudal with a dusky longitudinal line through middle.

**105. *Amia hyalosoma* (Bleeker).**

Two specimens from Mindoro Island, 4.50 inches long, and one from Calayan (from brackish water near stream mouth), 5 inches. These specimens agree perfectly with the description and figure of this

species published by Day. Bleeker fails to describe and omits from his figure the black blotch between the second and third dorsal spines. There is, however, scant reason for supposing that his and Day's specimens are different. *Amia jenkinsi* Evermann & Seale differs from the present species in its shorter maxillary. Life colors of Calayan specimen silvery, dusky above; a large circular dusky spot on caudal peduncle; a small dusky mark on each side above posterior base of anal.

**106. *Amia kalloptera* (Bleeker).**

A single specimen 3 inches long, from Fuga Island, evidently belongs to this species. There is an indistinct dusky lateral band, above and below which is a faint light border. At the base of the caudal fin, above the lateral line, is a black blotch as large as the pupil. There are oblique black blotches on the first four membranes of the spinous dorsal. Both soft dorsal and anal are barred across the base, and the soft dorsal is also margined with dusky. The caudal is black-edged above and below, and the membrane between the first and second rays of the ventral is blackish.

**MIONORUS Kreff.**

**107. *Mionorus glaga* (Bleeker).**

Four specimens, 2 to 3 inches, from Manila. Color in life silvery, with green reflections; dorsal and caudal edged with dusky; ventral and anal washed with yellow; pectoral faintly washed with red.

**APOGONICHTHYS Bleeker.**

**108. *Apogonichthys fo* (Jordan & Seale).**

A single example, 2 inches long, from Iloilo.

The original type of *Apogonichthys* Bleeker is *A. perdis* Bleeker (Floris). This species has an incomplete lateral line, an entire preopercle and teeth on the palatines. The genus *Apogonichthys* is therefore the same as *Foa*, and *Fowleria (aurita)* is generically distinct.

**Family AMBASSIDÆ.**

**AMBASSIS Cuvier.**

**109. *Ambassis urotænia* Bleeker (not *Ambassis urotænia* of Day).**

Four specimens, 3 to 4 inches long, from Calayan, in a brackish estuary, and one example from Iloilo, 4 inches. Lateral line not interrupted.

**110. *Ambassis kopsi* (Bleeker).**

A single specimen, 2.50 inches long, from Iloilo.

**PRIOPIS Kuhl & Van Hasselt.**

**111. *Priopis interrupta* (Bleeker).**

Two specimens from Mindoro Island, 2.50 and 3 inches long, and one from Cuyo, 2 inches.

**112. *Priopis buruensis* (Bleeker).**

Two specimens from Aparri, 2.75 and 3.50 inches long, we refer with some hesitation to this species. They are of slightly slenderer form than the specimens we have called *Priopis interrupta*, and the second dorsal spine is not so long, the specimens in these respects agreeing with those from Cavite, called *buruensis* by Jordan & Seale. In both the present specimens and in those here recorded as *Priopis interrupta* the interopercle has from 3 to 5 small denticulations in front of its posterior angle. Doctor Bleeker states (Key, Revision *Apogonini*) that the interopercle is smooth or has only a single denticulation in *Ambassis buruensis*. The two forms, as they are represented in our own specimens, are evidently very closely related, and may not be really different.

**Family SERRANIDÆ.**

**NIPHON Cuvier & Valenciennes.**

**113. *Nippon spinosus* Cuvier & Valenciennes.**

A single specimen, 3.50 inches long, from Cuyo.

Color in life pale silvery blue; fins light salmon; caudal light yellow at base.

## CENTROGENYS Richardson.

(Myriodon Brisout de Barneville; Gennadius Jordan &amp; Seale.)

114. *Centrogenys vaigiensis* (Quoy & Gaimard).*Scorpaena vaigiensis* Quoy & Gaimard, Voy. Uranie, Zool., 324, pl. LVIII, fig. 1, 1824; Waigiou.*Centrogenys waigiensis*, Bleeker, Atlas, VII, 68, pl. CCXCVII, fig. 1, 1876; East Indies.*Sebastes stoliczkae* Day, Fish. Ind., 148, pl. XXXVI, fig. 1, 1877; Nicobars (name corrected in addenda to *Myriodon waigiensis*).*Gennadius stoliczkae*, Jordan & Seale, Bul. U. S. Bureau of Fisheries, xxvi, 1906 (1907), 37; Panay, P. I.*Centrogenys vaigiensis*, Boulenger, Cat., 147, 1895; Singapore to Philippines and Australia.

One specimen from Cuyo, 3.25 inches long. The original figure of this species by Quoy & Gaimard shows the lower pectoral rays unbranched.

## VARIOLA Swainson.

115. *Variola louti* (Forskål).

A specimen, 9.50 inches long, from Calayan. Color in life dark red, spotted with darker red; terminal half of pectoral light yellow.

## CEPHALOPHOLIS Bloch &amp; Schneider.

116. *Cephalopholis miniatus* (Forskål).

One finely preserved specimen from Calayan, 7.50 inches long. In life bright scarlet, thickly spotted with dark blue.

117. *Cephalopholis argus* (Bloch). *Turnatulina*.

One example, 5.50 inches long, from Cagayancillo. Color in life dark brown, everywhere spotted with deep blue, each spot surrounded with black; spots most numerous on dorsal, caudal, and anal fins.

118. *Cephalopholis leopardus* (Lacépède).

A specimen, 6 inches long, from Calayan Island. Dorsal ix, 15; anal iii, 9; scales 7-75-30; color apparently much faded; two dusky blotches on top of caudal peduncle; fins pale; caudal with two oblique converging dark bars behind. In life bright scarlet, with dusky along sides of dorsal.

## EPINEPHELUS Bloch.

119. *Epinephelus diacanthus* (Cuvier & Valenciennes).

A specimen, 4 inches long, from Cuyo, and one 3 inches long from Cagayancillo, apparently belong to this species. Oblique body bands distinct. Teeth in two rows in anterior part of lower jaw.

120. *Epinephelus megachir* (Richardson).

Four specimens from Calayan, 3 to 3.50 inches long, conform more nearly to the description of this species than any other. The pectorals are noticeably longer than in other East Indian species of *Epinephelus*, though somewhat shorter than the head. The teeth are in two rows anteriorly in the lower jaw and in a single row behind the anterior third of the jaw. Body, head, and fins are everywhere closely spotted, the spots on the body being for the most part roundish and larger in size than the pupil. There are no cross bands.

121. *Epinephelus nebulosus* (Cuvier & Valenciennes).

Depth 3.20; head 2.60; dorsal xi, 16; anal iii, 8; scales 17-98-42; snout 4.60, equaling eye; eye 4.60; interorbital space 1.6 in eye; lower jaw slightly projecting; maxillary 2.30 in head, scarcely extending to the vertical from posterior border of orbit; teeth in two series in lower jaw; canines moderate; preopercular angle with 5 or 6 teeth larger than the rest; middle opercular spine nearer lower than upper, the lower spine scarcely as far back as upper; opercular flap pointed; head covered with cycloid scales; maxillary not scaly; gill-rakers 15 on the lower part of the anterior arch; dorsal origin over base of pectoral; longest dorsal spine shorter than soft rays; pectoral 1.6 in head; ventral 1.9, not quite to vent; third anal spine scarcely as long as second; caudal rounded; scales of middle portion of sides ctenoid, those of belly and breast and above lateral line on anterior half of body cycloid.

Color in spirits dark brownish, each side with numerous large circular pale spots, nearly as large as eye, and each encircled by a more or less continuous black border; two similar black-bordered spots on the opercle; three dark stripes radiating from the eye backward across the cheek; two zigzag black lines, bordering a pale interstripe, passing downward and backward from back of maxillary; a similar



pale cross band, bordered with blackish, on each side of chin midway of length of mandible; dorsal dusky, slightly mottled with lighter, especially anteriorly on soft dorsal; caudal blackish, with a narrow white edge and with a few small whitish spots posteriorly; anal blackish, with pale edge; ventrals dusky; outer two-thirds of pectorals blackish, with pale outer edge and with three pale crossbars, the two anterior ones incomplete, being represented in the middle of the fin by two or three separated round pale spots.

A single young specimen, 3.50 inches long, from Aparri, agrees with the figure of Bleeker except in the coloration of the pectorals. Owing to its small size, we can not be certain that the specimen is not the young of Bloch's *Epinephelus brunneus*. Bloch's figure, however, shows a considerably different coloration. From Doctor Boulenger's redescription of *E. brunneus* from a half-grown individual from the Chinese Sea, our specimen differs in the following particulars: (1) In that the scales are largely ctenoid; (2) that the lower opercular spine is not as far back as the upper; (3) that the maxillary is not scaly; (4) that the third anal spine is shorter, rather than longer, than the second. It is difficult to compare the coloration, owing to the different age of the specimens and the lack of detail in Doctor Boulenger's description. *Serranus kawamebari* of Richardson (not Temminck & Schlegel), which is thought by Doctor Boulenger to be a synonym of *Epinephelus brunneus* was said by Sir John Richardson to have the pectorals colorless (size of specimen, 6 inches). Bloch's fish had the pectorals barred.

**PLESIOPS Cuvier.**

(*Pharopteryx* Rüppell.)

**122. Plesiops nigricans** (Rüppell).

Three examples, 5 inches long, from Calayan. Dorsal spines 12.

**123. Plesiops melas** (Bleeker).

Four specimens, 2 to 2.75 inches, from Calayan. Dorsal spines 11; body without blue spots or lines.

**Family PRIACANTHIDÆ.**

**PRIACANTHUS Cuvier.**

**124. Priacanthus hamrur** (Forskål).

One specimen, 9.50 inches long, from Calayan. Uniform light scarlet in life.

**Family LUTIANIDÆ.**

**LUTIANUS (Bloch).**

**125. Lutianus argentimaculatus** (Forskål).

A specimen, 7.50 inches long, from Calayan, in a brackish estuary; one 5 inches long from Camp Balete, Rio Baco, Mindoro, above tide; and one, 4 inches, from Iloilo. Life colors of Calayan specimen dark olive green above lateral line, below dark red, more or less spotted and blotched with silvery; a wavy line of dark blue green below eye; ventral and anal red, edged with white; pectoral red.

**126. Lutianus kasmira** (Forskål).

A single example, 5 inches long, from Fuga Island.

**127. Lutianus lineatus** (Quoy & Gaimard).

A specimen, 4 inches long, from Lubang, and one from Aparri, 3 inches.

**128. Lutianus russelli** (Bleeker). *Daragdarag*.

A specimen 3.50 inches long from Cuyo, and one of the same size from Iloilo. In life, dark greenish above lateral line; side and belly silvery; each side crossed by five light orange lines, the upper one short, the second extending from the eye to the large brown spot on lateral line beneath first dorsal ray; third and fourth extending from gill-opening to caudal; fifth from pectoral to caudal; pectoral white, the other fins washed with light orange; no dark spot at base of pectoral.

The identification of these specimens with this species of Bleeker is rendered possible only by the full description of the life colors by Mr. McGregor, all traces of the orange stripes having disappeared in the preserved specimens. We are not certain that *L. russelli* is distinct from *L. fulviflamina* (Forskål). The young specimens recorded from Cavite by Jordan & Seale as *Lutianus russelli* are not this species, but are more probably *L. quinquelineatus*.

**129. *Lutianus quinquelineatus* (Bloch).**

A specimen 3.50 inches long from Manila, and one yet smaller from Aparri, we refer with some hesitation to the present species. Scales 58; dorsal x, 14; anal III, 9; tongue with teeth; back of preopercle with an evident, but not deep, notch; each side with three dusky bands, the upper band extending from top of eye to end of spinous dorsal; second band proceeding from middle of eye backward, passing through a black fingermark-like blotch, bordered with pale, which lies half above and half below the lateral line, under the front part of the soft dorsal; a distinct black blotch on upper part of base of pectoral. The life colors of the Manila specimen are thus described by Mr. McGregor: Dusky green above; white below; three obscure dusky brown longitudinal bands on side, the middle one ending in a large black oblong spot under first dorsal rays; pectoral white; anal and ventral clear light yellow; dorsal and caudal dusky.

The presence of only 3 dusky stripes, instead of 5, which Doctor Day found in specimens as small as 6 inches, we think may be due to the still more youthful condition of our specimens. The occurrence of the dark spot at the base of the pectoral appears to be a distinctive character.

The specimens recorded by Jordan & Seale from Cavite as *Lutianus russelli* belong to the present species.

**130. *Nemipterus japonicus* (Bloch).**

A single specimen, 3.50 inches long, from Manila. In life silvery, with a rosy wash; about eight obsolescent longitudinal lines of pale yellow; a broad stripe of sulphur yellow along under surface from isthmus to caudal; dorsal and caudal tipped with deep rose; caudal with a line of chrome yellow along upper margin; pectoral pale rose; ventral white; anal white with two faint rosy lines.

## Family THERAPONIDÆ.

THERAPON Cuvier.<sup>a</sup>**131. *Therapon cancellatus* (Cuvier & Valenciennes).**

Two specimens from Mindoro Island, 5 and 6 inches in length.

**132. *Therapon quadrilineatus* (Bloch).**

Four specimens, 3 to 5 inches long, from Cuyo, Lubang, Iloilo, and Aparri. General color in life silvery white; a steely gloss on upper parts; four longitudinal lines of brown on each side, with an incomplete fifth stripe between the two upper ones, stopping under the second or third dorsal spine; dorsal clear, with a dark brown blotch between third and sixth spines; on each side a dusky predorsal blotch.

**133. *Therapon puta* (Cuvier & Valenciennes).**

One specimen from Iloilo and one from Manila, 3 and 4 inches long. Life colors of Manila specimen silvery, with a light bluish wash above; two dusky green bands extending full length of side, the first originating behind middle of eye and the second just above it; a large dusky blotch on spinous dorsal; anterior margin of soft dorsal greenish; four oblique dark green bands on caudal, two on each side of a median horizontal band; pectoral and ventral clear; anal with a large diffuse blotch of dark greenish.

**134. *Therapon jarbua* (Forskål).**

A specimen each, 4 inches long, from Manila and Calayan, and two young examples, under 1 inch, from Ticao Island. Color in life of the Manila specimen silvery, washed with bluish steel; each side with three curved longitudinal bands, the first beginning at front of spinous dorsal and ending under soft dorsal, second beginning midway between occiput and first dorsal spine, curving downward to below lateral line, and then upward to its termination behind soft dorsal; third beginning on occiput, whence it passes downward along posterior margin of opercle, then backward along side, under the lateral line anteriorly, to the base of the caudal fin; three dusky bands on caudal; anal and ventral clear white, the former reddish yellow externally, the latter reddish yellow mesially; a large dusky blotch on first dorsal; two smaller dusky blotches on margin of second dorsal; an obsolete line of golden yellow above ventral and anal.

## HELOTES Cuvier.

**135. *Helotes sexlineatus* (Quoy & Gaimard).**

One example, 4 inches long, from Manila.

<sup>a</sup> Originally misprinted *Tesapon*, "an error of transcription."

## SCOLOPSIS Cuvier.

136. *Scolopsis cancellata* Cuvier & Valenciennes.

One specimen, 3.50 inches long, from Cuyo. In life the upper half brown, with three pale yellow stripes; lower half silvery white; vertical fins washed with pink; paired fins white with a black spot in each axil.

## POMADASIS Lacépède.

137. *Pomadasis argyreus* (Cuvier and Valenciennes).

Eight specimens, 2.50 to 4 inches long, from Manila. Color in life of largest examples silvery white, washed ventrally with elusive yellow; fins more strongly yellow; a dusky spot on posterior part of opercle; eye large, 3.2 in head; second anal spine long and slender.

These specimens are certainly not different from those described and figured by Bleeker as *Pristipoma argyreum*, and figured by Day as *P. guoraca*. The *P. guoraca* and *argyreum* of Bleeker appear to be different species, the first having a much smaller eye and shorter and heavier second anal spine, and being probably identical with the *Guoraka* of Russell.

138. *Pomadasis argenteus* (Lacépède).

Two specimens from Manila, 3 to 4 inches. Color in life silvery, with dusky spots on each scale of upper parts; pectoral pale yellow; other fins a little dusky; spines of dorsal silvery.

139. *Pomadasis maculatus* (Bloch).

A single example, 3 inches long, from Manila. General color in life dusky silvery; five dusky vertical blotches on side, three below dorsal crossing lateral line, and two on caudal peduncle, the first just behind soft dorsal; dorsal and caudal fins dusky; pectoral clear; ventral light yellow; anal dusky yellow.

## PENTAPUS Cuvier &amp; Valenciennes.

140. *Pentapus caninus* (Cuvier & Valenciennes). (*Pentapus bifasciatus* Bleeker.)

Two specimens, 2.50 inches long, from Cuyo. Color in life brown, the side stripes and belly white.

## PLECTORHYNCHUS Lacépède.

141. *Plectorhynchus orientalis* (Bloch).

One specimen from Calayan, 4 inches long. In life white, with large irregular dark seal brown bands and blotches; one irregular wide band from eye to end of caudal on each side, connecting across occiput; a transverse interorbital band; another paler narrow band from base of pectoral to and on anal; dusky spot on snout and another on each side below eye, bordered with yellow; caudal crossed diagonally above and below by seal brown bands; spinous dorsal crossed by two brown bands; soft dorsal with one band; both dorsals white and yellowish on margins; ventral white; red spots in axils of ventral and pectoral.

142. *Plectorhynchus lineatus* (Linnæus).

Three specimens from Aparri, 2.50 inches long, agreeing in all respects with the original figure and description of *Diagramma albovittatum* of Rüppell. Rüppell's types were 5 inches long.

## Family SPARIDÆ.

## LETHRINUS Cuvier.

143. *Lethrinus mcensii* Bleeker.

One specimen, 7.50 inches long, from Calayan. Depth 3.2; head 2.75; snout 2 in head; teeth all conical and pointed; each side with 6 indistinct dusky cross bands; a dark spot at base of each dorsal spine and ray. In life brownish; dorsal and caudal marked with red; a red spot on opercle.

This species appears to be close to *Lethrinus variegatus* Ehrenberg (*L. latifrons* Rüppell), from which it is distinguished apparently by its more slender form and by certain differences in coloration.

144. *Lethrinus mahsenoides* Ehrenberg.

A specimen 4 inches long from Cuyo agrees with others called *Lethrinus mahsenoides* by Jordan & Seale. Depth 2.50 to base of caudal; posterior teeth molar; coloration in spirits uniform pale olive, each scale of sides and back with a faint dark spot at base; base of dorsal spines dusky. The third, fourth, and fifth dorsal spines are the longest. The specimen is evidently close to *Lethrinus hæmatopterus* of Temminck & Schlegel, and may be that species. We have no notes on the life colors.

## Family KYPHOSIDÆ.

## KYPHOSUS Lacépède.

145. *Kyphosus cinerascens* (Forskål). (*Pimelepterus tahmel* of Günther.)

One example, 6 inches long, from Calayan. This species is known by its high soft dorsal, with 12 rays, and the numerous brown longitudinal stripes on the body. As pointed out by Doctor Day, it seems that the name *cinerascens* should replace that of *tahmel*, used by Doctor Günther. Forskål's *Sciæna cinerascens, tahmel*, seems to be a parallel of his *Sciæna ? armata, galem fish*. In both these cases the second word is evidently the intended specific name and should so stand.

## Family GERRIDÆ.

## XYSTÆMA Jordan &amp; Evermann.

146. *Xystæma punctatum* (Cuvier & Valenciennes).

One example, 3.50 inches long, from Calayan; one from Aparri, 3 inches; and one from Iloilo, 2.25 inches.

147. *Xystæma kapas* (Bleeker).

One specimen, 3 inches long, from Cuyo. Depth 2.8; head 3; second anal spine stronger but shorter than third; scales 40; color plain silvery, spinous dorsal tipped with dusky.

This specimen does not appear to differ, except in the smaller number of scales, from the specimens from Apia, Samoa, recorded as *Xystæma argyreum* by Jordan & Seale.

## Family MULLIDÆ.

## UPENEUS Bleeker.

148. *Upeneus chryseredros* (Lacépède). *Timbungan; Ubacan*.

Two specimens, 4 and 6.50 inches long, from Cagayancillo. In life (large specimen) white below; a bluish wash above; a rosy wash on opercle, preopercle, and tail; a yellow saddle behind second dorsal; several lines of dark yellow and lavender from snout through eye, and a number of lines radiating from upper side of eye; rays of first dorsal lavender, membranes yellow; second dorsal irregularly striped with lemon yellow and lavender; anal like second dorsal; pectorals and ventrals clear. The smaller specimens was lemon all over in life, darker above and a little paler below, brighter on fins. Under the rules of the International Code of Zoological Nomenclature, the type of *Upeneus* is *Upeneus bifasciatus*, not *U. vittatus*. (See Jordan & Evermann, Fishes North and Middle America, I, p. 857.)

149. *Upeneus barberinus* (Lacépède). *Amacan*.

One specimen 5 inches long and one 2.50 inches, from Cuyo. General color in life silvery; dark brown next to dorsal, below which is a wide golden stripe from eye, fading out below posterior end of dorsal; below the golden stripe a short black stripe which is just below lateral line; lower half of head silvery, washed with crimson; a large black spot on caudal peduncle; lower part of sides and all fins faintly washed with crimson.

## UPENEOIDES Bleeker.

150. *Upeneoides sulphureus* (Cuvier & Valenciennes).

Three specimens from Manila, 3 to 4.50 inches long. Color in life dusky blue above, a rosy wash on head; sides silvery, with two lines of chrome yellow, one from head, the other from pectoral to caudal; a band of pale sulphur yellow from base of ventral to end of anal and including these fins; several longitudinal lines of white and dark brown on dorsal; caudal dusky, edged with brown.

151. *Upeneoides vittatus* (Forskål).

Two specimens, 3.50 and 4.50 inches long, from Lubang, and one from Iloilo, 3 inches.

152. *Upeneoides tragula* (Richardson).

Three examples, 4.50, 2.50, and 3.75 inches long, from Cuyo.

153. *Upeneoides luzonius* (Jordan & Seale).

A specimen 4.50 inches long from Manila agrees with the cotypes of this species. We are not certain that it is different from *Upeneoides tragula*, from which it appears to differ in coloration though apparently in no other characters. Our specimen has no dark marking on either dorsal fin.

## Family SCIÆNIDÆ.

## PSEUDOSCLÆNA Bleeker.

154. *Pseudoscæna anea* (Bloch).

One example, 3.75 inches long, from Manila. Color in life silvery; first dorsal black; frontal region dusky; a dusky spot on opercle and another above it; pectoral, ventral, and anal pale yellowish.

## UMBRINA Cuvier.

155. *Umbrina dussumieri* Cuvier & Valenciennes.

One specimen from Manila, 4 inches long. In life silvery, dusky above; first dorsal dusky, second lighter; a few specks of dusky in axil of pectoral; ventral and anal white; caudal pale yellowish, with dusky tip.

## Family SILLAGINIDÆ.

## SILLAGO Cuvier.

156. *Sillago sihama* (Forskål). *Asohos*.

Two examples, 5 inches long, from Manila, and two from Aparri, 3 and 4 inches.

## Family PSEUDOCROMIDÆ.

## CICHLUPS Müller &amp; Troschel.

157. *Cichlops spiloptera* Bleeker.

A specimen, 6 inches long, from Fuga Island, and one from Calayan, 4 inches. Color in life of the example from Calayan: Deep claret, a little lighter below lateral line; each scale with a small deep blue spot; head dark green, top very dark, lighter at jaws; several blue and red lines crossing face under eye; opercle heavily spotted with blue; pectoral and ventral pale claret; dorsal light claret, curiously marked with short dusky lines and spots, and with a subterminal margin of bright scarlet followed by a very narrow blue line; caudal the color of body, each membrane with a long, thin scarlet line; anal strongly banded with deep scarlet and blue.

In the blue spot on each scale our specimens resemble *Cichlops cyclophthalmus* Müller & Troschel, but the depth is less and the length of the head less than is stated for that species, and the specimens have not the dorsal marked posteriorly as figured and described by Bleeker from his example of *C. cyclophthalmus*. Our specimens agree in proportions, fins, scales, and in all details of coloration except presence of spots on scales of sides, with Bleeker's figure and description of *Cichlops spiloptera*. The condition of one of our specimens indicates that the blue side spots fade easily, which probably accounts for their absence from Bleeker's figure.

158. *Cichlops melanotænia* Bleeker.

One example, 3 inches long, from Cuyo. In life dull reddish, each side with ten narrow black longitudinal lines; rows of dark red spots about eye; dorsal and ventral bright red; dorsal spotted; pectoral yellowish.

## Family OPISTHOGNATHIDÆ.

## GNATHYPOPS Gill.

159. *Gnathypops dendritica* Jordan & Richardson, new species. *Tabangca*.

Head 2.66 in length without caudal; depth 3.40; eye 3.20 in head; interorbital space 3.70 in eye; nose 2 in eye; maxillary 1.33 in head, extending for half its length behind eye; teeth in bands in both jaws, those in the outer row somewhat enlarged and slightly recurved; dorsal XI, 13; anal II, 13; pectorals 2 in head; ventrals 1.75; dorsal inserted over base of pectorals; anal inserted under eleventh ray of dorsal; scales 105; lateral line high, running along back half an eye length from base of dorsal, and terminating over middle of anal; anterior pores of lateral line branched; top and sides of head and predorsal region with numerous, variously connected, branching mucous channels, those immediately in front of the dorsal fin disposed in a tree-like pattern.

Color in spirits light grayish brown with darker brown spots and blotches, these connected in a coarse reticulated pattern on posterior part of trunk and caudal peduncle; scapular region, opercles, and cheeks sparsely sprinkled with coarse black specks; each upper jaw crossed by a broad band of dusky near tip, under which is a dark spot; spinous dorsal with a large squarish black blotch between third and fifth spines, and similar but smaller and fainter spots on the other membranes, near base of fin; outer edging of spinous dorsal white, above a submarginal zigzag streak of black; soft dorsal barred lengthwise with dusky just below middle, its outer margin dusky, the middle of the fin and its basal portion pale; anal marked like soft dorsal; caudal broadly tipped with blackish and barred crosswise with blackish near base, the middle of the fin pale; ventrals faintly dusky posteriorly; pectorals pale, with a faint diffused dusky spot at base.

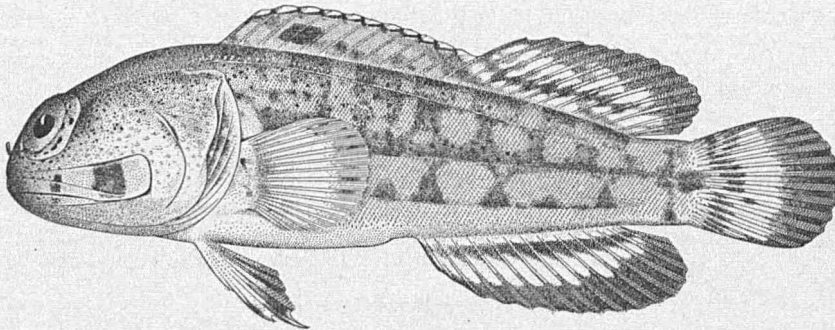


FIG. 9.—*Gnathypops dendritica*, new species. Type.

One specimen, 5.25 inches long, the type, from Cuyo, no. 20313, Stanford University. On this specimen, Mr. McGregor has the following note concerning life colors: "General color brown, mottled with light yellow and dotted with black; head light yellow, sparsely spotted with black, but more thickly spotted on interorbital and postocular areas; pectorals rich yellow with an irregular dark spot at base; ventrals lighter yellow with black tip; dorsal mottled with brown, spines tipped with white, below which is a narrow black line; a quadrangular black spot between third and fifth spines; each membrane with a small black spot near its middle followed by a white spot; anal light yellowish, tipped broadly with black and with a dark brown bar across middle; caudal yellowish, irregularly barred near base and broadly tipped with black; a dark brown spot at base of caudal."

#### Family ANABANTIDÆ.

##### ANABAS Cuvier.

160. *Anabas testudineus* (Bloch, 1792). (= *Perca scandens* Daldorff, 1797.)

A single specimen from Sibuyan, 2.75 inches long.

#### Family POMACENTRIDÆ.

##### POMACENTRUS Lacépède.

161. *Pomacentrus nigricans* Lacépède. (*Pomacentrus scolopseus* Quoy & Gaimard.)

Three specimens from Calayan, 0.75 to 2.75 inches long, and one from Cagayancillo, 3 inches. General color in life of the specimens from Cagayancillo very dark, almost black; most of the scales on body marked with a dark violet spot; a band of violet from mouth under eye; fins black.

The present species has twelve dorsal spines and a black blotch on base of pectoral and on last rays of soft dorsal. The specimens we have called *Pomacentrus albofasciatus*, following Jordan & Seale, differ only in the presence of the pale crossbands on the posterior part of the body.

162. *Pomacentrus albofasciatus* Schlegel.

Two specimens from Calayan, 2.50 inches long, taken from coral-rock tide pools. Dorsal spines 12. Color in life dusky brown; an ill-defined black blotch on anterior part of dorsal; a dusky spot on posterior base of dorsal; a broad white band across body behind tip of pectoral; a dusky spot in axil of pectoral.

**163. *Pomacentrus pristiger* Cuvier & Valenciennes. *Palata*.**

A single specimen, 3 inches long, from Cuyo. Dorsal spines 13; a black spot at tip of opercle.

We follow Sauvage in identifying the present specimen with *Pomacentrus pristiger* (= *littoralis* of Bleeker, and Günther, part). This species is near *Pomacentrus tripunctatus* Cuvier & Valenciennes (= *trilineatus* of Sauvage), but is distinguished by having all the suborbital denticulations equal, and by the absence of a black spot on the top of the caudal peduncle.

The specimen from Cuyo had the following colors in life: Body dull dark green; fins dark brown; a line under eye and a spot in front of eye; some spots on top of head of a rich violet color; opercles faintly washed with violet.

**164. *Pomacentrus littoralis* Kuhl & Van Hasselt.**

Four specimens, 2 to 3 inches long, from Cavite, collected by Dr. G. A. Lung and recorded by Jordan & Seale under the name *Pomacentrus tripunctatus* Cuvier & Valenciennes, evidently belong to this species as redefined by Sauvage, from the types. The anterior suborbital denticulation is enlarged and followed by a notch, and there is a round black spot on the tip of the opercle, as in *Pomacentrus tripunctatus*, but the top of the caudal peduncle is without blotch; dorsal spines 13.

**165. *Pomacentrus emarginatus* Cuvier & Valenciennes.**

Two young specimens from Ticao and a well-colored adult, 2.50 inches long, from Cuyo, should probably be referred to this species; dorsal spines 13.

We can find no differences between the species called *emarginatus* and *chrysurus* by Cuvier & Valenciennes. Sauvage states that *Pomacentrus chrysurus* has only two rows of scales on the preopercle. The scales are in three rows in our largest specimen, which has the caudal deep yellow, in strong contrast with the contiguous color on the caudal peduncle. All the other fins are without spots or ocelli. The two young specimens both have an ocellus at the back of the soft dorsal, like *Pomacentrus delurus* Jordan & Seale, but lack the fully developed third row of scales on the preopercle present in the type of *Pomacentrus delurus* as figured by Jordan & Seale. A cotype of *P. delurus*, however, agrees with the present specimens in having only two developed rows. It is probable that *Pomacentrus delurus* is the young of the forms called *Pomacentrus emarginatus* and *chrysurus* by Cuvier & Valenciennes, and it is not impossible that these in turn, when a full series is examined, will prove to be not different from *Pomacentrus littoralis*.

**166. *Pomacentrus fasciatus* Cuvier & Valenciennes.**

Two specimens from Ticao Island, 0.75 and 1.25 inches long. Color in spirits brown, with 4 light cross bands, narrower than the dark interspaces; one of these crossing opercle, one crossing the body in front of the fourth dorsal spine, one originating at junction of spinous and soft dorsal, and the last one crossing the root of the caudal peduncle; the two middle bands are continued upward on the dorsal fin; on the top of the opercle there is a small black spot, and behind this several dark specks, forming two indistinct series, ceasing over tip of pectoral; the suborbital is smooth and the preopercle only weakly denticulated, or crenulate.

**ABUDEFDUF Forskål.****167. *Abudefduf saxatilis* (Linnæus).**

One specimen 2 inches long from Manila, and one from Calayan, 1.50 inches, in tide pools. Color in life of Calayan specimen: Pale bluish white; body and dorsal crossed by four vertical bands of dark-blue (washed out on belly), between which are three golden yellow areas; head black; belly white.

**168. *Abudefduf dicki* (Liénard).**

A single example from Cagayancillo, 3 inches long. Color in life brown; a black band at beginning of soft dorsal, the color behind the band light fawn; pectoral rich yellow.

**169. *Abudefduf zonatus* (Cuvier & Valenciennes). (*Glyphidodon brownriggii* Günther, not of Bennett.)**

One specimen from Cagayancillo, 2 inches long.

**170. *Abudefduf unimaculatus* (Cuvier & Valenciennes). (*Glyphidodon dispar* Günther.)**

Eight specimens from Calayan, 1.50 to 2.50 inches long, and one from Cagayancillo, 2.50 inches. These specimens have the dorsal XIII, 12 or 13, and the anal II, 11 or 12, and each scale of the body with a more or less distinct vertical light streak, these forming longitudinal rows on the sides. Four of the Calayan specimens, probably males, have all the fins except pectorals dusky, the dorsal with a distinct black spot at the base of the last four rays. The others, probably females, have the body and fins paler,

and the dorsal without distinct dark blotch. The life colors of one of the specimens from Calayan (probably female) are described by McGregor as "stone gray; belly white; a narrow red line across base of pectoral."

171. *Abudefduf amabilis* (De Vis). (*Glyphidodon brownriggii* var. *xanthozona*, Günther, Südsee; not *G. xanthozona* of Bleeker.)

Three specimens, 0.75 to 2.50 inches long, from Calayan.

172. *Abudefduf glaucus* (Cuvier & Valenciennes). (*Glyphidodon modestus* Schlegel.)

Three specimens, 2 and 2.50 and 2 inches, from Cagayancillo and Ticao. Life color of Cagayancillo specimen bluish gray above; white below.

173. *Abudefduf antjerius* (Kuhl & Van Hasselt). (Not *Glyphidontops antjerius* Bleeker = *Chatodon brownriggii* Bennett.)

Two specimens, 0.50 inches long, from Ticao Island, and two, 1 inch, from Calayan. These specimens have a black blotch partly on back and partly on base of latter part of spinous dorsal, and a small black spot on posterior base of soft dorsal. A narrow sky-blue band, not wider than pupil, passes backward from in front of and above eye on each side to a point on top of the back directly under the fifth or sixth dorsal spine. Comparison with Samoan specimens indicates that the sky-blue stripe fades or becomes narrower with age. In no case does it appear to occupy the whole space between the base of the dorsal and the lateral line, nor does it extend backward beyond the fifth or sixth ray of the spinous dorsal.

174. *Abudefduf brownriggii* (Bennett). (Not *Glyphidodon brownriggii* of Günther, which is *A. zonatus*.)

A single example, 0.66 inch long, from Ticao Island, may be referred to this species. The specimen has a black blotch at the back of both dorsals, and the space between the lateral line and the basal edge of the dorsal fin is a bright sky blue, in a band about equal in width to orbit, and extending as far back as the base of the caudal peduncle; body below lateral line pale brownish olive in spirits. This species, or form, does not differ from *Abudefduf leucopomus* except in the absence of the black blotch on the top of the base of the caudal fin. From *Abudefduf antjerius* it seems to differ mainly in the greater width and length of the sky-blue band, and in the sharp demarcation of the upper color from that below the lateral line.

175. *Abudefduf sapphirus* Jordan & Richardson, new species.

Head 3.37 in length to base of caudal; depth 2.50; dorsal XIII, II; anal II, 11 or 12; scales 27; eye 3 in head; nose 4.50; interorbital space 3.80; maxillary 3 in head, equal to eye, its tip under anterior

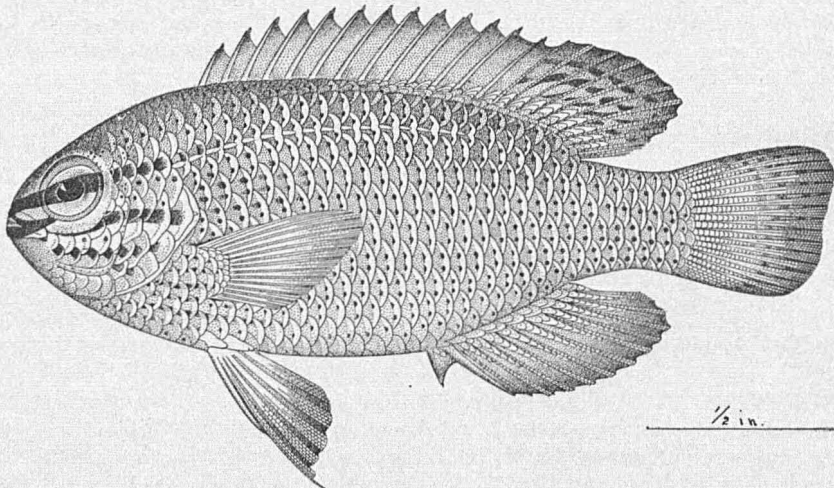


FIG. 10.—*Abudefduf sapphirus*, new species. Type.

border of orbit; teeth compressed, in a single row in each jaw, not notched; preopercle not denticulate; pectoral 1.27 in head; ventral 1.16; caudal 1.20; subtruncate, the upper rays a little the longest; depth of caudal peduncle 3 in head.



Color in spirits of head, body, and fins, except pectorals, bright sky blue; each scale of sides with one or two very small round black specks; a black band as wide as pupil from the top of the gill-opening, through eye, to end of snout; two narrower, wavy or broken black lines on cheek below eye, and three of these crossing opercle; top of head between eyes with several small black specks; spinous dorsal plain sky blue; soft dorsal, caudal, and anal sky blue, speckled with dusky outwardly, and tipped with black; rays of ventrals sky blue, dusky toward tips; pectorals sky blue at base, otherwise colorless (transparent).

Known from 6 specimens from Ticao Island, 1.25 to 1.75 inches long. The sky-blue color of body and fins, and the black-edged soft dorsal, caudal, and anal appear to distinguish this species. The type is no. 20207, Stanford University; cotypes are no. 61682, U. S. National Museum.

**176. *Dascyllus melanurus* Bleeker. *Calitbobo*.**

A single specimen, 2.33 inches long, from Cagayancillo.

General color in life pale green, belly white; body decorated with four wide black bars which extend on fins above and below; one across frontal region, eye, and chin; one from anterior third of dorsal through base of pectoral and on ventrals, which fins are black; one from posterior third of dorsal to and including anal; and the last on posterior two-thirds of caudal.

Family LABRIDÆ.

**CHOIRODON Rüppell.**

**177. *Choirodon anchorago* (Bloch). *Banquilan*.**

A single specimen from Cuyo, 4 inches long. Life color, above gray; lower half and belly white; head greenish; opercle and preopercle spotted with brick red; line above eye and two irregular lines from eye to mouth brick red; spots of the same color from head backward to end of dorsal, above lateral line; pectoral rich yellow, the base blue crossed by a line of dark brick red; ventral white, membrane between first and second rays pale red; dorsal dull greenish, barred with two lines of brick red, one subterminal and one near the base, the latter ending on first ray; anal light lemon yellow and white, tipped with a marginal line of bright orange; caudal dirty reddish brown, base pale blue; iris bronze, surrounded by blue.

**178. *Choirodon oligacanthus* (Bleeker).**

One specimen from Iloilo, 3.50 inches long.

**AMPHECES Jordan & Snyder.**

**179. *Ampheces pterophthalmus* (Bleeker).**

One specimen from Cuyo, 6 inches long.

General color in life, dark purple; a large ocellate black spot on posterior part of dorsal and anal fins, surrounded with yellow; a bluish interocular stripe; pectoral yellow.

**STETHOJULIS Günther.**

**180. *Stethojulis strigiventer* (Bennett).**

Four specimens from Cuyo, 2.50 to 4 inches long.

Life colors of Cuyo specimen: A line of light blue from above nose through top of eye along middle of body to and on to base of caudal; side above this line brown, below it white, washed with yellow; another blue line from snout backward below eye, ending just below base of pectoral; a third blue line from gill-opening passing below pectoral and ending below middle of dorsal; space between the last two lines salmon pink in front of pectoral; opercle washed with pink; a light blue line on each side of dorsal, uniting posteriorly; a bit of blue on side of chin; fins all clear and colorless.

**181. *Stethojulis phekadopleura* Bleeker.**

Four specimens, 1.50 to 2.75 inches long, from Cuyo and Calayan.

Color in life of Cuyo specimen (2.75 inches in length): Above black, finely speckled on body with pale blue; lower parts bluish; two<sup>a</sup> parallel rows of large spots extending from pectoral to below end of dorsal; dorsal and caudal slightly red; dorsal finely speckled with pale blue.

<sup>a</sup>A third and fainter row shows in preserved specimens.

**182. *Stethojulis bandanensis* (Bleeker).**

One example 4 inches long from Cuyo, and one, 3 inches, from Cagayancillo.

Life color of Cuyo specimen: Above dark greenish, finely and regularly speckled with pale blue; a salmon-colored spot over pectoral and a small blue crescent in axil; a short yellow band from angle of mouth to below eye; a fine blue line under eye; a small ocellated spot on lateral line at end of caudal peduncle; dorsal finely spotted with blue; lower parts very pale blue.

**183. *Stethojulis zatima* Jordan & Seale. *Lugday*.**

One example, 2.50 inches long, from Cuyo, and 3 from Calayan, less than 1 inch in length, all obtained in tide pools.

Mr. McGregor has the following note on the life colors of the Cuyo specimen: "Dark grass green, tending to pale blue on belly; sides below lateral line crossed by about five light lines; a narrow silvery line from mouth across head, becoming brilliant blue on opercle; a narrow dark bar at base of tail and a small black dot on tail above lateral line; caudal and ventral pale blue, washed basally with golden; preopercle silvery."

**PLATYGLOSSUS (Klein) Bleeker.****184. *PlatyGLOSSUS notopsis* (Kuhl & Van Hasselt).**

Four specimens, 1.50 to 1.75 inches long, from Calayan. Color in life, black, with six or eight pale yellow lines from snout and lower jaw to tail, radiating over side of body; in some specimens these lines are obsolete; caudal white.

**HALICHERES Rüppell.****185. *Halicheres centiquadrus* (Bleeker). *Payuc*.**

One specimen from Cagayancillo, 5 inches in length.

Life colors: Body white, each scale with a black mark, these larger on upper than on lower part of sides; belly pure white; a large black spot below and on anterior portion of dorsal; in front of dorsal the black spots are salmon instead of black; head green; lips light yellow; several curious dark salmon marks on head, one from maxillary through eye, two on opercle, and one from chin to margin of preopercle; a spot of salmon on part of lower preopercle; several pink spots on scales below pectoral; three bright lemon-yellow spots next to dorsal, one of them in front of the black spot, another some distance behind it, and the third one behind dorsal; dorsal reddish with numerous large chrome-yellow spots; caudal brilliant chrome yellow; pectoral and ventral clear; a bright vermilion spot on base of pectoral behind; a dark spot on base above; anal with stripes of pale pink and yellow.

**186. *Halicheres gymnocephalus* (Bloch & Schneider).**

Two specimens, 3 and 4 inches long, from Cuyo.

General color in life, including dorsal, caudal, and anal, light green; a large black blotch on side behind pectoral; belly white; a pink band from snout to eye; a dark green spot on preopercle, bordered with blue; base of pectoral yellow with a dark band; a light green band under base of pectoral; iris light green.

**187. *Halicheres trimaculatus* (Quoy & Gaimard).**

One example, 3 inches long, from Cagayancillo.

General color in life, pale yellowish above and white below; each scale marked with a vertical bar of pinkish, on some scales mixed with brown; on lower part of body the bars are faint or wanting; head beautifully marked with bands of pink and pea green, two of each color from eye to snout; behind eye and on upper opercle several pink spots; preopercle light yellow; top of head from interorbital to dorsal dotted with pink; a pink band beneath pectoral; dorsal transparent, with three longitudinal bands of pink and one of green; anal transparent; a band of pink near base; pectoral transparent, a small dark spot in its axil, bordered with blue; ventral pale pea green; caudal transparent, tipped with a reddish wash.

**188. *Halicheres miniatus* (Kuhl & Van Hasselt).**

One specimen from Calayan, 2.50 inches long.

**189. Halichoeres pœcilus** (Lay & Bennett).

Two examples from Calayan, 3 and 3.50 inches long, from a tide pool.

Color in life: A pea-green band on cheek; a large brown spot bordered with blue on opercle; dorsal and anal greatly variegated, mottled with green and light claret; a large black spot between second and third dorsal rays; ventral pale green, edged with claret.

**190. Halichoeres nebulosus** (Cuvier & Valenciennes).

Three specimens from Cuyo, 2.75 to 3.25 inches long.

In life brightly colored and variegated; on head various irregular markings of light brick red and bright green, bordered narrowly with bright blue; body purplish, marked with green spots and blotches; dorsal reddish, marked with ocellated green spots; anal similar to dorsal, with a median green band bordered with bright blue; caudal pale yellowish, with spots of dark red; pectoral colorless; ventral pale green, the long rays pale reddish.

**191. Halichoeres opercularis** (Günther).

Seven specimens from Calayan, 2 to 3 inches long, and one without locality label. One of the Calayan specimens has a small black spot on the back part of the soft dorsal, in addition to the normal median and anterior spot. It does not otherwise appear to differ from the other examples.

**CHEILIO** Lacépède.**192. Cheilio inermis** (Forskål).

Three specimens from Cuyo, 6 to 7.50 inches long.

General color in life, dark green above and light brown below median line; each scale below with a pale blue spot; a median line of black spots; dorsal and caudal pale green; pectoral, ventral, and anal clear; a few dark reddish marks on chin.

**THALASSOMA** Swainson.**193. Thalassoma dorsale** (Quoy & Gaimard).

One specimen from Cagayancillo, 3 inches long.

**194. Thalassoma guntheri** (Bleeker).

One specimen from Calayan Island, 3 inches long.

Color in life: Head and body with broad longitudinal lines of rank emerald green and purple; dorsal with lines of same green and more delicate shades; pectoral and ventral washed with pale green; belly light blue; caudal washed with pale red, green, and yellow, tending to form bars; two outer rays of caudal deep purple.

**195. Thalassoma umbrostigma** (Rüppell).

A single specimen, 2 inches long, from Calayan.

**CHEILINUS** Lacépède.**196. Cheilinus digrammus** (Lacépède).

One specimen from Romblon, 5 inches long.

**197. Cheilinus oxycephalus** Bleeker.

Depth 2.50 in length to base of caudal; head 2.80; nose 3.66; interorbital space  $1\frac{1}{2}$  times eye; eye 4.4 in head; maxillary 3.33; canines small; dorsal x, 9; anal III, 8; pectoral 2 in head; ventral 1.70; scales 20; lateral line interrupted; head fully scaled.

One example from Cuyo, 3.50 inches long.

Color in spirits brownish, vaguely mottled and clouded with darker both on body and on vertical fins; four dusky spots, each about size of pupil, forming a row along middle of each side, the first spot above the tip of the reflexed pectoral, the next one above the middle of the anal, the third above the back of the anal, and the last at base of caudal fin; soft dorsal with an indistinct dusky blotch at the base of its last rays.

General color in life, green, sparsely spotted with brick red, most thickly on head; edges of dorsal, caudal, and anal marked with red.

**NOVACULICHTHYS** Bleeker.**198. Novaculichthys tæniurus** (Lacépède). *Calili*.

A single example, 5.50 inches long, from Cagayancillo. The specimen in spirits shows two short dark lines radiating backward from posterior margin of orbit, and two longer ones extending downward and backward across cheek and opercle.

In life dusky brown in general color; a whitish spot on each scale; dorsal, anal, and caudal similar to body, but barred instead of spotted; pectorals light yellow, dusky at base; ventrals dark reddish brown with white tips; a broad white bar at base of caudal; head dirty green; lips yellowish.

#### Family SCARICHTHYIDÆ.

##### SCARICHTHYS Bleeker.

199. *Scarichthys auritus* (Kuhl & Van Hasselt). *Busalog; Layag layag.*

One example from Cagayancillo, 3.50 inches long. Life colors: Body dirty green, with irregular spots of brown and light blue; head dirty green, with numerous spots of purplish blue; fins light reddish brown with dark mottling of the same color.

##### CALOTOMUS Gilbert.

200. *Calotomus moluccensis* (Bleeker).

One specimen from Cuyo, 5 inches long.

General color in life, dark green, sparsely spotted with brick red. This species may be recognized by the presence of a distinct black blotch between the second and third dorsal spines. We may here note that the description and figure of *Calotomus carolinus*, from Rarotonga, were by some accident included in the recent paper on the Fishes of Samoa, by Jordan & Seale, under the name of *Scarichthys cæruleopunctatus* (Rüppell).

##### CALLYODON Gronow.

201. *Callyodon capistratoides* (Bleeker).

General color in life, dull brown with a purplish wash; a blue band over mouth to below posterior margin of eye; another below mouth, below that a pink line, then a blue line, then pink again, and below that two greenish spots; belly with a median blue line from isthmus to vent, continued on edge of anal fin; gill covers dull purple; a blue wash on pectoral; ventral blue, three rays pink; base and edge of anal blue, middle pink; dorsal similar to anal; caudal with upper and lower edges broadly blue, tip pink, a subterminal blue band, base purple.

A single example, the type, from Cagayancillo, 6 inches in length.

#### Family TOXOTIDÆ.

##### TOXOTES Cuvier.

202. *Toxotes jaculatrix* (Pallas).

Three specimens, 3.50 to 5 inches long, from Mindoro Island.

#### Family EPHIPPIDÆ.

##### EPHIPPUS Cuvier.

203. *Ephippus argus* (Gmelin). *Citang.*

One example, 6 inches long, from Manila, and one from Iloilo, 2 inches.

#### Family DREPANIDÆ.

##### DREPANE Cuvier & Valenciennes.

204. *Drepane punctata* (Gmelin).

Two specimens from Manila and one from Lubang, 3 to 4 inches. Color in life silvery; five vertical rows of long dusky spots from dorsal to near ventral margin; one spot on caudal peduncle; fins pale dusky greenish, all of them except pectoral broadly margined with dusky.

#### Family PLATACIDÆ.

##### PLATAX Cuvier.

205. *Platax orbicularis* (Forskål).

Three specimens from Ticao Island and one from Cagayancillo, 1.50 inches long.

## Family SCORPIDÆ.

## MONODACTYLUS Lacépède.

206. *Monodactylus argenteus* (Linnæus).

One specimen from Aparri, one from Iloilo, and two from Calayan, 2 to 3 inches.

## Family CHÆTODONTIDÆ.

## GONOCHÆTODON Bleeker.

207. *Gonochætodon triangulum* Cuvier & Valenciennes. *Culbangbang*.

One example from Cagayancillo, 3.50 inches long.

## CHÆTODON (Artedi) Linnæus.

208. *Chætodon ephippium* Cuvier & Valenciennes.

One specimen from Cagayancillo, 5 inches long.

209. *Chætodon setifer* Forskål. *Culbangbang*.

Two specimens, 4 and 5 inches, from Cagayancillo.

210. *Chætodon trifasciatus* Park.

Two specimens from Cagayancillo, 3.50 inches. Color in life chrome yellow, most intense about base of pectoral; each side crossed by 13 deep violet longitudinal stripes, which are strongest above and fade out below pectoral; about six narrow longitudinal lines of the same color on dorsal; head mostly dark brown; a vertical dark brown band through eye, bordered on each side with light lemon yellow; above the eye the yellow lines are narrow, below eye they are nearly as wide as the brown band; a narrow brown line across head behind eye; belly, including ventral, rich lemon yellow; anal marked with the following colors, beginning on the base: (1) blue gray; (2) lemon yellow, extending forward to belly; (3) black; (4) darker lemon, which joins the upper yellow line around posterior end of black line; (5) broad band of rich red brown; (6) narrow lines of black and lemon yellow; (7) in front of black band and extending a little in front of anus, a dark salmon area; dorsal spines white; pectoral clear; a dusky spot on isthmus; caudal white, marked at its middle by a wide vertical black band, broadly margined with lemon yellow; dorsal on its posterior part marked with oblique lines and bands of black, brown, and lemon yellow.

211. *Chætodon kleini* Bloch.

One specimen, 3 inches long, from Cagayancillo.

212. *Chætodon citrinellus* (Broussonet).

One specimen, 2.75 inches long, from Cagayancillo. Color in life white with greenish wash, each scale with a violet spot; below line of pectoral the body white and scale spots pale yellow on caudal peduncle, base of caudal, and posterior margins of dorsal and anal; a black spot on snout; a dark brown band from predorsal region through eye to lower margin of gill cover, the band above the eye bordered on each side with pale green; membranes of spinous dorsal light blue at base, light yellow above; anal with terminal black band and subterminal light yellow band, these divided by a narrow pale blue line; caudal light golden yellow; ventral pale pea green, except the two shortest rays; pectorals clear.

## HOLACANTHUS Lacépède.

213. *Holacanthus bicolor* Bloch. *Calit bobo*.

One example from Cagayancillo, 4 inches. Life colors: Anterior part of body, including first five dorsal spines and pectoral and ventral, rich orange chrome, bordered posteriorly with lemon yellow; caudal and tips of long dorsal rays rich chrome; caudal at base lemon yellow; posterior part of body, including most of dorsal and all of anal, solid black; a wide black band over frontal from eye to eye; head washed with dusky green; an orange submalar stripe; a spot of orange back of eye and a line of orange on margin of opercle; two indistinct orange lines at base of pectoral.

## Family ZANCLIDÆ.

ZANCLUS (Commerson) Lacépède. *Calibagio*.214. *Zanclus cornutus* (Linnæus).

One specimen from Cagayancillo and one from Fuga Island, 2.50 and 3 inches.

While the original descriptions of both *Chaetodon cornutus* and *C. canescens* are unsatisfactory, the two species are figured both by Klein and by Bonnaterre in such a manner as to leave little doubt of their specific distinctness. Doctor Bleeker had specimens of the short-nosed form called by himself and by Bonnaterre *canescens*, and differing further from the common "Moorish Idol" in the absence of the triangular black marking on the side of the nose. The short-nosed form recently described from Hawaii by Bryan, and named by him *Zanclus ruthiae*, is almost certainly not different from the *Zanclus canescens* of Bleeker and the *Chaetodon canescens* of Bonnaterre and Linnæus.

### Family HEPATIDÆ.<sup>a</sup>

#### HEPATUS Gronow.

##### 215. *Hepatus olivaceus* (Bloch & Schneider). *Indangan*.

Of this species we have one well-preserved example from Cagayancillo, 3.50 inches long, plainly showing the pale bar above the pectoral, the length of the bar being about two-thirds that of the fin. The caudal lobes are very little prolonged, the specimen agreeing in that respect with examples (3 to 6 inches long) from Samoa. The figure of *Teuthis olivaceus* published by Jordan & Evermann was taken from a Formosan specimen 13 inches long, and has the caudal lobes greatly prolonged and the humeral bar reaching tip of pectoral. It is probably not, however, different. We note, in this connection, the occurrence in specimens of *Hepatus nigricans* from Pago Pago, Samoa, taken at the same time and place, about the same amount of difference in the prolongation of the caudal lobes between young and older specimens.

Life colors of the specimen from Cagayancillo: General color dark brown; humeral bar a narrow basal portion of dorsal mottled with gray; short rays of caudal tipped with white, the pale portion forming a conspicuous white crescent.

Two smaller specimens from Cagayancillo, 2.75 inches long, appear to be this species, but do not show the humeral bar. Their life color is described by Mr. McGregor as "bright yellow, speckled with brown; top of head and edges of dorsal, anal, and ventral darker." This description of the life colors corresponds well with that of Samoan specimens, except for the absence of mention of the humeral bar. It is not impossible that this may be indistinct in young individuals, or that these two examples were faded at the time of writing.

##### 216. *Hepatus elongatus* (Cuvier & Valenciennes).

Two examples, 2.50 and 2.75 inches long, from Cagayancillo.

##### 217. *Hepatus lineatus* (Gmelin). *Saguing saguing*.

A young specimen from Cagayancillo, 2.50 inches long. In life striped from mouth backward over whole body with colors in this order: Blue, black, yellow, black, blue; caudal peduncle vertically marked by two blue, one yellow, and four black lines; caudal with a blue crescent; dorsal yellow, with two blue lines, posteriorly dusky; pectoral clear; ventral orange black outwardly, edged with blue; anal yellow, with a greenish black line at base and with a blue edge; belly pale dirty blue.

##### 218. *Hepatus matoides* (Cuvier & Valenciennes).

A specimen, 3.75 inches long, from Calayan, and two smaller ones, 1.50 to 2.25 inches long, from Aparri.

##### 219. *Hepatus triostegus* (Linnæus). *Culaban*.

A specimen, 4 inches long, from Cagayancillo, and one of the same size from Fuga Island. A small example, 2.75 inches long, from Calayan Island.

#### ZEBRASOMA Swainson.

##### 220. *Zebrasoma rhombeum* (Kittlitz). *Catol edtol*.

One example, 3 inches long, from Cagayancillo. Life colors: Dark seal brown, darker posteriorly; dorsal, caudal, and anal black; sides of face and body finely dotted with blue, the dots joined in short lines on side of body.

<sup>a</sup> Under the rules of the International Code of Zoological Nomenclature the name *Monoceros*, Bloch & Schneider, must be used for *Chaetodon unicornis* in place of *Acanthurus* or *Naso*. *Teuthis* was, however, first restricted by Cuvier as a synonym of *Acanthurus*=*Hepatus* Gronow.

## Family SIGANDIÆ.

## SIGANUS Forskål.

**221. *Siganus marmoratus*** (Quoy & Gaimard).

A single specimen, 6.50 inches long, from Calayan, agrees with specimens taken by Jordan & Kellogg in Samoa, except that the soft dorsal, anal, and caudal are not barred. The depth is 2.60 in the length to base of caudal, as in Samoan examples. In the absence of dorsal, caudal, and anal bars, the specimen agrees with Günther's figure of *Teuthis striolata*, which, however, is represented as a slender fish, having the depth nearly 3. We do not think it likely that the two forms are different.

Life colors of the specimen from Calayan: Upper half dusky green; lower half whitish; base of pectoral with a bright chrome-yellow bar above and below; sides with many yellow and dusky spots, each surrounded by pale blue; tail mottled with orange and dusky; anal red at base, followed by an orange band; dorsals dusky with a light yellow band near margin.

**222. *Siganus lineatus*** (Cuvier & Valenciennes). *Barangen.*

A specimen, 4 inches long, from Cuyo, and one from Aparri, 3 inches. Color of Cuyo specimen in life: Body white, slightly bluish above lateral line, covered with large spots of dull-brownish yellow; at back of dorsal a large golden yellow spot; top of head dark greenish; a light blue line behind eye which passes downward and forward under eye and then curves forward again, inclosing a golden yellow space; space outside blue line is also golden; a golden spot at beginning of anal.

**223. *Siganus javus*** (Linnæus).

One example, 4 inches long, from Manila, and one 3 inches from Iloilo. Life colors of the specimen from Manila: Dusky green, with numerous large spots of pale blue and of white; lower half of sides with indistinct lines of dusky and pale blue; pure white below pectorals and in front of ventrals; pectorals clear, other fins dusky; a wash of lemon yellow on face and in front of and along base of anal.

**224. *Siganus virgatus*** (Cuvier & Valenciennes). *Mandalada.*

One young specimen, 3 inches long, from Cuyo. In life this specimen had a wide band of dark reddish brown extending diagonally forward from in front of dorsal through eye to angle of mouth; a similar band of pale yellow behind this, followed by another reddish brown band, beginning between the fifth and seventh dorsal spines and tapering out over the base of pectoral; the last two bands are bordered with light blue; upper posterior half of body light yellow with a very large light reddish blotch in middle of side; dorsal brown, soft dorsal yellow; caudal yellow, pectoral, ventral, and anal pale; lower third of body silvery; three or four longitudinal blue lines between this and the large reddish blotch; several irregular diagonal blue lines on side of body in addition to those bordering the reddish brown bands; a line from eye to angle of mouth and another on preopercle; a number of blue spots along sides above lateral line; frontal region barred by about ten blue lines; interorbital and nasal region light yellow; chin dark.

**225. *Siganus corallinus*** (Cuvier & Valenciennes).

A specimen 5 inches long from Cagayancillo. Color in life bright yellow, closely covered with spots of light blue; top of head, pectorals, dorsal, and caudal without spots; spots enlarged at base of anal.

Although the caudal is without spots, there is little doubt that our specimen is the present species. *Siganus corallinus* is very close to *Amphacanthus guttatus* Bloch & Schneider, and may not be different.

**226. *Siganus rostratus*** (Cuvier & Valenciennes).

One example, 5.50 inches long, from Fuga Island.

**227. *Siganus oramin*** (Bloch & Schneider).

One small specimen, 2 inches long, from Aparri.

Depth 2.4 (3 in total, including caudal); caudal moderately emarginate; a dark spot on shoulder; chin crossed by two obscure dusky bands; body with scattered dusky blotches.

We also have specimens of the same species from Cavite and southern Negros, previously recorded, grading in size up to 5 inches. In examples under 3.50 inches, the white spots seem to be absent, in their place the sides bearing a few scattered dusky spots. In all the tail is very little emarginate, the depth of the notch being little more than the width of the pupil. All have an evident dusky blotch on the shoulder, have the two chin bands, and have the depth 2.40 in length to base of caudal. One speci-

men 5 inches long from southern Negros has the body a little more slender (depth 2.60) and the caudal notch deeper, its depth being greater than eye. Otherwise this specimen is not different from the rest.

In using the name *Siganus oramin* for specimens the most of which have a slightly emarginate tail and a dark blotch on the shoulder, while the figure of Bloch & Schneider shows a fish with a deeply forked caudal and without humeral blotch, we are of opinion that the poorly characterized *Amphacanthus guttatus*, var. *oramin*, of Bloch & Schneider is not really different from the *Amphacanthus dorsalis* of Cuvier & Valenciennes. Doctor Günther states that *Teuthis dorsalis* is without the dusky humeral spot, but later says that in the closely related *Teuthis albopunctatus* the shoulder spot becomes indistinct in older specimens. Were it not for the fact that Doctor Günther found the depth of specimens of *Teuthis albopunctatus* to be 3.50 in the total, we should have no hesitation in regarding it as identical with the present species, from which it is unlikely that it is different. Some of Doctor Günther's specimens of *Teuthis albopunctatus* were from the Philippines.

#### Family TRIACANTHIDÆ.

##### TRIACANTHUS Cuvier.

#### 228. *Triacanthus blochi* Bleeker.

Three specimens from Iloilo and four from Manila, 3 to 4 inches long. In life silvery white; face yellow; several large spots of yellow on side, one under each dorsal; dorsal spine black at tip; caudal peduncle dusky above, fins yellowish.

#### Family MONACANTHIDÆ.

##### CANTHERINES Swainson.

#### 229. *Cantherines sandwichiensis* (Quoy & Gaimard).

Three specimens from Romblon, 3.50 to 4.50 inches long.

#### 230. *Monacanthus tomentosus* (Linnæus). *Pagnesian*.

Four specimens from Cuyo, 2.50 to 3 inches long, and one from Lubang, 2 inches. Color in life pale dirty green, slightly mottled; two incomplete dark bars across tail.

Two specimens from Panay, recorded by Jordan & Seale as *Monacanthus nemurus*, belong to this species. It is well distinguished from *M. nemurus* by the oblique pale bar above the pectoral and by the stouter and more strongly serrate dorsal spine.

#### Family BALISTIDÆ.

##### BALISTES (Artedi) Linnæus.

#### 231. *Balistes flavimarginatus* Rüppell.

One example from Cuyo, 3.50 inches long. Color in life pale dirty yellow, lightly spotted with black on each scale; above, from mouth to eye and from eye to pectoral and about dorsals, mottled black; pectoral yellowish; two bands of dull green over snout to corner of mouth.

#### 232. *Balistes chrysopterus* Bloch & Schneider.

One specimen, 4.75 inches long, from East Cove, Fuga Island. In life dusky brown; on chin dark purple; tail lighter brown, bordered on three sides with milk white; a white ring around mouth and another below this on chin; a large yellowish brown area below dorsal.

##### BALISTAPUS Tilesius.

#### 233. *Balistapus aculeatus* (Linnæus).

A fine example from Cuyo, 6.50 inches. Colors in life: A yellow band over snout extending backward to below pectoral, its posterior portion salmon; on the snout the band includes a sky blue band which extends to the corner of the mouth; interorbital with four blue and three dark green bands, three of these extending below eye and uniting at base of pectoral; a black mark at base of pectoral and over gill-opening; a brown saddle in front of dorsal, extending forward and downward and merging into a dark area behind the gill-opening; spinous portion of caudal peduncle black; four parallel diagonal white bands from anal upward and forward to middle of body; fins colorless; lower parts white.



**234. *Balistapus rectangulus* (Bloch & Schneider).**

One specimen, 6 inches long, from Calayan Island. Life colors: A bluish saddle over mouth; interorbital space crossed by three black bars; a broad black band from eye downward to pectoral, where it widens greatly and extends backward across body to base of anal; parallel to this two pale blue lines from eye to pectoral; a bright red bar on base of pectoral; upper portion of body dark golden brown, lower anterior portion white; two V-shaped markings of green extend backward from median line, the arms of the larger meeting dorsal and anal; arms of smaller meeting fellow on opposite side of body just behind dorsal and anal; caudal peduncle black; a vertical green line at base of caudal; caudal dark golden brown.

**235. *Balistapus undulatus* (Bloch & Schneider).**

Two examples, 5 and 5.50 inches long, from Cagayancillo.

**236. *Balistapus verrucosus* (Linnæus).**

One specimen, 3.50 inches long, from Cagayancillo. In life with the body dusky green above and white below; a large dark brown patch on side behind pectoral; four blue lines connecting eyes on interorbital; three blue lines from eye to pectoral, inclosing a dark green area; a light yellow line in front of first blue line; snout light blue just back of upper lip and on each side back of angle of mouth; a narrow scarlet line from lower edge of pectoral forward and over snout to other side, separating the blue of the snout from the dusky green color above; a bar of blue and scarlet on base of pectoral; soft dorsal and anal barred with light yellow; middle of caudal yellow, its edges light orange.

## Family TETRAODONTIDÆ.

## SPHEROIDES (Lacépède) Duméril.

**237. *Spheroides lunaris* (Bloch).**

Three specimens, 2.50 to 3.75 inches long, from Manila, and one from Iloilo, 3.50 inches. In life silvery along sides, the color of which is sharply marked off from the dusky upper parts; belly dead white; a wash of pale yellow from mouth to and including pectoral; dorsal dusky with white base; anal white; caudal dusky, darker on edge; lower third milk white. The smaller examples are without yellow on the sides.

## TETRAODON Linnæus.

**238. *Tetraodon hispidus* Linnæus.**

One example 3.75 inches long and one 3 inches, from Cuyo.

**239. *Tetraodon reticularis* Bloch & Schneider.**

A single specimen, 2.50 inches long, from Lubong.

**240. *Tetraodon immaculatus* Bloch & Schneider.**

One specimen, 3 inches long, from Lubang; three from Iloilo, 1 to 2.50 inches; one from Cuyo, 2.75 inches; and one from Ticao Island, 1.25 inches. The five smaller specimens all have the back striped and bristles short. The specimen from Lubang is without stripes and has the entire body covered with bristles<sup>a</sup> of fully twice the length of the longest in the other specimens.

<sup>a</sup> An examination of a number of specimens of *Tetraodon nigropunctatus* from Apla, Samoa, five of which are from 5 to 6.50 inches in length, some with long bristles and some apparently almost bristleless, favors the supposition that these fishes have the power of extruding and withdrawing into the skin at will these defensive bristles. It is noteworthy that the bristles in this species are found long (i. e., fully extended) only in specimens which are dilated, the grade of extrusion seeming to be related to the amount of dilation. Specimens in which the belly is not dilated ordinarily have the skin nearly smooth, except for small areas on the back and lower portion of each side, where the knobbed tips of the bristles show. On dissection of these it is found, however, that the apparently naked skin contains multitudes of long bristles (fully as long as those of the so-called "bristly" form), each withdrawn into an intracutaneous sheath. If a thin sagittal strip of skin is cut from the belly of a preserved specimen of one of these "naked-skinned" forms, by taking hold of it at either end with the fingers and stretching it quickly and smartly, the retracted bristles may be made to protrude for a considerable distance, up to about half their length. This fact seems to go some way toward verifying our supposition, deduced from observation of the condition of several dilated and undilated preserved specimens, that the bristles are thrown out upon dilation and probably not normally at any other time. One of the specimens from Apla, 5 inches long, is especially interesting as showing in the same individual part of the bristles fully extruded and the rest retracted. The fully extruded bristles are on the left side of the forward portion of the belly. It is probable that at the time of capture the bristles of the whole body were erected and that in dying there was a partial retraction, leaving the specimen in its present condition. The two figures of the so-considered "bristly" and "smooth" form of this species, published by Jordan & Seale (Fishes Samoa, fig. 70 and pl. 35), apparently represent exactly the same form of fish in the different conditions of extrusion and retraction of the bristles.

## CHELONODON Müller.

241. *Chelonodon patoca* Hamilton-Buchanan. *Batete*.

Five specimens from Manila, 3 to 6 inches long.

## Family GOBIIDÆ.

## ELEOTRIS Gronow.

242. *Eleotris fusca* (Bloch & Schneider).

The scales in this species are 55-60 in longitudinal series. Its habitat is from the East Indies to Tahiti. It is not found in Hawaii, where it is represented by the small-scaled *Eleotris sandwichensis*. *Eleotris sandwichensis* Vaillant & Sauvage, of the streams of Hawaii, has 70 to 80 scales, but is otherwise identical with the present species.

Of this species we have four examples, from 3 to 4 inches long, from Sibuyan and Aparri (northern Luzon).

## OPHIOCARA Gill.

243. *Ophiocara aporos* (Bleeker). *Pazo*.

Dorsal vi-1, 9; scales 30-34; scales on top of head large, about 15 rows in front of dorsal; maxillary reaching scarcely beyond vertical from front of orbit; posterior border of preopercle with two inconspicuous pores; a mid-lateral row of large spots on trunk and caudal peduncle, more or less confluent into a narrow band, of a width equal to diameter of eye; above is another indefinite series of similar spots; cheek and opercle crossed by three oblique bands of dusky, the upper band continuing lengthwise across the base of the pectoral, being bordered above and below by whitish, and fusing posteriorly with a transverse band of dusky which crosses the bases of the pectoral rays; dorsal and anal margined with pale; anal in males with a crimson band across base, outside of which, near middle of fin, is a narrower band, pale bluish in preserved specimens, probably violet in life; spots at base of pectoral indistinct in female.

Two specimens, a male and a female, 7 inches long, from Mindoro Island; a male 5 inches long from Sibuyan, and a large male, 8.50 inches long, from Camp Balete, Rio Baco, Mindoro (above tide).

*Ophiocara hedti* (Bleeker) may not be different from this species.

244. *Ophiocara porocephala* (Cuvier & Valenciennes).

Dorsal vi-1, 8; scales 40-42; scales on top of head small, about 25 rows in front of dorsal; maxillary reaching vertical from middle of orbit; posterior border of preopercle with three large pores; scales of trunk for the most part each with a squarish dark spot at base; soft dorsal, caudal, anal, and ventrals edged with pale. Life colors: Black above; sides with slight green tinge; belly white, thickly speckled with dusky; dorsal, anal, and caudal narrowly edged with pale yellow.

One specimen from Mindoro Island, 4.50 inches long, and one from Calayan, in a brackish estuary, 6 inches.

A specimen of this species, taken at Calayan, was left dry for more than half a day, and revived upon being placed in water.

*Ophiocara ophiocephala* (Kuhl & Van Hasselt, in Cuvier & Valenciennes) is probably not distinct from the present species. *Eleotris ophiocephala* of Day is not this species, being a fish with a small mouth, and with the scales on top of head large, 15 in front of dorsal. The name *porocephala* has page priority over *ophiocephala*.

## BUTIS Bleeker.

245. *Butis koilomatodon* (Bleeker).

*Eleotris koilomatodon* Bleeker, Verh. Bat. Gen., xxii, 1849, 21 (Cantor cited this memoir in his Catalogue of Malayan Fishes, giving it priority); Maduras Straits.

*Eleotris caperatus* Cantor, Cat. Mal. Fishes, 197, 1850; Sea of Pinang.

*Prionobutis serrifrons* Rutter, Proc. Ac. Nat. Sci. Phila., 1897, 84; Swatow, China.

Head 3.25; depth 4.30; eye 3.75; dorsal vi-9; anal 9; scales 29; superorbital crests strongly serrated; two anteriorly converging serrated ridges in front of each eye, as in other species of *Butis*; mouth oblique, making an angle of about 40 degrees with the horizontal axis.

*Butis serrifrons* is stated by Rutter to differ from *Butis caperatus* (Cantor) in having the mouth "nearly horizontal" (not "nearly vertical"), and in having two (instead of one) serrated ridges in front of each eye. In the type which we have examined the mouth cleft makes about 35 degrees with the horizontal.

As there are two ridges in front of each eye, even in those species of *Butis* (*butis*, *amboinensis*, etc.), which lack the strongly serrated orbital crests, it is doubtful whether Cantor's failure to describe more than one in *Butis caperatus* denotes the absence of the second. Cantor's estimation of the angle of the gape as "barely vertical" was evidently a comparative one, with reference to *Butis butis*. It may also easily have been influenced by the condition of the specimens.

One specimen, 2 inches long, from Iloilo.

The genus *Prionobutis* Bleeker is nominal, differing from *Butis* only in the more marked serration of the orbital crests. The species of *Butis* and *Prionobutis* agree in coloration, all having the black spot at base of pectoral, with the smaller white spots above and below.

**246. *Butis butis* (Hamilton-Buchanan).**

*Cheilodipterus butis* Hamilton-Buchanan, Fish. Ganges, 57, 367, 1822; Ganges. Gray & Hardwicke, Illus. Ind. Zool., II, pl. 93, fig. 3.

*Eleotris humeralis* Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 246, 1837; Bengal.

(?) *Butis butis* Bleeker, Revis. Eleotriiformes, 64, 1875; Sumatra, Borneo, Amboina, Philippines, etc.

*Butis melanostigma* Bleeker, Blenn. & Gob., 23, 1849; Maduras Straits. Bleeker, Revis. Eleotriiformes, 68, 1875.

*Eleotris butis* Day, Fishes India, 316, pl. LXVII, fig. 3 (not good), 1878-88; Ganges. Günther, Cat., III, 116, 1861 (in part, only, perhaps).

*Butis leucurus* Jordan & Seale, Proc. U. S. Nat. Mus., XXVII, 1905, 794, fig.; Negros, P. I. Evermann & Seale, Bul. U. S. Bureau of Fisheries, XXVI, 1906 (1907), 104; Bacon and San Fabian, P. I.

Head 3 in length without caudal; depth 5; in total length, including caudal, 6; depth of caudal peduncle 3.30 in head; eye 5.50 in head, 1.50 in interorbital space; interorbital space 4 in head; maxillary 2.50 in head, greater than nose, extending past front of orbit under its anterior third; teeth small, in bands in both jaws, the outer ones slightly enlarged; dorsal vi-9; anal 9; scales 29; secondary scales present at base of large ones; color brown, with a few small spots on sides and under part of head, and scattered ones on body; scales of sides each with a pale spot at center, these appearing to form longitudinal rows; dorsals blackish, edged with pale; upper edge of caudal whitish, the rest dusky; anal blackish, with a trace of pale at edge; pectoral base with a black spot, above and below which are smaller white ones.

This species differs from *Butis amboinensis* (Bleeker) in its less slender form, its broader interorbital space, and in the presence of secondary scales at the bases of the large scales on the sides. From *Butis prismaticus* (Bleeker) it is distinguished by its shorter maxillary, rather coarser teeth, and slenderer caudal peduncle. The three species, *butis*, *prismaticus*, and *amboinensis*, all have the superorbital crests weakly serrated or crenulate, differing widely in that respect from *Butis* (*Prionobutis*) *koilomatodon* (Bleeker). The statement in the original description of *Butis leucurus* Jordan and Seale, that the superorbital crests are smooth, was apparently made in a comparative sense, with reference to the condition in *Butis koilomatodon*. It also seems that the interorbital distance in *Butis leucurus* was measured between the interorbital crests in the preparation of the original description of that species.

Of this species we have two specimens, one 3.50 inches long from Manila, and one 3 inches from Iloilo.

**247. (P) *Butis prismaticus* (Bleeker).**

(?) *Eleotris prismatica* Bleeker, Blenn. & Gob., 23, 1849; Maduras Straits.

(?) *Butis prismatica* Bleeker, Revis. Eleotriiformes, 61, 1875.

Head 3 in length without caudal; depth 4 to 4.50; in total length, including caudal, 5 to 5.59; depth of caudal peduncle 2.80 in head; eye 6 to 6.50 in head, 1.65 to 2 in interorbital space; interorbital space 3.75 to 4 in head; maxillary 2.75 in head, slightly greater than nose, not extending beyond the vertical from front of orbit; teeth minute, in bands in both jaws, outer ones not enlarged; dorsal vi-9; anal 9; scales 29; secondary scales present; color as in *Butis butis*.

A specimen from Cuyo, 5.50 inches long, and one from Manila, 3.50 inches, are referred with some doubt to the present species. They are plainly distinguished from *Butis butis* by their shorter, more robust body, shorter maxillary, smaller eye, and finer teeth. Both the present species and *Butis butis* are easily separated from *Butis amboinensis*, which is a very slender fish, with narrow interorbital space, and without secondary scales.

**248. *Butis amboinensis* Bleeker.**

*Eleotris amboinensis* Bleeker, Bijdr. Ichth. Amboina, iv, in Nat. T. Ned. Ind., v, 1853, 343; Amboina. Günther, Cat. Fishes, III, 117, 1861. (?) Day, Fishes India, 316, 1878-88; Bengal (probably not the same).

*Butis amboinensis* Bleeker, Revis. Eleotriiformes, 66, 1875.

Head 3 in length without caudal; depth 5.50; in total length, including caudal, 6.75; depth of caudal peduncle, 3.60 in head; eye 5 in head, equal to interorbital space; interorbital space 6 in head; maxillary 2.50 in head, scarcely exceeding a vertical from anterior margin of orbit; teeth minute, in bands, none enlarged; dorsal vi-9; anal 9; scales 29; secondary scales absent; color brown, the back with 6 distinct cross bands and each side with an obscure longitudinal stripe of dusky, of the width of one scale; most scales of side with a post-central whitish spot, these spots forming rows as in *Butis butis* and *Butis prismaticus*; an obscure dark band across cheek and opercle, and a similar one on the snout, from eye to middle of maxillary; dorsals, anal, and ventrals dusky, anal blackish with pale outer margins; upper edge of caudal pale, rest blackish; pectoral paler, with a large black spot at base, with two smaller white ones in front of it, above and below.

Two specimens, 2.50 and 3.50 inches long, from Mindoro Island.

This species is readily distinguished from *Butis butis* and *Butis prismaticus* by its slenderer form, narrower interorbital space, absence of secondary scales, and different coloration.

**HYPSELEOTRIS Gill.****249. *Hypseleotris modestus* (Bleeker).**

Head 3.60; depth 4.25; eye 3.66; dorsal vi-10; anal 11; scales 29; a dark vertical bar across base of pectoral; a small caudal spot; no side stripe; fins pale, the spinous dorsal and caudal with faint brown specks.

A single specimen, 2.50 inches long, from Mindoro Island.

Bleeker states that this species has no specks on either dorsal fin. In our specimen the specks are very faint.

**PERIOPHTHALMUS Bloch & Schneider.****250. *Periophthalmus barbarus* (Linnaeus). (*Periophthalmus cantonensis* (Osbeck); *Periophthalmus kalbreuteri* Pallas; *Periophthalmus kalolo* Lesson.)**

One specimen, 3 inches long, from Ticao Island, and one from Aparri, northern Luzon, 2.50 inches. Scales in Ticao specimen 82, in Aparri specimen 76.

These specimens seem to be identical with examples from Tokyo and with others from Samoa. It is doubtful whether more than one species of *Periophthalmus* proper can be defined. The specimens from Panay called *Periophthalmus chrysospilus* by Jordan & Seale are not different from *Periophthalmus barbarus*.

**RHINOGOBIUS Gill.**

(*Porogobius* and *Acentrogobius* Bleeker; *Coryphopterus* Gill.)

**251. *Rhinogobius nebulosus* (Forskål).**

*Gobius nebulosus* a Forskål, Descr. Animal., 24, 1775; Red Sea.

*Gobius criniger* Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 82, 1837; New Guinea. Günther, Cat. Fishes, III, 29, 1861.

Day, Fishes India, 288, pl. LXII, fig. 2, 1878-88.

*Rhinogobius nebulosus* Jordan & Seale, Bul. U. S. Fish Comm., xxvi, 1906, 41; Cavite, Philippine Islands. Jordan & Seale, ibid., xxv, 1905, 401; Apia, Samoa.

*Rhinogobius lungi* Jordan & Seale, Bul. U. S. Fish Comm., xxi, 1901, 41, fig. 13; Panay, Philippine Islands.

Head 3.50; depth 4.60; nose 3.20; interorbital space .6 of eye; eye 3.40 in head; maxillary 2.75; dorsal vi-10; anal 10; scales 28; head and nape naked; body with four large roundish black blotches on each side, alternating with broad saddle-like dorsal blotches; nape with two broad bands of dusky, each broken up by vermiculate lines of pale; anal fin with a dark edge.

Five specimens from Manila 3 inches long, and one from Aparri 4 inches.

<sup>a</sup> This name is thought by Klunzinger (Fische Rothen Meeres, p. 479) to be perhaps a synonym of *Gobius caninus* C. & V. The latter species, however, lacks the black border of the anal fin, described by Forskål in *Gobius nebulosus*.

**252. *Rhinogobius baliuroides* (Bleeker).**

Head 3.60; depth 5.20; nose 3.60; maxillary 2.70; interorbital space .4 of eye; eye equal to nose; a recurved canine at each side of lower jaw; tongue entire; dorsal vi-10; anal 10; scales 27; nape, cheeks, and opercles naked; tail broadly rounded; spinous dorsal with a black bar across middle; broken cross bands on chin; under side of head without specks; color otherwise as in *Rhinogobius gymnauchen*.

This species is near *Rhinogobius gymnauchen* (Bleeker), of Japan, differing from it in its more rounded caudal fin and in its coloration.

Of this species we have a single specimen in excellent condition, 2.50 inches long, from Aparri, in Luzon.

We may here note that *Gobius calderæ* Evermann & Seale (fide Evermann, in lit.) has no silk-like rays in the pectoral. It is a species of *Rhinogobius*.

**253. *Rhinogobius caninus* (Cuvier & Valenciennes).**

Head 3.70; depth 4.30; nose 3.60; interorbital space 2.50 in eye; eye 4 in head; maxillary 2.50, extending under anterior third of eye; two (or one) canines in each side of lower jaw; dorsal vi-10; anal 10; scales 29; scales of nape very small, about 23 rows in front of dorsal; cheeks naked; opercles with a few small scales along upper margin.

Five large roundish spots of dusky on each side, alternating with obscure dorsal bar-like blotches; a dark blotch on shoulder, above opercle; pale roundish spots at center of scales, forming indistinct rows on sides; all fins more or less dusky; anal without dark edge.

Two specimens from Iloilo, a large female, 4 inches long, and a young example, 2 inches. A specimen from Lubang, 3 inches long (male), differs from the Iloilo specimens only in having fewer (about 16) rows of scales in front of the dorsal fin. It is possible that this may represent a distinct species.

**GOBIUS Linnæus.****254. *Gobius ornatus* Rüppell.**

One specimen 2.50 inches long from Ticao Island.

**GLOSSOGOBIUS Gill.****255. *Glossogobius giuris* (Hamilton-Buchanan).**

*Gobius giuris* Hamilton-Buchanan, Fishes Ganges, p. 51, pl. 33, fig. 15, 1822; Ganges.

*Gobius giuris* Günther, Cat. Fishes, II, 1861, 21 (in part only), *Gobius fasciato-punctatus* Richardson being the same as *Glossogobius brunneus* (Temminck & Schlegel).

*Glossogobius giuris* Smith & Seale, Proc. Biol. Soc. Washington, XIX, 79, 1906; Mindanao, not *Gobius giuris* of Rutter, which = *Glossogobius brunneus* (Temminck & Schlegel) nor of Abbott, which = *Rhinogobius giurinus* (Rutter). *Ctenogobius platycephalus* of Jordan & Evermann, from Formosa, is also identical with *Rhinogobius giurinus*. The original *Gobius platycephalus*, of Richardson, from Macao, is *Glossogobius brunneus*.

Head 3; depth 5; nose 3; interorbital space  $\frac{1}{2}$  eye; maxillary 2.30; eye 5.30; dorsal vi-9; anal 9; scales 30; nape closely scaled; cheeks and opercles naked; tongue forked; spinous and soft dorsal fins specked in the rays only; 5 large squarish blotches forming a lateral row on each side; above and below these, narrower, wavy longitudinal streaks of dusky, more or less broken; nape without spots; a dark spot at the upper part of the pectoral base.

Two excellent specimens from Mindoro Island, 6 and 7 inches long; one from Iloilo, 4 inches, and one from Aparri, 3.50 inches.

This species is very close to *Glossogobius brunneus* (Temminck & Schlegel), from which it differs mainly in the absence of the dusky bar across spinous dorsal, and the lack of spots on the nape.

**AWAOUS Steindachner.**

(*Chonephorus*. Poey.)

**256. *Awaous ocellaris* (Broussonet).**

Head 3.33; depth 4.60; nose 2.30; maxillary 2.40; interorbital space .88 of eye; eye 6 in head (2.60 in nose); dorsal vi-11; anal 11; scales 55.

Five specimens from Mindoro Island, 3.50 to 4.59 inches long. These specimens agree essentially with examples from Samoa, differing only in having the body less uniformly darkened, and the spotting more prominent. Like the specimens from Samoa, they have the ocellus at back of spinous dorsal, and a spot on the upper part of base of pectoral.

**AMBLYGOBIUS** Bleeker*(Odontogobius* Bleeker.)**257. *Amblygobius phalæna*** (Cuvier & Valenciennes).

Colors in life: Dark green, the body with five light and five dark alternate bands, between each two of which is a narrow light blue band; three blue stripes on gill cover; a large dusky spot above upper angle of opercle; a similar spot on upper part of tail near base; first dorsal striped with cream and brown, a large dusky spot on its posterior portion; second dorsal margined with light yellow, blue black, and brown; belly pale blue; anal pale blue, like belly, margined with dusky; ventrals very pale blue, with dusky margins; pectoral clear pale yellow; caudal washed with salmon, dusky at tip.

A single specimen, 2 inches long, from Cagayancillo.

**GOBIICHTHYS** Klunzinger.*(Pselaphias* Jordan & Seale.)**258. *Gobiichthys tentacularis*** (Cuvier & Valenciennes). *Zapatero*.

Two specimens from Iloilo, 3 inches long, and one of the same size from Aparri, northern Luzon.

The genus *Gobiichthys* Klunzinger (*petersii*) supersedes *Pselaphias* Jordan & Seale, the type of Klunzinger's genus having a tentacle over the eye. Except in this rather slight character, *Gobiichthys* does not differ from *Oxyurichthys* Bleeker as restricted in the present paper.

**OXYURICHTHUS** Bleeker.

The genus *Oxyurichthys* Bleeker (*belosso*) includes gobies with ventral fins united, tail lanceolate, dorsal fin short, an adipose nuchal crest, the upper teeth in one series, and the tongue convex. The species differ from those of *Gobiichthys* Klunzinger (*Pselaphias* Jordan & Seale) in lacking a tentacle over the eye, and from *Gobionellus* Girard in having the upper teeth in a single series, and the tongue convex. The type of *Oxyurichthys* was stated by Bleeker to have the upper pectoral rays silk-like, doubtless by error, none of the closely related forms of these genera known to us having them so. *Gobius papuensis* Cuvier & Valenciennes and *Gobionellus lonchotus* Jenkins are congeneric with the present species.

**259. *Oxyurichthys cristatus*** (Day).

A single specimen from Cagayancillo, 3 inches long.

**APARRIUS** Jordan & Richardson, new genus.*Aparrius* Jordan & Richardson, new genus of Gobiidæ (*acutipinnis*.)

This genus has the teeth very fine, in bands in both jaws, the tongue short, adnate nearly to tip, emarginate, and the tail acuminate, as in *Gobionellus*, in each of these characters differing from *Rhinogobius*. Like *Rhinogobius*, it has the scales large and the soft dorsal fin short. The name is from Aparri in northern Luzon, where the typical species is found.

**260. *Aparrius acutipinnis*** (Cuvier & Valenciennes).

*Gobius acutipinnis* Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 80, 1837; Malabar. Day, Fishes India, 292, pl. LXI, fig. 2, 1878-88; Seas of India to the Andamans.

*Rhinogobius ocyurus* Jordan & Seale, Bul. U. S. Fish Comm., xxvi, 1906, 42, fig. 14; Cavite, P. I. *Acentrogobius acutipinnis*, Smith & Seale, Proc. Biol. Soc. Wash., XIX, 1906, 81; Mindanao, P. I.

Head 3.60; depth 4; dorsal vi-11; anal 11; scales 27; nose 3.50; maxillary 2; interorbital space .66 of eye; eye 4; teeth very fine, in bands in both jaws; outer teeth not enlarged; no canines; tongue short, adnate nearly to its tip, which is emarginate; cheeks and opercles naked; nape scaled, at least posteriorly; maxillary nearly to back of orbit; mouth scarcely oblique; first four rays of spinous dorsal (in female) prolonged, though scarcely filamentous, carrying the membrane nearly to their tips; the depressed longest spinous ray reaching to fourth ray of soft dorsal; soft dorsal high behind, the depressed fin reaching past base of caudal; caudal long, acuminate, its length less than 2.50 in length without caudal; anal reaching base of caudal; ventrals united, reaching nearly to vent; pectorals slightly longer than head, without silk-like rays.

Color in spirits dusky olive, with obscure cloud-like blotches, tending to form indistinct cross bands; nape vermiculated; a suborbital bar of dusky, dorsals and caudal specked in both rays and membranes; anal dusky, slightly darker toward margin; ventrals dusky, with pale edge; pectorals with a faint short bar across upper base.

Here described from a single specimen, 2.25 inches long (female) from Aparri, in northern Luzon.

This fish has the aspect of species of *Gobionellus* or *Oxyurichthus*, though differing from them distinctly in its generic characters. It has the notched tongue of *Gobionellus*, with the large scales of *Rhinogobius*. The Aparri specimen is referred to the present species with some hesitation, having perhaps a little less oblique mouth than the type of *Rhinogobius ocyurus* Jordan & Seale, and showing less plain traces of dark crossbars. The type of *Rhinogobius ocyurus* has the tongue destroyed.

#### WAITEA Jordan & Seale.

##### 261. *Waitea mystacina* (Cuvier & Valenciennes).

Head 3.50; depth 4.50; nose 2.75; interorbital space .5 of eye; eye 4.20; maxillary 1.50, produced behind eye, to preopercle; teeth minute, in bands, as in *Gobionellus*; dorsal vi-11, the first three rays (in male) of the spinous dorsal much produced and finely filamentous, the filamentous extension of the third ray reaching beyond back of base of soft dorsal, anal 12; scales 29, head naked; caudal probably pointed (broken).

Color in spirits olive, bluish forward; sides with five distinct blotches; both dorsals mottled in the membranes; anal and ventrals dusky.

A single example (male), from Aparri, northern Luzon, 2.75 inches long.

#### SICYOPTERUS Gill.

##### 262. *Sicyopterus tæniurus* (Günther).

Head 4.50; depth 5; eye 5.50 in head; dorsal vi-11 or 12; anal 11; scales 55-60.

One specimen from Mindoro Island, 3.25 inches long, and one from Sibuyan, 1.75 inches.

#### TRYPACHENICHTHYS Bleeker.

##### 263. *Trypauchenichthys typus* (Bleeker).

Dorsal 59 (vii, 52); anal 49; scales 56, cycloid; ventrals notched three-fourths to base; color in spirits dull uniform light brown, with purplish tinge.

A single specimen from Cagayancillo.

#### GOBIOIDES Lacépède.

##### 264. *Gobioides brachygaster* (Günther).

A specimen, 4.75 inches long, from Aparri is doubtless this species. It has the head 7.50 in length to base of caudal, not 9, as stated by Doctor Günther, but otherwise agrees with his description. Depth 12.50; dorsal vi, 45; anal 46; dorsal and anal separated from caudal by a notch; pectoral half the length of the ventral; eyes invisible; chin with numerous short barbels; head much wrinkled with sensory ridges; each side with a median lateral row of transverse vertical slits or pores, each surrounded by blue color.

#### Family SCORPÆNIDÆ.

#### SEBASTOPSIS Gill.

##### 265. *Sebastopsis guamensis* <sup>a</sup> (Quoy & Gaimard).

Four specimens, 1.50 to 3 inches long, from Calayan.

#### SEBASTAPISTES Gill.

##### 266. *Sebastapistes nuchalis* (Günther).

Head 2.50 in length to base of caudal; depth 2.75; depth of caudal peduncle 3.20 in head; dorsal xi, i, 10; anal iii, 5 or 6; scales 38, the anterior 5 or 6 scales of the lateral line with a short spine; nose 3.66 in head; eye 4; interorbital space 1.50 in orbit; maxillary 1.90 in head, its tip reaching a vertical

<sup>a</sup> Two small specimens, 1.8 inches long, taken at Honolulu, H. I., in 1901, are apparently the young of this species.

from posterior margin of orbit; spinous armature of head well developed; a pair of sharp spines between nostrils in front of eye; each upper orbital rim with three spine-like serratures; posterior rim of orbit with two or three very small spines; two sharp "strong" spines in transverse series behind each upper posterior angle of orbit, and two in longitudinal series on each side of nuchal region; two strong spines at back of opercle, and three along upper margin of opercle, in a series continuous with the anterior spinous tubes of the lateral line; a strong humeral spine; a strong spine at upper angle of preopercle, with two weak spines in front of and above it, and four below it on the free preopercular margin; teeth in jaws in velvety bands, the posterior ones recurved; no barbels; orbital tentacles very small; a short nasal flap on each side; lower margin of preopercle with five or six small cirri; middle of each upper jaw with a short tentacle; scales of side without dermal flaps; pectoral 1.20 in head, with no prolonged or free rays; ventrals 1.40; caudal rounded, 1.50 in head; longest dorsal spine (fourth to seventh) 2.66 in head; second anal spine longest, two in head; lateral line complete; upper parts of cheeks and opercles scaled.

Color in spirits, grayish brown, mottled with darker; under parts little paler than upper; head darkest on lower part of cheek and at upper angle of opercle; edges of lower jaw and chin rather faintly marked with narrow dusky cross bands; spinous dorsal mottled, with a conspicuous black blotch in its upper part between the sixth and tenth spines, soft dorsal mottled, darkest in front and toward base, with a faint broad pale crossband at middle; caudal barred broadly with dusky across base, at middle, and behind; anal with an obscure broad bar across middle and on outer fourth; ventrals dusky, paler toward base; pectorals with scattered dark specks, forming an indistinct broad bar across inner third; axil of pectoral with several roundish white spots, smaller than pupil.

Two specimens from Calayan, 2.25 inches long. It is with hesitation that we refer these specimens to *S. nuchalis*, as the scales appear to be larger than in that species, and there are some differences in coloration and minute orbital tentacles. The species is near *S. balliewi* (Sauvage), but has a shorter jaw and much smaller orbital tentacles.

#### PARACENTROPOGON Bleeker.

##### 267. *Paracentropogon longispinis* (Cuvier & Valenciennes).

A single example, 2 inches long, from Cuyo. The pale spot above the lateral line does not show in the specimen, which otherwise agrees closely with descriptions and figures of this species.

##### 268. *Paracentropogon indicus* (Day).

A single small specimen from Cuyo, 2 inches long, agrees closely with Day's original description and figure of this species (Fishes of India, p. 155, pl. 38, fig. 2).

#### TETRAROGE Günther.

##### 269. *Tetraroge barbata* (Cuvier & Valenciennes).

One example from Aparri, 2 inches long.

#### Family PLATYCEPHALIDÆ.

##### PLATYCEPHALUS Bloch.

##### 270. *Platycephalus indicus* (Linnæus). (*Cottus insidiator* Forskål.)

One example, 8 inches long, from Manila.

##### THYSANOPHYS Ogilby.

##### 271. *Thysanophys tentaculatus* (Rüppell). (*Platycephalus nematophthalmus* Günther, also of Bleeker.)

One specimen from Cuyo, 6 inches long.

#### Family PLEURONECTIDÆ.

##### PLATOPHRYNS Swainson.

##### 272. *Platophryns pantherinus* (Rüppell).

One specimen, 3 inches long, from Aparri, northern Luzon.



## PSEUDORHOMBUS Bleeker.

**273. Pseudorhombus javanicus** (Bleeker).

Six specimens, 3 to 4 inches long, from Cavite, collected by Doctor Lung and recorded as *Pseudorhombus polyspilus* by Jordan & Seale, appear to belong to this species. They are distinguished from *Pseudorhombus arsius* (*russellii*) and *polyspilus* by their shorter jaw and wholly convex profile, without angle over snout.

**274. Pseudorhombus polyspilus** (Bleeker). *Dapa*.

One example, 4 inches long, from Iloilo, and one, 4.50 inches, from Manila. This species is apparently sufficiently distinguished from *Pseudorhombus arsius* (*russellii*) by the presence of numerous scattered small black specks on the body, each with a pale border.

**275. Pseudorhombus malayanus** Bleeker.

One specimen from Manila, 5.50 inches long. Dorsal 71; scales 85, ctenoid on both sides; traces of two dark spots on lateral line; color otherwise uniform.

In color this specimen resembles *Pseudorhombus oligodon*, which species, however, according to Doctor Bleeker, has fewer teeth.

## Family SOLEIDÆ.

## MICROBUGLOSSUS Günther.

**276. Microbuglossus humilis** (Cantor).

Four specimens from Manila, 1.75 to 2 inches in length.

## BRACHIRUS Swainson.

(*Synaptura* Cantor, substitute for *Brachirus* on account of the prior *Brachyrus* and *Brachyurus*, restricted by Kaup to allies of *B. commersoni*.)

**277. Brachirus sorsogonensis** Evermann & Seale.

One specimen, 7.50 inches long, from Manila, and one, 6.25 inches, from Lubang.

## CYNOGLOSSUS Hamilton-Buchanan.

**278. Cynoglossus sindensis** Day. *Dapa*.

One example, 10 inches long, from Manila. Dorsal 108; anal 86; two lateral lines on each side; scales cycloid on blind side.

**279. Cynoglossus sumatrensis** (Bleeker).

A specimen from Ticao Island, 2.75 inches long, is probably this species, although the angle of the mouth is a little farther forward than is said by Doctor Bleeker to be the case in *sumatrensis*. Dorsal 110; scales in lateral line (from base of nuchal branch) 70; transverse count between lateral lines on eyed side 11; a single lateral line on the blind side; scales ctenoid on both sides; color in spirits mottled brownish, with much the aspect of *Cynoglossus puncticeps*, from which it is easily distinguished by its much larger scales and longer dorsal fin.

## Family PTEROPSARIDÆ.

## PARAPERKCIS Gill.

**280. Paraperkcis tetracanthus** Lacépède.

Two specimens from Calayan, 4 inches long. Color in life of upper parts brown, belly white; nine dark cross bands, extending downward nearly to median ventral line; head mottled with light and dark brown, white, and dusky green; dorsal sparsely and irregularly spotted with dusky; ventral and anal pale yellow; a large, well-defined, almost black area at base of caudal; beyond this a much smaller area of opaque white, about half an inch in length and including the middle ray and its two adjacent membranes.

**281. Paraperkcis cylindrica** (Bloch).

One example, 4 inches long, from Cuyo. Life color dirty white, with about ten wide vertical brown bars, which are wide at their middle and are united on the belly; top of head brown; dorsal light brown,

with spots of dark brown on membranes; caudal similar to dorsal; pectoral reddish brown; ventral dusky; anal light brown, spotted with darker brown and milky white.

Family BATRACHOIDIDÆ.

MARCGRAVIA Jordan.

282. *Marcgravia diemensis* (Le Sueur). *Guecquan*.

(*Cottus grunniens* Linnæus, "habitat in America," dorsal 11-26, anal 22, is *Opsanus tau* or *Marcgravia cryptocentra*, and can not be identified with any Asiatic fish.)

Head 3.16 in length without caudal; depth 3.30; eye 4.75; interorbital space slightly greater than eye; nose somewhat less than eye, 4.50 in head; maxillary 2 in head, reaching a vertical from behind eye; opercular spines 4; three fringed tentacles above each eye; a fringe of small cirri on each side of upper lip, and a similar fringe encircling lower jaw; other smaller cirri on top of head and along margin of preopercle; dorsal 11-19; anal 14; pectoral 1.4 in head; ventral 1.4; teeth in coarse villiform (molar-like) bands in jaws and on vomer and palatines.

Color brown, coarsely mottled, and speckled with darker; fins barred. Life color, dark, mottled with black, dark brown and gray, the gray forming three broken and irregular bands; belly, throat, and chin flesh color; pectoral strongly banded with gray and brown; a black band at base of caudal followed by five gray and four brown bands.

A single specimen, 3 inches long, from Cuyo.

This species is type of the genus *Coryzichthys* Ogilby, named but not defined in the Report of the Amateur Fishermen's Association of Queensland, 1907, p. 11.

Family CALLIONYMIDÆ.

SYNCHIROPUS Gill.

283. *Synchiropus ocellatus* (Pallas).

Head 3.30 in length without caudal; depth 5; depth of caudal peduncle 3 in head; width of head 1.16 in its length; eye 4 in head; nose 3.75; interorbital space equal to width of pupil; mouth very small, its width less than eye, the jaws subequal, the maxillary touching a vertical from anterior margin of orbit; jaws with minute teeth; preopercular spine with two curved hooks, directed obliquely inward; gill-opening as wide as pupil, superior, situated on the neck nearly midway between the preopercular spine and the base of the spinous dorsal; dorsal 14-8; anal 7; pectoral 1.3 in head, reaching past front of anal; ventral equal to head; caudal 1.16; lateral line complete, high, its course about an eye-width distant from the mid-dorsal line.

Color in spirits: Upper parts and sides brown; sides of head with numerous small ocelli (pale-encircled dark dots); sides of trunk marbled with grayish, the lighter color crossing the back in six crenulate-edged bands; lower part of side with about four roundish gray spots, each with smaller whitish specks about its circumference; other similar smaller white specks forming an indefinite row along outer edge of belly; middle of sides, between the marblings, with many small dark-encircled pale specks, of same size as the facial ocelli; spinous dorsal with three incomplete double-edged oblique crossbands, above which, between the first and third spines, is a row of four roundish ocellate black spots, each with a darker center and a pale edge; soft dorsal with two or three indistinct obliquish bands; caudal barred with dusky near base, pale submedially; its outer half obscurely double-barred, its posterior margin pale; anal dusky, paler near base, the rays tipped with whitish, ventrals twice barred broadly with blackish, tips pale; pectorals with three bands of small black spots in the rays; breast crossed by a vague, diffuse band of dusky; belly pale.

Two specimens, 1.50 and 2 inches long, from Calayan, in tide pools. On the life color, Mr. McGregor has the following note: "Brown, mottled with gray; tail with a few red spots; pectoral and ventral more or less orange; first dorsal with four conspicuous ocellate brown spots; snout and gill-covers and sides of face thickly speckled with blue."

Günther's *Callionymus microps*, the figure of which shows the spinous dorsal uniform black without ocelli, does not appear to differ in any important respects from the present species. The pectoral fins have fine, dark cross bars. *Synchiropus lili* Jordan & Seale, recently described from Samoa, is also

very close and may not be different. The pectorals are, however, clear, bright yellow, without bars. Mr. McGregor states that the pectorals of the present species are yellowish in life. Those of *Synchiropus lili* are bright yellow, edged with golden. It is not unlikely that both *microps* and *lili* are identical with *Synchiropus ocellatus*.

CALLIONYMUS Linnaeus.

284. *Callionymus sagitta* Pallas.

Two young males, 1.50 inches long, from Manila. Dorsal iv-9; preopercular spine with four or five hooks directed inward and upward, and with a single strong spine in front pointing forward. Color in spirits brownish, with numerous darker ocelli; a row of dusky blotches along middle of each side; cheeks with small dark specks bordered with whitish; spinous dorsal blackish.

Family. BLENNIIDÆ.

ENNEAPTERYGIUS Rüppell.

825. *Enneapterygius philippinus* (Peters).

Head 3.75; depth 5; depth caudal peduncle 3 in head; eye 3; dorsal iii-xi, 8; anal 15; pectoral 2.75 in length without caudal; ventral 1.1 in head; caudal 1.4 in head; scales 30, 12 in lateral line; a pair of short nasal barbels; orbital cirri absent, or, if present, extremely small (not found by us).

Color in spirits pale straw, probably red in life; top of head, sides, and under parts more or less dusted with fine dark specks; two small spots of silver under eye; a large silver spot below front base of each pectoral, and a pair of similar small ones before base of ventrals; several splashes of silvery along lower portion of side, forming an indistinct row; second and third dorsals a little dusky outwardly; caudal faintly barred; anal pale; pectorals with distinct black specks in four series. A second, and smaller specimen, has the under part of the head and breast much more profusely specked, the anal uniformly dusky, and the caudal with a large, rather diffuse basal blotch.

This species is close to *Enneapterygius tusitala* Jordan & Seale, from Samoa, apparently differing from it chiefly in the presence of the silvery markings and in the reduction (or absence) of the orbital tentacle.

Two specimens, 0.70 and 0.80 inches long, from Calayan. The description of Peters differs only in that the type specimens from Luzon have the body marked by obscure dark cross bands.

PETROSCIRTES Rüppell.<sup>a</sup>

286. *Petroscirtes eretes* Jordan & Seale.

*Petroscirtes eretes* Jordan & Seale, Proc. U. S. Nat. Mus., xxviii, 1905, 801, fig. 19; Negros, Philippine Islands. Bul. U. S. Bureau of Fisheries, xxvi, 1906 (1907), 47; Iloilo, Philippine Islands.

*Petroscirtes vulsus* Jordan & Seale, Bul. U. S. Fish Comm., xxvi, 1906, 47, fig. 20; Manila (young specimen).

(?) *Petroscirtes variabilis* Cantor, Cat. Mal. Fishes, 200, 1850; Sea of Pinang. Günther, Cat. Fishes, iii, 234, 1861. Day, Fishes India, 327, pl. Lxix, fig. 7, 1878-88.

Head 4.20; depth 4.75; eye 3.50; nose 3.40; interorbital space 4.00; superior dermal flaps minute, there being two above each eye and one on each side of nuchal region; chin with a pair of well developed but small barbels, and a trace of a second pair (on one side only in this specimen); color in spirits, grayish brown, obscurely blotched and mottled; an indistinct dark stripe from eye to base of caudal fin, most prominent in front of pectoral, back of which it is nearly invisible, except when viewed at a favorable angle; dorsal with specks in the rays, these scarcely arranged in rows; caudal with an obscure V-shaped basal blotch; in life mottled with white and dark green, and with numerous points of pale blue.

One specimen, 2.50 inches long, from Cuyo.

This species is close to *Petroscirtes variabilis* Cantor, as figured by Day, and may not be different, although that species is stated by Günther to have no orbital tentacles. These are shown, however, in the figure by Day, although, on account of their small size, they are likely to be overlooked. Day states that specimens of *Petroscirtes cynodon* Peters (placed in the synonymy of *Petroscirtes variabilis* by Günther, sent to him by Doctor Peters, lacked the orbital tentacle. The present specimens show the dark lateral stripe of *P. variabilis*, a marking which apparently disappears readily, being difficult to make out in the cotypes of *P. eretes*.

<sup>a</sup> *Petroscirtes azureus* Jordan & Seale, from Samoa, is probably not different from *P. tenuatus* (Quoy & Gaimard).

## SALARIAS Cuvier.

**287. *Salarias rivulatus* Rüppell.**

*Salarias rivulatus* Rüppell, Atlas, Africa, 114, 1828; Red Sea. Jordan & Seale, Bul. U. S. Bureau of Fisheries, xxv, 1905 (1906), 429; Samoa.

*Salarias quadricornis* Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 329, 1836; Ile de France. Günther, Cat. Fishes, III, 255; Fische der Südsee, 209, taf. 117, fig. B, 1877; Upolu, Paumotu, Tahite. Klunzinger, Fische des Rothen Meeres, 486, 1871; Red Sea.

*Salarias oryx* (Ehrenberg) Cuvier & Valenciennes, Hist. Nat. Poiss., xi, p. 327; Red Sea.

Head 4.16; depth 4.50; depth of caudal peduncle 2.33 in head; eye 3.75; interorbital space 2 in eye; a pair of simple tentacles above orbits and on nape, each about half diameter of eye; nasal tentacles short, fringed; a crest on nape (in male) as high as half diameter of orbit; dorsal XII or XIII, 20; anal 23; pectoral 1 in head; ventral 1.3; dorsals of almost equal height, deeply notched; soft dorsal adnate to basal third of caudal.

Color in spirits, smoky bluish brown; the body with many narrow, vertical, obliquish, or zigzag streaks darker than the ground color, which is smoky brown; fins dusky, the dorsals crossed longitudinally by several (the spinous dorsal by three) oblique pale streaks; anal with at least one median longitudinal pale streak and with a very narrow outer edging of pale.

Two specimens, 2.50 inches long, from Calayan. These specimens, except for a very slight difference in the number of soft dorsal rays, agree very well with Günther's description and figure of *Salarias quadricornis* Cuvier & Valenciennes, and with the specimens obtained by Jordan & Kellogg in Samoa. Rüppell's *rivulatus* (var. *rivulatus* of Klunzinger) with elongate, black-edged, yellow spots, is said to represent a mere color variation of the probably more typical form called *quadricornis* by Cuvier & Valenciennes and Günther.

**288. *Salarias fasciatus* (Bloch). *Palu*.**

Head 4.60; depth 3.60; eye 3; orbital tentacles bi- or tri-branched; nuchal tentacles in the form of a fringed tuft, each with 6 or 8 projections; dorsal 31; anal 19; spinous and soft dorsals continuous.

Color in spirits brownish with blue wash; anterior dorsal region with numerous small bluish or dusky spots, these becoming elongate about middle of side and backward, where they form incomplete longitudinal streaks; traces of crossbands on hinder part of body, apparently continued upward more or less on soft dorsal; spinous dorsal mottled and spotted, with several rather large circular pale spots; caudal and pectorals with prominent specks in the rays, those on the pectorals quite squarish; breast crossed by a blue band; ventrals specked in the rays like pectorals.

One specimen, 3.30 inches long, from Cagayancillo. On the life colors of this specimen Mr. McGregor has the following note: "Mottled and lined with dark green and black; on side below posterior half of dorsal about twelve spots of sky blue; a few spots of the same color about eye."

The present specimen does not differ from the smaller one recorded by Jordan & Seale from southern Negros (Dean collection), nor from the example from Ishigaki, Riu Kiu, Japan, described as *Salarias ceramensis* Bleeker by Jordan & Snyder. It is possible that Bleeker's *S. ceramensis* is not different from the present species. Specimens of this species from Apia, Samoa, obtained by Jordan & Kellogg, have a row of blue spots,<sup>a</sup> each with a light center, on the upper part of the caudal peduncle, and have the fins, especially the caudal, more heavily marked than in the Philippine and Japanese specimens.

**289. *Salarias edentulus* (Bloch & Schneider).**

Head 4.50 to 4.75; depth 4.25 to 4.50; depth caudal peduncle 2.5 in head; eye 3.50; interorbital space 2 in eye; dorsal XI or XII, 21; anal 21 or 22; pectoral 1.1 in head; ventral 1.2; tentacles simple; no crest; dorsals rather deeply notched; back of trunk, tail, dorsals, and caudal fin with numerous small spots.

Two specimens from Calayan, 3.50 inches.

**290. (?) *Salarias deani* Jordan & Seale (male (P), or new species (P)).**

Head 4.60; depth 5.80; depth caudal peduncle 2.25 in head; eye 3.30; interorbital space 2 in eye; a single slender simple tentacle over each orbit, nearly as long as eye; no nuchal tentacles; nasal tentacles three- or four-branched; a moderate nuchal crest, as high as width of pupil (♂ ?); dorsal XII, 20; anal 21; pectoral 1.16 in head; ventral 1.50; dorsals both low, notched about halfway to base; longest dorsal spine 1.50 in head; longest ray 1.30; soft dorsal terminating above base of caudal; teeth uniserial in both jaws; no canines.

<sup>a</sup>In this respect agreeing with Günther's "variety" (specimen from Red Sea), Cat., III, 245.

Color in spirits dark, smoky, bluish brown; caudal peduncle with traces of darker bands or blotches; head with fine punctulations; an oblong blue spot on each opercle (sex marking?); dorsals dusky in both rays and membranes, the spinous dorsal with three or four and the soft dorsal with eight or ten narrow longitudinal or obliquish and more or less zigzag streaks of darker; outer edges of both dorsals pale; caudal crossed transversely with zigzag bars of dusky, in places more or less mottled, or the light spaces taking the form of small circular spots; anal dusky, darker submarginally, and with a very narrow pale outer edge; pectoral pale, transparent, except for the six or seven middle rays, each of which bears one or two minute but conspicuous black dots about midway of its length.

A single specimen, 2.50 inches long, from Calayan.

This fish agrees substantially with *Salarias deani* Jordan & Seale in measurements, fin counts, etc., and in the absence of nuchal tentacles. The different coloration and the presence of a nuchal crest are apparently distinctive, but may be sexual characters of the male.

### Family CONGROGADIDÆ.

#### CONGRODADUS Günther.

(*Machaerium* Richardson, preoccupied; *Hierichthys* Jordan & Fowler.)

#### 291. *Congrogadus subducens* (Richardson). (*Hierichthys encryptes* Jordan & Fowler.)

Head 6.50 in total length; 6.20 in length without caudal; depth at front of anal 1.75 in head; eye 5.30 in head, 1.50 in snout; maxillary 2.20 in head; teeth in lower jaw more than 40 on a side; dorsal 76; anal 65; pectoral 2.66 in head; dorsal beginning over posterior fourth of pectorals; anal beginning under twelfth ray of dorsal; scales more than 200 in a longitudinal series (240, estimated, on a count of  $\frac{1}{2}$ ); lateral line terminating under twelfth to fourteenth ray<sup>a</sup> of dorsal; cheeks scaled.

Color in spirits, light grayish brown, rather sparsely mottled and spotted with darker; a dark spot on opercle; dorsal and anal each with a basal row of dark spots. Life color: "Dark red, irregularly spotted with dark brown and mottled with gray; belly, throat, and chin marked with large white spots; a row of large dark spots along base of dorsal; dorsal, caudal, and ventrals pale, the membranes more or less regularly spotted with light reddish." (McGregor.)

Our three specimens, 7 to 9 inches long, all from Cuyo, agree with the description of *Machaerium reticulatum* Bleeker, regarded as a synonym of the present species by Doctor Günther, who had both Richardson's type and specimens of *Machaerium reticulatum* from Doctor Bleeker's collection. *Hierichthys encryptes* Jordan & Fowler, described from the Riu Kiu Islands from a young specimen in which all color has faded, is apparently not different from the present species.

#### 292. *Congrogadus hierichthys* Jordan & Richardson, new species. *Tamayo*.

Head 5.75 in length to base of caudal; depth at front of anal 1.3 in head; eye 5 in head, 1.60 in nose; maxillary 2.50 in head; lower jaw somewhat longer than upper, the teeth on one side between

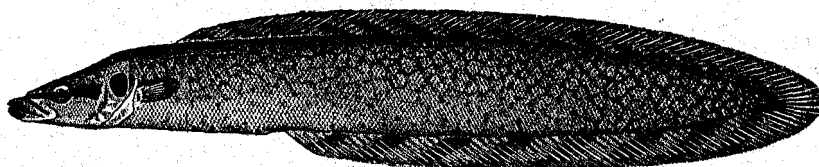


FIG. 11.—*Congrogadus hierichthys*, new species. Type.

25 and 30; dorsal 57; anal 46; pectoral 2.60 in head; dorsal beginning over tip of pectoral; anal beginning under tenth ray of dorsal; scales 160; lateral line terminating under sixth or eighth ray of dorsal; cheeks scaled.

Color in spirits nearly uniform brownish, vaguely mottled and clouded with darker; a conspicuous roundish black spot on opercle, a little smaller than eye, surrounded by a narrow border of pale; a

<sup>a</sup> Not running the whole length of body, as wrongly indicated in Richardson's figure, an error which led to the establishment of the nominal genus, *Hierichthys*.

dark band across cheek and through eye; a row of black specks on each side of top of head and a similar row along posterior margin of preopercle, these marking the openings of pores; dorsal and anal with dark spots in the membranes, in four series in the dorsal and in three in the anal. Color in life: Dark brown; head dark greenish, lighter below; side behind gill-opening and side of head with a few white spots; on opercle a large black spot narrowly bordered with yellow; dorsal, caudal, and anal light brown, membranes spotted with darker brown.

(*Hierichthys*, a generic name proposed by Jordan & Fowler, identical with *Congrogadus*).

Two specimens from Cuyo, 3 and 4 inches long. The type is no. 20208, Stanford University; the cotype is no. 61684, U. S. National Museum.

#### Family BROTULIDÆ.

##### *DINEMATICHTHYS* Bleeker.

#### 293. *Dinematichthys iluocosteoides* Bleeker.

Head 4 in length, without caudal; depth 5.30; eye 3 in nose; dorsal 82-85; anal 56-59; pectoral 1.40 in head; ventral 1.25; caudal separate; a prominent anal papilla and a pair of horny claspers; scales about 100; cheeks scaly; opercle with a spine at its upper angle, pointing backward, and another shorter and blunter one at about middle of its posterior margin, directed obliquely downward.

Color in spirits grayish brown; head, body, and vertical fins along their bases finely punctulated with dark specks.

Two specimens from Ticao Island, 2 inches long. These specimens agree with Samoan examples in having the anal rays under 60, and not 69, as stated by Bleeker and Günther, probably by error.

#### Family ANTENNARIIDÆ.

##### *ANTENNARIUS* (Commerson) Lacépède.

#### 294. *Antennarius chironectes* (Lacépède).

A single specimen from Cagayancillo, 3 inches long.

#### 295. *Antennarius lithinostomus* Jordan & Richardson, new species.

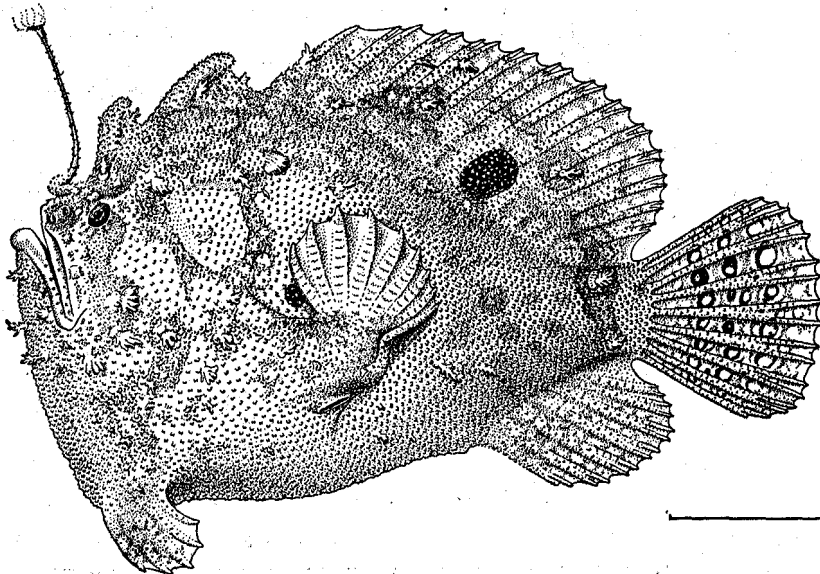


FIG. 12.—*Antennarius lithinostomus*, new species. Type.

Depth 1.60; width 3.2; body and fins everywhere roughened with wart-like asperities, which are typically bifid; sides with a few larger and fringed dermal flaps; two fringed flaps behind the angle of the maxillary, one directly below it, and one in front of the posterior fourth of the mandible; three

dermal flaps, set in a triangle, on chin below its middle; eye 4.75 in length of maxillary; interorbital space 3 times eye; maxillary 4.2 in length, nearly vertical; "fishing-rod," or prolongation of first dorsal spine, twice the length of the second dorsal spine, 1.2 times length of maxillary; second dorsal spine 2.2 in maxillary, the depressed spine reaching halfway to tip of third dorsal spine; dorsal rays in continuous dorsal fin 13, the longest rays as long as the middle rays of caudal; anal rays 7, the longest ones .8 of longest dorsal rays; last rays of dorsal and caudal connected by membrane with caudal peduncle fully to base of caudal rays; depth of caudal peduncle 1.9 in length of maxillary; pectoral reaching vertical from fifth anal ray; horizontal spread of ventrals 2.3 in length of fish to base of caudal; gill-opening under base of pectoral; teeth strong, in a broad band in each jaw, directed obliquely backward.

Color in spirits grayish olive, with some black marblings, blotches, and ocelli; a large black ocellus on base of eighth dorsal ray, twice diameter of eye; two round black spots larger than eye above and behind base of pectoral; head, trunk, and all fins except caudal with obscure, faded marblings; caudal with three transverse rows of conspicuous black ocelli, each with a transparent center; tongue and inside of throat marbled like front of chin and trunk.

The life colors are thus described by Mr. McGregor: "Mottled and blotched with dark brown and gray; lips grass green; dorsal, caudal, and anal largely green; a pink spot above pectoral; the whole fish with the appearance of an alga-covered rock, even the interior of the mouth being mottled."

One specimen from Cuyo, 4 inches long; the type is no. 20204, Stanford University.

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α λιθινός, marbled; στόμα, mouth.