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A COLLECTION OF FISHES FROM SUMATRA

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A COLLECTION OF FISHES

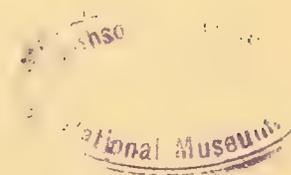
FROM

SUMATRA.

BY

HENRY W. FOWLER.

PHILADELPHIA :
1904.



ERRATA.

By an inadvertence the following references to plates, in the text, are incorrect. They should read:

- Page 546, *Zenodon caeruleorum*. Plate XXIV.
- “ 548, *Parapercis atromaculata*. Plate XXIV.
- “ 549, *Malacanthus urichthys*. Plate XXII.
- “ 551, *Gobius venustus*. Plate XXVII.
- “ 552, *Scartichthys basiliscus*. Plate XXV.
- “ 553, *Scartichthys stigmatopterus*. Plate XXV.
- “ 554, *Entomacrodus leopardus*. Plate XXVII.
- “ 555, *Entomacrodus calurus*. Plate XXVI.
- “ 556, *Cynoglossus os*. Plate XXVIII.

A COLLECTION OF FISHES FROM SUMATRA.

BY HENRY W. FOWLER.

During the late summer and autumn of 1901 Mr. Alfred C. Harrison, Jr., and Dr. H. M. Hiller formed an important zoölogical collection while pursuing their explorations in Sumatra. Most of the reports on the different groups have already appeared in the PROCEEDINGS of the Academy, and as the fishes comprise a large part of the material they have demanded corresponding attention.

But two localities appear on the labels. With the exception of a few fresh-water forms taken at Batu Sangkar, Tanah Datar, in Padangsche Bovenland, at an elevation between 1500 and 3000 feet, the specimens were secured in the markets or environs of Padang. Many are food-fishes, evidently of importance, though no particular information concerning the fisheries, local names, etc., has been preserved.

The collection was submitted to me for examination by Dr. Samuel G. Dixon, President of the Academy, to whom I am indebted for this opportunity of studying East Indian fishes. At that time I was at Stanford University, assisting Dr. Jordan with the work on his Japanese fishes, and later the United States Fish Commission with their report on the Hawaiian collections. When first examined, the colors, which had been well preserved, were noted, as the fishes had all been prepared in arrack or rice-rum. After being placed in alcohol they soon more or less faded. Through the courtesy of Dr. Jordan I had the opportunity of examining and comparing the fine collections in Stanford University. From the other well-known ichthyologists located there I also received many courtesies, especially from Dr. Oliver P. Jenkins, who freely placed his collection of Hawaiian fishes at my disposal. I am also indebted to Dr. Barton W. Evermann, for suggestions and comparisons with Hawaiian forms. Dr. Seth E. Meek has also kindly forwarded notes on his collection of Aden fishes. Finally, to the naturalists of the Academy I wish to express appreciation for many courtesies, more especially to Mr. Witmer Stone and Dr. Henry A. Pilsbry. To these gentlemen I am under many obligations. Mr. Stone has not only granted numerous and varied favors but also freely offered advice and excellent suggestions. Upon returning to Philadelphia I found it necessary to entirely revise the original manuscripts written at Stanford University, more especially as the library and museum of the Academy offers so many facilities for consultation and comparison. At present the material is contained in the Academy with the exception of a series of duplicates left in Stanford University. The latter includes several cotypes.

Difficulty, as usual, has been experienced in the identification of a number of species, owing to the short, incomplete or unsatisfactory accounts, with little relation

or attention to geographical distribution. Many forms said to range throughout the Indian and Pacific Oceans should be examined and compared by means of abundance of material before such views can be established as absolutely final. My own acquaintance with the Japanese ichthyic fauna has at least convinced me of its great difference from the East Indian, but few forms straying up in the warm southern current. So far as one may judge at present that of the Indian basin has much in common, but just what exhaustive material will indicate remains to be seen. The work of the early writers on Red Sea and East African forms still needs the most careful and scrutinizing attention, as it forms the basis of much of the work of their successors also in other regions. In some cases I have been led to renounce their decisions, due in larger part to incongruities and differences accruing in the works of the latter. Polynesia, Micronesia and Australia also indicate different faunas, though they also display considerable East Indian infusion.

In matters of nomenclature I have followed the code of the American Ornithologists' Union, with several exceptions. These have already been noticed by Drs. Jordan and Evermann. They concern the names of males having precedence over names of females when occurring on the same page, and the spelling of names. These conclusions appear to me valid. However, I do not accept the views of Dr. Jordan regarding the selection of the first species as the type of a composite genus, unless the author or first reviser has so indicated. Elimination is now so generally accepted by the majority of American naturalists that its rejection can only lead to confusion. I might also add that all names spelled differently, such as Zenodon for Xenodon, etc., are regarded as different.

HEMISCYLLIIDÆ.

1. CHILOSCYLLIUM INDICUM (Gmelin).

GALEORHINIDÆ.

2. GALEOCERDO TIGRINUS Müller and Henle.
3. CARCHARHINUS MENISORRAH (Müller and Henle).

SPHYRNIIDÆ.

4. SPHYRNA ZYGÆNA (Linnæus).

RHINOBATIDÆ.

5. RHYNCLOBATUS DJIDDENSIS (Forskål).

DASYATIIDÆ.

6. TÆNIURA LYMMA (Forskål).
7. DASYATIS RUSSELLII (Gray).

PLOTOSIDÆ.

8. PLOTOSUS ANGUILLARIS (Bloch).

CHLARIIDÆ.

9. CHLARIAS BATRACHUS (Linnæus).
10. CHLARIAS OLIVACEUS sp. nov. Plate XXVIII, lower figure.
Clarias fuscus Valenciennes, Hist. Nat. Poiss., XV, 1840, p. 284. Sumatra. (M. Desjardins.) (Not *Macropteronotus fuscus* Lacépède).

Head $5\frac{1}{4}$; depth 7; D. 66; A. 51; P. I, 9; V. 6; width of head $1\frac{1}{8}$ in its length; depth of head 2; snout $2\frac{3}{5}$; eye 11; width of mouth $2\frac{1}{3}$; interorbital $1\frac{9}{10}$; pectoral spine $2\frac{1}{6}$; pectoral fin $1\frac{1}{2}$; ventral $2\frac{1}{2}$; caudal $1\frac{1}{2}$; least depth of caudal peduncle 3.

Body elongate.

Head broad and strongly depressed. Snout broad and flattened. Eye small, and well anterior. Mouth broad, and with rather thin papillose lips. Teeth minute, rather sharp, and in broad bands in jaws. A broad crescent-shaped patch of fine teeth on vomer with a slight projection posteriorly. Anterior nostrils in short tubes near edge of snout, but closer together than posterior. Posterior slit-like, behind bases of nasal barbels midway between anterior and front margin of eye. Interorbital space broad, flattened, and slightly elevated, especially posteriorly. Nasal barbel reaching almost opposite edge of gill-opening. Maxillary barbel not quite reaching tip of pectoral spine. Outer mental barbel reaching about first two-fifths of pectoral spine. Inner mental barbel reaching base of pectoral spine. Fontanel shaped like a plumb-bob, rounded posteriorly, and not quite equal to space between two nasal barbels. Interparietal fontanel about equal to eye.

Gill-rakers slender, moderate in number, pointed and not as long as filaments on first arch.

Skin rather smooth. Lateral line somewhat obsolete along middle of side to base of caudal.

Dorsal beginning well behind tip of depressed pectoral, and separate from caudal posteriorly. Anal similar to dorsal and inserted a little nearer tip of snout than base of caudal. Pectoral a little less than half of space to ventral. Pectoral

spine smooth on outer surface, and equal to about two-thirds length of fin. Ventral inserted well behind origin of dorsal and reaching past origin of anal. Caudal elongate and rounded. Anal papilla long.

Color in arrack dark blackish-olive above, lower surface brown. Vertical fins blackish-olive. Pectoral and ventral brownish, darker above. Indistinct traces of vertical series of pale dots on sides of back. Barbels blackish. Peritoneum whitish.

Length $11\frac{1}{4}$ inches.

Type No. 27,280, A. N. S. P. Padang.

This fish, originally described by Valenciennes, is said to have the head, measured to end of occipital process, $4\frac{2}{3}$ in total length of body, including caudal, and fins with 67 dorsal and 48 anal rays. The Formosan fish figured by Drs. Jordan and Evermann as *Chlarias fuscus* (Lacépède) is certainly different. A comparison of the type with four cotypes with same data, and measuring $7\frac{1}{2}$ to $10\frac{1}{4}$ inches, shows dorsal ranging from 60 to 63 and anal 50 or 51 rays. It is, however, in the more slender or elongate body that *olivaceus* differs from related species. Space between occiput and dorsal was found to be $2\frac{4}{5}$, $2\frac{2}{3}$, $2\frac{1}{2}$, $2\frac{2}{3}$ and $2\frac{7}{8}$ in head, measured from former point to tip of snout. Gill-rakers 5 + 4 on first arch of one of cotypes. Possibly records for *Chlarias liacanthus* in Sumatra should go with this species.

(*Olivaceus*, olive-color.)

SILURIDÆ.

11. NETUMA THALASSINA (Rüppell).
12. HYPSELOBAGRUS MICRACANTHUS (Bleeker).
13. GLYPTOTHORAX PLATYPOGONIDES (Bleeker).
14. GLYPTOTHORAX PLATYPOGON (Valenciennes).

COBITIDIDÆ.

15. HYMENOPHYSA HYMENOPHYSA (Bleeker).

CYPRINIDÆ.

16. SCHISMATORHYNCHUS HETORHYNCHUS (Bleeker).
17. OSTEOCHILUS HASSELTII (Valenciennes).
18. OSTEOCHILUS KUHLI (Bleeker).
19. LABEOBARBUS TAMBRA (Valenciennes).
20. LABEOBARBUS DOURONENSIS (Valenciennes).
21. CYCLOCHEILICHTHYS SIAJA (Bleeker).
22. BARBODES SCHWANENFELDII (Bleeker).
23. BARBODES FASCIATUS (Bleeker).
24. BARBODES BINOTATUS (Valenciennes).
25. HAMPALA MACROLEPIDOTA (Valenciennes).
26. RASBORA ARGYROTÆNIA (Bleeker).
27. MYSTACOLEUCUS PADANGENSIS (Bleeker).
28. CYPRINUS CARPIO Linnæus.

MONOPTERIDÆ.

29. MONOPTERUS ALBUS (Zuiew).

ANGUILLIDÆ.

30. ANGUILLA BENGALENSIS (Gray).
31. ANGUILLA BICOLOR McClelland.

OPHICHTHYIDÆ.

32. CIRRHIMURÆNA CHINENSIS Kaup.

MURÆNIDÆ.

33. EVENCHELYS MACRURUS (Bleeker).
 34. GYMNOTHORAX FIMBRIATUS (Bennett).
 35. GYMNOTHORAX FLAVIMARGINATUS (Rüppell).

CHIROCENTRIDÆ.

36. CHIROCENTRUS DORAB (Forskål).

CLUPEIDÆ.

37. SARDINELLA BRACHYSOMA (Bleeker).
 38. ILISHA HOEVENII (Bleeker).
 39. ILISHA BRACHYSOMA (Bleeker).
 40. OPISTHOPTERUS MACROGNATHUS (Bleeker).

DUSSUMIERIDÆ.

41. DUSSUMIERIA ELOPSOIDES Bleeker.

ENGRAULIDIDÆ.

42. ANCHOVIA COMMERSOHNII (Lacépède).
 43. ANCHOVIA ENCRASICHOLOIDES (Bleeker).
 44. ANCHOVIA VALENCIENNESI (Bleeker).

SYNODONTIDÆ.

45. SAURIDA TUMBIL (Bloch).
 46. HARPODON NEHEREUS (Hamilton).

MACROGNATHIDÆ.

47. MASTACEMBELUS UNICOLOR Valenciennes. Plate VIII, upper figure.

BELONIDÆ.

48. TYLOSURUS LEIURUS (Bleeker).
 49. TYLOSURUS MELANOTUS (Bleeker).
 50. TYLOSURUS CROCODILUS (Lesueur). Plate IX, upper figure.

HEMIRAMPHIDÆ.

51. HYPORHAMPHUS NEGLECTUS (Bleeker).
 52. HEMIRAMPHUS FAR (Forskål).

PEGASIDÆ.

53. PARAPEGASUS NATANS (Linnæus). Plate VII, two figures above to right.

SYNGNATHIDÆ.

54. HIPPOCAMPUS TÆNIOPS sp. nov. Plate VII, upper figure to left.

Head $1\frac{1}{4}$ in trunk, measured to gill-opening; depth of trunk $2\frac{1}{3}$ in its length; width of trunk $3\frac{3}{4}$; trunk $1\frac{2}{3}$ in tail; D. 18; A. 4; P. 16; rings 11 + 37; depth of head, at coronet, $1\frac{5}{6}$ in its length; width of head $2\frac{3}{4}$; snout $2\frac{1}{10}$; eye 7; base of dorsal $2\frac{3}{4}$; interorbital space 2 in eye.

Body rather deep, trunk short and compressed. Tail tapering, quadrangular, with rather slender point.

Head rather deep and compressed. Snout long, of about even depth. Eye small, a trifle posterior in head. Mouth terminal, small, superior, and with rather thin jaws slightly protruding above and below. Nostrils small, close to middle

of front rim of orbit. Interorbital space narrow, triangular, angle forming a little in front of eyes.

Gill-opening small, lateral, opening upward, high and close to nape near nuchal keel. Coronet high, its upper surface concave, with two lateral and one posterior tubercles, and also an elevated prominence springing from ridge in front. Below latter, on each side of head, a round tubercle. Interorbital space with each side of triangle continued as bony ridges till over middle of eye, where they each form a round supraorbital tubercle. Shoulder girdle with three large round tubercles. Bones on side of head, especially opercles, with fine radiating striæ. Rings with concave surfaces, without spines, and with few rounded tubercles, best developed on ridges of first ring, lower lateral ridges of trunk, and first four or five of tail. None distinctly enlarged at regular intervals.

Fins small, with simple rays. Dorsal rather low, beginning on middle of tenth ring and then extending on to second caudal ring near its posterior margin. Anal small, short, on first caudal ring. Pectoral with a broad base, rays rather short.

Color in arrack dark brown, more or less indistinctly mottled with paler. About five deep brown oblique cross-bars on side of snout. Several oblique deep brown cross-bars on side of head. A deep almost blackish-brown band along median compartment of spaces on side of trunk from base of pectoral to tail. Body marked everywhere with numerous minute whitish dots. Fins pale, their bases dark, especially that of dorsal.

Length, measured from top of coronet to tip of extended tail, $5\frac{1}{2}$ inches.

Type No. 27,409, A. N. S. P. Padang.

One example. This species is close to *Hippocampus kuda* Bleeker,¹ which has also been recorded from Priaman and Sibogha,² and with which it may prove identical. However, it has one more dorsal ray, and the color is entirely different from that given in the original description. My example also has more caudal rings. The Japanese example placed by Messrs. Jordan and Snyder³ with *H. kuda* may still be different. It differs from my specimen in such points as its agrees with Bleeker's, though its coloration is different from either. *Hippocampus kamphylotrachelos* Bleeker⁴ is the only other species known from Sumatra. It differs in having twenty dorsal rays.

(Tavía, band; ψψ, face.)

MUGILIDÆ.

55. *LIZA CÆRULEOMACULATA* (Lacépède). Plate XI, upper figure.

SPHYRÆNIDÆ.

56. *SPHYRÆNA TOXEUMA* sp. nov. Plate IX, middle figure.

Head $3\frac{1}{6}$; depth $7\frac{1}{3}$; D. V—I, 9; A. II, 8; P. II, 12; V. I, 5; scales to base of caudal in lateral line about 110 (squamation injured); 12? scales between origin

¹ Nat. Tijds. Ned. Ind., III, 1852, p. 82. Singapore, in mari.

² Act. Soc. Sci. Ind. Neerl. (Zesd. Bijd. Visch. Sumatra), III, 1857, p. 30.

³ Proc. U. S. Nat. Mus., XXIV, 1901, p. 15. Ishigaki, Yaeyama Island, Riukiu.

⁴ Nat. Tijds. Ned. Ind., VII, 1854, p. 107. Priaman, in mari.

of second dorsal and lateral line; about 15 scales between latter and origin of anal; width of head 3 in its length; depth of head $2\frac{7}{8}$; mandible $1\frac{4}{7}$; length of depressed spinous dorsal 3; of depressed soft dorsal $2\frac{1}{4}$; of depressed anal $2\frac{3}{7}$; least depth of caudal peduncle $4\frac{2}{5}$; pectoral $2\frac{7}{8}$; ventral $3\frac{5}{6}$; snout $2\frac{1}{3}$ in head, from its tip; eye $4\frac{2}{3}$; maxillary $2\frac{1}{6}$; interorbital space $4\frac{1}{3}$.

Body elongate, rather slender, though thicker anteriorly and more compressed posteriorly. Greatest depth about origins of soft dorsal and anal. Caudal peduncle long, compressed, its depth about three in its length.

Head long, attenuate in front, flattened above, and sides compressed, especially below, so that lower surface is constricted. Snout long, pointed, its upper profile nearly horizontal and premaxillary projecting beyond its tip. Eye large, high, posterior margin a little behind last third in space between tip of snout and gill-opening. Mouth large, a little inclined, and gape reaching about two-thirds of distance to front rim of orbit. Maxillary slightly curved, expanded distally till equal to pupil, and its posterior tip not reaching, but approaching close to front rim of orbit. Expanded portion of maxillary forms rather long blunt projection above which fits into a corresponding deep obtuse preorbital groove. Jaws large, powerful, and mouth not capable of being completely closed. Mandible large, powerful, produced well beyond upper jaw, and with symphyseal protuberance. Four large compressed and slightly curved sharp teeth in front of upper jaw. Teeth uniserial along edges of upper jaw, small, and sharp. Single large canine at symphysis of mandible directed backward. Teeth along sides of mandible uniserial, compressed, sharp, at first small, then gradually increasing in size backward. About six large compressed wedge-shaped sharp pointed teeth in each palatine series, last two or three small. Tongue elongate, rounded in front, free for a good part of its length, and joined to floor of mouth posteriorly by rather thin frenum. Its surface finely asperous above. Nostrils small, inconspicuous, vertical slit near front of eye or just a little behind obtuse maxillary angle. Interorbital space flattened, a trifle elevated, slightly concave in middle, and two long low ridges running out toward end of snout. Preopercle obtusely rounded. Opercle with broad obtuse point above.

Gill-opening large, carried forward till about opposite front rim of orbit at least. Pseudobranchiæ about equal to one-third of eye.

Scales small, cycloid, and more or less deciduous in spirits. Small scales on basal portions of most of fins and extending out on a good portion of unpaired ones. Scales on back before dorsals small. Posterior half of head, including cheeks all more or less scaled. Lower margin of opercle bare. Pectorals and ventrals scaleless, and without flaps. Lateral line nearly straight to base of caudal.

Spinous dorsal small, depressable in a groove, its insertion a little nearer front margin of eye than insertion of second dorsal. Spines pungent, rather thin, second longest and close to first. Soft dorsal inserted about midway between insertion of first dorsal and base of caudal, its margin concave, first and last rays longest, and former longer than latter. Anal inserted a trifle behind soft dorsal, spines weak, first ray longest, margin concave, and last ray three-fifths its length. Caudal deeply

forked, lobes sharp pointed. Pectoral small, reaching about two-fifths length of ventral. Ventral reaching about one-fourth of distance to origin of anal.

Color faded in alcohol, pale or dull brown above, and with many narrow inconspicuous dark brown longitudinal bands arranged close together, formed by a dark tint on each scale. Spinous dorsal dark gray, becoming dusky above. Soft dorsal with its upper portion dusky. Caudal grayish. Pectoral pale, base dusky, and other fins whitish. Lower surface of body silvery-white. Peritoneum silvery.

Length $11\frac{1}{8}$ inches.

Type No. 27,470; A. N. S. P. Padang.

One example. This species originally described from Batavia by Bleeker was referred to *Sphyræna forsteri* Cuvier with doubt,¹ and other examples were subsequently also referred to it from other islands in the East Indies.² Dr. Günther figures a fish certainly referable to *S. forsteri*, from Tahiti, which does not agree with my example.³ It shows 126 scales in the lateral line, and the eye is about $3\frac{2}{5}$ in the snout. Furthermore his description gives 90 scales for the lateral line, and if not an error is certainly a different species. *Sphyræna toxeuuma* has 115 scales in the lateral line, counting the few on base of caudal, and the eye is hardly over 2 in snout. Dr. Günther also describes a fish from Calcutta which may be identical.⁴

(*Τόξευμα*, arrow.)

HOLOCENTHRIDÆ.

57. MYRIPRISTIS MURDJAN (Forskål).

HOLOCENTHRUS Scopoli.

Holocenthrus Gronow, in Scopoli, Introd. Hist. Nat. Genera, 1777, p. 449 (*rostratus* = *adscensionis*?). (Based on *Holocentrus maxilla inferiore longiore*, etc., Gronow, Zoophylacii, 1763, p. 65, plate 4, fig. 3. Surinami = *Holocentrus rostratus* Gray, Cat. Brit. Mus. Fish., Gron., 1854, p. 173.)

58. HOLOCENTHRUS AUREORUBER sp. nov. Plate X, upper figure.

Head 3; depth 3; D. XI, 1, 12; A. IV, 9; P. I, 12; V. I, 7; scales to base of caudal 33, and 3 more on latter; 3 scales between origin of dorsal and lateral line, and 7 obliquely between latter and origin of anal; 7 scales before spinous dorsal; width of head 2 in its length; depth of head $1\frac{1}{6}$; snout $4\frac{1}{5}$; eye 3; maxillary $2\frac{4}{7}$; mandible $2\frac{1}{5}$; interorbital space $4\frac{1}{8}$; preopercular spine $3\frac{1}{2}$; first dorsal spine $3\frac{1}{6}$; second $2\frac{1}{10}$; third $1\frac{5}{6}$; fourth $1\frac{3}{4}$; last 5; third developed dorsal ray $1\frac{4}{5}$; third anal spine $1\frac{1}{2}$; fourth $2\frac{1}{4}$; second anal ray $1\frac{5}{6}$; upper caudal lobe $1\frac{1}{2}$; least depth of caudal peduncle $3\frac{3}{4}$; pectoral $1\frac{7}{12}$; ventral $1\frac{5}{12}$; ventral spine 2.

Body elongate, oblong, compressed, back elevated, convex, and lower profile nearly straight. Greatest depth about base of pectoral. Caudal peduncle small, compressed, its least depth about one and two-thirds in its length.

Head moderate, rather deep, compressed, and upper profile convex. Snout

¹ Nat. Tijds. Ned. Ind., VII, 1854, p. 424.

² L. c., IX, 1855, p. 285. Manado.—Act. Soc. Sci. Ind. Neerl. (Besch. Visch. Amb.), I, 1856, p. 4. Amboina.—Nat. Tijds. Ned. Ind., XII, 1856, p. 293. Bali.—L. c., XII, 1857, p. 371. Sangir-eilanden.

³ Journ. Mus. Godef. (Fische der Südsee), XI, 1877, p. 211, plate 119, fig. a.

⁴ Cat. Fish. Brit. Mus., II, 1860, p. 337.

steep, blunt, rather broad, and short. Eye large, anterior, its upper margin impinging on upper profile. Mouth low, slightly inclined, and gape reaching opposite front rim of orbit. Jaws protruding, upper little beyond lower and tip of snout, which is concave. Maxillary broad distally till equal to two and a quarter in eye and reaching for three-fifths its diameter. Lips thick and fleshy, especially along sides. Teeth fine, minute, and in broad bands in jaws. Minute teeth in patches on palatines and vomer. Tongue long, pointed and free in front. Nostril a large vertical slit, close to and in front of lower rim of orbit. Interorbital space broad, concave, and with two broad low median longitudinal ridges. Bones of head all more or less striate, and with serrated edges. A strong spine directed outward on each side of snout, and another below each nostril. Margin of infraorbital strongly dentate. Three broad infraocular spines running forward till just behind nostril. Opercle with two flat spines, upper longer. Preopercle with a long dagger-like spine reaching opposite base of first developed pectoral ray. Serrations along margin of preopercle a little larger below. No nasal spines.

Gill-opening extending forward till opposite middle of eye. Gill-rakers 6 + 10, counting rudiments, short, compressed, and sometimes clavate. Pseudobranchiæ large, and about equal to pupil. Gill-filaments shorter, though only a little longer than rakers.

Scales large, finely ctenoid, and rather narrowly imbricated. Scales along bases of dorsals and anal spinescent, those of latter fin elongate and pointed. Greater portion of caudal covered with small scales, margins naked. Base of pectoral with small scales. No pectoral flap, and ventral with a sharp pointed scale at its base. Lateral line concurrent with base of dorsal and running down along upper side of caudal peduncle to middle of base of caudal. Opercle with a single row of large scales, and five rows on cheek, head otherwise naked.

Origin of spinous dorsal a trifle in front of that of pectoral, spines alternately enlarged, forming a double row, and depressable in a groove. Fourth longest, and others graduated posteriorly to last, which is shortest. Membranes of spines deeply incised along their margins. First few anterior dorsal rays longest, and margin of fin slightly convex at this point. Origin of soft dorsal about opposite that of spinous anal. Third anal spine large, broad, reaching near tip of first anal rays. Fourth anal spine shorter and slender. Origin of soft anal falling about under middle of soft dorsal's base, and its margin slightly convex. Caudal small, forked, and lobes with rather broad points. Pectoral elongate and pointed. Ventral inserted a little behind pectoral and reaching about three-fifths of distance to caudal. Ventral spine elongate, slender, and straight.

Color in arrack pale golden, with about nine rather narrow deep rosy longitudinal bands along sides. Fins more or less pale or whitish, washed or tinted with pale orange. Ventrals pale rosy-white. Each scale on cheek with a deep rosy blotch. Abdomen whitish. Most of scales on back minutely punctuated with brown, and below soft dorsal a large dusky-brown blotch. A pale brown blotch at base of upper caudal rays and traces of another at bases of posterior anal

rays: Base of pectoral inside fin lemon-yellow. Edges of membranes between dorsal spines lemon-yellow. Inside of gill-opening tinted with deep rosy. Peritoneum silvery.

Length $9\frac{1}{8}$ inches.

Type No. 27,472, A. N. S. P. Padang.

One example. This species is closely related to *Holocenthrus albo-ruber*, differing in its more elongate body. It also resembles *Holocenthrus melanospilos* (Bleeker),¹ but differs from that species in the absence of the nasal spines. Anterior or upper rays of the soft vertical fins are not dark.

(*Aureus*, golden; *ruber*, red.)

59. HOLOCENTHRUS ALBO-RUBER (Lacépède).

SCOMBRIDÆ.

60. SCOMBER KANAGURTA Rüppell. Plate XII, upper figure.
 61. GERMO GERMON (Lacépède). Plate VIII, lower figure.
 62. SCOMBEROMORUS GUTTATUS (Schneider).

TRICHIURIDÆ.

63. TRICHIURUS HAUMELA (Forskål). Plate VII, lower figure.

CARANGIDÆ.

64. SCOMBEROIDES TOLOO (Cuvier).
 65. SCOMBEROIDES TOL (Cuvier).
 66. MEGALASPIS ROTTLEKI (Bloch).
 67. SERIOLA CRETATA sp. nov. Plate XI, lower figure.

Head $3\frac{2}{5}$; depth $3\frac{4}{5}$; D. V—II, 32; A. I—II, 16; P. II, 17; V. I, 5; scales about 156 to base of caudal; width of head $1\frac{1}{5}$ in its length; depth of head $1\frac{1}{4}$; mandible $1\frac{9}{10}$; third dorsal spine $4\frac{3}{5}$; first developed dorsal ray $1\frac{3}{4}$; last $3\frac{3}{5}$; first anal ray $2\frac{4}{5}$; last 4; least depth of caudal peduncle $5\frac{3}{4}$; pectoral $1\frac{2}{3}$; ventral $1\frac{2}{5}$; snout $3\frac{1}{6}$, from tip of upper jaw; eye $4\frac{1}{10}$; maxillary $2\frac{1}{6}$; interorbital space $2\frac{1}{12}$; base of soft dorsal $2\frac{2}{7}$ in body; base of anal $5\frac{1}{4}$.

Body oblong, compressed, and greatest depth about opposite origin of soft dorsal. Caudal peduncle small, broad, flattened above and below, with a pit at origin of each lobe. Least depth a little less than least width.

Head deep, compressed, upper profile evenly and more convex than lower. Snout blunt, broad, convex, and with upper jaw projecting. Eye moderate, posterior margin of pupil midway between tip of mandible and gill-opening. Eyelid narrow. Mouth large, slightly inclined and curved, and mandible projecting beyond upper jaw. Maxillary moves in a rounded depression, slips under greater part of narrow preorbital, and reaches opposite middle of eye. Preorbital not quite as wide as distal expanded extremity of maxillary, which is about two and one-quarter in orbit. Teeth small, sharp pointed, and in rather broad bands in jaws. Vomer and palatines with patches of smaller pointed teeth. Tongue broad, short, blunt, a little free in front, and with two patches of minute teeth. Lower lip rather thin.

¹ Act. Soc. Sci. Ind. Neerl. (Neg. Bijd. Visch. Amb.), III, 1857, p. 2. Amboina in mari. (M. D. S. Holdt.)

Nostrils adjoining, a trifle above middle of eye, and nearer its front margin than tip of snout. Interorbital space broad, convexly elevated, and like top of head with a median trenchant keel running to spinous dorsal. Anterior part of opercle with vertical striæ. Space just above opercle, and upper part of shoulder girdle also striate.

Gill-opening large, running forward before nostrils a short distance. Gill-rakers in form of 5 blunt processes on ceratobranchial. Isthmus narrow, with a median groove. Gill-filaments about equal to three-quarters of eye, and pseudo-branchiæ about four-fifths their length.

Scales small, cycloid, irregular, and extending on base of caudal and basal portion of anterior soft dorsal and anal. Small scales on upper part of head and cheeks, rest of head naked. Lateral line concurrent with back at first, then running along side of caudal peduncle, where it forms a slight keel, to base of caudal.

Spinous dorsal small, low, with pungent spines, third longest, and all depressible in a groove. Insertion of spinous dorsal a little behind origin of pectoral. Soft dorsal long, high, first developed ray longest, those comprising about first third of fin also elongate and graduated posteriorly. Last dorsal ray much longer than those immediately preceding. Origin of soft dorsal a little nearer tip of mandible than base of its last ray. Anal spine rudimentary. Anal similar to dorsal, short, anterior rays elevated, and last produced. Origin of anal a little nearer origin of soft dorsal than base of caudal. Caudal deeply forked, lobes pointed, and upper longer. Pectoral small, pointed, much shorter than ventral, and reaching a little beyond origin of soft dorsal. Ventral long, somewhat falcate, pointed, inner rays strong, and with a deep cavity at base posteriorly. When depressed fin reaches three-fifths of distance to origin of anal. Anus near last third of space between tips of ventrals and origin of soft anal.

Color in arrack dull brown, darker on back or upper surface, and belly or lower surface more or less soiled silvery. Fins dusky-brown, especially about their edges, and median portions of soft dorsal, caudal and pectoral more brownish-olivaceous. Anal pale. Ventral chalky-white. Spinous dorsal dark or deeper dusky than color of other fins. Peritoneum pale.

Length 12 inches.

Type No. 27,499, A. N. S. P. Padang.

One example. It differs from *Seriola purpurascens* Schlegel,¹ in the fin radii, longer ventral, larger eye, more convex upper profile of head, and posterior insertion of anal. Schlegel's figure shows eye nearly one-seventh of head, ventral small, and origin of anal well anterior.

(*Cretata*, chalked or whited.)

68. *ELAGATIS BIPINNULATUS* (Quoy and Gaimard).

69. *ALEPES MELANOPTERA* Swainson.

70. *ALEPES GLABRA* sp. nov. Plate XII, lower figure.

Head $3\frac{3}{4}$; depth $2\frac{9}{10}$; D. I, VIII—I, 26; A. II—I, 22; P. II, 20; V. I, 5; scales 44 in curved portion of lateral line, remaining straight portion with 62 scutes;

¹ Fauna Japonica, Poiss., 1845, p. 113, plate 51. Les mers du Japon.

about 13 scales between spinous dorsal and upper part of lateral line, and nearly 48 between latter point obliquely and origin of spinous anal; width of head 2 in its length; depth of head $1\frac{1}{10}$; mandible $2\frac{1}{3}$; fourth dorsal spine $2\frac{4}{5}$; first dorsal ray $2\frac{1}{2}$; first anal ray $2\frac{1}{3}$; least depth of caudal peduncle $5\frac{1}{2}$; ventral $2\frac{2}{5}$; snout 4 in head, from its tip; eye $3\frac{1}{5}$; maxillary $3\frac{1}{8}$; interorbital space $3\frac{1}{8}$; upper caudal lobe $2\frac{7}{8}$ in body; pectoral $3\frac{1}{5}$.

Body elongate, ellipsoid, compressed, upper and lower profiles nearly evenly convex. Greatest depth at origin of soft dorsal. Caudal peduncle long, its least depth one and a third in its exposed length, and its width one and a half.

Head rather small, compressed, and obtuse in front. Snout short, convex above, and blunt in front. Eye large, well anterior, and adipose eyelid broad, nearly covering posterior half of eye. Mouth inclined, rather small, and with upper jaw projecting beyond snout. Teeth fine, crowded, and in a single series along edges of jaws. No vomerine or palatine teeth. Lips rather thin. Tongue rather long, rounded, and free in front. Mandible slightly projecting. Maxillary narrow, reaching below front margin of eye, and its distal expanded extremity about three and one-half in eye. Nostrils small, adjoining, lateral, and nearer front of eye than tip of snout. Interorbital space broad, elevated, and with a trenchant keel beginning in front and extending to origin of dorsal.

Gill-opening large, running forward a little in front of nostrils. Gill-rakers 7 + 21, compressed, pointed, and longest equal half of eye. Filaments a little longer than longest rakers. Pseudobranchiae small. Isthmus broad and with a groove.

Scales small, cycloid, and imbricated. Breast densely scaled. Head, except infraorbital region, opercle, and upper posterior side, naked. Lateral line abruptly arched at first till at least a little over straight portion which begins opposite origin of soft dorsal. Scutes small, deepest about nine in greatest depth of body.

Origin of spinous dorsal about over first fourth of pectoral, spines weak, depressable in a groove, and fourth longest. Origin of soft dorsal nearly midway between tip of snout and base of caudal, anterior rays elevated but not forming a lobe. Anal spines small, first inserted a little before soft dorsal, about equal in size, and depressable in a groove. Origin of soft anal a little nearer base of caudal than tip of snout, or a little behind that of soft dorsal, fin similar. Caudal deeply forked, lobes long and pointed, and upper longer. Pectoral long, falcate, reaching half way to base of last anal ray. Ventral small, inserted below origin of pectoral, reaching a little more than half way to origin of spinous anal. Anus well before anal at tip of ventrals.

Color in arrack slaty-gray above, lower sides and under surface silvery-white. A large grayish blotch on opercle. Snout and upper surface of head somewhat tinted with brown. Dorsals and caudal gray, spinous dorsal and inner margins of caudal dusky. Soft dorsal and anal with a grayish longitudinal band, median on first rays, and then submarginal. Pectoral pale grayish. Ventral whitish. Peritoneum silvery.

Length $8\frac{1}{2}$ inches.

Type No. 27,502, A. N. S. P. Padang.

One example, which resembles *Caranx macrurus* (Bleeker), *C. djedaba* (Forskål), and *C. malam* (Bleeker). These are all grouped among the species of *Selar* apparently on account of the presence of palatine, vomerine, and lingual teeth. It is not possible to determine the width of the maxillary from the descriptions given.

(*Glabra*, smooth.)

RASTRUM subgen. nov.
Type *Alepes scitula* sp. nov.

Scales rather large. Vomerine teeth in a small patch. Maxillary about a third of orbit, in this apparently different from *Alepes*.

(*Rastrum*, a rake or harrow, with reference to the vomerine teeth.)

71. ALEPES SCITULA sp. nov. Plate X, lower figure.

Head $3\frac{3}{4}$; depth $2\frac{4}{5}$; D. VIII—1, 24; A. II—I, 20; P. II, 20; V. I, 5; scales 32 in curved portion of lateral line, remaining straight portion with 45 scutes; about 10 scales between origin of spinous dorsal and upper curve of lateral line; width of head $2\frac{1}{6}$ in its length; depth of head $1\frac{1}{8}$; mandible $2\frac{1}{4}$; third dorsal spine $2\frac{1}{4}$; second dorsal ray 2; second anal ray $2\frac{1}{3}$; least depth of caudal peduncle $5\frac{1}{2}$; snout $2\frac{2}{3}$ in head, from its tip; eye $3\frac{2}{5}$; maxillary $2\frac{3}{4}$; interorbital space $3\frac{1}{8}$.

Body moderately long, compressed, fusiform, and anterior profiles evenly convex. Greatest depth at origin of soft dorsal. Caudal peduncle long, its depth nearly two in its length, and its width one and one-half.

Head rather small, compressed, rhomboid, and rather blunt anteriorly. Snout short, convex, and with upper jaw projecting. Eye small, anterior, and with a broad posterior adipose eyelid. Mouth oblique, mandible projecting beyond upper jaw, and maxillary slipping below preorbital for a good portion of its length. Maxillary expanded distally till equal to two-fifths of orbit, and reaching posteriorly nearly opposite front margin of pupil. Lips thin. Teeth minute, crowded, and uniserial in jaws. Vomer with a small patch of teeth, but palatines smooth. Tongue small, elongate, free and rounded in front, its upper surface with a few small asperities. Nostrils small, high, close together, and much nearer front rim of orbit than tip of snout. Preorbital broad, and with several radiating flutings from above. Interorbital space broad, and with a median keel which begins over nostrils and extends up to spinous dorsal. Margin of preopercle strongly convex.

Gill-opening deep, running forward below nostrils. Gill-rakers 12 + 30, long, slender, compressed, and about equal to gill-filaments, or about two-thirds of eye-diameter. Pseudobranchiæ small. Isthmus narrow, broadening posteriorly, and not trenchant.

Scales rather large, cycloid, and imbricated. Spinous dorsal with a low narrow basal sheath. Soft dorsal and anal with a rather broad basal sheath along anterior basal half of fins at least. Base of caudal with small scales, but lobes without basal keels. Upper side of head, opercle, and cheek, covered with small scales, rest of head naked. Lateral line strongly arched at first, then running

straight to base of caudal peduncle. Scutes narrow, deepest six and one-half in greatest depth of body.

Dorsal spines pungent, third longest, depressable in a groove, and insertion of fin about over first sixth of pectoral. Soft dorsal inserted nearer tip of mandible than base of caudal, anterior rays elevated. Anal similar, inserted a little nearer front rim of orbit than base of caudal, and its last ray, like that of dorsal, longer than short rays immediately preceding. Anal spines depressable in a groove, second a little over twice length of first, which is inserted about opposite origin of soft dorsal. Pectoral long, falcate, reaching well past anterior elevated dorsal rays, and about three and one-third in body. Ventral small, inserted below origin of pectoral, and reaching about half way to origin of spinous anal. Anus near tip of ventral. Abdomen with a bony trenchant keel a short distance before anal spines.

Color in arrack slaty-gray above, lower surface white and more or less silvery. Back shot with deep iridescent-blue. A black blotch a little smaller than eye, on opercle. Spinous dorsal tinged with dusky. Soft dorsal and caudal grayish, other fins pale whitish. Peritoneum silvery.

Length $5\frac{3}{4}$ inches.

Type No. 27,503, A. N. S. P. Padang.

One example. This species is close to *Caranx kuhlii* (Bleeker),¹ but from the description of that species it is impossible to determine their identity. From the definition of *Selar*, according to Bleeker, it would also have palatine teeth.

(*Scitula*, pretty neat, trim.)

72. *CARANX MEGALASPIS* (Bleeker). Plate XIII, upper figure.

73. *CARANX MATE* Valenciennes. Plate XIII, lower figure.

74. *CARANX SEMISOMNUS* sp. nov. Plate XVI, upper figure.

Caranx forsteri Bleeker, Verh. Bat. Genoot. (Bijd. Makreel. Vissch. Soend. Moluk. Arch.), XXIV, 1852, p. 57. Batavia, in mari—et Padang, Sumatrae occidentalis, in mari. (Not of Valenciennes.)

Head 3; depth $2\frac{2}{3}$; D. VIII—I, 21; A. II—I, 17; P. II, 18; V. I, 5; scales 46 in curved portion of lateral line, and about 38 scutes in remaining straight portion; about 23 scales between origin of spinous dorsal and upper portion of lateral line; width of head 2 in its length; depth of head $1\frac{1}{20}$; mandible 2; third dorsal spine $2\frac{1}{2}$; first dorsal ray $1\frac{7}{8}$; first anal ray $1\frac{9}{10}$; least depth of caudal peduncle $7\frac{2}{3}$; ventral $2\frac{3}{5}$; snout $3\frac{4}{5}$ in head, measured from its tip; eye $3\frac{2}{3}$; maxillary $2\frac{1}{20}$; interorbital space $3\frac{4}{5}$; pectoral $2\frac{3}{4}$ in body.

Body oblong, compressed, deep, upper anterior profile much more convex than lower, and greatest depth about origin of soft dorsal. Caudal peduncle broad, depressed, its least depth a trifle less, and its width one and one-quarter in its length.

Head deep, upper profile strongly convex. Snout steep, oblique, blunt, and with upper jaw projecting slightly beyond. Eye large, well anterior, and with a broad adipose eyelid covering nearly all of its posterior half. Mouth large, low, slightly inclined and curved, gape reaching nearly opposite front rim of pupil, and mandible projecting a little beyond upper jaw. Maxillary long, its distal expanded

¹ Verh. Bat. Genoot. (Bijd. Makreel. Vissch. Soend. Moluk. Arch.), XXIV, 1852, p. 54. Kammal Tandjong (Maduræ insulæ), in mari.

extremity free from preorbital a short distance, and equal in width to three-fifths of eye-diameter. Lips rather thick. Teeth in upper jaw biserial, conic, rather large, numerous, outer series enlarged, and also much larger anteriorly. Teeth in mandible uniserial, similar to those in upper jaw, and with a pair of canines on each side in front. Vomer, palatines, and tongue with minute teeth. Tongue rather broad, rounded and free in front. Nostrils two vertical slits, opposite middle and close to front of eye. Preorbital broad, about equal to exposed portion of eye. Interorbital space broad, elevated, and giving place to median trenchant keel which begins over nostrils and runs to spinous dorsal. A supraocular keel running up on upper side of head and another more posterior running toward shoulder not so pronounced.

Gill-opening broad, extending forward a little beyond front rim of orbit. Rakers IV, 3 + 13, III, long, compressed, slender, attenuate, and longest about two-thirds of orbit. Gill-filaments shorter. Pseudobranchiæ but little shorter than filaments. Isthmus rather narrow, and with a rather broad groove.

Scales small, more or less crowded anteriorly, and narrowly imbricated. Head, with exception of opercle above, upper posterior side, and entire cheek, naked. Scales on cheek, like those on breast, small. Narrow scaly sheath at base of spinous dorsal. Soft dorsal and anal with rather low anterior basal scaly sheaths made up of minute scales, and anterior rays of these fins also covered with minute scales. Base of caudal with minute scales, and base of each lobe with a low keel. Base of pectoral naked. Lateral line strongly arched anteriorly till about opposite base of fourth dorsal ray. Scutes strong on sides of caudal peduncle, deepest a little over nine in greatest depth of body.

Origin of spinous dorsal a little behind that of pectoral, spines slender, pungent, third longest, and all depressable in a groove. Soft dorsal with anterior rays elevated, forming a distinct lobe, last ray longer than those immediately preceding, and origin of fin nearly midway between front of eye and base of caudal. Soft anal similar, slightly convex, and origin a little nearer base of caudal than posterior margin of eye. Anal spines depressable in a groove, first inserted about opposite origin of soft dorsal, and second longer. Abdomen keeled before anal spines to anus. Pectoral long, falcate, and nearly reaching a third of straight part of lateral line. Ventral small, inserted a little in advance of origin of pectoral, and about reaching anus. Caudal deeply forked, lobes pointed. Anus well forward, at tips of ventrals.

Color in arrack grayish or slaty-gray above, sides and lower surface white, washed with silvery. Outer portions of dorsals and upper lobe of caudal dusky, other parts and remaining fins yellowish. A small grayish-black blotch on upper edge of opercle. A blackish blotch on inner base of pectoral. Iris yellowish. Peritoneum white.

Length 8 inches.

Type No. 27,512, A. N. S. P. Padang.

Three examples, the type described above, and two young, the larger of which

is $3\frac{2}{3}$ inches long. It has profile less convex, a shorter pectoral, adipose eyelid little developed, and ridge of preopercle more oblique. When received fresh in arrack they were pale leaden-gray above, sides and lower portions white, everywhere silvery. Sides with five deep lead-colored vertical bands fading out below. Spinous dorsal blackish. Opercle with a diffuse dusky blotch on its margin.

(*Semisomnus*, half asleep.)

75. *CARANX SEM* Valenciennes. Plate XIV, upper figure.

76. *CARANGOIDES MALABARICUS* (Schneider).

77. *CARANGOIDES GIBBER* sp. nov. Plate XV, upper figure to left.

Head $2\frac{5}{8}$; depth $1\frac{2}{3}$; D. VIII—1, 22; A. II—I, 18; scales about 56 in curved portion of lateral line, and about 32 in remaining short straight portion; width of head $2\frac{2}{3}$ in its length; depth of head 1; mandible $1\frac{9}{10}$; third dorsal spine $2\frac{2}{3}$; second dorsal ray $1\frac{2}{3}$; first anal ray $1\frac{7}{8}$; least depth of caudal peduncle 7; pectoral $1\frac{1}{2}$; ventral $2\frac{2}{3}$; snout 3 in head, measured from its tip; eye 3; maxillary $2\frac{1}{4}$; interorbital space $3\frac{1}{2}$.

Body short, deep, ellipsoid, greatly compressed, greatest depth at origin of soft dorsal, and caudal peduncle small and compressed. Upper and lower profiles about evenly convex anteriorly.

Head large, deep, compressed, and rhomboid. Snout a little prominent, short, compressed, oblique, blunt, and upper jaw scarcely projecting. Eye rather large, in middle of length of head. No adipose eyelid. Mouth small, oblique, and mandible projecting beyond upper jaw. Maxillary small, its upper edge slipping under preorbital anteriorly, and its distal expanded extremity, which is equal to half of eye reaches opposite front rim of same. Teeth minute, equal, and forming narrow bands of two or more series in jaws. Vomerine and palatine teeth reduced to minute asperities, none on tongue. Tongue small, elongate, rounded and free in front. Lips rather thin. Nostrils rounded, close together, high, and close to front of eye above. Interorbital space narrow, elevated, and giving place to rather high median trenchant ridge running to spinous dorsal. Preorbital broad, nearly equal to eye. Two supraocular ridges running up from eye posteriorly.

Gill-opening large, carried forward a little in front of nostrils. Gill-rakers 8 + 23, a little longer than filaments, pointed, compressed, about two and one-third in eye. Pseudobranchiæ rather small. Isthmus narrowly compressed, and with a narrow median groove.

Scales minute, and narrowly imbricated. Breast naked, including base of pectoral. Base of spinous dorsal with a narrow scaly sheath, and basal scaly sheaths along anterior portions of soft dorsal and anal. Base of caudal scaly, without keels at bases of lobes. Lateral line strongly arched till about opposite middle of base of soft dorsal, remaining straight portion armed with small weak scutes, broadest not more than half least depth of caudal peduncle. Upper side of head posteriorly and cheek scaled, rest of head naked.

Origin of spinous dorsal well behind origin of pectoral, third spine longest, and all depressable in a groove. Origin of soft dorsal midway between front rim of orbit and base of caudal, anterior rays elongate, first developed longest, and last not

especially elongate. Soft anal similar, first ray longest, and origin of fin a little posterior. Anal spines small, second larger; and first inserted opposite origin of soft dorsal. A short bony keel from anal spines to anus. Caudal small, triangular, forked, and lobes sharply pointed. Pectoral rather broad, falcate, and not reaching beginning of straight part of lateral line. Ventral small, inserted below pectoral, and hardly reaching half way to origin of soft anal.

Color in arrack grayish or slaty-brown above, sides and lower surface whitish, washed with silvery. Fins plain pale or dilute brown, dorsals slightly dusky. No opercular spot. Peritoneum silvery.

Length $3\frac{1}{4}$ inches.

Type No. 27,517, A. N. S. P. Padang.

One example. This species is closely related to *Carangoides malabaricus*, differing in its deeper body and in absence of opercular spot.

(*Gibber*, hunch-back.)

78. CARANGOIDES OBLONGUS (Valenciennes).

79. CITULA ARMATA (Forskål).

80. CITULA ATROPOS (Schneider). Plate XIV, lower figure to left.

81. SCYRIS INDICA Rüppell.

82. TRACHINOTUS OVATUS (Linnæus).

RACHYCENTRIDÆ.

83. RACHYCENTRON PONDICERIANUS (Cuvier).

STROMATEIDÆ.

84. APOLECTUS NIGER (Bloch).

LEIOGNATHIDÆ.

EQUULITES subgen. nov.

Type *Leiognathus vermiculatus* sp. nov.

Mouth protractile downward. Breast and chest entirely scaled. Lateral line incomplete.

(“*Cavalla* est le nom portugais du maquereau et *equula* sa traduction” [Cuvier].)

85. LEIOGNATHUS VERMICULATUS sp. nov. Plate XV, lower figure to left.

Head $3\frac{1}{4}$; depth $2\frac{1}{10}$; D. VIII, 16; A. III, 13; P. II, 14; V. I, 5; scales 48 in lateral line to base of caudal; about 12 scales between origin of dorsal and lateral line; width of head $2\frac{1}{8}$ in its length; depth of head $1\frac{1}{4}$; snout 3; eye 3; tip of snout to end of maxillary $2\frac{3}{7}$; interorbital space 3; second dorsal spine $1\frac{2}{3}$; second anal spine 2; least depth of caudal peduncle $4\frac{2}{3}$; pectoral $1\frac{1}{2}$; ventral $2\frac{3}{5}$.

Body rather elongate, compressed, and greatest depth at origin of spinous anal. Caudal peduncle compressed, its exposed length two-thirds its depth.

Head rather deep, compressed, upper profile greatly inclined, nearly straight, and lower profile with a small process about opposite front of pupil. Snout rather long, blunt. Eye a little anterior and high. Mouth inferior, upper jaw projecting a trifle beyond mandible. Profile of chin slightly concave, nearly straight. Gape not reaching more than two-fifths of space to eye. Mouth protractile downward.

Teeth fine, small, weak, and brush-like, in jaws. Lips broad and fleshy. Nostrils close together, near front of eye a little above its middle, and anterior with a small fleshy flap behind. A single preocular spine. Interorbital space a little elevated, with a median ridge and a parietal ridge well separated on each side. Supraocular ridge entire. Occipital ridge distinct. Lower edge of preopercle minutely serrated.

Gill-opening extending forward opposite front rim of pupil. About 4 + 15 gill-rakers at least, developed on first arch, short, longest much less than longest filaments, which are about a third of eye. Pseudobranchiæ large. Shoulder girdle, inside gill-opening, with three processes, first opposite origin of pectoral, second just below its base, and third close to second. Isthmus broad, gill-membranes broadly connected.

Scales small, narrowly imbricated, and extending on chest. Scaly sheaths along bases of spinous dorsal and anal. Soft dorsal and anal with a series of inconspicuous spines on each side directed backward. Ventral flap as long as spine. Base of caudal scaly. Abdomen narrowly compressed and sharply trenchant, just before anal, half way to root of ventral. A short median groove on process of chest. Two small keels running forward from bases of ventrals rather close together. Lateral line convex most all of its course and obliterated on upper surface of caudal peduncle. Pores and scales in its course large. Back rather trenchant before spinous dorsal.

Origin of spinous dorsal about over first two-fifths of pectoral, second spine highest, and others graduated down. Front edges of third and fourth dorsal, and third anal spines finely serrate on basal portion. Second anal spine largest. Insertion of spinous anal about midway between tip of snout and base of caudal. Soft dorsal and anal low, similar. Caudal forked, lobes broad and pointed. Pectoral small, origin but little below middle of depth of body, and reaching posteriorly opposite origin of spinous anal. Ventral small, inserted a little behind origin of pectoral, and reaching a trifle over half way to origin of spinous anal. Anus nearly midway between base of ventral and origin of spinous anal.

Color in arrack pale brown on upper half of body, lower half white. Body everywhere more or less silvery, and line separating dark color of back distinct. Upper half of body marked with variable lines and blotches or vermiculations of brown. Snout with a blackish-brown bar from its tip up to nostrils. Inside of gill-opening dusky. Fins more or less dilute yellowish, dorsal a shade darker. Axil of pectoral with brown dots. Peritoneum silvery, with brown dots.

Length $4\frac{1}{4}$ inches.

Type No. 27,525, A. N. S. P. Padang.

One example. This species is closely related to *Equula lineolata* Valenciennes. The original description of the latter is imperfect, and neither Bleeker or Dr. Günther give the scales found in a lateral count, or counted in the lateral line. Day states the lateral line "consists of above 60 tubes placed in a row of plate-like rounded scales." His figure does not agree with my fish, especially in the

vertical dark bars on back. In all of these accounts of *lineolata* the body is more elongate.

(*Vermiculatus*, from color marks simulating the tracks of worms.)

86. *LEIOGNATHUS VIRGATUS* sp. nov. Plate XV, lower figure to right.

Head $3\frac{2}{3}$; depth $1\frac{7}{8}$; D. VIII, 16; A. III, 14; P. II, 14; V. I, 5; pores with first 20 or more distinct, others obliterated; width of head 2 in its length; depth of head 1; second dorsal spine $1\frac{7}{8}$; second anal spine $2\frac{1}{8}$; pectoral $1\frac{1}{3}$; ventral $2\frac{2}{3}$; least depth of caudal peduncle $4\frac{1}{4}$; snout $3\frac{1}{2}$ in head, measured from its tip; eye $2\frac{2}{3}$; tip of snout to end of maxillary $2\frac{1}{3}$; interorbital space $3\frac{1}{3}$; upper caudal lobe $3\frac{1}{4}$ in body, from tips of jaws.

Body deep, compressed, upper and lower profiles nearly evenly convex, and greatest depth about origin of spinous dorsal. Caudal peduncle compressed, and its exposed length about four-fifths its least depth.

Head deep, compressed, and upper profile convex, concave, and again convex. Lower profile forming an obtuse angle at slight articular process. Snout high, broadly conic, and with upper jaw projecting beyond. Eye a little anterior, and high in head. Jaws equal, mouth terminal, and gape reaching about opposite first two-fifths of length of snout. Profile of chin straight. Mouth protractile downwards. Teeth small, fine, brush-like, and in a single series in jaws. Lips rather thin. Maxillary with its upper margin nearly vertical and opposite front rim of orbit. Nostrils more or less facing forward, lateral, adjoining, near front of eye, and posterior twice as large as anterior. Interorbital space a little elevated, with a median low ridge, and a parietal ridge widely separated on each side, sharp, and leaving a broad space between. Occipital ridge distinct. Two small spines in front of eye above, anterior with two prongs. Supraorbital ridge a little rough, almost entire. Lower edge of preoperculum finely serrated.

Gill-opening extending forward opposite front rim of orbit. Gill-rakers 6 + 18, slender, pointed, more or less equal, and a little less than filaments. Pseudo-branchiæ large, about half of orbit. Shoulder girdle inside with three processes, first opposite origin of pectoral, second opposite lower base of pectoral, and third obsolete and well separated. Isthmus broad and rounded.

Scales small, narrowly imbricated, weak, and extending on chest and breast. Scaly sheaths along bases of spinous dorsal and anal. Soft dorsal and anal with a series of inconspicuous spines along their bases on each side. Ventral flap equal to its spine. Base of caudal scaly. Abdomen narrow, compressed, sharply trenchant just before spinous anal, and reaching a little more than half way to origin of ventral. A short median convex process on chest. Two small keels close together, each running forward from root of ventral to chest process. Lateral line convex, running for half of base of dorsal, becoming indistinct, and finally obliterated after spinous dorsal. Pores large. Back trenchant before spinous dorsal.

Origin of spinous dorsal over first quarter of pectoral, second spine longest, enlarged, and others graduated down. Soft dorsal low, origin of fin about midway

between front rim of eye and base of caudal. Origin of spinous anal nearly midway between tips of jaws and base of last anal ray, second spine enlarged. Lower front edges of third and fourth dorsal, and third anal spines, finely serrate. Soft anal similar to soft dorsal. Caudal forked, lobes rather broad, and pointed. Ventral small, reaching a little over half way to origin of spinous anal. Pectoral small, short, and reaching about opposite base of second anal spine. Anus nearer base of ventral than origin of spinous dorsal.

Color in arrack pale brownish-gray on upper half of body, marked or variegated with short darker blotches or vermiculations. Lower half of body white. Body everywhere more or less bright silvery. Snout dusky. Fins more or less dilute brownish-yellow. Spinous parts of vertical fins more or less burnished with silvery, and spinous dorsal with a blackish cross-line a little below center of its height. Base of pectoral marked with pale brown dots on inside. Inside of gill-opening similar. Iris pale orange. Peritoneum silvery.

Length $4\frac{9}{16}$ inches.

Type No. 27,526, A. N. S. P. Padang.

Five examples. This species is related to *Leiognathus bindoides* (Bleeker),¹ differing in the black bar on dorsal, preocular spines more obsolete, and absence of golden spots on spinous dorsal.

(*Virgatus*, striped with reference to black band on spinous dorsal.)

EUBLEEKERIA subgen. nov.

Type *Equula splendens* Cuvier.

Differs from *Equulites* in complete lateral line.

(Named for Dr. Pieter van Bleeker, the most voluminous of writers in Ichthyology, and whose work on the fishes of Sumatra is the most complete ever given.)

87. LEIOGNATHUS SPLENDENS (Cuvier).

88. LEIOGNATHUS SPILOTUS sp. nov. Plate XIV, lower figure to right.

Head $3\frac{1}{10}$; depth $2\frac{1}{8}$; D. VIII, 16; A. III, 14; P. I, 13; V. I, 5; width of head $2\frac{2}{3}$ in its length; depth of head 1; snout $3\frac{1}{2}$; eye $2\frac{3}{5}$; interorbital space $3\frac{1}{3}$; tip of snout to end of maxillary $2\frac{3}{5}$; second dorsal spine $1\frac{2}{5}$; caudal $1\frac{1}{4}$; pectoral $1\frac{1}{3}$; ventral 2; least depth of caudal peduncle 5.

Body elongate, greatly compressed, greatest depth at origin of dorsal, and upper profile more or less convex from this point. Caudal peduncle compressed.

Head deep, compressed, and upper profile slightly and evenly convex. Snout short, blunt, and upper jaw not projecting. Eye rather large, anterior. Mouth small and protractile downward. Teeth fine, weak, brush-like, and uniserial in jaws. Preocular spines two. Parietal ridges well separated. Occipital ridge developed. Profile of chin strongly concave. Supraorbital ridge serrate. Lower margin of preopercle serrate.

Gill-opening extending forward opposite posterior margin of pupil. Rakers small, pointed, much smaller than filaments. Pseudobranchiæ well developed.

¹ *Equula bindoides* Bleeker, Nat. Tijds. Ned. Ind., I, 1850, p. 372. Batavia, in mari.

Scales all fallen and hardly a trace of lateral line. Pockets on chest and breast indicate that it was scaled. Bases of spinous dorsal and anal with a scaly sheath. Two conical processes on chest with a groove between, and a low keel forward from base of each ventral, space between narrow.

Spinous dorsal inserted a little behind origin of pectoral, second spine enlarged and longest. Second anal spine largest, and origin of fin a little nearer tip of snout than base of caudal. Caudal deeply forked, and lobes rather broad. Pectoral reaching at least opposite base of second anal spine. Ventral small, inserted below origin of pectoral, and reaching two-thirds of distance to anal.

Color in arrack with upper half of body plain pale brownish-gray, lower half white. Body everywhere more or less bright silvery. Back with several rows of brownish blotches, two or three blotches to a row, and line of demarcation distinct. Fins dilute brown or whitish, spinous dorsal black on membranes of upper half. Inner base of pectoral dark brown. Iris whitish.

Length $1\frac{5}{16}$ inches.

Type No. 27,529, A. N. S. P. Padang.

One example. This may prove to be the young of *Leiognathus blochii* (Valenciennes). An indistinct brown saddle-like blotch in front of spinous dorsal on the back. Day's description and figure of *Equula blochii* differ in the posterior dark-colored base of pectoral.¹

(Σπιλωτός, spotted.)

Subgenus LEIOGNATHUS Lacépède.

Differs from *Equulites* in naked breast and chest.

89. LEIOGNATHUS EDENTULUS (Bloch).

DEVEXIMENTUM gen. nov.

Type *Zeus insidiator* Bloch.

This genus differs from *Leiognathus* in the nearly vertical mandible, so that the mouth is protractile horizontally.

(*Devexum*, hanging, or declining down; *mentum*, chin.)

90. DEVEXIMENTUM INSIDIATOR (Bloch).

91. GAZZA TAPEINOSOMA (Bleeker). Plate XV, upper figure to right.

92. GAZZA MINUTA (Bloch).

93. PENTAPRION LONGIMANUS (Cantor).

MENIDÆ.

94. MENE MACULATA (Schneider).

LACTARIIDÆ.

Body oblong, compressed. Head compressed, with *Percoidean* aspect. Snout conic. Eyes lateral. Mouth cleft deep and oblique. Teeth small in the jaws, with one or two pairs of canines in front. Margin of preopercle entire. Gill-opening large. Gill-rakers long. No processes on the shoulder girdle inside the gill-opening. Branchiostegals seven. Pseudobranchiæ present. Peritoneum pale. Scales of moderate size, cycloid, and extending partially over the fins. Lateral line continu-

¹ Fishes of India, II, 1876, p. 241, plate 52, fig. 5.

ous. Air-vessel bifurcated both anteriorly and posteriorly. Pyloric appendages few. Two dorsal fins. Spinous dorsal with feeble spines. Three feeble anal spines. Soft dorsal and anal with many rays. Caudal forked.

This family contains the single genus *Lactarius*, of the Indian and Malayan seas. It approaches the *Carangidæ*, especially "*Serioloidei*" according to Bleeker, while on the other hand it has affinities with the *Sciænidæ* according to Dr. Günther.

LACTARIUS Valenciennes.

Lactarius Valenciennes, Hist. Nat. Poiss., IX, 1833, p. 177 (*delicatulus* = *lactarius*).

95. LACTARIUS LACTARIUS (Schneider).

Scomber lactarius Schneider, Syst. Ichth., 1801, p. 31. Tranquebariam.

One example, $4\frac{5}{8}$ inches long. The species is carnivorous. Macerated remains of several young fishes were taken from the gullet.

APOGONIDÆ.

96. APOGON HYALOSOMA Bleeker.

Subgenus OSTORHINCHUS Lacépède.

Ostorhinchus Lacépède, Hist. Nat. Poiss., IV, 1803, p. 23 (*fleurieu*).

97. APOGON EVANIDUS sp. nov.

Head $2\frac{1}{3}$; depth $2\frac{5}{8}$; D. VII—I, 9; A. II, 8; P. II, 14; V. I, 5; scales 24 in lateral line to base of caudal, and 4 more continued out on base of latter; 2 scales between origin of dorsal and lateral line, and 5 scales in an oblique series between latter and origin of anal; width of head $2\frac{2}{5}$ in its length; depth of head $1\frac{1}{3}$; mandible $1\frac{4}{5}$; third dorsal spine $2\frac{3}{4}$; second dorsal ray $1\frac{7}{8}$; second anal spine 4; first anal ray $2\frac{1}{4}$; pectoral $1\frac{3}{4}$; ventral $1\frac{4}{5}$; ventral spine $3\frac{1}{5}$; least depth of caudal peduncle $2\frac{3}{4}$; snout $4\frac{1}{3}$ in head, from tip of upper jaw; eye $3\frac{1}{2}$; maxillary $2\frac{1}{10}$; interorbital space about $5\frac{1}{2}$.

Body elongate, compressed, and back a little elevated. Caudal peduncle long, and compressed, its least depth nearly one and two-thirds in its length.

Head large, compressed, and lower profile a little convex, upper much inclined and more or less straight. Snout short, broad, convex, and upper jaw projecting a little. Eye high, large, and its posterior rim about midway between tip of upper jaw and end of opercular flap. Mouth large, slightly curved, and mandible projecting well in front. Maxillary large, reaching posteriorly below posterior margin of pupil, and its distal expanded extremity half of eye. Teeth in jaws minute, in narrow bands. Patch of minute teeth on vomer. Palatines edentulous. Tongue smooth, small, rounded and free in front. Nostrils separated, posterior larger, close to front rim of orbit, and anterior much nearer latter than tip of upper jaw. Top of head a little convex posteriorly, interorbital space flattened. Margin and ridge of preopercle inclined a little posteriorly, former finely denticulated, and latter with one or two short denticulations at its corner. Opercle with a small broad spine, and large flap. Preorbital narrow.

Gill-opening till about opposite space between nostrils. Gill-rakers about 4+13,

longest longer than filaments, or about two-fifths of orbit. Pseudobranchiæ small. Isthmus rather broad and trenchant.

Scales large, ctenoid. Two series of large scales on cheek, opercles scaled, and rest of head naked. Base of caudal scaly, fins otherwise naked. Lateral line more or less concurrent with dorsal profile, and continuous.

Origin of spinous dorsal a little behind that of pectoral or a little nearer tip of mandible than tip of depressed second dorsal, and fourth spine longest. Anterior dorsal rays longest, and origin of fin about midway between middle of eye and base of caudal. Origin of anal about opposite that of soft dorsal, and similar in shape. Second anal spine much longer than first. Caudal a little emarginate. Pectoral long, reaching opposite origin of spinous anal. Ventral inserted a little before origin of pectoral and reaching within but a short distance of origin of spinous anal. Ventral spine about four-sevenths length of fin.

Color in arrack more or less pale uniform brown, lower surface not especially lighter. A dull brown diffuse stripe from occiput along back above to upper edge of caudal peduncle. Another band from snout continued behind eye where it is narrow, along middle of side where it widens, and out over caudal to tips of median rays. Below this a pale band longitudinally from axil of pectoral, but fading out over anal. Chin pale dusky. Fins dilute brown, and a trifle dusky on their outer portions, especially ventrals. A narrow dusky band close to base and parallel with it on soft dorsal and anal. Bases of these fins whitish. Iris a little brownish. Peritoneum silvery, speckled and spotted with grayish.

Length $3\frac{5}{16}$ inches.

Type No. 27,540, A. N. S. P. Padang.

Two examples. This species has been confounded under the name *Apogon frenatus* by authors. Valenciennes' account and figure¹ agree well with Bleeker's,² but Day's figure³ represents a different fish. The latter certainly represents the examples before me, agreeing in every respect. *Apogon vittiger* Bennett⁴ is probably close to if not identical with *Apogon frænatus* Valenciennes. *Apogon melanorhynchos* Bleeker⁵ also has claims, in part, to separation. *Apogon frenatus* Günther,⁶ judging by the incomplete description, may be the same as that of Valenciennes, but the examples described and figured later⁷ are close to if not identical with Day's figure.

(*Evanidus*, flashy, vain.)

98. APOGON NOVEMFASCIATUS Cuvier.

99. ARCHAMIA BLEEKERI (Günther).

¹*Apogon frænatus* Valenciennes, Nouv. Ann. Mus. Hist. Nat. Paris, I, 1832, p. 57, plate 4, fig. 4. Nouvelle-Guinée, et à l'île Guam.

²*Amia frenata* Bleeker, Atlas Ichth., VII, 1876, p. 89, and l. c., VIII, 1876, plate 342 (64), fig. 2. [East Indies.]

³*Apogon frenatus* Day, Fishes of India, Atlas, I, 1875, plate 16, fig. 4. [India.]

⁴Proc. Zool. Soc. London, 1833, p. 32. Mauritius. (Mr. C. Telfair.)

⁵*Apogon melanorhynchos* Bleeker, Nat. Tijds. Ned. Ind., III, 1852, p. 255. Wahai, Ceram septentrionalis, in mari.

⁶Cat. Fish. Brit. Mus., I, 1859, p. 241. Feejee Islands.

⁷Journ. Mus. Godef. (Fische der Südsee), I, 1873, p. 19, plate 19, fig. a. Sandwich-Gesellschafts-und Paumotu-Inseln. (Mr. Andrew Garrett.)

SERRANIDÆ.

100 PLECTROPOMA PESSULIFERUM sp. nov. Plate XVII, upper figure.

Head 3; depth $3\frac{1}{5}$; D. VII, II, 11; A. III, 8; P. I, 15; V. I, 5; scales 132 in a lateral series to base of caudal; 18 scales in an oblique series between origin of spinous dorsal and lateral line, and 28 in a vertical transverse series between latter and origin of anal; width of head 2 in its length; depth of head $1\frac{1}{2}$; mandible 2; third dorsal spine $3\frac{3}{4}$; first developed dorsal ray $2\frac{1}{2}$; first anal ray $2\frac{1}{2}$; least depth of caudal peduncle $2\frac{2}{3}$; pectoral $2\frac{1}{8}$; ventral $2\frac{1}{12}$; caudal $1\frac{1}{3}$; snout $2\frac{9}{10}$, from tip of upper jaw; eye $6\frac{3}{4}$; maxillary $2\frac{1}{4}$; interorbital space 5.

Body oblong, compressed, and greatest depth near middle of spinous dorsal. Caudal peduncle large, compressed, and its greatest depth three-quarters its length.

Head elongate, compressed, rather pointed, and profiles about evenly convex. Snout moderate, convex, and upper jaw well projecting. Eye small and high. Mouth curved, oblique, jaws large, and lower protruding. Maxillary large, expanded distally till about seven-eighths of orbit, and reaching posteriorly about opposite front rim of pupil. Lips broad, thick, and fleshy. Teeth conic, sharp, some of outer erect, inner more or less depressable, and each jaw with two well separated canines. Vomerine and palatine teeth minute. Tongue small, narrow, broadly pointed and free in front. Nostrils close together, circular, anterior with a little fleshy rim, and posterior much larger, placed about last two-fifths of snout in front of lower part of eye. Interorbital space and top of head convex. Lower margin of preopercle with about three low obsolete spines directed down and forward. Opercular spines two, lower forward, and much smaller than upper.

Gill-opening large, extending forward nearly opposite posterior nostril. Gill-rakers 3 + 9, compressed, strong, longest equal to gill-filaments, or about three-fifths of orbit, and inner surfaces with large asperities. Pseudobranchiæ well developed. Isthmus broad, with a short groove in front, and constricted edge rounded.

Scales small, mostly somewhat oblong, and finely ciliated. Head, with exception of snout, lips, greater portion of maxillary, branchiostegal region, narrow space around eye, and interorbital region, covered with small scales. Basal portions of soft dorsal, anal, and caudal covered with small scales. Axil of pectoral with a pit, covered above with a small fleshy flap. Lateral line continuous, a little convex in front, and not pronounced.

Spinous dorsal lower than soft fin, continuous, inserted a little behind origin of pectoral, and spines about even, except first, which is shortest. First two dorsal rays not much branched, insertion of fin about midway between middle of eye and base of caudal. Anal inserted a little nearer base of caudal than origin of pectoral, spines flexible distally and graduated to last, which is longest. Caudal large, broad, and emarginate. Pectoral broad, rounded, and middle rays longest. Ventral pointed, inserted a trifle before pectoral, and reaching a little beyond same. Anus about last three-ninths of space between tips of ventrals and origin of spinous anal.

Color in arrack yellow, more or less tinged with orange below and pinkish above. Body marked with many blue spots with dark brown edges, rather large

on head and back, a few of those on middle of trunk formed into short vertical bars, and those extending out on caudal, soft dorsal, and anal rather numerous. Pectoral plain, deep orange. Ventral, also anal and caudal, tinged with deep orange. Iris pale orange. Peritoneum pale or whitish.

Length $16\frac{5}{8}$ inches.

Type No. 27,546, A. N. S. P. Padang.

One example. It is closely related to *Paracanthistius maculatus* Bleeker.¹ Distinguished by a number of short vertical dark bars on the middle of side, and the more spotted caudal fin.

(*Pessulus*, a little bar; *fero*, to bear; with reference to the short dark vertical bars on side.)

101. VARIOLA LOUTI (Forskål).

102. PETROMETOPON PACHYCENTRON (Valenciennes).

103. PETROMETOPON FORMOSUS (Shaw and Nodder).

104. PETROMETOPON CYANOSTIGMA (Valenciennes).

105. BODIANUS INDELEBILIS sp. nov. Plate XVII, lower figure.

Head $2\frac{1}{2}$; depth $2\frac{2}{3}$; D. IX, 15; A. III, 9; P. I, 17; V. I, 5; scales 72 in a lateral series to base of caudal, 15 between origin of dorsal and lateral line obliquely, and about 29 between latter and origin of anal; pores about 40 in lateral line to base of caudal; width of head $2\frac{1}{4}$ in its length; depth of head $1\frac{2}{5}$; mandible $1\frac{4}{5}$; fourth dorsal spine $3\frac{3}{7}$; seventh dorsal ray $2\frac{4}{5}$; second anal spine $2\frac{2}{3}$; sixth anal ray $2\frac{2}{3}$; caudal $1\frac{9}{10}$; least depth of caudal peduncle $3\frac{1}{8}$; pectoral $1\frac{1}{7}$; ventral 2; snout 4 in head, from tip of upper jaw; eye $5\frac{1}{2}$; maxillary 2; interorbital space $7\frac{1}{2}$.

Body elongate, compressed, and upper profile forming a regular even convex curve to caudal peduncle. Greatest depth about origin of ventral. Caudal peduncle compressed, deep, and its length about five-sixths its depth.

Head rather large, compressed, somewhat pointed, and both profiles more or less convex. Snout short, convex, and upper jaw prominently projecting. Eye small, high, and well anterior. Mouth large, a little inclined, and lower jaw well protruding. Maxillary large, reaching opposite eye posteriorly, and distally expanded till equal to four-fifths of orbit. Teeth small, sharp pointed, and inner ones depressable. An outer series of strong erect teeth in each jaw, upper but little if any larger. Lower inner depressable teeth, also those in front of upper jaw, enlarged. Two canines in front of each jaw, well separated, and upper ones twice as far apart as lower. Vomer and palatines with small teeth. Tongue long, narrow, free, and with a rounded tip. Lips thick and tough. Nostrils close together near front of eye, and anterior in a short tube. Interorbital space more or less level, with a depression in front. Margin of preopercle with minute serræ. Three opercular spines, uppermost distant, directed a trifle upward, and lowest most anterior.

Gill-opening extending forward to middle of orbit. Gill-rakers iv 2 + 11 iv, compressed, about equal to gill-filaments or two-fifths of orbit. Pseudobranchiæ about equal to gill-filaments. Isthmus broad, with a broad depression in front and constricted behind, edge not trenchant.

¹ Atlas Ichth., VII, 1876, p. 26, plate 291 (13), fig. 3.

Scales small and finely ciliated. Head scaled, except lips, greater part of maxillary, and snout. Scales on head more or less smooth, those on maxillary small. Fins with greater basal portion covered with small scales. Ventral with but a few basal scales. A scaly flap at base of pectoral over axillary pit. Lateral line continuous, convex till below bases of fifth and sixth dorsal spines, and then inclined in a more or less straight line till along middle of side of caudal peduncle to base of caudal. Scales on top of head, back in front of spinous dorsal, and cheek, much reduced and crowded.

Origin of spinous dorsal a little behind that of pectoral, and spines graduated to fourth, after which all are more or less even and lower than soft dorsal. Origin of soft dorsal inserted much nearer origin of pectoral than base of caudal, rays more or less uniform, and posterior edge of fin rounded. Second anal spine a little longer than third, fin inserted also a little nearer origin of pectoral than base of caudal, lower edge straight, and posterior edge rounded. Caudal rounded. Pectoral long, broad, rounded, expanded, and reaching opposite origin of anal. Ventral reaching more than four-fifths to anus, spine three-fifths length of fin.

Color in arrack orange, faded a little, and many of scales on upper part of body with pale dusky. Head and back in front with small round golden spots. On margin of soft dorsal at thirteenth ray a brown spot equal to pupil. Anal and ventral with a narrow dusky margin. Caudal with a narrow whitish line close to and concurrent with edge of fin. Pectoral deep golden-orange. Iris golden-yellow. Inside of gill-opening with more or less faded orange-yellow. Peritoneum silvery.

Length $7\frac{1}{8}$ inches.

Type No. 27,553, A. N. S. P. Padang.

One example. Closely related to *Bodianus aurantius* (Cuvier), differing in the pale submarginal band and the dark spot on thirteenth dorsal ray. Dr. Boulenger has united *Serranus aurantius* with *S. analis*, after an examination of the types in the Paris Museum.¹ However, the two fishes figured by Bleeker appear to differ.

(*Indelebilis*, not to be blotted out; referring to the dorsal spot.)

106. BODIANUS MINIATUS (Forskål).

ÆTHALOPERCA subgen. nov.

Type *Perca rogaa* Forskål.

Closely related to *Bodianus*, differing in the physiognomy, which somewhat suggests that of *Lobotes* and certain *Lutianidæ*. Soft dorsal and anal nearly forming right-angled lobes. Caudal truncate. Ventral as long as pectoral. Caudal peduncle deep. Snout with a straight profile, then upper profile strongly convex to dorsal so that back is elevated.

(*Αἶθαλος*, dark-colored, sooty, or blackened; *πέρκη*, perch.)

107. BODIANUS ROGAA (Forskål).

108. EPINEPHELUS HENIOCHUS sp. nov. Plate XVIII, upper figure.

¹Cat. Fish. Brit. Mus., Ed. II, I, 1805, p. 193. N. Celebes. (Dr. A. B. Meyer.) Louisiade Archipelago. (Mr. J. Macgillivray.)

Head $2\frac{1}{3}$; depth $3\frac{1}{6}$; D. XI, 15; A, III, 8; P. II, 15; V. I, 5; scales 87 in a lateral series to base of caudal, 16 in an oblique series between origin of spinous dorsal and lateral line, and 25 between latter and origin of anal; pores 52 in lateral line to base of caudal, and about 5 more on base of latter; width of head $2\frac{2}{5}$ in its length; depth of head $1\frac{3}{4}$; mandible $1\frac{1}{5}$; third dorsal spine $3\frac{2}{3}$; sixth dorsal ray $2\frac{9}{10}$; third anal spine 4; fourth anal ray $2\frac{3}{4}$; caudal 2; least depth of caudal peduncle $3\frac{5}{6}$; pectoral $1\frac{1}{5}$; ventral $2\frac{2}{5}$; snout $4\frac{1}{5}$ in head, from tip of upper jaw; eye $5\frac{1}{4}$; maxillary $2\frac{1}{5}$; interorbital space $7\frac{2}{3}$.

Body oblong, compressed, back hardly elevated, and greatest depth at origin of ventral. Profiles more or less evenly convex. Caudal peduncle compressed, rather deep, and its length from base of last dorsal ray but little less than its least depth.

Head long, pointed, profile slightly and evenly convex. Snout convex, rather broad. Eye with its center about first third of head, measured from tip of snout. Mouth not much inclined, and mandible projecting well beyond upper jaw. Maxillary large, reaching opposite posterior rim of orbit, and distally expanded till about four-sevenths of latter's diameter. Lips thick and tough. Teeth sharp pointed, conical, and biserial in jaws. Outer series erect, of about equal length in each jaw, and inner series small, depressable and longer in mandible. Teeth irregular in front of each jaw, those above more elongate. Canines in front of each jaw, two smaller ones in lower, and two adjoining on each side of upper well separated. Minute teeth on vomer and palatines. Tongue long, narrow, free, and rounded in front. Nostrils close together near middle of front of eye, and anterior with a fleshy rim forming a short tube. Interorbital space slightly convex, with a slight depression in front. Top of head convex. Posterior margin of opercle finely serrated and ending in two small spines at lower corner. Three opercular spines, upper obsolete though most anterior, and middle largest, slightly directed upward. Opercular flap rather long and pointed.

Gill-opening large and carried forward below posterior nostril. Gill-rakers $v\ 2 + 10\ III$, compressed, equal in length to gill-filaments, or a trifle less than half of orbit. Pseudobranchiæ about equal to gill-filaments. Isthmus rather broad, with a broad furrow in front and posteriorly with a slightly trenchant edge.

Scales small and finely ciliated. Head covered with more or less smooth scales, except lips and greater portion of maxillary. Scales on maxillary few and inconspicuous. Check, top of head, and snout with small scales. Basal portions of fins with minute scales which do not extend far out. A few scales on bases of pectoral and ventral. A broad scaly flap over axillary pit. Lateral line convex till about fifth dorsal spine, then down along middle of side of caudal peduncle to base of caudal.

Spinous dorsal inserted a trifle before origin of pectoral, and graduated to third spine which is longest, and others all more or less equal. Soft dorsal inserted a little nearer base of caudal than origin of pectoral, much higher than spinous dorsal and its posterior edge rounded. Origin of anal a little in front of that of second dorsal, spines graduated to third, which is longest. Soft anal higher than soft dor-

sal, and rounded. Caudal subtruncate, its posterior margin slightly rounded when expanded. Pectoral long, expanded, middle rays longest, fin rounded, and reaching opposite anus. Ventral inserted a little before pectoral, and reaching about three-fifths of distance to anal. Ventral spine strong, straight, and about two-thirds length of fin. Anus about midway between tip of ventral and origin of anal.

Color in arrack rich wood-brown, belly and lower surface paler. A narrow dark brown line from side of snout under eye to base of pectoral, and another similar from above end of maxillary across preopercle on side of head. Another diffuse one also from posterior edge of eye across postocular region. Fins and mouth more or less tinged with dull olive-yellow, former somewhat dusky marginally, except pectoral which is almost uniform pale olive-yellow. Iris brownish-yellow. Peritoneum silvery.

Length 9 inches.

Type No. 27,557, A. N. S. P. Padang.

Two examples, larger 13 inches in length. This species is related to *Epinephelus præopercularis* (Boulenger).¹ It differs in the absence of black dots or spots on upper surface, fewer gill-rakers, fewer lateral pores, vertical fins without a narrow whitish margin. Lower brown streak across preopercle also characteristic of *E. heniochus*.

(*Ἡνίοχος*, charioteer; the streaks on side of head suggesting a bridle or reins.)

- 109. EPINEPHELUS MACULATUS (Bloch).
- 110. EPINEPHELUS SEXFASCIATUS (Valenciennes).
- 111. EPINEPHELUS MEGACHIR (Richardson).
- 112. EPINEPHELUS DERMOCRURUS Valenciennes).
- 113. EPINEPHELUS HORRIDUS (Valenciennes).
- 114. EPINEPHELUS LANCEOLATUS (Bloch).

PRIACANTHIDÆ.

- 115. PRIACANTHUS TAYENUS Richardson.

LUTIANIDÆ.

- 116. EVOPLITES DECEMLINEATUS (Valenciennes).

Subgenus LUTIANUS Bloch.

Lutianus Bloch, Ichthyologie, IV, pt. 7, 1797, p. 85 (*lutjanus*).

No gash on lower margin of preopercle, and process opposite obsolete. Forehead scaly.

- 117. LUTIANUS MADRAS (Valenciennes).
- 118. LUTIANUS VITTA (Quoy and Gaimard).
- 119. LUTIANUS NOULENY (Valenciennes).
- 120. LUTIANUS BIGUTTATUS (Valenciennes).

BENNETTIA subgen. nov.

Type *Anthias johnii* Bloch.

Interorbital space naked. Scales above and below lateral line following in parallel series. In this respect it resembles *Raizero* Jordan and Fesler.

(Named for Mr. E. T. Bennett, an early writer on the fishes of Sumatra.)

¹*Serranus præopercularis* Boulenger, Proc. Zool. Soc. London, 1887, p. 654. Muscat. (Mr. A. S. G. Jayakar.)—*Epinephelus præopercularis* Boulenger, Cat. Fish. Brit. Mus., Ed. II, I, 1895, p. 207, plate 5.

121. LUTIANUS JOHNNI (Bloch).

PARKIA subgen. nov.

Type *Lutianus furvicaudatus* sp. nov.*Hobar* Forskål, Descript. Animal., 1775, p. 44 (*fulviflanma*). [Uncertain.]

Interorbital space naked. Scales above lateral line sloping up in oblique series more or less, to base of dorsal fin.

(Named for Mungo Park, the first writer on the fishes of Sumatra.)

122. LUTIANUS LEPISURUS (Lacépède).

123. LUTIANUS LUNULATUS (Park).

124. LUTIANUS LINEATUS (Quoy and Gaimard).

125. LUTIANUS VAIGIENSIS (Quoy and Gaimard).

126. LUTIANUS LIOGLOSSUS Bleeker.

127. LUTIANUS RUSSELLII (Bleeker).

128. LUTIANUS DECUSSATUS (Cuvier).

129. LUTIANUS CÆRULEO-PUNCTATUS (Cuvier).

130. LUTIANUS ROSEUS Day.

131. LUTIANUS FURVICAUDATUS sp. nov. Plate XVIII, lower figure.

Head $2\frac{1}{2}$; depth $2\frac{9}{10}$; D. X, 13; A. III, 8; P. II, 14; V. I, 5; scales 50 in a lateral series to base of caudal below lateral line; 9 scales in a slightly oblique forward series between origin of spinous dorsal and lateral line, and 17 between latter and origin of anal; pores 49 in lateral line to base of caudal; width of head $2\frac{3}{5}$ in its length; depth of head at posterior margin of eye $1\frac{1}{7}$; mandible 2; third dorsal spine $2\frac{3}{4}$; tenth $3\frac{1}{2}$; fifth dorsal ray $2\frac{5}{6}$; second anal spine $3\frac{1}{8}$; first anal ray $2\frac{2}{5}$; least depth of caudal peduncle $3\frac{1}{8}$; upper caudal lobe $1\frac{1}{3}$; pectoral $1\frac{1}{3}$; ventral $1\frac{2}{3}$; snout $2\frac{7}{10}$, from tip of upper jaw; eye $4\frac{1}{3}$; maxillary $2\frac{3}{7}$; interorbital space $5\frac{3}{4}$.

Body elongate, compressed, rather slender, and back somewhat elevated, with a more or less curved profile. Caudal peduncle compressed, and its least depth about one and one-quarter in its length.

Head elongate, pointed, compressed, and upper profile straight from tip of upper jaw to occiput, though well inclined. Snout rather long, convex, profile straight, and upper jaw projecting. Preorbital a little less in width than vertical diameter of eye. Eye a little longer than deep, a little anterior, and high in head. Mouth rather small, slightly inclined horizontally, and curved. Lips thick, rather broad, fleshy, and papillose on their inner edges. Lower jaw projects well beyond upper. Maxillary reaching a trifle beyond front of eye, and its distal expanded extremity one and three-quarters in horizontal diameter of orbit. A narrow inner series of fine teeth in jaws, but only in front of lower. An outer series of enlarged sharp pointed conic teeth in each jaw, those on sides and front of mandible enlarged, and a pair of large canines in upper well separated. Minute teeth on vomer, palatines, and tongue, in a V-shaped patch on former. Tongue rather long, rounded, and free in front. Nostrils well separated, anterior with a slightly elevated fleshy rim, much nearer front of eye than tip of snout, and posterior about midway between front of eye and anterior. Interorbital space a trifle convex. Margin of preopercle finely serrated, with a slight excavation below opposite rather obsolete interopercular process. Opercle with two broad processes. Opercular flap rather obtuse.

Gill-opening extending forward nearly opposite posterior nostril. Gill-rakers

v 2 + 10 ii, compressed, with rather coarse prickles on inner surfaces, and longest a third longer than longest filaments, or one and three-quarters in eye. Pseudobranchiæ equal to longest gill-filaments. Isthmus compressed and with a rather shallow groove in front.

Scales moderate, finely ciliated, those on middle of side a little large, sloping up in inclined series above lateral line to upper profile, and below it in horizontal series. Seven series of scales on cheeks. Scales on opercle, subopercle and interopercle, largest on former. Two broad opercular spines, upper anterior. Opercular flap blunt. Suprascapula with serrated edge. Small scales crowded along base of spinous dorsal, and small patches elevated alternately. Small scales crowded on bases of other vertical fins and well out between rays of soft dorsal and anal. Caudal basally with small crowded scales, margin broadly and greater portions of median rays bare. Small scales crowded at base of pectoral, and also extending on bases of rays. Ventral naked and with a small pointed scaly flap at its base. Lateral line a little convex in front, and inclined more or less straight till out on median basal portion of caudal, running well up on caudal peduncle at first. Scales in lateral line small and with a large concealed single tube. Patch of oblique scales on upper side of head broad and high up.

Origin of spinous dorsal about over that of pectoral, spines graduated to third, second equal to eighth, first a trifle over half length of last, and margin of fin deeply notched. First dorsal ray simple, about midway between origin of pectoral and base of caudal, margin of fin straight, rounded behind, and first rays highest. Anal inserted opposite base of second dorsal ray, second and third spines equal, first rays longest, and base of rayed portion one and two-thirds in its height. Caudal emarginate, pointed above and below. Pectoral rather small, pointed, and reaching a little past anus, but not to anal. Ventral placed a trifle behind base of pectoral, and ending in a short filament. Anus at tips of ventrals.

Color in arrack deep brown above, lower surface silvery-white. Indistinct dusky-brown lines obliquely up from lateral line, and rather narrow. Below lateral line a number of indistinct horizontal lines, fading out below. These also extend on side of head and cheek, but indistinct at present. Caudal, with exception of slightly paler posterior margin, deep blackish-brown. Dorsals, anal and pectoral grayish-brown. Ventral pale orange, now much faded. Lower lip dusky. Iris dull golden, with a brown blotch above. Peritoneum silvery.

Length $7\frac{3}{8}$ inches.

Type No. 27,596, A. N. S. P. Padang.

One example. This species is related to *Lutianus argentimaculatus* (Forskål). The uniform dark caudal and oblique and horizontal stripes in combination will however distinguish *L. furvicaudatus* from this and other allied species.

(*Furvus*, blackish-brown; *caudatus*, tailed.)

Subgenus GENYOROGÉ Cantor.

Genyrorogé Cantor, Journ. As. Soc. Bengal (Cat. Malay. Fish.), XVIII, 1850, p. 12 (*seba*).

132. LUTIANUS CHIRTAH (Cuvier).

133. LUTIANUS MALABARICUS (Schneider). .

134. LUTIANUS SEBÆ (Cuvier).

ETELINÆ.

135. APRION TYPUS (Bleeker).

DENTICINÆ.

ANEMURA subgen. nov.

Type *Dentex notatus* Day.

Six canines in upper jaw. First dorsal spine without filament. No filament to upper caudal lobe.

(Ἄ, without; νῆμα, thread; ὄυρά, tail.)

136. DENTEX NOTATUS Day.

ODONTOGLYPHIS subgen. nov.

Type *Dentex tolu* Valenciennes.

Three series of large scales on cheek. Margin of spinous dorsal deeply notched, so that ends of spines are free for good part of their length. Teeth equal, except two canines in front of upper jaw.

(Ὀδοντογλύφῖς, tooth-pick; relating to free ends of dorsal spines.)

137. DENTEX TOLU Valenciennes.

EUTHYOPTEROMA subgen. nov.

Type *Dentex blochii* Bleeker.

Scales large on cheek. Margin of spinous dorsal straight, unnotched. Canines only in front of upper jaw.

(Εὐθύς, straight; πτέρωμα, fin; referring to entire margin of spinous dorsal.)

138. DENTEX BLOCHII Bleeker.

139. DENTEX MESOPRION Bleeker.

140. GYMNOCRANIUS LETHRINOIDES (Bleeker).

THERAPONIDÆ.

Subgenus THERAPON Cuvier.

Therapon Cuvier, Hist. Nat. Poiss., III, 1829, p. 94 (*servus*).

Scales small, 75 to 100 in a lateral series to base of caudal.

141. THERAPON JARBUA (Forskål).

EUTHERAPON subgen. nov.

Type *Therapon theraps* Cuvier.

Scales large, about 55 in a lateral series.

(Εὔ, properly; θεράπων, a servant or slave.)

142. THERAPON THERAPS Cuvier.

HÆMULIDÆ.

EUELATICHTHYS subgen. nov.

Type *Diagramma affine* Günther.

About 45 scales in a lateral series to base of caudal. Body deep. Dorsal spines 12 or more.

(Εὐλάτος, well beaten out or hammered; ἰχθὺς, fish.)

143. PLECTORHINCHUS AFFINIS (Günther).

SPILOTICHTHYS subgen. nov.

Type *Holocentrus radjabau* Lacépède.

Dorsal spines 10. Scales small.

(Σπιλωτός, stained or blotched; ἰχθὺς, fish.)

144. PLECTORHINCHUS RADJABAU (Lacépède).

Subgenus PLECTORHINCHUS (Lacépède).

Dorsal with 11 to 13 spines. Scales small, about 80.

145. PLECTORHINCHUS SEBAE (Bleeker).

146. POMADASYS COMMERSONNI (Lacépède).

147. SCOLOPSIS BLEEKERI Günther.

148. ODONTONECTES ERYTHROGASTER (Cuvier).

149. CÆSIO CÆRULAUREUS Lacépède.

150. CÆSIO ERYTHROCHILURUS sp. nov. Plate XIX, upper figure.

Head 3; depth $2\frac{3}{4}$; D. X, 15; A. III, 11; P. II, 17; V. I, 5; scales 52 in a lateral series to base of caudal below lateral line; 8 scales between origin of spinous dorsal and lateral line, and 15 between latter and origin of anal; 52 scales in lateral line to base of caudal; width of head $2\frac{1}{10}$ in its length, measured from tip of upper jaw; depth of head $1\frac{1}{4}$; snout 4; eye $3\frac{2}{3}$; maxillary 3; interorbital space $3\frac{2}{7}$; mandible $2\frac{1}{2}$ in head, measured from its own tip; third dorsal spine $2\frac{1}{6}$; first dorsal ray $2\frac{3}{4}$; third anal spine 3; first anal ray $2\frac{2}{3}$; least depth of caudal peduncle $3\frac{1}{10}$; ventral $1\frac{2}{3}$.

Body elongate, compressed, more or less ellipsoid, back little if any elevated, and profiles more or less evenly convex. Caudal peduncle compressed, and its least depth about three-fourths its length.

Head rhomboid, rather deep, compressed, and upper profile slightly concave over front of eye. Snout short, somewhat broad, convex, and upper jaw but little projecting. Eye moderate in size, orbicular, a little high, and its posterior margin about midway in length of head. Mouth well inclined, and when closed mandible protrudes a little beyond upper jaw. Maxillary reaching a little beyond front rim of orbit, and its distal expanded extremity two-fifths latter's diameter. Preorbital narrow, its least width one-fourth of orbit. Teeth minute, several a little enlarged and canine-like in front of upper jaw. Each ramus well elevated inside mouth. A series of minute teeth on vomer and along each palatine. Tongue elongate, pointed, and free in front. Nostrils close together, well separated from upper front rim of orbit. Anterior nostril with a slight cutaneous rim. Interorbital space convexly elevated. Margin of preopercle finely serrate, and suprascapula smooth along its margin. An obsolete opercular spine, and a pointed opercular flap behind.

Gill-opening extending forward opposite front rim of orbit. Gill-rakers $11 + 23$, long, slender, and pointed, equal to longest filaments, which are half of orbit. Pseudobranchiæ as large as gill-filaments. Isthmus narrow and convex.

Scales moderately large, ctenoid, running in series parallel with lateral line above its course, and in more or less horizontal longitudinal series below. Interorbital space, snout, narrow orbital border, preorbital, maxillary and jaws naked, head otherwise scaly. A patch of scales on top completely crossing over inter-

orbital area above. Four series of scales on cheek. Basal portions of vertical fins all with reduced and crowded scales, on caudal they become minute and extend well over lobes. Bases of pectoral and ventral more or less with minute scales. Lateral line a little convex, somewhat concurrent with dorsal profile, approaching it more closely posteriorly, running a little high on side of caudal peduncle and well out on base of caudal. A long pointed scaly flap at base of ventral.

Origin of spinous dorsal behind that of pectoral, spines slender, first shortest, five or six immediately following highest, and others graduated to last, which is shorter than any excepting first. Margin of fin hardly notched. Origin of soft dorsal over tip of pectoral, anterior rays longest, and margin of fin a little convex behind. Anal inserted a little behind origin of soft dorsal, spines slender, first very short, and second and third about equal. Soft anal graduated from first rays, which are longest, and margin of fin nearly straight. Caudal deeply forked, lobes slender, pointed, and upper longer. Pectoral long and a number of upper rays long. Ventral inserted behind origin of pectoral, pointed, and spine about two-thirds length of fin. Anus nearer tip of ventral than origin of anal.

Color in arrack rich olivaceous-brown above, more or less washed with golden-green, middle rays of each caudal lobe yellowish-green. Lower surface of body, together with lower side of trunk, head and caudal peduncle, deep rosy. Edges of caudal lobes, and several of middle rays, paler rosy. Dorsal fin olivaceous-brown, margin or border broadly blackish. Ventral and anal orange, former inclining to deep red. Pectoral deep orange, with axil and a distinct blotch at base of upper rays jet-black. Peritoneum silvery.

Length $5\frac{3}{4}$ inches.

Type No. 27,621, A. N. S. P. Padang.

Nineteen examples. Closely related to *Cæzio lunaris* Ehrenberg as identified by Bleeker's East Indian examples. It agrees with it more or less in the large scales, fin radii, and deep body. *C. lunaris* has fewer scales in a vertical series above the lateral line, and a differently colored caudal, the tip of each lobe black.

(Ἐρυθραῖος, red; χεῖλος, margin; οὐρά, tail.)

SPARIDÆ.

Subgenus LETHRINUS Cuvier.

151. LETHRINUS ORNATUS Valenciennes.

152. LETHRINUS OPERCULARIS Valenciennes.

LETHRINELLA subgen. nov.

Type *Sparus miniatus* Schneider.

Snout long and pointed. Lips broad and fleshy, upper equal to diameter of pupil. Conic pointed teeth.

(“Le nom que nous avons cru pouvoir donner à ce genre est celui que la pagel porte en grec moderne” [Valenciennes].)

153. LETHRINUS MINIATUS (Schneider).

SCIÆNIDÆ.

154. OTOLITHUS ARGENTEUS Cuvier.
155. SCIÆNA MACROPTERA (Bleeker).

POLYNEMIDÆ.

156. POLYDACTYLUS PFEIFFERI (Bleeker). Plate XVI, lower figure.

GERRIDÆ.

PERTICA subgen. nov.
Type *Gerres filamentosus* Cuvier.

Second dorsal spine longer than head.

(*Pertica*, a pole; with reference to second dorsal spine.)

157. GERRES FILAMENTOSUS Cuvier.

KYPHOSIDÆ.

158. KYPHOSUS LEMBUS (Cuvier).

MULLIDÆ.

159. UPENEOIDES SULFUREUS (Cuvier).
160. UPENEOIDES MOLUCCENSIS Bleeker.
161. UPENEUS MALABARICUS Cuvier.

NANDIDÆ.

162. PHAROPTERYX CORALLICOLA (Bleeker).

OSPHRONEMIDÆ.

163. OSPHRONEMUS GORAMY Lacépède.
164. TRICHOPODUS TRICHOPTERUS (Pallas).

ANABANTIDÆ.

165. ANABAS SCANDENS (Daldorff).

OPHICEPHALIDÆ.

166. OPHICEPHALUS SPIRITALIS sp. nov. Plate IX, lower figure.

Head 3; depth $5\frac{1}{4}$; D. 39; A. 28; P. I, 16; V. I, 5; 55 scales to base of caudal in a lateral series; about 16 osseous scales before dorsal; 5 scales between origin of dorsal and lateral line, and 11 between latter and origin of ventral; width of head 2 in its length; depth of head $2\frac{1}{10}$; snout $5\frac{3}{4}$; eye $7\frac{1}{8}$; mouth, from tip of snout, $3\frac{1}{5}$; maxillary $2\frac{4}{5}$; mandible $2\frac{1}{10}$; interorbital space $4\frac{1}{2}$; pectoral 2; ventral $2\frac{5}{8}$; caudal $1\frac{3}{4}$; least depth of caudal peduncle $2\frac{3}{4}$.

Body moderately elongate, rather thick, greatest depth about outer portion of ventral. Tail long, rather deep and compressed.

Head large, elongate, broad, depressed in front, and sides rounded with a swollen appearance. Snout short, broad, rounded when viewed above. Eye small, superior, and its posterior rim about first third in length of head. Mouth large, broad, oblique, and maxillary reaching below posterior portion of orbit. It is received in a deep infraorbital groove, and its distal extremity dilated till about three-fifths of eye-diameter. Mandible large, flattened below, and projecting well beyond tip of snout. Teeth in upper jaw minute, and in a broad band. Mandible with a small short patch of similar teeth at symphysis in front, and along sides a single series of enlarged, compressed, rather short and sharp pointed teeth. An outer series of small irregular pointed teeth along outer bases of enlarged teeth, in

jaws. Vomer with a long fang in center, and several small teeth about. Palatines with a single series of a few enlarged teeth, similar to those along sides of mandible. Tongue rather long, narrow and free. Lips rather broad and somewhat fleshy. Anterior nostril with a short bifid tube. Posterior rather large, circular, level with upper rim and nearly opposite front rim of orbit. Interorbital space broad and flattened. Opercle with a narrow fleshy gill-flap. Top of head broad and more or less flattened, becoming convex posteriorly.

Gill-opening large, extending forward till about an eye-diameter posterior to posterior rim of orbit, and branchiostegal membrane forming a broad fold over isthmus. Gill-rakers small, short broad asperous stumps, and 7 in number on first arch. Gill-filaments short. Accessory branchial cavity large, and with a large fleshy valve.

Scales moderately large, cycloid, those on bases of caudal and pectoral fins small. On head above, and opercular region, scales become bony and firmly joined to top of head. Lateral line slightly oblique at first, then dropping down a scale over third anal ray and extending straight to base of caudal.

Dorsal fin of nearly uniform height, long, and beginning over posterior margin of gill-opening. Anal beginning about midway between tip of snout and base of caudal, similar to dorsal in size and shape. Caudal oblong, its posterior margin convex. Pectoral rounded, middle rays longest. Ventrals small, inserted well behind pectorals, and reaching anus. Caudal peduncle deep and compressed.

Color in arrack more or less brown, dark or dusky above, and lower surface whitish or soiled-brown. Trunk more or less mottled or blotched with blackish-brown. A pale streak along side from opercle, and below this four or five large blackish blotches. Opercle with a blackish blotch. A dark streak from eye above obliquely across opercle, and another similar one from lower margin of eye. Fins all more or less dusky, with obliquely horizontal blackish lines on dorsal and anal in front, becoming more or less parallel with fin posteriorly. Caudal with indistinct blackish mottlings. Pectoral with four or five vertical cross-bars of blackish. Ventrals mottled with dusky. Peritoneum silvery.

Length $11\frac{1}{8}$ inches.

Type No. 27,664, A. N. S. P. Padang.

One example. This species is close to *Ophicephalus pleurophthalmus* Bleeker,¹ differing however in color. Sides without the large ocelli of that species, but about six large dark blotches below lateral line, like those in Bleeker's figure of *O. lucius*.² Pectoral barred, in this case agreeing with *O. polylepis* Bleeker,³ but that species is said to have longitudinal dark bands or lines on dorsal and anal, and sides without dark blotches. *O. urophthalmus* Bleeker⁴ is probably the same as *O. pleurophthalmus* from Borneo.

(*Spiritalis*, belonging to air or breath. Applied as *Ophicephalus* is said to live in mud-pools and rise to the surface before it becomes sun-baked to take in air at times.)

¹ Nat. Tijds. Ned. Ind., I, 1850, p. 270.

² Atlas Ichth., VIII, 1877, plate 398 (2), fig. 1.

³ Nat. Tijds. Ned. Ind., III, 1852, p. 578.

⁴ L. c.

POMACENTRIDÆ.

167. *PREMNAS EPIGRAMMATA* sp. nov. Plate XIX, lower figure to right.

Head $3\frac{1}{3}$; depth 2; D. X, 16; A. II, 14; P. I, 15; V. I, 5; scales 66 in a lateral series below lateral line to base of caudal; 44 porous scales in lateral line to base of caudal; 10 scales in an oblique series from origin of spinous dorsal back to lateral line, and 25 between latter forward to origin of anal; width of head $1\frac{1}{2}$ in its length; depth of head over posterior margin of eye 1; snout 3; eye $4\frac{1}{2}$; maxillary 3; interorbital space $3\frac{1}{2}$; first dorsal spine $2\frac{1}{4}$; second anal spine $2\frac{1}{4}$; least depth of caudal peduncle $1\frac{4}{5}$; caudal 1; pectoral 1; ventral $1\frac{1}{5}$.

Body ellipsoid, deep, and strongly compressed, profiles similar. Caudal peduncle compressed, rather deep, and its length about three-fifths its least depth.

Head deep, protruding, and its anterior profile evenly though strongly convex. Upper profile from above eye to origin of spinous dorsal a little concave. Snout broad, blunt, with a convex surface and profile, and upper jaw slightly projecting. Eye small, high, anterior and circular. Mouth broad, short, and gape reaching opposite posterior nostril. Maxillary narrow, its width about equal to pupil of eye and its posterior margin reaching opposite front rim of orbit. Mandible broad, rami short and even with upper jaw in front. Teeth compressed, uniserial and with their extremities more or less truncate. Vomer and palatines edentulous. Tongue far back, broad, rather blunt and little free in front. Nostrils near together, small, circular, posterior nearer anterior than front of eye. Interorbital space broad, and a little convex or not much elevated. Bony orbital rim narrow, corrugated, or roughly striated, preorbital with a short spine directed downward, and infraorbital ending in a backwardly directed spine that reaches about middle of opercle. Margin of preopercle with a number of rough jagged denticles. Opercle finely striate. Subopercle coarsely striate and with its margin denticulate.

Gill-opening extending forward about opposite posterior margin of pupil, and membrane forming a rather narrow free fold across. Gill-rakers 6 + 13, short, pointed, rather weak, and equal to about two-thirds of longest filaments. Gill-filaments about five-sixths of orbit. Pseudobranchiæ well developed, a little over half of orbit. Isthmus compressed, narrow and with a shallow groove in front.

Scales mostly finely ctenoid and small. Head more or less naked, cheek, interopercle, and upper moiety of pectoral covered with small scales. A broad naked space on each side of head above between eyes and interorbital space, and occiput. Bases of vertical fins covered with minute scales. Bases of pectoral and ventral with minute scales, and space between bases of ventrals thickly scaled. Lateral line well curved up, ending about opposite last two-thirds of base of soft dorsal. Tubes simple.

Spinous dorsal inserted a little before origin of pectoral, fourth spine longest, others graduated from it, and first and sixth of about even length. Soft dorsal inserted a little before tip of pectoral, posterior rays highest, much higher than posterior dorsal spines, and forming a blunt lobe. Anal inserted about opposite origin of soft dorsal, first spine short, and rays of soft fin more or less equal in

height, forming a blunt lobe posteriorly. Caudal rounded. Pectoral similar to caudal, rounded, and median rays longest. Ventral inserted well behind pectoral, innermost ray united with abdomen by a membrane for greater part of its length, rounded, and when depressed reaching origin of soft anal. Ventral spine straight, a trifle longer than half length of fin. Anus about midway between tip of ventral spine and origin of anal fin.

Color in arrack deep clove-brown, paler beneath, and fins also more dilute distally. A broad milky-white saddle, slightly tinted with pearl-gray, extending from occiput and just behind eye till down on middle of opercle. There it gives place to a brownish-black line extending down across interopercle. A similar narrower saddle extends down on back to middle of abdomen from ninth and tenth dorsal spines. This is also continued below to origin of spinous anal as a blackish-brown line. Caudal peduncle with a similar saddle-like band, becoming narrower below. Blackish-brown lines of two preceding saddles extends up narrowly along their edges, forming a dark border. Saddle on caudal peduncle also with similar dark edges. Iris with a yellow ring, otherwise dusky-slate color. Peritoneum grayish-silvery.

Length $3\frac{1}{16}$ inches.

Type No. 27,665, A. N. S. P. Padang.

Two examples. Bleeker recognized three varieties of *Premnas biaculeatus*. According to his diagnosis this species approaches near *semicineta* of Cuvier,¹ but both the original figure and that by Bleeker² do not agree, as no dark lines are indicated running down from the saddles above. Furthermore, the saddles are of altogether different pattern. They do not extend as low, the second blotch hardly extends on spinous dorsal, and last does not entirely encircle caudal peduncle.

(*Epigramma*, brand.)

Subgenus AMPHIPRION Schneider.

168. AMPHIPRION EPHIPIUM (Bloch).

ACTINICOLA subgen. nov.

Type *Luljanus percula* Lacépède.

Dorsal deeply notched, though spinous and rayed fins are connected they are also distinct.

(*Actinia*, Sea-anemone; *incola*, inhabitant. According to Day the following species is commensal in certain *Actinizoa*.)

169. AMPHIPRION PERCULA (Lacépède).

170. DASYLLUS ARUANUS (Linnæus).

171. DASYLLUS TRIMACULATUS (Rüppell).

172. CHROMIS CINERASCENS Cuvier.

173. POMACENTRUS LEUCOSPHYRUS sp. nov. Plate XIX, lower figure to left.

Head $3\frac{2}{3}$; depth $2\frac{2}{3}$; D. XIII, 11; A. II, 11; P. II, 14; V. I, 5; scales 28 in a lateral series below lateral line to base of caudal; 3 scales between origin of spin-

¹ Hist. Nat. Poiss., V, 1830, p. 307, plate 133, fig. 1.

² Atlas Ichth., IX, 1878, plate 402 (3), fig. 7.

ous dorsal and lateral line; 11 scales in an oblique series up to lateral line from origin of anal; 16 scales in lateral line; width of head 2 in its length; depth of head, over middle of orbit, $1\frac{1}{8}$; snout 4; eye $3\frac{2}{3}$; maxillary $3\frac{1}{6}$; interorbital space 3; last dorsal spine $1\frac{1}{2}$; second anal spine $1\frac{2}{5}$; least depth of caudal peduncle 2; pectoral 1.

Body elongate, compressed, greatest depth at origin of ventral, and upper profile a little more convex in front. Caudal peduncle compressed, and its depth equal to its length.

Head small, deep, and upper profile evenly though slightly convex from upper jaw to occiput. Snout short, broad and convex, upper jaw projecting a little. Eye small, a little above middle of depth of head, circular, and its posterior margin a trifle before middle in its length. Mouth small, oblique, mandible slightly protruding beyond upper jaw, distal expanded end of maxillary about two-fifths of orbit, and reaching a little beyond its front rim. Teeth uniserial, compressed, with truncate extremities, and forming cutting edges in jaws. Vomer and palatines edentulous. Tongue rather elongate, narrow, pointed, free and moderately far back in mouth. Nostril circular, midway on side of snout. A small pore close in front. Interorbital space a little broader than eye and convex. Preopercle with minute irregular or jagged edge. Opercle with two short spines, one at angle most pronounced

Gill-opening extending forward opposite front rim of orbit. Gill-rakers 7 + 17, slender, elongate, a little shorter than filaments, which are about two-thirds of orbit. Pseudobranchiæ about half of orbit. Isthmus narrow, compressed, its edge a little flattened, and membrane forming a short fold across.

Scales large, finely ctenoid, broadly exposed, and largest on middle of side. Smaller scales crowded along bases of vertical fins, and still smaller or minute scales extending well out between spines and rays. Along bases of spinous dorsal and anal a line of demarcation, indicating profile of trunk, evident. Base of pectoral with minute scales. Small scales crowded on snout, interorbital space, top of head, and around eye. Four rows of scales on cheek. Lateral line convex, slightly recurved near its termination below bases of third or fourth dorsal rays. Below and a little above middle a series of ten scales, each with a puncture, continue to base of caudal. Tubes of lateral line simple. At beginning of lateral line a large scale thickly covered with small scales.

Spinous dorsal inserted well in advance of origin of pectoral, margin of fin notched with a cutaneous flap behind tip of each spine, and spines more or less graduated to last, which is longest. Soft dorsal inserted nearly midway between middle of pectoral and base of caudal, rays graduated to sixth, which is longest, and prolonged into a filamentous point reaching about three-fifths length of caudal. Anal inserted about opposite eleventh dorsal spine, second spine a little more than twice length of first, or about equal to half of eye and postocular region. Soft anal similar to soft dorsal, larger, and seventh ray longest, not quite reaching middle of caudal. Posterior rays of both fins much shorter than anterior. Caudal deeply

forked, and lobes long, slender, and ending in slender or narrow points. Pectoral small, not reaching origin of anal, and rather broad. Ventral inserted a little behind pectoral, and first ray longest, extending to origin of anal fin. Ventral spine slender and reaching about half of distance.

Color in arrack black with a dull violaceous tinge. Each scale with a dusky or slightly olivaceous margin, more distinct than basal portion, which has a dull slaty tint. Fins all blackish, pectoral paler, and first ray of ventral beyond spine pearly-white. Pronounced scale at beginning of lateral line black, forming a distinct blotch. Iris slaty.

Length $4\frac{3}{8}$ inches.

Type No. 27,673, A. N. S. P. Padang.

One example. This species is closely related to *Pomacentrus violascens* (Bleeker). It differs however in the almost uniform dark color, without any yellow or golden on lower regions or caudal peduncle. Ventrals also differ, as they are entirely dark like the other fins, except tip of first or longest ray which is pearl-white beyond tip of spine.

(Λευκόσφυρος, white-footed, with reference to the white-tipped ventrals.)

- 174. POMACENTRUS TRIPUNCTATUS Cuvier.
- 175. POMACENTRUS VANICOLENSIS Cuvier.
- 176. CHRYSIPTERA MODESTA (Schlegel and Müller).
- 177. CHRYSIPTERA UNIMACULATA (Cuvier).
- 178. GLYPHISODON SEPTEMFASCIATUS Cuvier.
- 179. GLYPHISODON SAXATILIS (Linnæus).
- 180. GLYPHISODON LEUCOGASTER Bleeker.

LABRIDÆ.

- 181. CHOEROPS SCHOENLEINII (Valenciennes).
- 182. LEPIDAPLOIS MESOTHORAX (Schneider).
- 183. STETHOJULIS PHEKADOPLEURA (Bleeker).

OCTOCYNODON subgen. nov.

Type *Julis miniatus* Valenciennes.

Canines $\frac{4}{4}$.

(Ὀκτώ, eight; κύων, dog; ὀδὸν, tooth.)

- 184. HALICHERES MINIATUS (Valenciennes).
- 185. HALICHERES ANNULATUS sp. nov. Plate XX, upper figure.

Head $2\frac{9}{10}$; depth $3\frac{1}{2}$; D. IX, 11; A. III, 11; P. II, 11; V. I, 5; scales 28 in a lateral series below lateral line to base of caudal; 2 scales between anterior spinous dorsal and lateral line; 28 scales in lateral line, last one on base of caudal; 8 scales obliquely back and up to lateral line from origin of anal; width of head $2\frac{1}{2}$ in its length; depth of head over middle of eye $1\frac{2}{3}$; snout 3; eye $5\frac{1}{5}$; mouth $3\frac{1}{3}$; interorbital space $4\frac{3}{5}$; first dorsal spine $4\frac{3}{4}$; ninth $3\frac{1}{5}$; first dorsal ray $2\frac{1}{2}$; third anal spine $3\frac{1}{8}$; first anal ray $2\frac{1}{3}$; caudal $1\frac{1}{2}$; least depth of caudal peduncle $2\frac{1}{5}$; pectoral $1\frac{4}{7}$; ventral $1\frac{4}{5}$.

Body elongate, compressed, upper profile a little more convex, and greatest

depth about front of spinous dorsal. Caudal peduncle deep, compressed, and its length about four-fifths of least depth.

Head elongate, pointed, compressed, and profiles similar though upper a little more oblique. Snout long, convex above, and lip protruding in front. Eye small, with horizontal diameter a trifle longer, high, and its posterior margin near middle of head. Mouth small, horizontal, jaws equal, and corner extending about opposite posterior nostril. Preorbital broad, concealing end of maxillary. Lips broad, fleshy, and with their inner surfaces plicate. Teeth conic, pointed, uniserial, and with four canines in front of each jaw. Each side of upper jaw posteriorly with a canine. Tongue a little broad, rounded, free in front, and depressed or flattened above. Nostrils well separated, near upper margin of eye anteriorly, and anterior with a small cutaneous rim. Interorbital space elevated a little convexly. Opercle with a rather large cutaneous flap.

Gill-opening extending forward about opposite posterior margin of orbit. Gill-rakers 7 + 9? short weak points. Filaments less than eye and pseudobranchiæ much smaller. Isthmus broad and membrane forming but a narrow fold across.

Scales rather large, cycloid, becoming smaller on occiput, chest, at base of pectoral and on basal portion of caudal. Fins and head otherwise without scales. Lateral line concurrent with dorsal profile till below last dorsal rays, then sloping down and extending along middle of side of caudal peduncle to base of caudal. Tubes mostly with one or two bifurcations.

Origin of spinous dorsal about opposite that of pectoral, spines pungent, more or less graduated to the last which is longest, and margin of fin entire. Soft dorsal a little higher, origin of fin a little nearer eye than base of caudal, edge entire, and anterior rays longest. Origin of spinous anal about opposite origin of soft dorsal, spines pungent and third longest. Anterior anal rays longest, and membrane along margin of fin entire. Caudal with a convex margin when expanded, and edges of fin rounded. Pectoral broad, upper rays longest and not reaching opposite anus. Ventral inserted nearly opposite origin of pectoral, pointed, first ray longest, and not reaching tip of pectoral. Ventral spine slender, pungent, and nearly equal to three-fifths length of fin. Anus nearly midway between tip of ventral and origin of anal fin.

Color in arrack pale brownish-white, fins a little lighter than trunk. Five large deep brownish-dusky blotches along upper side of back. A broad brown band from opercular flap to base of caudal, more or less unevenly margined above and below with spots or flakes of pearly, and marked also with six large deep blackish or dusky-brown blotches, third and fourth of which are more or less confluent, not only with themselves but also with those on back above. Almost all of scales, especially those of darker hue, marked with paler centers. Pearly flakes or streaks on lower surface of body pronounced. Top of head with bluish streaks or short blotches. A bluish streak extends down from upper side of head towards eye. A broad bluish band from eye to corner of mouth, another below first toward lower margin of eye, another broader back across opercle then down to edge of gill-open-

ing, and finally a broad blue ring on cheek including margin of preopercle. Opercular flap with a broad blue-black blotch. All of markings on head narrowly margined with dark brownish. Vertical fins with blotches of pale pearly-bluish. Along base of dorsal these form large distinct blotches more or less rounded, enlarged and most pronounced on soft dorsal. On soft dorsal about second and third rays a large blackish blotch, and extending around paler blotches. Upper portions of dorsals also marked with similar large pale or pearly-blue blotches, most distinct on rayed fins. Anal with a basal series of pearly spots, one on membrane between each ray, a broad median pearly band longitudinally, and margin of fin a little dusky. Caudal with about five pale spots, with slightly brownish margins on each ray forming as many vertical series, and most distinct on outer median portion, which is also a trifle dusky. Pectoral and ventral unmarked. Peritoneum silvery-gray.

Length $3\frac{7}{8}$ inches.

Type No. 27,713, A. N. S. P. Padang.

Close to *Halichæres poecila* (Lay and Bennett) from near Riu Kiu. This was identified with *Julis (Halichæres) harloffii* Bleeker by that distinguished naturalist. However, he apparently had two forms united under *harloffii*, one of which represents the examples before me. *Harloffii* is figured later, though the description applies to *annulatus*. The complete circle or ring on the lower side of the head is the chief character for the distinction of *annulatus*.

(*Annulatus*, ringed.)

Subgenus HALICHÆRES Rüppell.

Canines $\frac{2}{2}$.

- 186. HALICHÆRES NIGRESCENS (Schneider).
- 187. HALICHÆRES LEPARENSIS (Bleeker).
- 188. HALICHÆRES HARTZFELDII (Bleeker).
- 189. HALICHÆRES GUTTATUS (Bloch).
- 190. THALASSOMA LUNARE (Linnaeus). Plate XXIII, lower figure.
- 191. THALASSOMA MELANOCHIR sp. nov. Plate XX, middle figure.

Head $2\frac{5}{6}$; depth $3\frac{1}{4}$; D. VIII, 13; A. III, 11; P. II, 14; V. I, 5; scales 24 in a lateral series below lateral line to base of caudal; 3 scales between lateral line and origin of spinous dorsal; 8 scales between origin of anal obliquely back to lateral line; 26 scales in lateral line, last one on base of caudal; width of head $2\frac{2}{5}$ in its length; depth of head over anterior margin of eye $1\frac{2}{3}$; snout $2\frac{1}{2}$; eye $6\frac{3}{4}$; mouth $3\frac{2}{3}$; interorbital space $4\frac{1}{4}$; eighth dorsal spine $3\frac{7}{8}$; second dorsal ray $2\frac{7}{8}$; third anal spine $4\frac{1}{2}$; second anal ray $3\frac{1}{8}$; least depth of caudal peduncle $2\frac{1}{7}$; caudal, measured to tip of middle rays, $1\frac{7}{10}$; pectoral $1\frac{2}{5}$; ventral $2\frac{2}{5}$.

Body elongate, compressed, deepest anteriorly or about origin of ventral, and upper profile a little more convex than lower. Caudal peduncle compressed, and its least depth a trifle less than its length.

Head moderately large, compressed, pointed, and its upper profile evenly convex from tip of upper jaw to occiput. Snout long, compressed, sides flattened, its upper surface convex, and upper jaw well protruded in front. Eye small, circular,

high, and its posterior margin midway in length of head. Mouth small, slightly inclined, jaws equal, and free edge of preorbital nearly opposite anterior nostril. Lips large, fleshy, and with inner surfaces plicate. Teeth uniserial, conic, and with two canines in front of each jaw. Tongue broad, rounded, and entirely free in front. Nostrils well separated, rather high and posterior on side of snout near upper front of eye, small, and anterior in a small cutaneous tube. Interorbital space broad, convex, and equal to a little more than one and one-half eye-diameters. Opercular flap a little long and pointed.

Gill-opening extending till within a little posterior to eye. Gill-rakers 5 + 16, small, short, compressed, and broadly triangular rudiments. Gill-filaments much larger, almost equal to eye-diameter in length. Pseudobranchiæ smaller. Isthmus broad, and membrane forming but a narrow fold across.

Scales large, cycloid, and crowded along bases of vertical fins. On bases of soft dorsal and anal pointed, not forming a basal sheath, and on base of caudal becoming small, especially on upper and lower elongated rays. A small patch of scales on opercular region above, head otherwise naked. Two short pointed scales at axillary region of ventral, and a single broad one between bases of two fins. A large scale above opercular flap at shoulder girdle. Lateral line concurrent with dorsal profile, sloping down below last rays of dorsal and continued along side of caudal peduncle medianly to base of caudal. Tubes arborescent.

Origin of spinous dorsal a little before that of pectoral, spines pungent, last highest, and margin of fin entire. Soft dorsal inserted a little before tip of pectoral or a little nearer base of caudal than posterior margin of eye, anterior part of fin highest, and its posterior extremity rounded. Anal inserted about opposite base of third dorsal ray or beyond tip of pectoral, spines small, pungent, and third longest. Soft anal similar to soft dorsal. Caudal truncate medianly, upper and lower rays produced in short points, and when expanded median rays form a convex margin. Pectoral rather long, upper rays longest, tip of fin rounded, and its posterior margin obliquely straight. Ventral small, inserted well behind pectoral, broad, pointed, reaching a little over half way to anal, and small pungent spine about three-fifths length of fin.

Color in arrack olive-green above, lower surface of head, abdomen, and caudal peduncle sky-blue white. Three broad deep purplish bands radiating from below and behind eye, last extending across opercle to front of pectoral. Another broad band extends along each side of snout to eye, and still another includes interorbital space to eye and extends back along upper side of head to gill-opening. All of bands on head narrowly margined with dusky-bluish. About seven jet-black transverse bars along side of back. First continued from supracephalic band of purple along upper shoulder girdle and down in front of base of pectoral, also a little below. Second similarly oblique, and extending down on side of abdomen as far as first. Several of scales between these two bands with centers largely black. Remaining transverse bars all wedge-shaped, becoming narrow below, and smaller posteriorly. A purplish longitudinal band along back above, parallel with first part of lateral

line, then extending along upper edge of caudal peduncle and out on uppermost caudal rays, where it becomes reddish. From lower portion of third transverse black blotch, a broad salmon-red horizontal band longitudinally and medianly to base of caudal. A similar streak of pinkish hue along lower edge of caudal peduncle forward. Dorsal pale yellow, with a median longitudinal band of dusky, broad at first, and narrowing down and fading out on last dorsal rays. Anal whitish, with a dusky blotch on first three rays. Caudal with its posterior portion broadly dusky-gray. Pectoral pale, creamy at base, with a black axillary spot at its base above, and terminal portion broadly black. Ventral dilute yellowish.

Length $6\frac{3}{8}$ inches.

Type No. 27,724, A. N. S. P. Padang.

One example. Closely related to *Thalassoma hardwicke* (Bennett).¹ It differs in blackish-tipped pectoral and presence of an oblique black band before base of pectoral. Bleeker's figure agrees with *melanochir*, except that he does not show the pectoral with a blackish extremity. *Thalassoma dorsale* (Quoy and Gaimard) has been identified with *hardwicke*, though it does not appear to have a broad rosy lateral band extending along side of trunk to caudal peduncle. *Julis semifasciatus* Valenciennes may also be allied or identical with *dorsale*, and the same may be said of *Julis* (*Julis*) *urostigma* Bleeker.

(Μέλας, black; χείρ, hand.)

192. CHEILINUS TRILOBATUS Lacépède.

193. CHEILINUS ENNEACANTHUS (Lacépède).

194. CHEILINUS DIAGRAMMA (Lacépède).

195. HEMIPTERONOTUS LIOGENYS sp. nov. Plate XX, lower figure.

Head $3\frac{1}{4}$; depth $2\frac{3}{4}$; D. II, VII, 12; A. II, 12; P. II, 10; V. I, 5; 26 scales below lateral line to base of caudal; 2 scales between origin of second spinous dorsal and lateral line; 9 scales obliquely back from origin of anal to lateral line; 21 scales in first division of lateral line, and 6 more in remaining portion with last scales on base of caudal; width of head $2\frac{1}{2}$ in its length; depth of head, over anterior margin of eye, equal to its length; first flexible spine of dorsal about $2\frac{2}{5}$; fifth pungent spine $3\frac{3}{4}$; fifth dorsal ray 3; second anal spine $5\frac{1}{2}$; third anal ray $2\frac{4}{5}$; least depth of caudal peduncle $2\frac{3}{5}$; caudal $1\frac{1}{2}$; pectoral $1\frac{2}{7}$; ventral $1\frac{1}{2}$; snout $1\frac{3}{4}$; eye $5\frac{3}{4}$; mouth $3\frac{2}{5}$; interorbital space 5.

Body oblong-elongate, greatly compressed, slightly trenchant, and profiles of trunk more or less similar. Greatest depth at base of ventral, and from that point posteriorly body becoming gradually less in depth to caudal peduncle. Caudal peduncle deep, compressed, and its length a little less than its depth.

Head deep, greatly compressed, large, parabolic, upper profile steep, convex from level with eye to origin of dorsal, and somewhat trenchant. Snout long, compressed, a little trenchant, and its profile nearly straight from opposite eye to tip of

¹ This name apparently has priority over *dorsale* of Quoy and Gaimard, though I have not been able to consult the original edition of the work as it is not contained in the Academy's library at present. It was published in London by Longman & Co., 1828 to 1839. The copy of the second edition now before me is by Edward Bull, Holles Street, Cavendish Square. It has a prefatory account which is dated "London, March 1, 1830."

snout. Eye small, high, circular, and nearly midway in head. Mouth low, moderately large, and corner falling about opposite anterior nostril. Jaws large, broad, not much produced, though forming a blunt angle at lower anterior profile. Lips broad, especially lower, thick and fleshy. Teeth uniserial, strong, conic, and front of each jaw with two large curved exposed canines, lower pair fitting in between upper and directed a little laterally. Tongue small, well back in mouth, and a little free in front. Nostrils minute and high. Interorbital space convex, elevated, and a little trenchant in middle. Margins of preopercle and gill-opening thin, former rounded.

Gill-opening extending forward till opposite front rim of pupil. Gill-rakers 5 + 8, short, uneven, and with small pricks on their inner surfaces. Gill-filaments much longer, equal to at least three-quarters of eye-diameter. Pseudobranchiæ smaller. Isthmus narrow, compressed, and membrane forming a rather broad fold across.

Scales large, thin, cycloid, and with exposed portions narrow. Fins naked, except base of caudal which is closely scaled, but none of its scales enlarged. Head naked, except occiput, a few scales on opercle above, and a few below and behind eye. Lateral line convex at first and then more or less straight till below posterior dorsal rays where it drops suddenly to middle of side of caudal peduncle, continuing straight and medianly to base of caudal. Tubes mostly simple, sometimes bifid.

Dorsal beginning close behind eye, first two spines flexible, and membrane uniting them with succeeding deeply incised. Other dorsal spines pungent, of nearly uniform height, and margin of fin straight. Soft dorsal inserted nearly midway between posterior end of maxillary and base of caudal, rays of about uniform height, and most of them higher than pungent spines. Anal inserted a trifle in advance of soft dorsal, spines small, pungent, second longest, and rayed fin similar to soft dorsal. Caudal rather small and rounded. Pectoral long, broad, upper rays pointed, and reaching below base of last pungent dorsal spine. Ventral long, pointed, inserted below origin of pectoral, spine short, and a little less than a third in length of fin. When depressed fin reaches nearly three-fourths of distance to anal fin.

Color in arrack pale brownish-white. Each scale with pearly-lead spot at its base leaving a vertical exposed streak, and more whitish on lower surface. A pale dusky-olive patch above eye. Side with five indistinct dusky-olive vertical transverse bands. First band below second flexible dorsal spine. Second extends down to large white patch which covers a good portion of costal region. In front of this a broad olive space merging in first transverse band. Second band begins below middle of spinous dorsal. Several scales at bases of third and fourth dorsal rays blackish, there third band begins. Fourth band begins below eighth, ninth and tenth dorsal rays, and last band on base of caudal. First two flexible dorsal spines and membranes dusky or blackish, dorsal fin otherwise pale yellowish-green, with a broad pale dusky margin, and marked with pale irregular oblique bars. Anal pale yellowish-green, with narrow oblique pale bars. Caudal pale, with several indistinct cross-lines. Pectoral and ventral pale brown.

Length $8\frac{2}{3}$ inches.

Type No. 27,730, A. N. S. P. Padang.

Also three cotypes. Closely related to *Hemipteronotus baldwini* Jordan and Evermann¹ from the Hawaiian Islands, but on comparison with one of the cotypes of that species *liogenys* is seen to have but few scales on the cheek and not extending down to the mouth. It also has a larger pectoral.

(*Δείος*, smooth; *γέυς*, cheek.)

SCARIDÆ.

196. *SCARUS PINGUIROSTRATUS* sp. nov. Plate XXI, upper figure.

Head $2\frac{3}{4}$; depth $2\frac{1}{3}$; D. IX, 10; A. III, 9; P. II, 13; V. I, 5; scales 23 in lateral series to base of caudal; 2 scales between origin of spinous dorsal and lateral line; 8 scales between origin of spinous anal and lateral line; 25 scales in lateral line to base of caudal, last one on latter; width of head 2 in its length; depth of head, over anterior margin of eye, $1\frac{2}{5}$; snout $1\frac{9}{10}$; eye $9\frac{1}{4}$; mouth $5\frac{1}{6}$; maxillary $3\frac{1}{2}$; interorbital space 3; ninth dorsal spine $3\frac{1}{2}$; first dorsal ray from tip of anterior bifurcation 4; ninth $3\frac{2}{5}$; third anal spine $3\frac{1}{3}$; first anal ray from tip of anterior bifurcation $3\frac{1}{4}$; eighth $3\frac{1}{5}$; least depth of caudal peduncle $2\frac{2}{3}$; pectoral $1\frac{3}{7}$; ventral 2.

Body elongate, robust, well compressed, greatest depth near middle of pectoral, profiles evenly convex, and upper more so than lower. Caudal peduncle large, compressed, and its least depth about seven-eighths its length.

Head large, moderately compressed, cheeks a little flattened, and upper profile from above front of eye to occiput convex. Snout large, its surface convex, profile at first convex then slightly concave, and in front extending a little beyond upper mandible. Snout also soft to touch. Eye small, circular, high, and midway in length of head. Mouth inferior, and its corner extending about two-fifths in space opposite vertical from front of eye. Teeth developed as two sharp uneven-edged mandibles with a smooth convex surface, and more or less convex granulations along their edges. Two posterior canine teeth on each side of upper mandible. A thick fleshy buccal fold inside of each mandible. Tongue convex, thick, and not free. Lips tough and fleshy, though not covering much of mandibles. Maxillary extending about opposite posterior nostril. Nostrils small, lateral, inconspicuous, separated, though close together, and situated a little over an eye-diameter before, and a little inferior to, front margin of orbit. Interorbital space broad and convex. Opercular flap narrow.

Gill-opening extending forward about opposite anterior margin of eye. Gill-rakers 45, small, compressed, and ending in attenuated slender flexible points, longest about a third of orbit. Filaments long, numerous, longest four and seven-eighths in head. Gill-rakers on inner edge of first branchial arch well developed, similar to outer series, only a little longer. Pseudobranchiæ about three-fifths diameter of eye. Isthmus a little broad, membrane adnate, only forming a narrow frenum across.

¹ Bull. U. S. Fish. Comm., 1902 (1903), p. 192.

Scales large, cycloid, and those on middle of side with exposed widths a little less than half of exposed depths. Top of head, including interorbital space, opercle, subopercle, interopercle, and cheek scaly, other portions of head bare. Scales on opercle large. Three series of scales on cheek. Scales enlarged a little on chest. Fins scaleless, except base of caudal which is covered with enlarged scales. Ventral with an elongate scaly flap a little over two-fifths length of fin. Lateral line concurrent with back, sloping down below bases of last dorsal rays and extending along middle of side of caudal peduncle to base of caudal. Tubes of lateral line arborescent, many bifurcations on each scale.

Origin of spinous dorsal over that of pectoral, spines more or less equal, first a little shorter than others, and with flexible adipose ends, margin of fin entire. Soft dorsal inserted nearly opposite tip of pectoral or nearly midway between base of caudal and posterior margin of eye, rays of about equal length, and margin of fin with shallow notches or emarginations between rays. Anal inserted about opposite base of second dorsal ray, spines graduated to third which is longest, and each ending in a flexible and adipose tip, like those of dorsal. Soft anal with rays more or less similar, like those of dorsal. Caudal deeply lunate, upper and lower lobes prolonged into slender points. Pectoral broad, first divided ray longest, insertion of fin a little low in depth of body, and its posterior margin straight. Ventral inserted a little posterior to origin of pectoral, reaching two-thirds of distance to anal, and spine about half way. Anus close in front of origin of anal.

Color in arrack pale grayish-olive or dull olive-brown, lower surface paler or with more of a pale brownish hue. Each scale on back and sides tinged with dull greenish-yellow. Cheek dull greenish-yellow, and same color of cheek extending across chin. Upper lip largely greenish-yellow, and margin narrowly brownish. Several short radiating bars from eye. Fins mostly pale brownish, margins of dorsals and anals narrowly dull greenish-yellow. Caudal dull greenish-yellow. Pectoral with more or less dusky-olivaceous, margin broadly pale. Ventrals colored like belly. Peritoneum silvery, sprinkled with minute blackish specks or dots.

Length $25\frac{1}{2}$ inches.

Type No. 27,734, A. N. S. P. Padang.

(*Pinguis*, plump; *rostrum*, snout.)

197. SCARUS CALUS sp. nov. Plate XXI, lower figure.

Head 3; depth $2\frac{2}{3}$; D. IX, 10; A. III, 9; P. II, 13; V. I, 5; 23 scales in a lateral series below lateral line to base of caudal; 2 scales between origin of spinous dorsal and lateral line; 8 scales obliquely back from origin of anal; 24 scales in lateral line, last one on base of caudal; width of head $1\frac{5}{6}$ in its length; depth of head over anterior margin of eye $1\frac{1}{2}$; snout $2\frac{1}{2}$; eye 8; mouth $5\frac{1}{3}$; maxillary 4; interorbital space $2\frac{2}{3}$; caudal $1\frac{1}{7}$, measured to tip of uppermost rays; least depth of caudal peduncle $2\frac{1}{2}$; pectoral $1\frac{3}{7}$; ventral 2.

Body rather deep, compressed, greatest depth near middle of pectoral, and back well arched in a convex profile. Caudal peduncle compressed, and its least depth equal to its length.

Head rather large, robust, compressed, and upper profile more convex than lower. Snout large, convex, both on surface and in profile, mandible not projecting in front. Eye small, circular, high, and its posterior margin nearly midway in head. Cheek flattened. Mouth inferior, upper mandible anterior, and corner reaching nearly opposite anterior nostril, maxillary concealed, though extending beyond. Mandibles convex, smooth, mosaic-like, and with uneven edges. A pair of posterior canines on each side of upper mandible. Lips broad, thin, not covering mandibles. A broad buccal flap inside of each mandible. Tongue rather large, convex, thick, and not free from floor of mouth. Nostrils small, near together, anterior with a small cutaneous rim, and both well before upper front rim of orbit. Interorbital space broad and convex. Opercular flap narrow.

Gill-opening extending forward about opposite posterior margin of eye. Gill-rakers about 50, fine, slender, short, weak, compressed, pointed, and longest about one-fifth of eye. Gill-filaments long, about one-fifth length of head. Pseudobranchiæ about five-sixths of eye. Isthmus broad, membrane forming but a narrow fold across.

Scales large, cycloid, and becoming enlarged on chest, those along middle of side with their exposed surfaces much deeper than broad. Head mostly scaly, those above extending well down on interorbital space. Opercle, subopercle and interopercle scaly, scales on former enlarged. Three rows of scales on cheek. Fins except base of caudal scaleless, and latter with three large terminal scales. An elongated scale at base of ventral a little less than half length of fin. Lateral line high at first, a little convex, not concurrent with dorsal profile, approaching near base of soft dorsal posteriorly where it descends abruptly till along middle of side of caudal peduncle, then extending out on base of caudal. Tubes with several bifurcations or only a little arborescent.

Origin of spinous dorsal about over that of pectoral, spines flexible, first a little shorter than last, otherwise more or less even in length. Margin of fin straight, and each spine with a thick fleshy or adipose-like end. Soft dorsal inserted well beyond tip of pectoral or nearer its origin than base of caudal, rays of more or less equal length, last shortest, and posterior end of fin rounded. Anal spines flexible, with fleshy or adipose-like ends, and graduated to third which is longest, origin of fin close behind that of soft dorsal. Soft anal similar to soft dorsal. Caudal truncate, with upper and lower rays produced into points, and posterior margin also truncate when fin is expanded. Pectoral broad, upper rays longest, and posterior margin straight. Also placed a little low in depth of body and not reaching opposite anus. Ventral inserted well behind pectoral, reaching about two-thirds distance to anal, first ray and spine with an adipose-like or fleshy extremity. Spine heavy and about five-sixths length of fin. Anus close in front of anal fin.

Color in arrack dull purplish-dusky above and on sides, lower surface whitish. Each scale on head above and sides, back and sides of trunk marked with short bars, lines and blotches of purplish-black, which form a beautiful intricate reticulating pattern of a more or less longitudinal nature. These lines and bars extend out over greater basal portions of dorsals. Dorsals and caudal dusky purplish-

brown, like general paler ground-color of back. Anal whitish. Pectoral with its upper half extending to tip of fin pale dusky-purplish, lower half of fin dilute yellowish-olivaceous. Ventral whitish. Iris tinged with orange. Peritoneum pale, shaded with dull purplish-black.

Length 16 inches.

Type No. 27,735, A. N. S. P. Padang.

One example. Closely related to *Scarus rubroviolaceus* Bleeker. According to Bleeker's figure¹ it differs in the presence of dark markings of trunk extending well out on bases of dorsal fins and profile of head above evenly convex.

(Καλὸς, beautiful.)

198. SCARUS CANTORI (Bleeker).

199. SCARUS QUOVI Valenciennes.

ILARCHIDÆ.

200. ILARCHES ORBIS (Bloch).

201. HARPOCHIRUS LONGIMANUS (Schneider). Plate XXIII, upper figure.

EPHIPPIDÆ.

202. EPHIPPUS ARGUS (Linnæus).

PLATACIDÆ.

203. PLATAX ORBICULARIS (Forskål).

204. PLATAX VESPERTILIO (Bloch).

CHÆTODONTIDÆ.

205. CHÆTODON VAGABUNDUS Linnæus.

206. CHÆTODON TRIFASCIATUS Park.

207. HENIOCHUS MACROLEPIDOTUS (Linnæus).

HARPURIDÆ.

HARPURUS Forster.

Harpurus Forster, Enchir. Hist. Nat., 1788,² p. 84 (no type indicated).³

Aspisurus Lacépède, Hist. Nat. Poiss., IV, 1802, p. 555 (*sohar* = *sohal*).

Forster's account does not include any species. It was supposed to be identical with *Acanthurus* Forskål (*monoceros*) = *Monoceros* Schneider. *Acanthurus* Forskål is rejected on the same basis as *Abu-defduf*, *Siganus*, etc.

208. HARPURUS GNOPHODES sp. nov. Plate XXII, upper figure.

Head $3\frac{7}{8}$; depth $2\frac{1}{3}$; D. IX, 25; A. III, 24; P. II, 15; V. I, 5; scales 135? in a median lateral series below lateral line to base of caudal; snout $1\frac{4}{5}$ in head; eye $4\frac{3}{4}$; maxillary $4\frac{2}{3}$; interorbital space $2\frac{5}{6}$; fifth dorsal spine $1\frac{2}{3}$; fifth dorsal ray $1\frac{2}{3}$; third anal spine $2\frac{1}{8}$; fifth anal ray $1\frac{4}{5}$; least depth of caudal peduncle $2\frac{3}{4}$; median caudal rays $1\frac{1}{3}$; ventral $1\frac{1}{3}$; width of head 2; pectoral $3\frac{2}{5}$ in trunk.

Body ovoid, well compressed, greatest depth about anus, profiles similar and evenly curved. Caudal peduncle compressed, and about as long as deep.

Head short, and profiles evenly convex. Snout long, convex, and upper jaw projecting but little in front. Eye round, high, anterior margin about midway in

¹ Atlas Ichth., I, 1862, pl. 13, fig. 3.

² The edition before me is the revised one published in London in 1797. It has the same pagination as the reference quoted above, which I have not consulted.

³ *Sohal* is here restricted to this name to form an absolute synonym with *Aspisurus*.

head, one and three-quarters in interorbital space, and two and one-half in snout. Mouth a little low, little produced, and rounded in profile. End of maxillary well formed, slipping in obliquely vertical preorbital groove. Teeth uniserial, forming a compressed cutting edge, and each one also with a finely crenulated margin. Tongue thick, fleshy, and edges not free from mouth. Nostrils close together and also close to front of eye, anterior larger, with a cutaneous rim ending in a small flap behind. Interorbital space well elevated and convex. A deep groove running obliquely down from front of eye.

Gill-opening lateral, extending forward below posterior nostril. Gill-rakers 4 + 10, short compressed rudiments. Filaments equal orbit, and pseudobranchiæ about two-thirds of latter.

Scales minute ctenoid, a little larger on middle of side. A narrow basal scaly strip to each vertical fin. Bases of caudal and ventral scaly. Base and basal region of pectoral naked, though minute scales extend well out on membranes between rays. A keeled spine on caudal peduncle but little less than least depth of latter, and depressable in a deep groove. Lateral line rather indistinct at first, nearly concurrent with, though approaching nearer dorsal profile posteriorly, and continuing directly above groove of caudal peduncle till out on base of caudal. Tubes small and simple.

Spinous dorsal inserted a little behind origin of pectoral, graduated to posterior spines which are longest and more or less equal. Soft dorsal beginning nearly midway between tip of snout and base of caudal, rays high and similar, and posterior end of fin blunt. Spinous anal inserted before soft dorsal, spines graduated to third which is longest, and rayed fin like soft dorsal, except that it ends in a sharper point posteriorly. Caudal with median rays forming a straight posterior margin, and upper and lower ones produced into moderately long sharp points. Pectoral reaching well beyond origin of soft dorsal, and its lower margin straight. Ventral inserted a little behind origin of pectoral, pointed, reaching origin of soft anal, and spine reaching about five-eighths of distance. Anus close behind and nearer origin of ventral than anal.

Color in arrack chocolate-brown, with many narrow blue lines longitudinally. Fins all more or less blackish or dusky-brown, pectoral paler, with a tinge of dilute olivaceous. Peritoneum silvery, with brownish dots.

Length 14 inches.

Type No. 27,750, A. N. S. P. Padang.

One example. This species is distinguished by the median position of the mouth, which is level with the caudal spine, and the color in combination with the narrow bluish longitudinal lines.

(Γρόφώδης, obscure.)

209. CTENODON CTENODON (Valenciennes).

TEUTHIDIDÆ.

Subgenus TEUTHIS Linnæus.

210. TEUTHIS JAVUS Linnæus.

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211. TEUTHIS VERMICULATUS (Valenciennes).
 212. TEUTHIS VIRGATUS (Valenciennes).
 213. TEUTHIS CORALLINUS (Valenciennes).

SIGANITES subgen. nov.

Type *Chatodon canaliculatus* Park.

Cheek naked or only with a small area including a few scattered scales.
 (From *Siganus*, an old name derived from the Arabic *Sidjan* or *Sigian*.)

214. TEUTHIS CANALICULATUS (Park).

TRIACANTHIDÆ.

215. TRIACANTHUS BREVIROSTRIS Schlegel.
 216. TRIACANTHUS NIEUHOFII Bleeker.

BALISTIDÆ.

217. LEIURUS STELLARIS (Schneider).

ZENODON Swainson.

Xenodon Rüppell, Neu. Wirbel. Faun. Abyss. Fisch., 1835, p. 52 (*niger*).*Zenodon* Rüppell, in Swainson, Lardner's Cabinet Cyclopædia, Nat. Hist., II, 1839, pp. 194, 325 (*niger*).*Erythrodon* Rüppell, Verz. Mus. Senck. Nat. Ges., 1852, p. 34 (*niger*).

I adopt the above name as it is a little different from *Xenodon*, a genus of Ophidia, employed by Boie in 1827.

218. ZENODON CÆRULEOLORUM sp. nov. Plate XVIII, upper figure.

Head¹ $3\frac{1}{20}$; depth $1\frac{9}{10}$; D. III—II, 32; A. II, 27; P. I, 15; 35 series of scales between gill-opening and base of caudal, and 3 more on latter; about 24 scales in a transverse series between spinous dorsal and origin of anal; snout $1\frac{1}{3}$ in head, from its own tip; eye $5\frac{4}{5}$; interorbital space 3; first dorsal spine 2; third developed dorsal ray about $1\frac{1}{6}$; first developed anal ray about $1\frac{4}{7}$; pectoral $2\frac{1}{2}$; least depth of caudal peduncle $3\frac{3}{4}$.

Body deeply ovoid, well compressed, and greatest depth at pubic process. Caudal peduncle rather thick, rounded, and its length a little more than its least depth.

Head large, greatly compressed, upper profile obliquely horizontal and straight, and lower profile well convex. Snout long, and with a convex surface. Eye small, high, close to and a little less than equal to space between snout's upper margin. A deep groove extending obliquely down from front of eye. Mouth small, superior, mandible convex in front and produced beyond jaws. Teeth protruding, a single convex tooth on each side with a bevelled edge below. Mandibular teeth incisor-like and with their two pointed edges adjoining. Lips rather thin and tough. Nostrils minute, separated, and not far from front of eye over orbital groove. Interorbital space convex.

Gill-opening a little oblique. Filaments a little less than eye. About four small rounded ossifications above base of pectoral and close behind gill-opening.

Scales large, rather narrowly imbricated and more or less free on trunk, becoming smaller on anterior half of body and at bases of vertical fins, where they

¹ Measured from tip of mandible.

are all more or less inseparable. In space between mouth and gill-opening in vertical series, and on lower surface of head and abdomen forming oblique series parallel with lower profile line. Along bases of dorsal and anal elongate, narrow, and forming series somewhat similar to layers of bricks. Small scales on bases of caudal and pectoral.

Spinous dorsal depressable in a groove, and inserted a little in front of pectoral. First spine thick, finely roughened and more or less flattened in front, smooth and flattened and somewhat compressed laterally, end rounded. Soft dorsal inserted a little in front of anal, high in front where a pointed lobe is formed. Anal similar only lobe not pronounced. Pectoral small, broad, and rounded. Pubic process free, movable, and followed by about twelve short spines. Caudal moderate, median rays a little convex, and upper and lower forming long slender points. Anus surrounded by short spine-like processes, and placed just in front of anal fin.

Color in arrack black, with a dull bluish-slaty hue. Emargination of caudal narrowly whitish with a submarginal narrow line of bluish. Margins of dorsal and anal narrowly bluish. A broad black band from corner of mouth to lower edge of gill-opening, and bordered above and below broadly with bluish-gray. Margin of pectoral black. Teeth bright scarlet. Iris pale grayish-blue. Peritoneum white.

Length $15\frac{1}{4}$ inches.

Type No. 27,763, A. N. S. P. Padang.

Three examples. This species is related to *Zenodon niger* (Rüppell). Bleeker gives a figure which he identifies with *niger* though it does not agree as Rüppell neither indicates the blue and black lines from the snout to the gill-opening or mentions them in his description. My examples differ from Bleeker's in the black band from the corner of the mouth being well bordered with bluish on each side.

(*Cæruleus*, blue; *lorum*, bridle.)

219. PACHYNATHUS CAPISTRATUM (Shaw).

220. BALISTAPUS UNDULATUS (Park).

TETRAODONTIDÆ.

221. LAGOCEPHALUS LUNARIS (Schneider).

222. LAGOCEPHALUS ALBO-PLUMBEUS (Richardson).

223. TETRAODON PALEMBANGENSIS Bleeker.

224. TETRAODON LEIURUS Bleeker.

OONIDUS Rafinesque.

Oonidus Rafinesque, *Analyse de la Nature*, 1815, p. 90 (*commersoni*).

Postfrontals and prefrontals deflected to describe a segment of a circle. Dorsal and anal small, each of about ten rays.

Lacépède's account, also Duméril's, are in the French vernacular. *Ovum* of Schneider is preoccupied.

225. OONIDUS RETICULARIS (Schneider).

226. OONIDUS IMMACULATUS (Schneider).

SCORPÆNIDÆ.

227. SEBASTOPSIS POLYLEPIS (Bleeker).
 228. SCORPÆNOPSIS OXYCEPHALA (Bleeker).
 229. PTEROIS LUNULATA Schlegel.

NOTOTHENIIDÆ.

230. PARAPERCS ATROMACULATA sp. nov. Plate XVIII, lower figure.

Head $3\frac{2}{5}$; depth at origin of spinous dorsal about 7; D. V, 21; A. I, 16; P. I, 16; V. I, 5; scales about 60 in lateral line, last 5 on base of caudal; scales 5 obliquely back from origin of spinous dorsal to lateral line, and 14¹ between latter and origin of anal; width of head $1\frac{4}{5}$ in its length; depth of head $2\frac{1}{5}$; mandible $2\frac{1}{10}$; snout $3\frac{1}{10}$ in head from its tip; eye 4; maxillary $2\frac{1}{2}$; interorbital space 13; third dorsal spine $4\frac{2}{3}$; third dorsal ray $2\frac{1}{2}$; third anal ray $2\frac{2}{3}$; least depth of caudal peduncle $3\frac{3}{4}$; caudal $1\frac{3}{5}$; pectoral $1\frac{3}{5}$; ventral $1\frac{2}{5}$.

Body elongate, subcylindrical at first, and becoming compressed above anal fin.

Head broad, and upper profile but slightly convex. Snout rather long and broadly depressed, with a convex surface, though pointed in profile. Eye high, directed upward, impinging on upper profile and a little elongate. Mouth large, superior, and mandible projecting. Maxillary reaching anterior rim of orbit. Lips thick. Teeth forming inner bands in jaws minute. An outer series of irregularly enlarged slightly curved canines also in each jaw. A small patch of vomerine teeth, none on palatines. Tongue elongate, rather slender, free in front, and its tip slightly rounded. Nostrils small, separated, anterior in a short cutaneous tube, and posterior a short round pore. Interorbital space narrow and flattened. Opercle with two short strong spines, lower anterior.

Gill-opening carried forward till about opposite posterior rim of eye? Rakers 6 + 12, short thick rudiments. Filaments about two-fifths of horizontal orbital diameter. Pseudobranchiæ a little smaller.

Scales mostly ctenoid, those in front of ventrals smooth. Scales on head small, especially those on cheek. Interorbital space, snout, lips, interopercle, and under surface of head naked. Small scales on basal portions of caudal and pectoral fins, and also extending out quite a distance on both upper and lower rays of former. Lateral line rather high at first, then descending posteriorly and running along middle of side of caudal peduncle and out on base of caudal. Tubes simple.

Dorsals continuous, spinous fin inserted well behind origin of pectoral, and third spine highest. Soft dorsal inserted a trifle nearer origin of pectoral than that of anal, fin of more or less even height, and margin more or less deeply incised above between each ray. Anal similar, caudal slightly rounded, corners forming angles. Pectoral reaching vent, and lower median rays longest. Ventral pointed, reaching anus, and first ray distinctly longer than innermost. Anus near anal.

Color in arrack dull brown, darker above, with a pale broad lateral band of ten oblong small blotches of pale brown extending from humeral region to base of caudal a little superiorly. Dark brown separating pale oblong areas continued

¹ My figure shows but nine on account of the flattened surface of anal region at this point.

above and below so as to form vertical bars. Side of head with seven brown dark-edged oblique bars extending backward below and behind eye. Snout more or less marbled with brown. Soft dorsal with three series of blackish-brown spots, one along base of fin, another median, and last submarginal. Anal with a single median series of round dusky spots extending longitudinally. Caudal with median rays whitish, marked with a number of round blackish spots, upper and lower edges of fin dusky. Pectoral and ventral dilute brown. Iris pale brownish. Peritoneum silvery-white.

Length 6 inches.

Type No. 27,780, A. N. S. P. Padang.

One example. This species is somewhat related to *Parapercis hexophthalma* (Cuvier)¹, but is easily distinguished by its coloration.

(*Ater*, dark; *macula*, spot.)

SILLAGINIDÆ.

231. SILLAGO SIHAMA (Forskål).

MALACANTHIDÆ.

232. MALACANTHUS URICHTHYS sp. nov. Plate XVI, lower figure.

Head $3\frac{1}{4}$; depth 6; D. 48; A. 38; P. I, 15; V. I, 5; scales 128 in lateral line, last six on base of caudal; about 11 scales² between origin of dorsal and lateral line, and about 25 between latter and origin of anal; width of head $2\frac{2}{5}$ in its length; depth of head, at posterior margin of eye, 2; snout $2\frac{1}{6}$; eye $6\frac{1}{3}$; mouth 4; maxillary $3\frac{1}{4}$; mandible $2\frac{3}{5}$; interorbital space $3\frac{4}{5}$; least depth of caudal peduncle $5\frac{1}{10}$; caudal $2\frac{1}{6}$; pectoral $1\frac{5}{6}$; ventral $3\frac{1}{6}$.

Body long, slender, compressed, and greatest depth at anterior pectoral region. Caudal peduncle compressed, and about as long as deep.

Head long, rather broad above, its sides well compressed, and pointed in front. Snout long, profile straight, its upper surface convex and upper jaw well produced in front. Eye circular, high, and a little posterior. Mouth terminally superior, lower jaw projecting a little in front, and maxillary reaching about opposite anterior nostril. Lips large, thick, fleshy, and plicate. Teeth fine, pointed, and in bands in jaws. Nostrils well separated, anterior a small pore about an eye-diameter directly in front of eye, and posterior similar, on lower edge of a small pit midway between. Interorbital space broad, slightly elevated above eye, and flattened. Opercle with short strong flattened spine.

Gill-opening extending forward a little in front of posterior edge of preopercle. Rakers 1 + 5 rudiments. Filaments about two-thirds of orbit. Pseudobranchiæ a trifle over half of orbit. Membrane forming a broad thick fold over wide isthmus.

Scales small and mostly finely ctenoid. Cheek, postocular region, opercle, especially above, occiput, back above and anteriorly, and chest, covered with elongate cycloid scales. Scales on abdomen and upper pectoral region rounded and

¹ Ehrenberg, in Cuvier, Hist. Nat. Poiss., III, 1829, p. 202.

² Not evident in my figure on account of the broad flattened back at this point.

cycloid. Scales along middle of side rather narrowly imbricated. Except base of caudal, which is covered with small scales, fins scaleless. A bare area at base of pectoral. Lateral line high at first, then sloping down and extending along middle of side of caudal peduncle and out on base of caudal. Tubes small and simple.

Dorsals continuous, spines small, much shorter than rays, and origin of fin about over pectoral. Soft dorsal beginning about opposite first third of pectoral, and fin of more or less uniform height, though becoming a little lower posteriorly. Anal inserted a little nearer tip of mandible than base of caudal, and anterior rays longest. Caudal unevenly emarginate, nearly straight when expanded. Pectoral with expanded rays, upper longest and forming a point that reaches origin of anal. Ventral inserted opposite origin of pectoral, and reaching about three-fifths of distance to anal.

Color in arrack olive-gray above, side and lower surface whitish. A broad blackish band from pectoral out over caudal to its margin, and upper and lower edges of latter dusky, otherwise whitish. Basal portion of dorsal somewhat dark gray-brown like back, and its margin paler. Anal whitish with a slightly dusky margin. Other fins whitish. Iris pale yellowish. Peritoneum white.

Length 14 inches.

Type No. 27,783, A. N. S. P. Padang.

One example. Griffith's figure of *Labrus vittatus*¹ is very crude, and may possibly be intended for this fish. The submarginal anterior dark line on the anal, if ever present, has faded completely. The black lateral band is not of the same pattern as it is shown in his figure, i. e., narrowing posteriorly.

(*Urichthys*, an old name applied to *Cheilinus*, a genus of Labroids which these fishes somewhat resemble.)

CALLIONYMIDÆ.

233. CALLIONYMUS SAGITTA Pallas.

PLATYCEPHALIDÆ.

234. PLATYCEPHALUS INDICUS (Linnæus).

GRAMMOPLITES gen. nov.

Type *Cottus scaber* Linnæus.

Lateral line armed with spines.

(Γραμμὴ, line; ὀπλίτης, armed.)

235. GRAMMOPLITES SCABER (Linnæus).

GOBIIDÆ.

ELEOTRIDINÆ.

236. OPHIOCARA POROCEPHALA (Valenciennes).

237. ELEOTRIS FUSCA (Schneider).

238. BUTIS GYMNOPOMUS (Bleeker).

¹ Anim. King. Cuv., X, 1834, plate 45 (opposite p. 254, no description). No locality. (Not *Labrus vittatus* Walbaum.)

GOBIINÆ.

239. *Gobius venustus* sp. nov. Plate XXI, lower figure.

Head $3\frac{1}{4}$; depth $5\frac{1}{2}$; D. VI—1, 10; A. 1, 9; P. 17; V. 5 (5); scales 25 to base of caudal; scales 8 in a transverse series at origin of anal; depth of head about $1\frac{2}{3}$ in its length; width of head $1\frac{1}{2}$; snout $2\frac{4}{5}$; eye 4; width of mouth $2\frac{4}{5}$; maxillary $3\frac{1}{5}$; pectoral $1\frac{1}{6}$; ventral $1\frac{1}{3}$; second dorsal spine $1\frac{3}{4}$; first dorsal ray 2; last dorsal ray $1\frac{2}{5}$; first anal ray $2\frac{1}{4}$; last anal ray $1\frac{2}{5}$; caudal 1; least depth of caudal peduncle $2\frac{1}{4}$; interorbital space $2\frac{1}{2}$ in eye.

Body elongate, depressed in front, and sides compressed, more especially posteriorly. Greatest depth about belly. Caudal peduncle elongate, compressed.

Head rather large, depressed, lower surface more or less flattened, and upper surface convex or rounded. Upper profile steep and convex till above eye, after which it is more or less straight. Snout blunt, rather short, broad, and convexly rounded. Eye rather small, high, somewhat directed upward, and posterior margin a trifle behind middle of head. Jaws rather large and powerful, upper margin slightly protruding. Mouth rather small, broad, and maxillary reaching anterior margin of orbit. Lips rather thin, fleshy. Teeth large, sharp pointed, in broad bands and with an outer series somewhat enlarged. No vomerine or palatine teeth. Upper buccal flap rather broad. Tongue broad, thick, truncated, and not free in front. Nostrils small, anterior with a short elevated fleshy rim, and posterior directly in front of eye. Nostrils also separated, anterior in a short tube. Interorbital space narrow.

Gill-opening lateral, slightly oblique, and its length about two and two-fifths in head.

Scales large, thin, finely ctenoid. Head with small and crowded scales on top, otherwise naked.

Dorsal spines flexible, second longest, and all rather high. Fin inserted a little behind first third in length of trunk. Second dorsal inserted over origin of anal, rays more or less uniform in height but becoming more elongate posteriorly, last longest. Anal similar. Caudal elongate, median rays longest, and fin rounded when expanded. Pectoral long, broad, upper rays short and silky, and those just below middle of fin longest. Ventrals united, with a rather broad frenum in front, and when depressed reaching anus.

Color in arrack pale or dull olivaceous-brown above, lower surface whitish-brown without olivaceous tinge. Several series of small brown spots longitudinally on head and back. A brown streak below eye, and another behind lower margin of preopercle. A short black line on margin of preopercle. Opercle with a brown spot in middle. Several large deep brown spots in front of base of pectoral. Lower side of body with two longitudinal series of large deep brown blotches. Pectoral crossed by six or seven narrow pale blue cross-lines. Spinous dorsal with a whitish margin below which is a blackish shade. Spinous dorsal also with four or five blackish-brown inclined cross-lines. Soft dorsal with a number of slightly inclined rather long brownish lines extending over several rays. Anal brownish, with sim-

ilar but less distinct lines. Caudal with transverse series of dark brown blotches. Ventrals grayish-black.

Length $3\frac{1}{6}$ inches.

Type No. 27,799, A. N. S. P. Padang.

Two examples. This species is related to *Gobius sumatranus* Bleeker, but differs in coloration.

(*Venustulus*, pretty.)

ECHENEIDIDÆ.

240. REMORA NIEUHOFII (Bleeker).

BLENNIIDÆ.

241. SCARTICHTHYS BASILISCUS sp. nov. Plate XIX, upper figure.

Head $4\frac{2}{5}$; depth $4\frac{3}{5}$; D. XIV, 8; A. II, 21; P. 14; V. 2; width of head $1\frac{1}{2}$ in its length; depth of head $1\frac{2}{5}$; eye $4\frac{1}{4}$; width of mouth $1\frac{5}{6}$; maxillary $2\frac{1}{6}$; fourth dorsal spine $1\frac{1}{2}$; fifteenth dorsal ray $1\frac{1}{6}$; eighteenth anal ray $1\frac{2}{3}$; least depth of caudal peduncle $2\frac{1}{4}$; caudal 1; pectoral $1\frac{1}{20}$; ventral $1\frac{5}{8}$.

Body rather deep, elongate, compressed, and greatest depth, though belly is emaciated, about origin of anal.

Head a little oblong, widest below, upper surface somewhat constricted, of more or less equal depth, and anterior profile steep. Snout broader than long and with a convex surface, its profile steep. Eye high, deeper than long, and well anterior. Mouth broad, jaws large, and maxillary reaching a little behind posterior margin of eye. Teeth minute, forming a comb-like series in each jaw but without a posterior canine. No teeth on vomer. Tongue large, thick, and not free. Nostrils circular, separate, with cutaneous rims, and anterior followed by a fleshy arborescent tentacle. Interorbital space narrow and concave. Head surmounted by a rather high median cutaneous flap or crest. A supraocular tentacle equal to vertical diameter of eye. A tentacle opposite end of crest on top of head on each side of occiput.

Gill-membrane forming a broad fold over a broad isthmus and falling well behind eye. Rakers small, short, and in moderate number. Filaments and pseudobranchiæ small.

Spinous dorsal high, beginning before origin of pectoral, spines flexible at least terminally, longest and more or less equal anteriorly and medianly, and rounded margin of fin entire. Soft dorsal separated by a deep notch, joined posteriorly with caudal by a membrane, rounded margin of fin hardly notched, and posterior rays a little longest. Anal beginning a little before origin of soft dorsal. Preceding rays two small flexible spine-like rudiments. Rays more or less equal, and margin of fin deeply notched. Caudal elongate and rounded. Pectoral broad, rounded, lower rays longest, and fin notched. Ventral inserted close behind anterior edge of gill-opening, and composed of two thick rays, inner a little longer.

Color in arrack deep drab with a tinge of heliotrope or purplish. Side with about eight pairs of broad transverse bands of a deeper shade than body color, alternating broader pale bands also with darker but narrow transverse band. On bases

of dorsals they extend for a short distance, but below do not reach lower surface of abdomen or base of anal. Head more or less variegated with dusky, and a dark transversely oblique band bordered with paler on each side extending down behind eye. Two dark bars from eye to maxillary. Fins dusky-blackish, bases paler. Spinous dorsal with about four longitudinal grayish lines, upper darker and more or less diffuse with dark color of that part of fin. Grayish lines extending longitudinally though inclined posteriorly. Anal with four grayish lines, outer two closer, and somewhat broken and interrupted in places. Indistinct traces of grayish cross-bands on caudal. Margins of vertical fins show little or no evidence of reticulations formed by grayish lines. Pectoral and ventral with more or less grayish and brownish. Iris brownish. Peritoneum whitish.

Length $4\frac{3}{4}$ inches.

Type No. 27,802, A. N. S. P. Padang.

One example. This species appears to be related to *Salarias oortii*, but differs in the coloration and fin radii.

(Βασιλίσκος, *Basiliscus*.)

242. SCARTICHTHYS STIGMATOPTERUS sp. nov. Plate XIX, lower figure.

Head $4\frac{1}{2}$; depth $6\frac{1}{5}$; D. XIII, 22; A. II, 23; P. 13; V. 2; width of head $1\frac{3}{4}$ in its length; depth of head $1\frac{1}{3}$; eye 4; width of mouth $2\frac{1}{3}$; maxillary $2\frac{2}{5}$; fourth dorsal spine 2; fifteenth dorsal ray $1\frac{1}{3}$; eighteenth anal ray $1\frac{1}{2}$; least depth of caudal peduncle $2\frac{2}{3}$; caudal $1\frac{1}{10}$; pectoral $1\frac{1}{10}$; ventral $1\frac{7}{8}$.

Body elongate, well compressed, and greatest depth probably through belly.

Head similar to preceding, except not so much constricted above, with broad fringed cutaneous flap over eye, and no occipital tentacle.

Gill-opening and fins similar to preceding.

Color in arrack deep drab with a tinge of pale heliotrope or purplish. Side with about seven pairs of broad transverse bands, darker than body color, space between each pair somewhat narrower than either dark band and also with a narrow dark median transverse line or band. These bands also extend diffusely out on bases of dorsals, but not on lower surface of abdomen or to base of anal. Head more or less plain-colored, a little darker above, and two dark bars from eye to maxillary. Fins pale, marginal portion broadly dusky or blackish. Margins of dorsals and most of upper half of caudal finely reticulated with narrow grayish hues. On spinous dorsal these give place more or less to longitudinal broad pale bands, and on soft dorsal to oblique grayish lines, inclined a little, and extending to upper reticulations of fin. Oblique lines of dusky on anal between rays distally. Pectoral and ventral pale.

Length $3\frac{1}{2}$ inches.

Type No. 27,803, A. N. S. P. Padang.

Two examples. They do not agree with any of the descriptions as they have 13 dorsal spines, though probably closer to Bleeker's second account¹ of *Salarias*

¹ Act. Soc. Sci. Ind. Neerl. (Zes. Bijd. Visch. Sumatra), III, 1857, p. 39.

oortii or that by Dr. Günther.¹ Bleeker's first account² is incomplete and may refer to a different species.

(Στίγμα, spot; πτέρωμα, fin.)

243. ENTOMACRODUS LEOPARDUS sp. nov. Plate XXI, upper figure.

Head $4\frac{2}{5}$; depth $6\frac{2}{5}$; D. XII, 19; A. I, 20; P. 14; V. 2; width of head $1\frac{3}{5}$ in its length; depth of head $1\frac{2}{5}$; eye $3\frac{1}{2}$; width of mouth $2\frac{2}{5}$; pectoral 1; ventral $1\frac{4}{5}$; caudal $1\frac{1}{5}$; interorbital space $2\frac{1}{2}$ in eye.

Body long, and well compressed.

Head oblong, constricted above, broad below, and of more or less equal depth. Upper profile nearly horizontal and without a fleshy flap or crest. Snout broad, steep, inclining a trifle inward so that above, at interorbital space, it is a little inclined beyond mouth. Eye far forward, high, circular, and nearly impinging on upper profile. Space between lower margin of eye and corner of mouth less than eye-diameter. Mouth low, inferior, end of maxillary reaching a little beyond posterior margin of eye. Teeth fine, in a narrow comb-like series in each jaw. No vomerine teeth. Mandible with a small posterior canine on each side. Lips rather thin, smooth, and entire. Tongue adnate to floor of mouth. Nostrils well separated and anterior with two small fleshy flaps. A small thin tentacle above eye. Interorbital space narrow, slightly concave.

Gill-opening large, membrane broad, and free across broad isthmus. Rakers short, weak, not numerous, much shorter than filaments. Pseudobranchiæ well developed.

Spinous dorsal a little lower than soft dorsal, and its base also a little shorter. Spines of more or less uniform height, flexible, and well separated from soft fin by a deep notch. Soft dorsal joined to caudal posteriorly by a membrane. Anal preceded by a small flexible spine, hardly distinguishable from rays, and margin of fin distinctly incised between rays. Last anal ray not connected with caudal peduncle by a membrane. Caudal elongate, margin slightly convex. Pectoral broad, rays just below middle longest, and lower ones enlarged. Ventral inserted nearly midway between posterior rim of eye and gill-opening.

Color in arrack uniform pale brown. Vertical fins and posterior side of body marked with numerous small round dark or blackish-brown spots. Tips of anal rays whitish. Along anterior side of body several indistinct H-shaped pale markings, giving place to dark dots posteriorly, though along middle of that region a median series of short horizontal lines. A pale brown spot on opercle. Pectoral brownish, darker on outer portion. Ventral pale brown.

Length $2\frac{3}{16}$ inches.

Type No. 27,805, A. N. S. P. Padang.

Two examples.

(*Leopardus*, leopard; from the dark spots.)

¹ Cat. Fish. Brit. Mus., III, 1861, p. 257.

² Nat. Tijds. Ned. Ind., I, 1850, p. 257.

244. *ENTOMACRODUS CALURUS* sp. nov. Plate XX, ♂ above, ♀ below.

Head 5; depth $6\frac{3}{4}$; D. XII, 20; A. II, 20; P. 14; V. 2; width of head $1\frac{4}{5}$ in its length; depth of head $1\frac{1}{2}$; eye $3\frac{1}{2}$; width of mouth $2\frac{1}{4}$; pectoral $1\frac{1}{3}$; ventral 2; caudal 1; interorbital space 3 in eye.

Body elongate, compressed, oblong, greatest depth about middle of belly.

Head elongate, compressed, oblong, and of more or less equal depth. Upper profile nearly horizontal, and surmounted by a thin rather high fleshy flap or crest. Snout nearly vertical, broad, convex, and slightly produced beyond mouth. Eye far forward, nearly impinging on upper anterior profile. Space between its lower margin and corner of mouth a trifle less than vertical diameter. Mouth low, inferior, broad, its corner reaching below posterior rim of orbit. Teeth in a narrow comb-like band in each jaw. Mandible with a strong canine on each ramus. Lips rather thin, but fleshy. Nostrils well separated, and lower with three or four short fleshy filaments. A thin fleshy tentacle above eye equal to three-fourths its diameter. Interorbital space narrow, slightly concave.

Gill-opening rather large, membrane broad, and free across rather broad isthmus. Rakers short, weak, not numerous, and much shorter than filaments. Pseudobranchiæ well developed.

Spinous dorsal shorter than soft dorsal, also lower, spines of more or less uniform height, flexible, and well separated from soft fin by a deep notch. Soft dorsal joined to caudal posteriorly by a membrane. Anal preceded by two small flexible spines hardly distinguishable from rays, and margin of fin distinctly incised between rays. Last anal ray free from caudal peduncle posteriorly. Caudal elongate, rounded. Pectoral broad, rays just below middle longest. Ventral inserted below posterior portion of crest on head.

Color in arrack uniform pale brown. Side with about eight pairs of indistinct dusky vertical cross-bars, and on each several short pale blue dark-edged horizontal bars formed in lateral series. Spinous dorsal gray, blackish on outer portion and edge. Soft dorsal gray with about six dusky inclined lines extending across. Anal gray, darker on outer portion and with a blackish edge adjoining a submarginal narrow blue line or band. Caudal with lower portion of fin dusky, greater part of fin gray above and crossed with about five narrow brown cross-bars, also finely marbled. Pectoral and ventral pale brownish.

Length 3 inches.

Type ♂ No. 27,807, A. N. S. P. Padang.

Also five others, ♀, cotypes. The females have no crests and lack the submarginal anal line.

(Καλός, beautiful; οὐρά, tail.)

PLEURONECTIDÆ.

245. *PSETTODES ERUMEI* (Schneider).

246. *PARALICHTHYS POLYSPILUS* (Bleeker).

247. *PARALICHTHYS TRIOCELLATUS* (Schneider).

SOLEIDÆ.

248. *CYNOGLOSSUS OS* sp. nov. Plate XXII, upper figure.

Head $3\frac{1}{2}$; depth $3\frac{2}{5}$; D. about 102; A. about 4—76; caudal 8; space between tip of snout and upper eye $2\frac{1}{4}$ in head; mouth cleft $5\frac{1}{5}$; upper eye $5\frac{1}{2}$ in space to tip of snout; interorbital space $5\frac{1}{2}$; scales in lateral line, from above branchial aperture to base of caudal, about 86; about 40 scales in a transverse series at deepest part of body; 12 scales between lateral line at same point.

Body elongate, greatly compressed, sinistral, and greatest depth would fall about first two-fifths of length of fish. Tail long, tapering narrowly posteriorly.

Head large, profile evenly rounded above and below. Snout rather long, compressed and rounded. Eyes small, close together, and upper nearly altogether in advance of lower. Posterior margin of lower eye a little nearer gill-opening than anterior margin of upper eye is nearer to tip of snout. Mouth large, its cleft horizontal. Teeth rather fine, sharp pointed, and in bands only on dextral side of jaws. Sinistral side of jaws with a labial fringe of small fleshy flaps. Tongue rather thick, rounded and little free. Upper nostrils damaged. Lower nostril a small fleshy tube below and anterior to lower eye, or hardly below middle of upper. Interorbital space rather narrow and flattened.

Gill-opening small, membrane broad and forming a broad fold over narrow compressed isthmus. Rakers none. Gills small, filaments small.

Scales small, ctenoid, and spread over entire body, except on fins. Lateral system of mucous pores double along trunk, median series begins near tip of snout and runs direct to caudal. Upper series confluent with this at its origin, and again about midway between upper eye and gill-opening, extending along upper portion of body close to and just below dorsal fin, then out on fifth ray from caudal. A system of mucous pores runs down from intersecting series, between eyes and gill-opening, and across side of head. Also another series of pores from front of eye obliquely down to lower margin of snout. No pores on dextral side of fish.

Confluent with caudal are long dorsal and anal, former divided at first by anus so that first four rays are separated from rest of fin. Caudal rather long and pointed.

Color in arrack, sinistral side pale olive, finely mottled with darker. Dextral side a livid whitish or brownish-white. Fins pale brown.

Length 5 inches.

Type No. 27,816, A. N. S. P. Padang.

One example. It is close to *C. sumatranus* Bleeker, and agrees with the same author's figure except that there is no oblique series of tubes before the eye. Seventy scales are given for the lateral series while my example shows about eighty-six scales in the lateral line.

(*Os*, mouth.)

FAUNAL WORKS.

Sumatra proper, as well as a number of the small adjacent islands, such as Banka, Biliton, and Nias, are included. All of these references have been consulted.

PARK, MUNGO.

1797. Descriptions of Eight new Fishes from Sumatra. Trans. Linn. Soc. London, III, pp. 33-39, and 1 plate.

RAFFLES, THOMAS STAMFORD.

1822. Second Part of the Descriptive Catalogue of a Zoölogical Collection made in the Island of Sumatra and its vicinity. Trans. Linn. Soc. London, XIII, pp. 335-336.

BENNETT, E. T.

1830. Catalogue of zoölogical specimens. Pisces, pp. 686-694. In the memoir of the life and public services of Sir Thomas Stamford Raffles, F. R. S., by his widow.

BLEEKER, PIETER VAN.

1851. Visschen van Banka. Nat. Tijds. Ned. Ind. Batavia, I, 1850, pp. 159-161. (October 1850.)
Visschen van Biliton. L. c., pp. 478-479. (Feb. 26, 1851.)
Bijdrage tot de kennis der ichthyologische fauna van Riouw. L. c., II., 1851, pp. 469-497. (Oct. 1851.)

1852. Bijdrage tot de kennis der ichthyologische fauna van Blitong (Biliton), met beschrijving van eenige nieuwe soorten van zoetwatervisschen. L. c., III, 1852, pp. 87-100. (Dec. 1851.)
Bijdrage tot de kennis der ichthyologische fauna van het eiland Banka. L. c., pp. 443-460. (June 1852.)

Diagnostische beschrijvingen van nieuwe of weinig bekende vischsoorten van Sumatra. Tiental I-IV. L. c., pp. 569-608. (May 1852.)

Nieuwe bijdrage tot de kennis der ichthyologische fauna van het eiland Banka. L. c., pp. 715-738. (Oct. 1852.)

1853. Over eenige nieuwe soorten van Homaloptera v. Hass. (Balitora Gray), van Java en Sumatra. L. c., IV, (I), pp. 155-164. (Dec. 1852.)

Exocoetus hexazona, eene nieuwe soort van Banka. L. c., pp. 206-207. (Feb. 16, 1853.)

Diagnostische beschrijvingen van nieuwe of weinig bekende vischsoorten van Sumatra. Tiental V-X. L. c., pp. 243-302. (Feb. 1853.)

Nalezingen op de ichthyologische fauna van het eiland Banka. L. c., V (II), pp. 175-194. (June-Sep. 1853.)

Nieuwe tientallen diagnostische beschrijvingen van nieuwe of weinig bekende vischsoorten van Sumatra. L. c., pp. 495-534. (Oct.-Dec. 1853.)

1854. Overzicht der ichthyologische fauna van Sumatra, met beschrijving van eenige nieuwe soorten. L. c., VII (IV), pp. 49-108. (Jan.-June 1854.)

1855. Antennarius Lindgreeni, eene nieuwe soort van Banka. L. c., VIII (V), pp. 192-193. (1854.)
Bijdrage tot de kennis der ichthyologische fauna van de Batoe-eilanden. L. c., pp. 305-328. (March 1855.)

Visschen van Tikoe, Sumatra's Westkust. L. c., p. 345. (March 15, 1855.)

Tweede bijdrage tot de kennis der ichthyologische fauna van de Batoe-eilanden. L. c., IX (VI), pp. 65-72. (April 1855.)

Nalezingen op de vischfauna van Sumatra. Visschen van Lahat en Sibogha. L. c., pp. 257-280. (June 1855.)

1856. Tweede bijdrage tot de kennis der ichthyologische fauna van het eiland Bintang. L. c., X (VII), pp. 345-356. (Nov.-Dec. 1855.)

Verslag van eenige verzamelingen van zee- en zoetwatervisschen van het eiland Banka. L. c., XI (I), pp. 415-420. (June 1856.)

Bijdrage tot de kennis der ichthyologische fauna van het eiland Nias. L. c., XII (II), 1856-57, pp. 211-228. (June 1856.)

Derde bijdrage tot de kennis der ichthyologische fauna van de Batoe-eilanden. L. c., pp. 229-242. (June 1856.)

Berigt omtrent eenige vischsoorten van Toboali, eiland Banka. L. c., pp. 273-275. (Aug. 24, 1856.)

1857. Zesde bijdrage tot de kennis der vischfauna van Sumatra. Visschen van Padang, Troessan, Priaman, Sibogha en Palembang. Act. Soc. Sci. Ind. Neerl. Batavia, III, 1857-58, pp. 1-50. (Oct. 1856.)

Over eenige vischsoorten nieuw voor de kennis der fauna van Biliton. Nat. Tijds. Ned. Ind. Batavia, XIII (III), pp. 283-287. (March 12, 1857.)

1858. Zevende bijdrage tot de kennis der vischfauna van Sumatra. Visschen van Palembang. Act. Soc. Sci. Ind. Neerl. Batavia, V, 1858-59, pp. 1-12. (Dec. 1857.)

Vierde bijdrage tot de kennis der vischfauna van Biliton. Nat. Tijds. Ned. Ind. Batavia, XV (I), pp. 219-240. (Dec. 1857.)

¹Visschen van Tikoe en reptiliën van Agam, verzameld door E. A. Ludeking. L. c., XVI (II), 1858-59, pp. 26-28. (Oct. 1857.)

¹Vischsoorten en reptiliën van Riouw en Lingga, verzameld door E. Netscher, E. F. Meyer en H. Raat. L. c., pp. 45-47. (Nov. 1857.)

¹These titles are taken from "Lijst der geschriften van Dr. P. Bleeker over Ichthyologie in chronologische volgorde" in Nat. Tijds. Ned. Ind. Batavia, XL, 1881, pp. 49-89.

- ¹ Vischsoorten uit de zoete wateren van Benkoelen, verzameld door J. A. W. van Ophuysen. L. c., pp. 210-211. (April 1858.)
- ¹ Tindjan Kassik uit de rivier van Priaman, verzameld door G. T. James. L. c., pp. 211-212. (April 1858.)
- ¹ Zeevisschen gevangen in de nabijheid van Benkoelen, verzameld door J. A. W. van Ophuysen. L. c., p. 239. (June 1858.)
- ¹ Vischsoorten gevangen bij Benkoelen en aangeboden door J. A. W. van Ophuysen. L. c., pp. 243-244. (June 1858.)
- ¹ Vischsoorten van Muntok, verzameld door F. W. Dolge. L. c., pp. 251-252. (June 1858.)
- ¹ Tarsius spectrum en reptiliën en visschen van Biliton, verzameld door A. Hendriks. L. c., pp. 261-262. (June 1858.)
- ¹ Vischsoorten van Palembang en Djambi, verzameld door E. A. Lange en F. J. P. Storm van 's Gravesande. L. c., pp. 263-266. (June 1858.)
- ¹ Over eene nieuwe verzameling vischsoorten van Benkoelen van A. J. W. van Ophuysen. L. c., pp. 273-275. (July 1858.)
- ¹ Vischsoorten van Priaman, verzameld door H. Diepenhorst. L. c., pp. 336-338. (Sep. 1858.)
- ¹ Vischsoorten van Palembang, verzameld door R. V. Heyliger. L. c., pp. 338-341. (Sep. 1858.)
- ¹ Vischsoorten uit de Moessi, Saleh, Padang en Kommering, verzameld door E. A. Lange en G. A. van Delden. L. c., pp. 384-388. (Dec. 1858.)
1859. Negende bijdrage tot de kennis der vischfauna van Banka. L. c., XVIII (IV), pp. 359-378. (Feb. 1859.)
- ¹ Vischsoorten en reptiliën van Bintang en Siak, verzameld door E. F. Meijer. L. c., XX (VI), pp. 86-88. (Feb. 1859.)
- ¹ Soorten van visschen van Priaman, verzameld door H. Diepenhorst. L. c., pp. 198-199. (July 1859.)
- ¹ Synanceia horrida Bl. Schn. en Opisthognathus Sonneratii Val. ? van Biliton, verzameld door den heer Krüymel. L. c., pp. 201-202. (July 1859.)
- Visschen uit de omstreken van Tandjong, aan de Samangka-baai. L. c., pp. 219-220. (Aug. 1859.)
1860. Achtste bijdrage tot de kennis der vischfauna van Sumatra. Visschen van Benkoelen, Priaman, Tandjong, Palembang en Djambi. Act. Soc. Sci. Ind. Neerl. Batavia, VIII, pp. 1-88. (Feb.-Aug. 1859.)
- Negende bijdrage tot de kennis der vischfauna van Sumatra. Visschen uit de Lematangenim en van Benkoelen. L. c., pp. 1-12. (Feb.-March 1860.)
- Tiende bijdrage tot de kennis der vischfauna van Banka. Nat. Tijds. Ned. Ind. Batavia, XXI (I), pp. 135-142. (Nov. 1859.)
- Vischsoorten van Benkoelen. L. c., XXII (II), pp. 65-66. (March 1860.)
- Elfde bijdrage tot de kennis der vischfauna van Banka. L. c., pp. 107-108. (May 1860.)
1863. Over eenige vischsoorten van het eiland Bangka, het rijks museum van natuurlijke historie te Leiden aangeboden, door den heer J. F. R. S. Van den Bossche, Resident. Ned. Tijds. Dierk., Amsterdam, I, pp. 72-73. (Feb. 28, 1862.)
1868. Sixième notice sur la faune ichthyologique de l'île de Bintang. Versl. Kon. Ak. Wet. Amsterdam, II (II), pp. 289-294. (Oct. 1867.)
- MARTENS, EDUARD VON.
1876. Die Preussische Expedition nach Ost-Asien. Zool. Theil., I, Berlin, Pisces, pp. 385-410. [Scattered records of Sumatran fishes.]
- VINCIGUERRA, DOCIO.
1879. Appunti ittologici sulle collezioni del Museo civico di Genova. I. Enumerazione di alcune specie di pesci raccolti in Sumatra dal D.re O. Beccari nell' anno 1878. Ann. Mus. Civ. Stor. Nat. Genova, XIV, pp. 384-397.
- HUBRECHT, A. A. W.
1887. Midden Sumatra. IV. Natuurlijke historie. I. Fauna. Tweede afdeeling. Kruidende dieren en visschen. Pisces, pp. 9-14.
- PERUGIA, ALBERTO.
1889. Elenco dei Pesci raccolti dal Dott. Elio Modigliani nelle Isole di Nias e di Sumatra. Ann. Mus. Civ. Stor. Nat. Genova, XXVII (VII), pp. 269-277.
1893. Di alcuni pesci raccolti in Sumatra dal Dott. Elio Modigliani. L. c., XXXIII (XIII), pp. 241-247.
- Sopra alcuni pesci di Engano raccolti dal Dott. Elio Modigliani. L. c., pp. 251-255.
1896. Elenco dei pesci raccolti dal Dott. Elio Modigliani nelle isole Mentawai. L. c., XXXVI (XVI), pp. 47-54.
- BOULENGER, GEORGE A.
1890. List of the Reptiles, Batrachians, and Freshwater Fishes collected by Professor Moesch and Mr. Iversen in the district of Deli, Sumatra. Proc. Zool. Soc. London, pp. 31-40. Pisces, pp. 38-40.
- VOLZ, WALTER.
1903. Neue Fische aus Sumatra. Zool. Anz. Leipzig, XXVI (V), June 19, pp. 553-559.
- Fische von Sumatra. Zool. Jahrb. Jena, XIX (IV), Nov. 24, pp. 347-415 (420), Pls. 25-26, figs. 1-5.

The west coast of the lower part of the Malay Peninsula, and the islands in the Malacca Strait.

CANTOR, THEODORE.

1850. Catalogue of Malayan fishes. Journ. As. Soc. Bengal, XVIII, 1849, pp. (i-xii) 983-1443, with 14 plates.

BLEEKER, PIETER VAN.

1852. Bijdrage tot de kennis der ichthyologische fauna van Singapore. Nat. Tijds. Ned. Ind. Batavia, III, pp. 51-86. (Dec. 1851.)
1858. Tweede bijdrage tot de kennis der vischfauna van Singapore. L. c., XV (I), pp. 241-254. (Jan. 1858.)
1859. ¹ Vischsoorten van Singapore, verzameld door Fr. Graaf de Castelnau. L. c., XX (VI), pp. 216-217. (Aug. 1859.)
- ¹ Nieuwe vischsoorten van Singapore, verzameld door Fr. Graaf de Castelnau. L. c., pp. 236-239. (Aug. 1859.)
- Derde bijdrage tot de kennis der vischfauna van Singapoera. L. c., pp. 446-456. (Oct. 1859.)
1860. ¹ Zoetwatervisschen van Singapoera, verzameld door Fr. Graaf de Castelnau. L. c., XXI (I), p. 334. (Feb. 1860.)
- ¹ Vischsoorten, nieuw voor de kennis der fauna van Singapoera, verzameld door Fr. Graaf de Castelnau. L. c., XXII (II), pp. 101-102. (May 1860.)
1861. Mededeeling omtrent vischsoorten, nieuw voor de kennis der fauna van Singapoera. Versl. Kon. Ak. Wet. Amsterdam, XII, pp. 28-63. (Jan. 10, 1861.)
- Iets over de vischfauna van het eiland Pinang. L. c., pp. 64-80. (Jan. 19, 1861.)
1878. ¹ Énumération des espèces de poissons actuellement connues de Singapore. [Not consulted, or located.]

STEINDACHNER, FRANZ.

1870. Ichthyologische Notizen (IX). Sitz. Ak. Wiss. Wien, LXI, pp. 557-575, with 5 plates.

SAUVAGE, HENRI E.

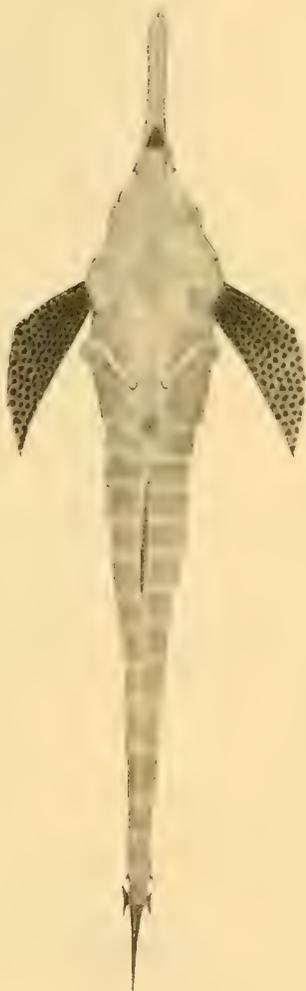
1884. Note sur une collection de poissons recueillie à Pérak, presqu'île de Malacca. Bull. Soc. Zool. Fr., Paris, IX, pp. 216-220, with woodcut.

Besides the above, the invaluable eight volumes of Dr. Günther's "Catalogue of the fishes in the British Museum" and the second edition started by Dr. Boulenger, together with the "Atlas Ichthyologique des Indes orientales Néerlandaises" by Dr. P. v. Bleeker, and the "Fishes of India," by Dr. Day, will furnish a clue to most all of the literature. The last work will also be found useful in referring to papers on the islands north of Sumatra (pp. vii-viii, preface).

EXPLANATION OF PLATES VII-XXVIII.

All of the figures were drawn from the types or examples in the collection of the Academy of Natural Sciences of Philadelphia. The specimens are from Padang unless otherwise stated. The line accompanying each figure represents an inch.

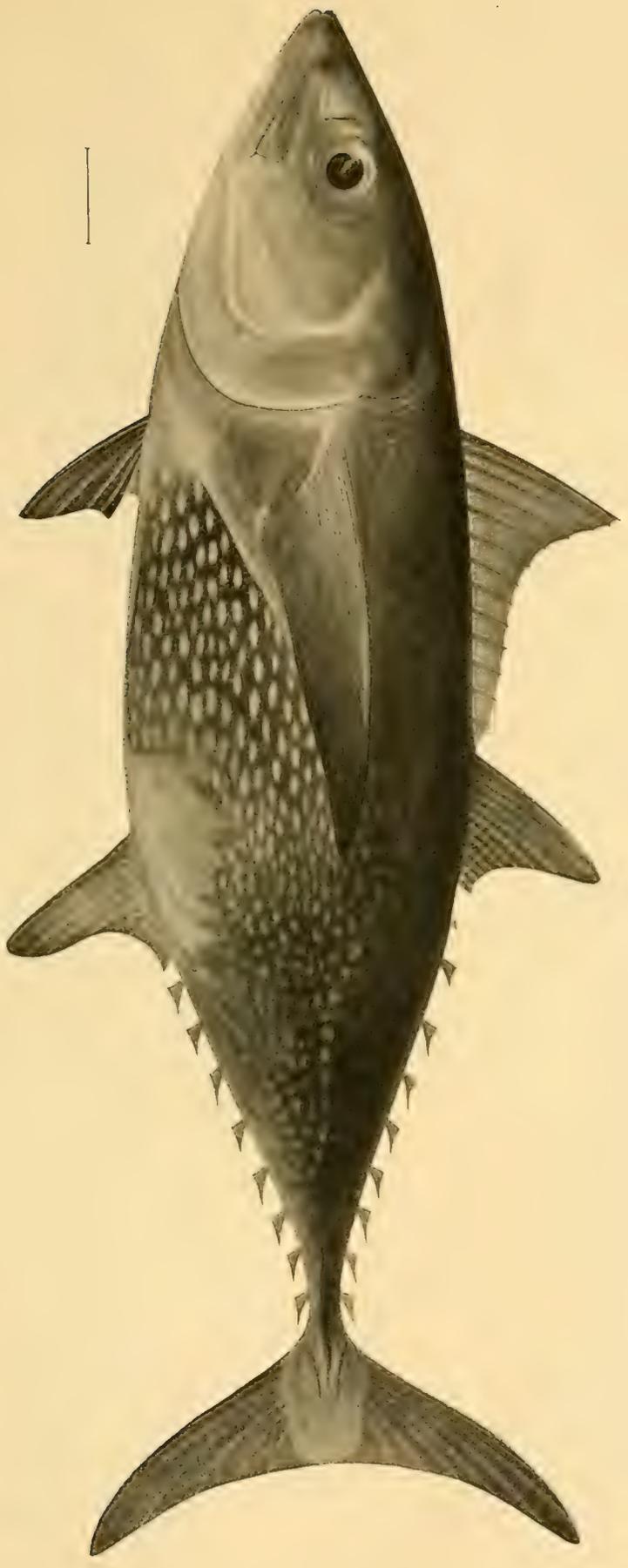
- PLATE VII.—*Hippocampus tæniops* Fowler. Type No. 27,409.
Parapegagus natans (Linnæus). No. 27,468.
Trichiurus haumela (Forskål). No. 27,492.
- PLATE VIII.—*Mastacembelus unicolor* Valenciennes. No. 27,456. *Batu Sangkar*.
Germo germon (Lacépède). No. 25,129.
- PLATE IX.—*Tylosurus crocodilus* Lesueur. No. 27,462.
Sphyræna toxeuina Fowler. Type No. 27,470.
Ophicephalus spiritalis Fowler. Type No. 27,664.
- PLATE X.—*Holocentrus aureoruber* Fowler. Type No. 27,472.
Alepes scitula Fowler. Type No. 27,503.
- PLATE XI.—*Liza cæruleomaculata* (Lacépède). No. 25,128.
Seriola cretata Fowler. Type No. 27,499.
- PLATE XII.—*Scomber kanagurta* Rüppell. No. 27,474.
Alepes glabra Fowler. Type No. 27,502.
- PLATE XIII.—*Caranx megalaspis* (Bleeker). No. 27,504.
Caranx mate Valenciennes. No. 27,508.
- PLATE XIV.—*Caranx sem* Valenciennes. No. 27,514.
Citula atropos (Schneider). No. 27,520. Young.
Leiognathus spilotos Fowler. Type No. 27,529.
- PLATE XV.—*Carangoides gibber* Fowler. Type No. 27,517.
Gazza tapeinosoma Bleeker. No. 27,534.
Leiognathus vermiculatus Fowler. Type No. 27,525.
Leiognathus virgatus Fowler. Type No. 27,526.
- PLATE XVI.—*Caranx semisomnus* Fowler. Type No. 27,512.
Polydactylus pfeifferi (Bleeker). No. 27,635.
- PLATE XVII.—*Plectropoma pessuliferum* Fowler. Type No. 27,546.
Bodianus indelebilis Fowler. Type No. 27,553.
- PLATE XVIII.—*Epinephelus heniochus* Fowler. Type No. 27,557.
Lutianus furvicaudatus Fowler. Type No. 27,596.
- PLATE XIX.—*Cæcio erythrochilurus* Fowler. Type No. 27,621.
Pomacentrus leucosphyrus Fowler. Type No. 27,673.
Premnas epigrammata Fowler. Type No. 27,665.
- PLATE XX.—*Halichoeres annulatus* Fowler. Type No. 27,713.
Thalassoma melanochir Fowler. Type No. 27,724.
Hemipteronotus liogenys Fowler. Type No. 27,730.
- PLATE XXI.—*Scarus pinguirostratus* Fowler. Type No. 27,734.
Scarus calus Fowler. Type No. 27,735.
- PLATE XXII.—*Harpurus gnophodes* Fowler. Type No. 27,750.
Malacanthus urichthys Fowler. Type No. 27,783.
- PLATE XXIII.—*Harpochirus longimanus* (Schneider). No. 27,741.
Thalassoma lunare (Linnæus). No. 27,723.
- PLATE XXIV.—*Zenodon cæruleolorum* Fowler. Type No. 27,763.
Parapercis atromaculata Fowler. Type No. 27,780.
- PLATE XXV.—*Scartichthys basiliscus* Fowler. Type No. 27,802.
Scartichthys stigmatopterus Fowler. Type No. 27,803.
- PLATE XXVI.—*Entomacrodus calurus* Fowler. Type No. 27,807 ♂. Cotype No. 27,808 ♀.
- PLATE XXVII.—*Entomacrodus leopardus* Fowler. Type No. 27,805.
Gobius venustus Fowler. Type No. 27,799.
- PLATE XXVIII.—*Cynoglossus os* Fowler. Type No. 27,816.
Chlarias olivaceus Fowler. Type No. 27,280.



HIPPOCAMPUS TÆNIOPS FOWLER.

PARAPEGASUS NATANS (LINNÆUS).

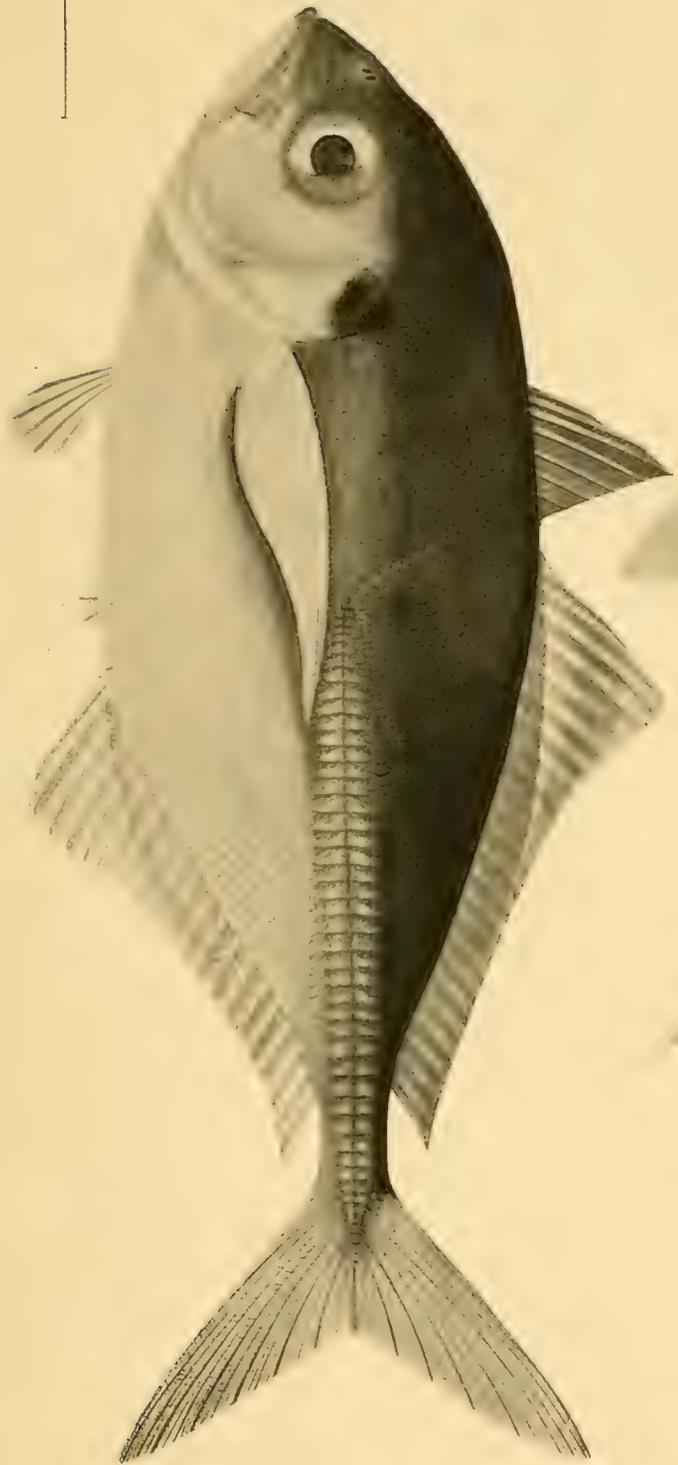
TRICHIURUS HAUMELA (FORSKÅL).



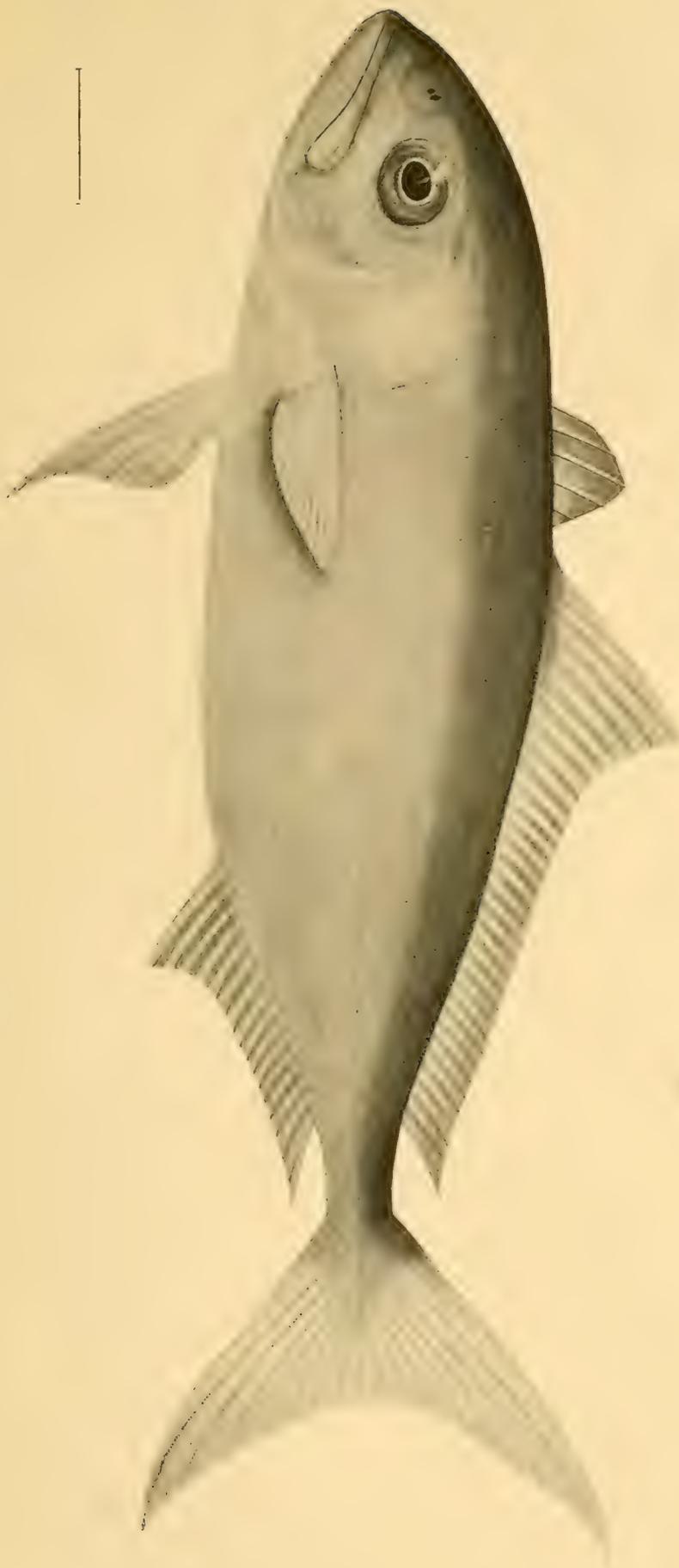
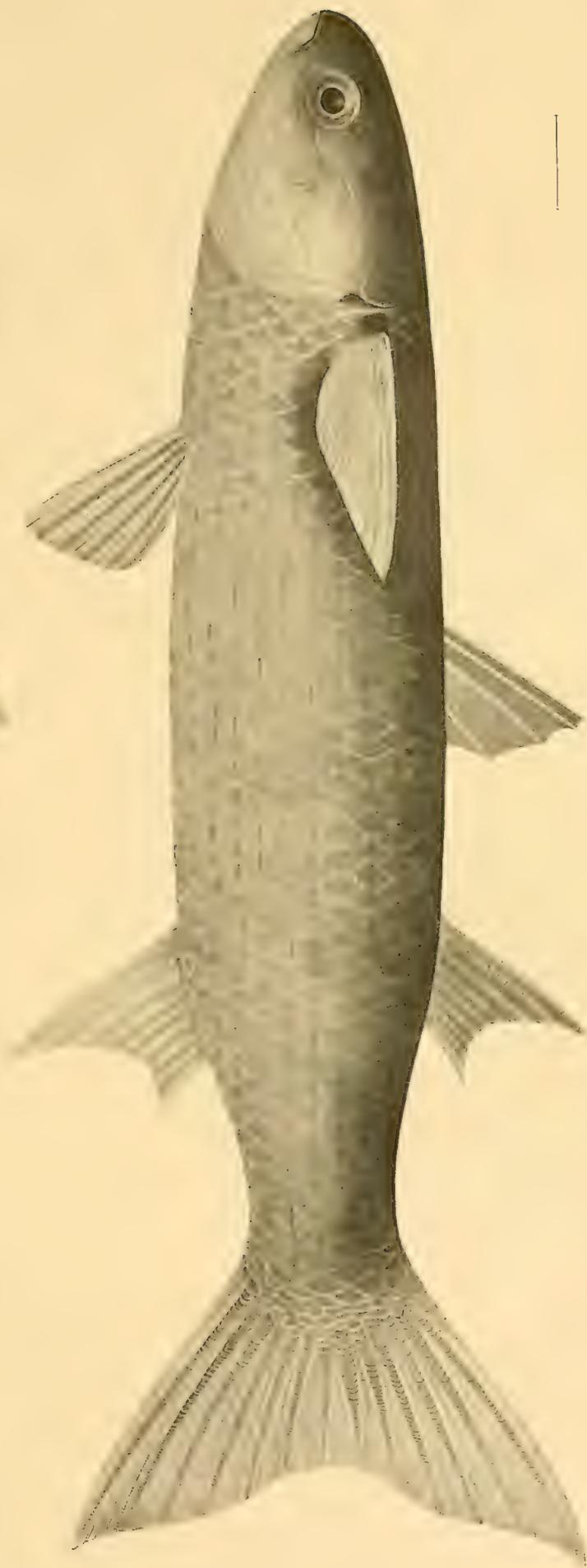
MASTACEMBELUS UNICOLOR VALENCIENNES.
GERMO GERMON (LACÉPÈDE).



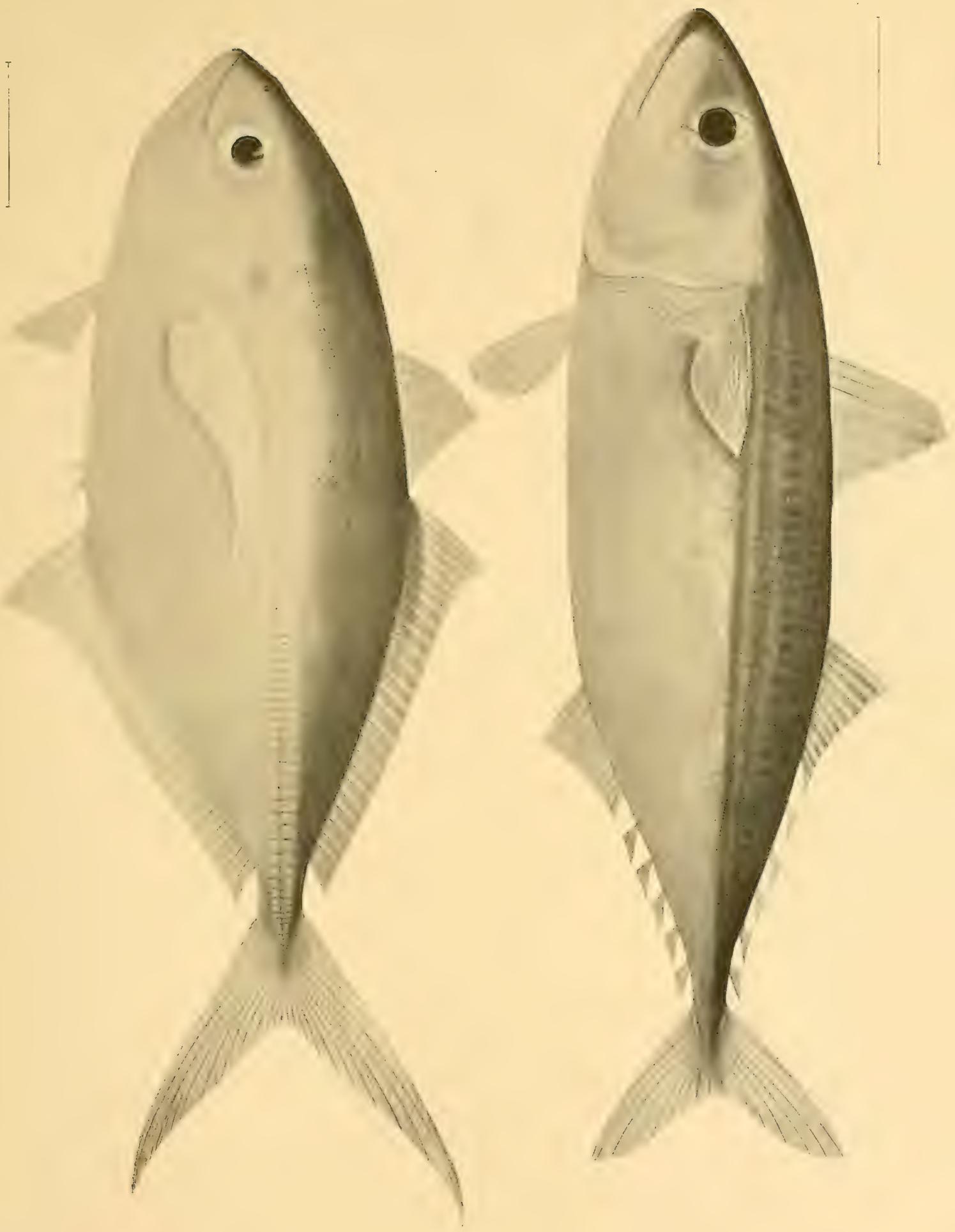
TYLOSURUS CROCODILUS (LESUEUR),
SPHYRÆNA TOXEUMA FOWLER,
OPHICEPHALUS SPIRITALIS FOWLER.



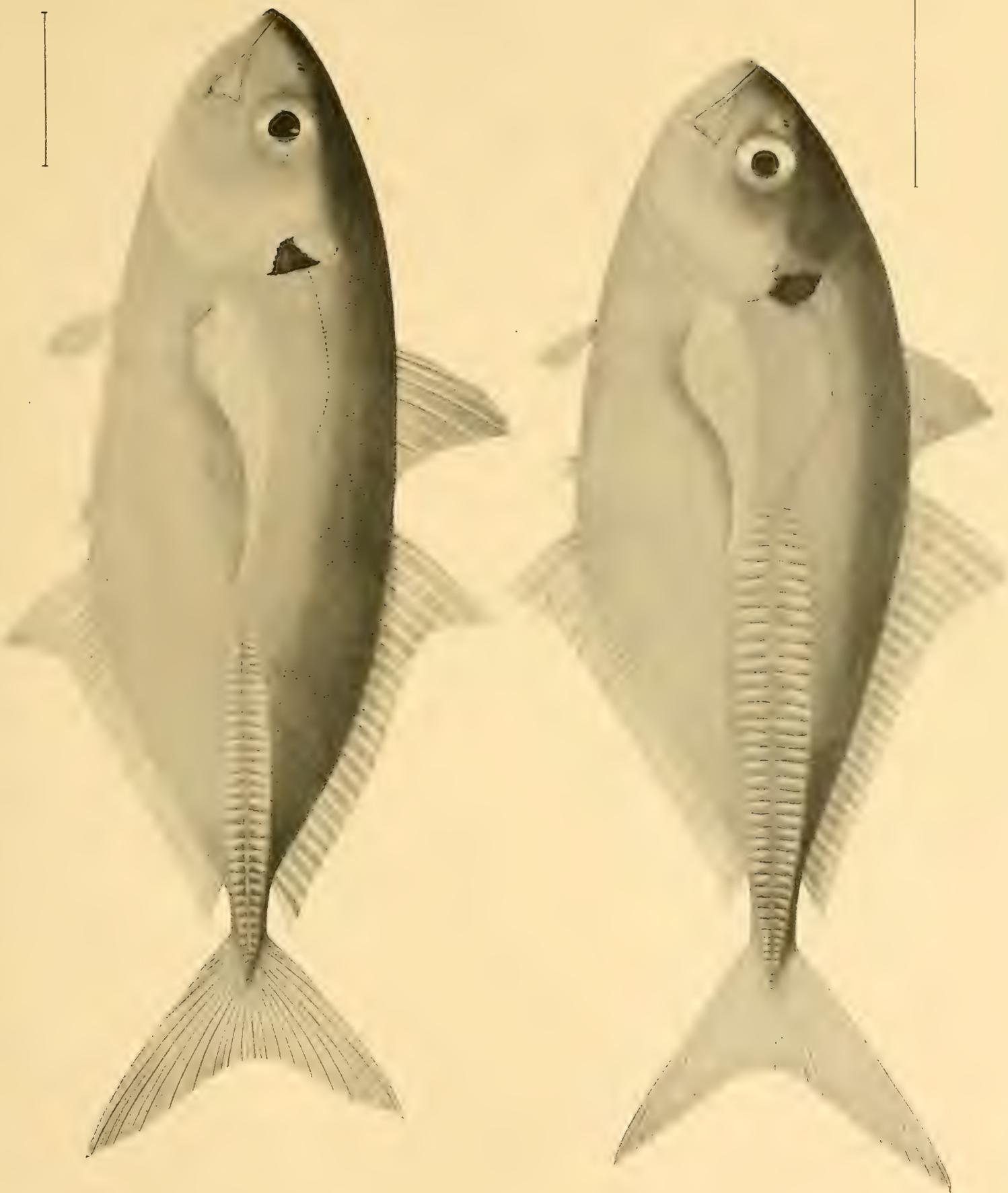
Holocenthrus aureoruber Fowler.
Alepes scitula Fowler.



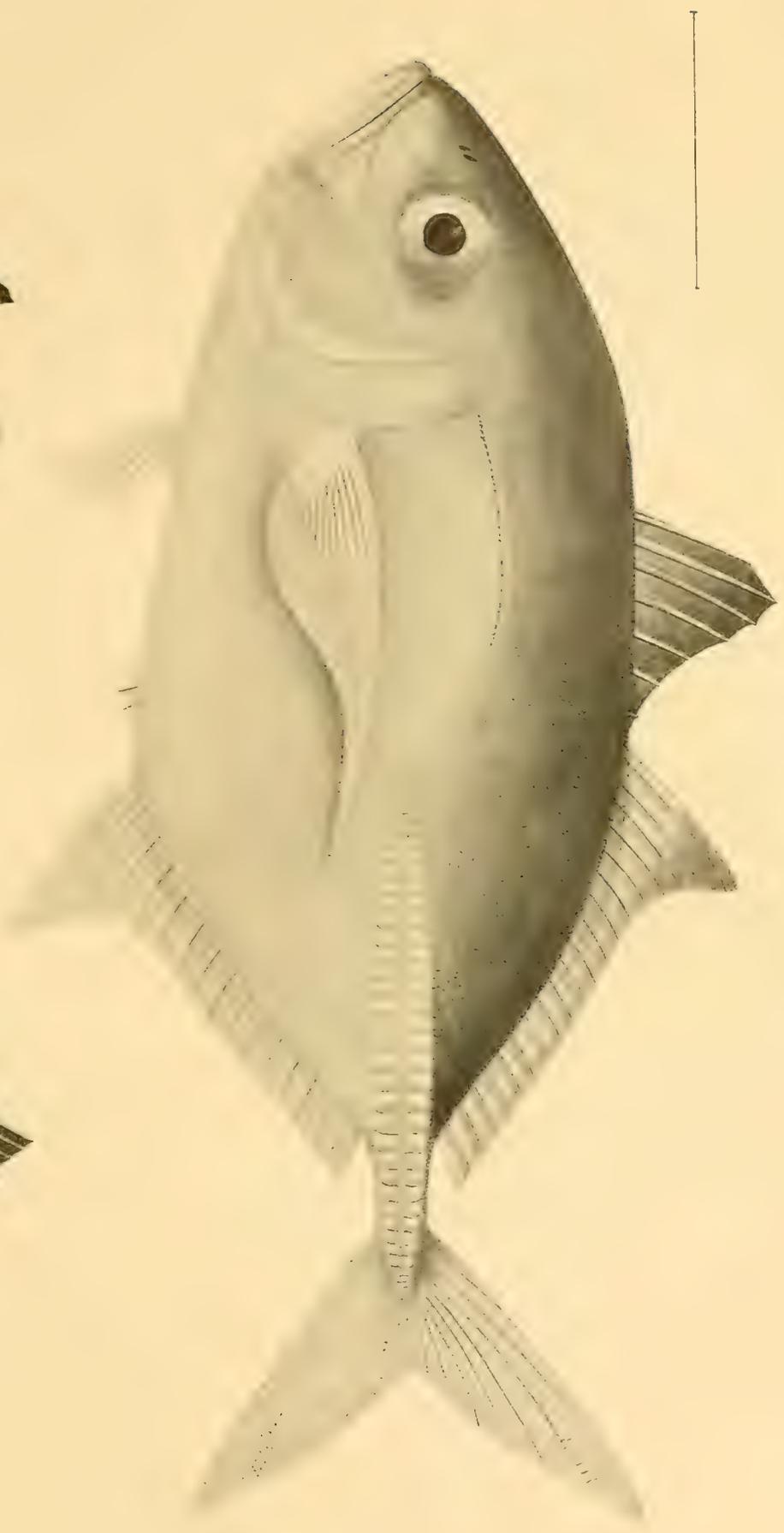
LIZA CAERULEOMACULATA (LACEPEDE).
SERIOLA CRETATA FOWLER.



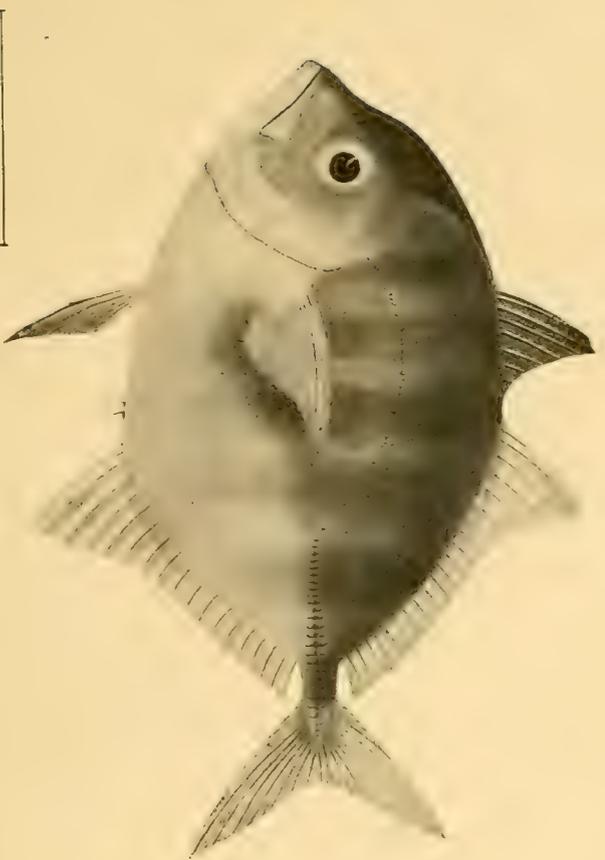
SCOMBER KANAGURTA RÜPPELL.
ALEPES GLABRA FOWLER.



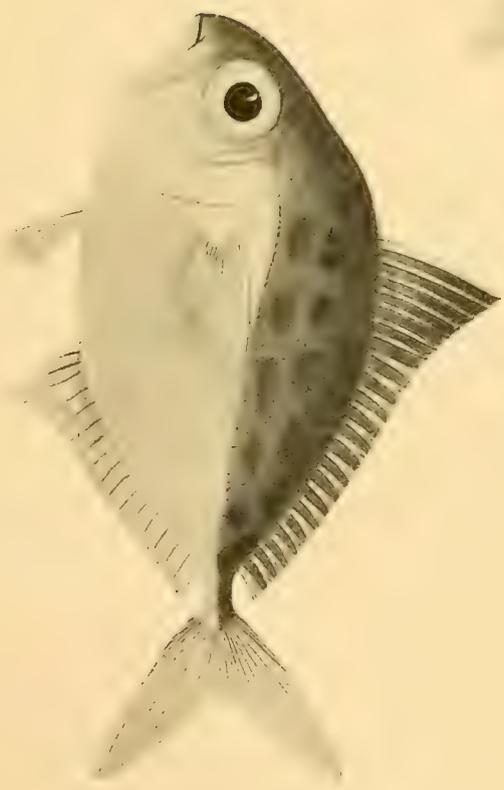
CARANX MEGALASPIS (BLEEKER),
CARANX MATE VALENCIENNES.



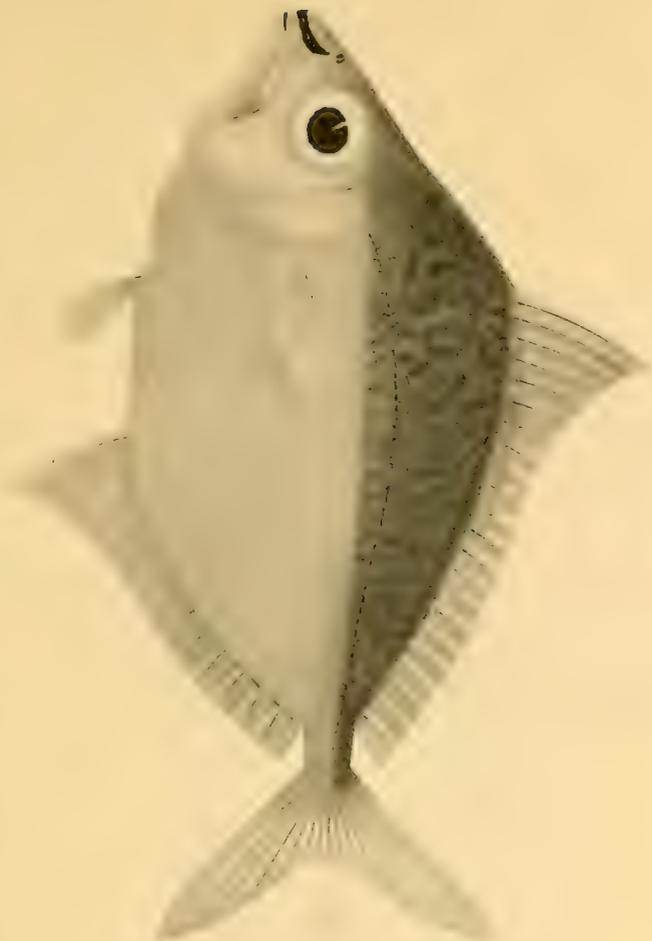
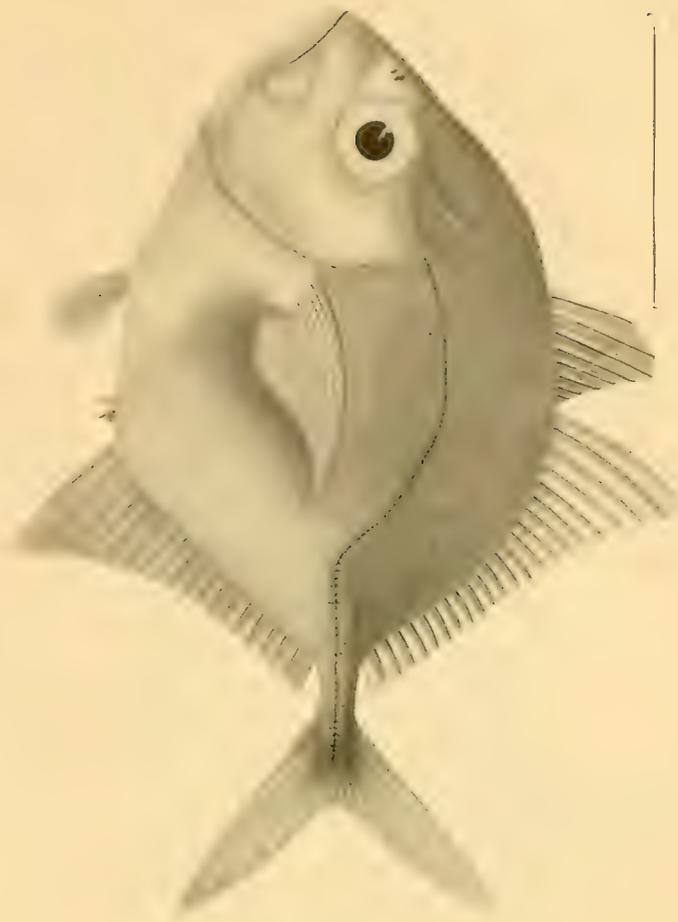
CARANX SEM VALENCIENNES.



CITULA ATROPOS (SCHNEIDER).



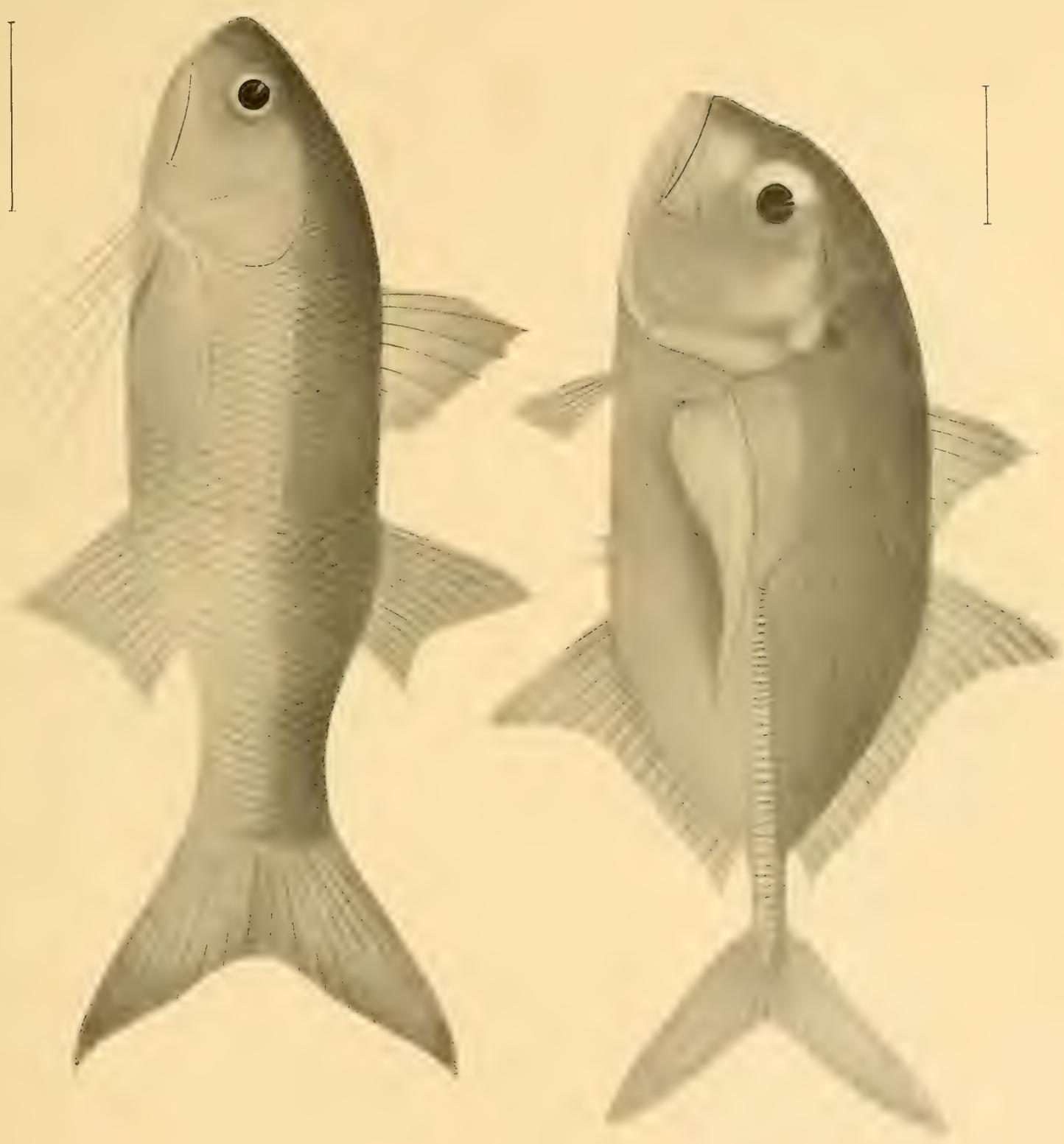
LEIOGNATHUS SPILOTUS FOWLER.



CARANGOIDES GIBBER FOWLER.
LEIOGNATHUS VERMICULATUS FOWLER.



GAZZA TAPEINOSOMA BLEEKER.
LEIOGNATHUS VIRGATUS FOWLER.



CARANX SEMISOMNUS FOWLER.
POLYDACTYLUS PFEIFFERI (BLEEKER).

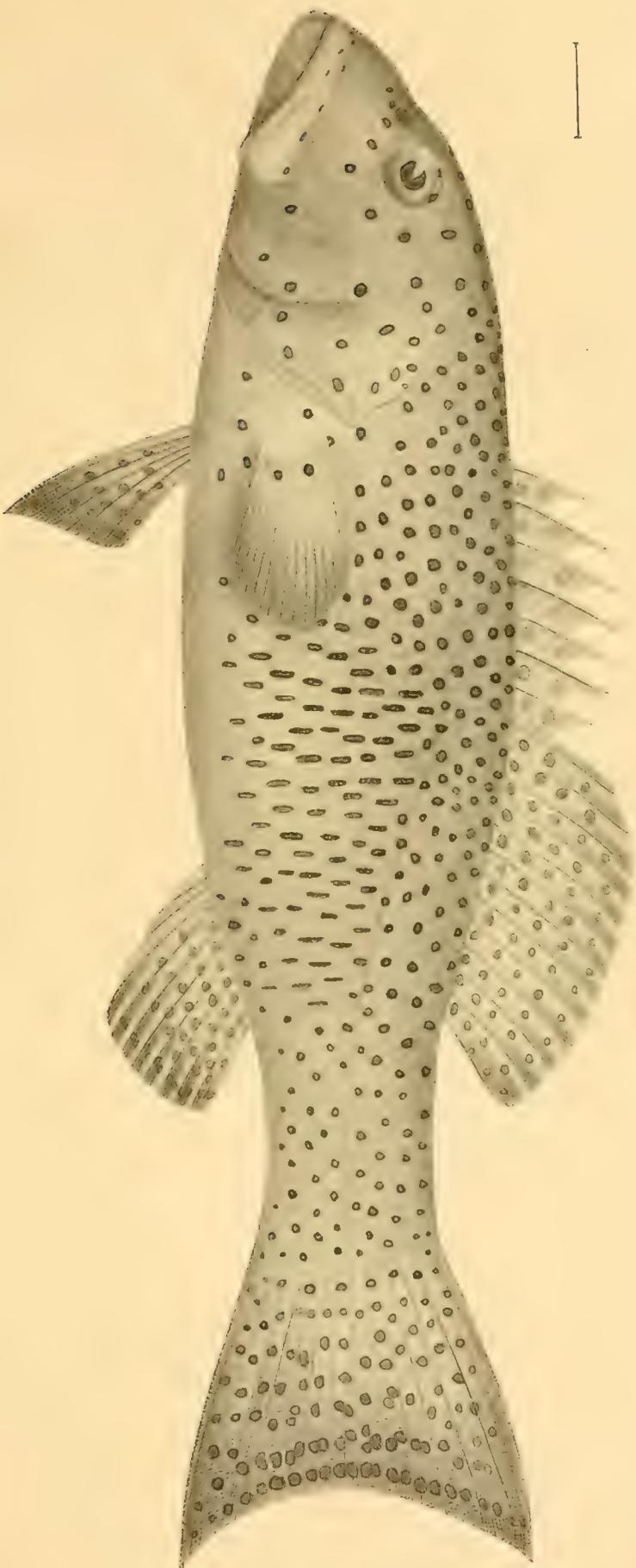
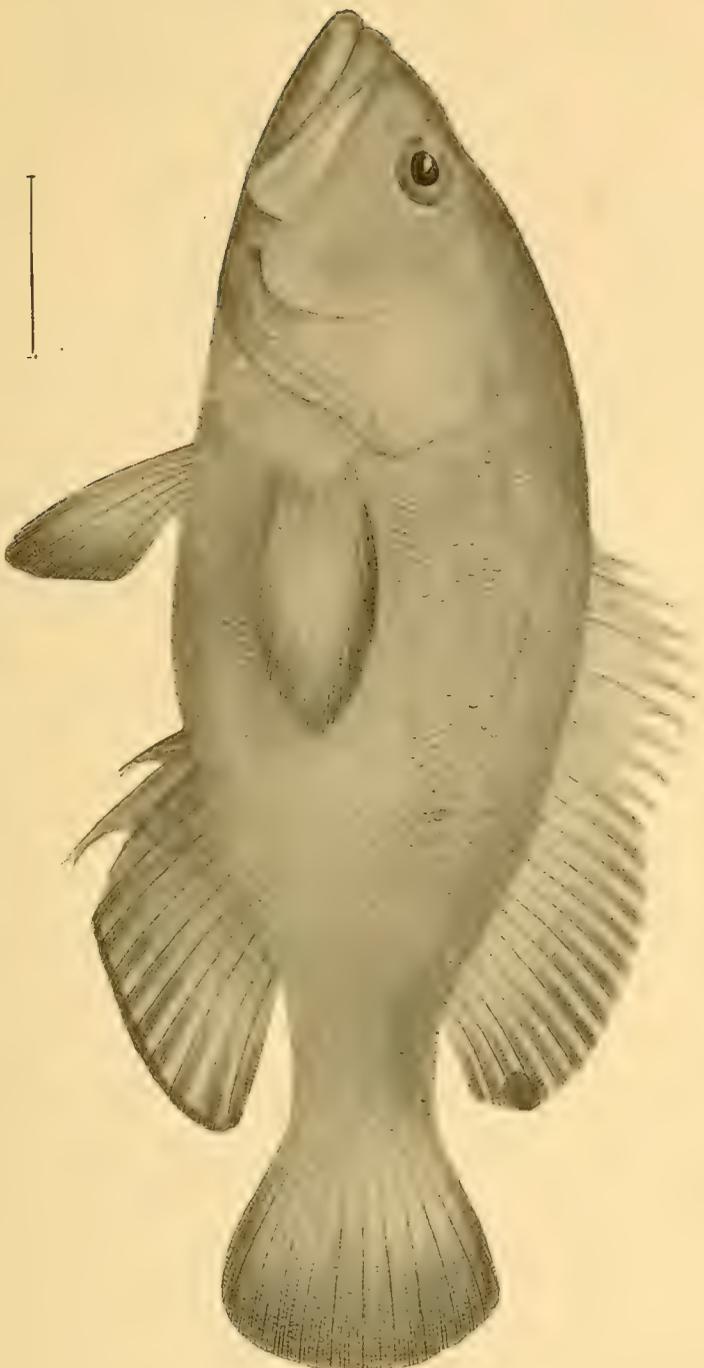
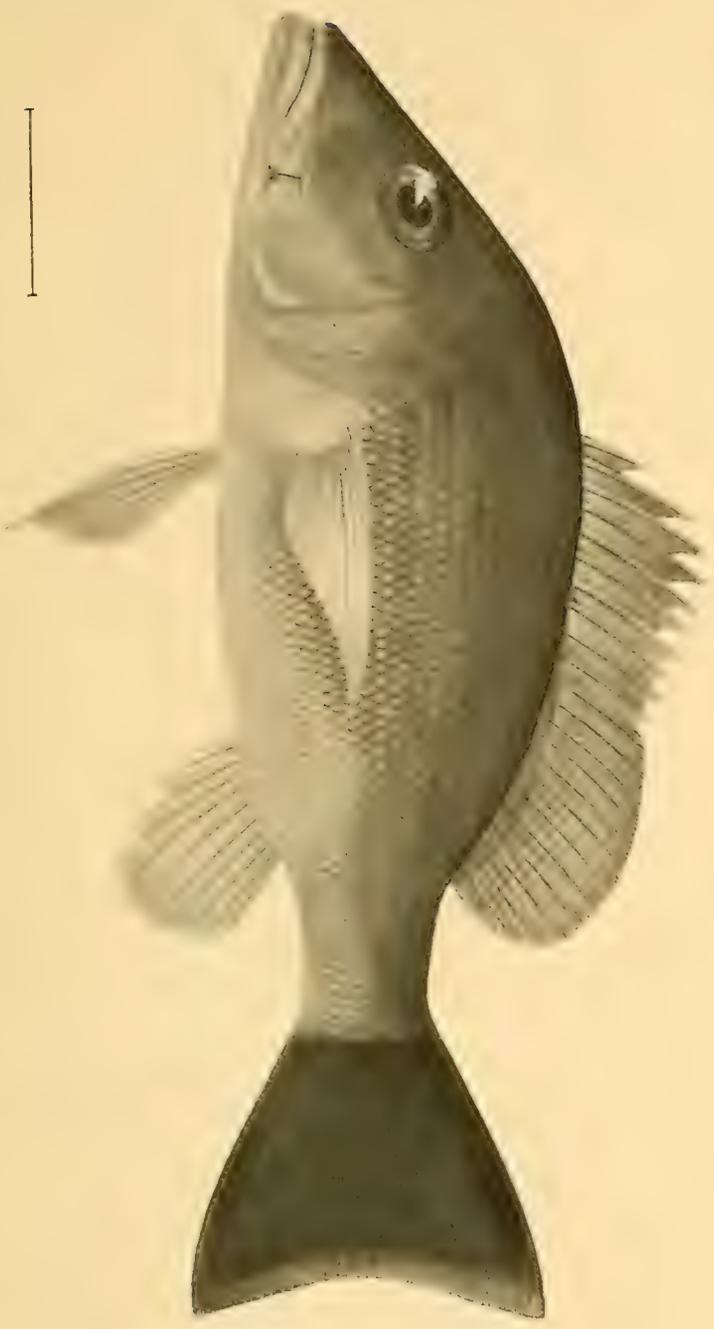
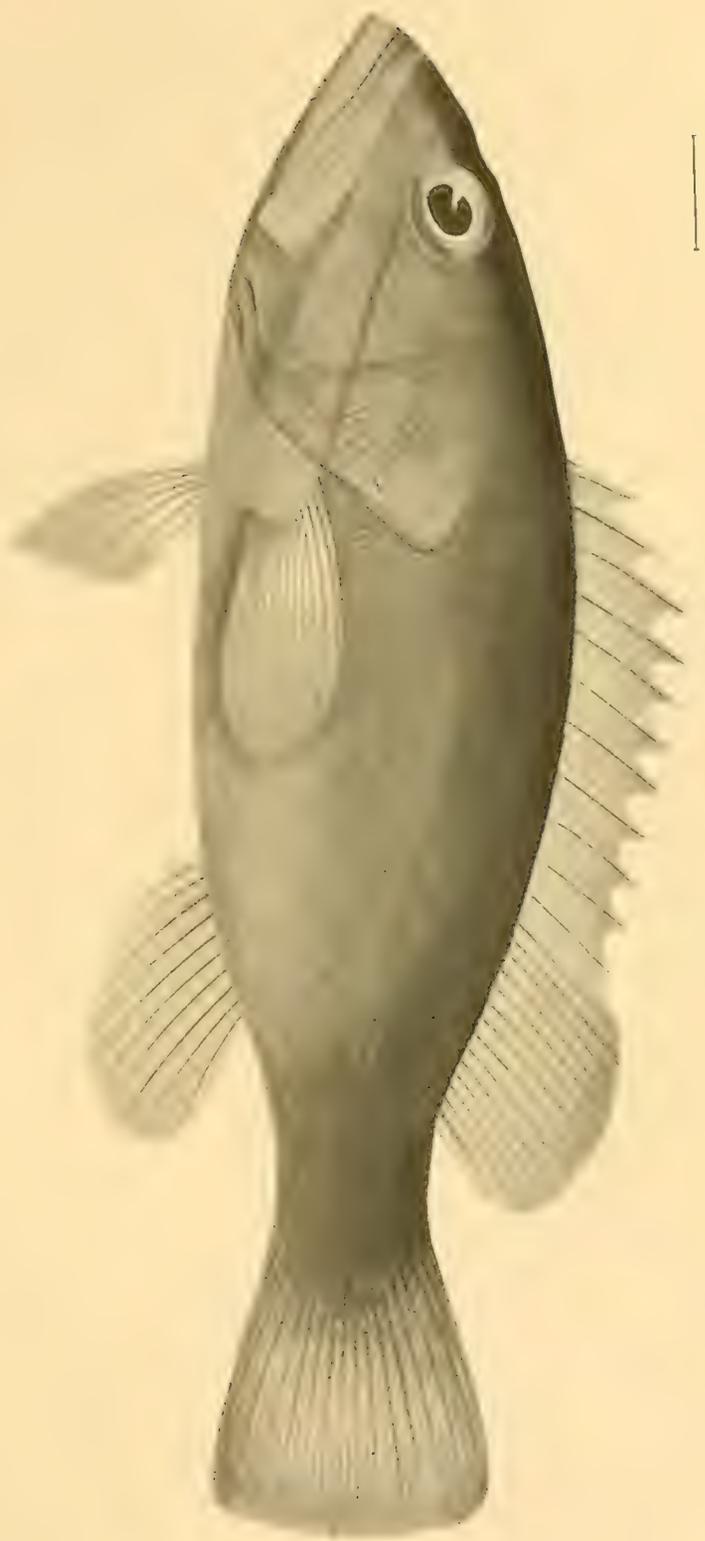


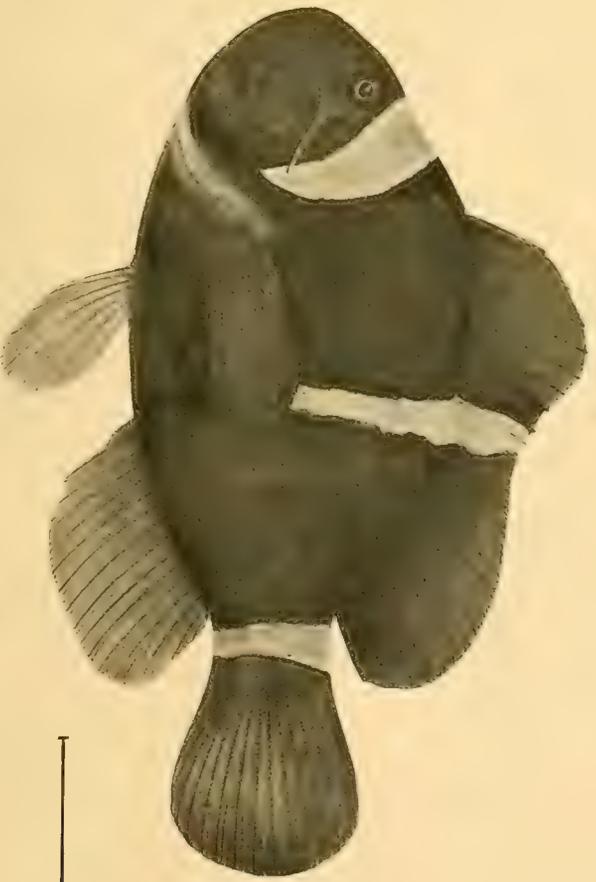
PLATE XVII.



PLECTROPOMA PESSULIFERUM FOWLER.
BODIANUS INDELEBILIS FOWLER.



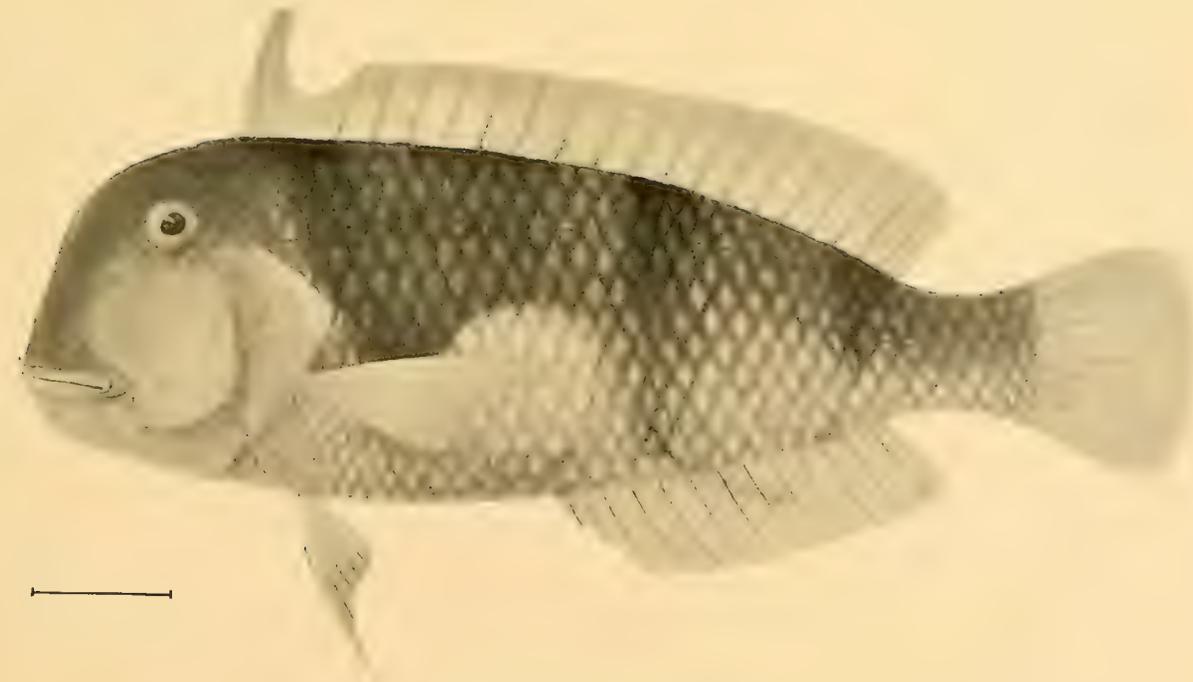
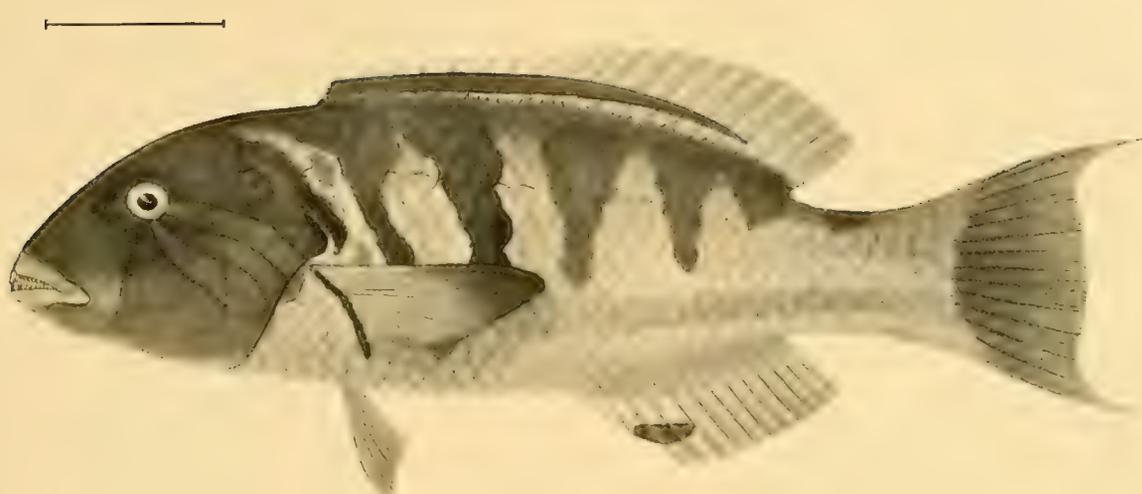
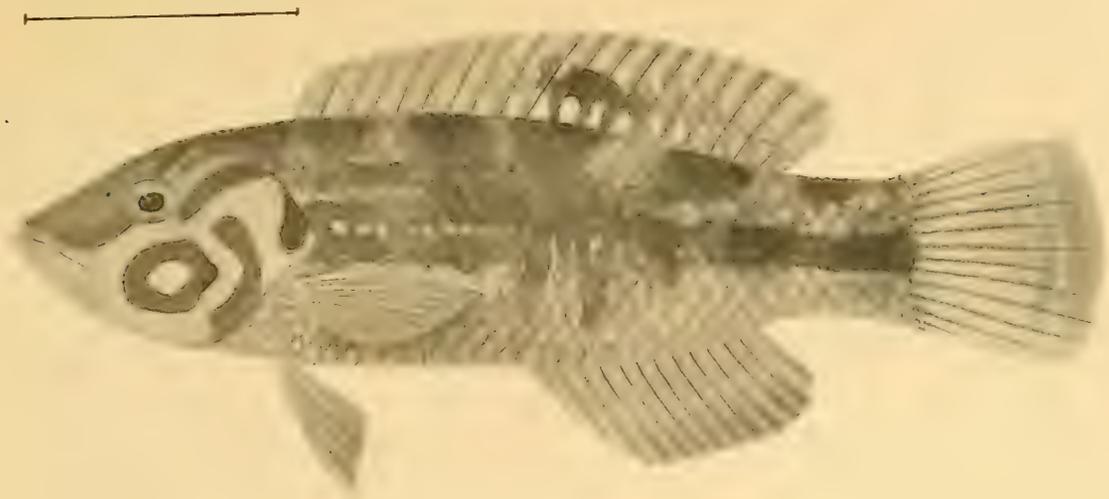
EPINEPHELUS HENIOCHUS FOWLER.
LUTIANUS FURVICAUDATUS FOWLER.



POMACENTRUS LEUCOSPHYRUS FOWLER.

CÆSIO ERYTHROCHILURUS FOWLER.

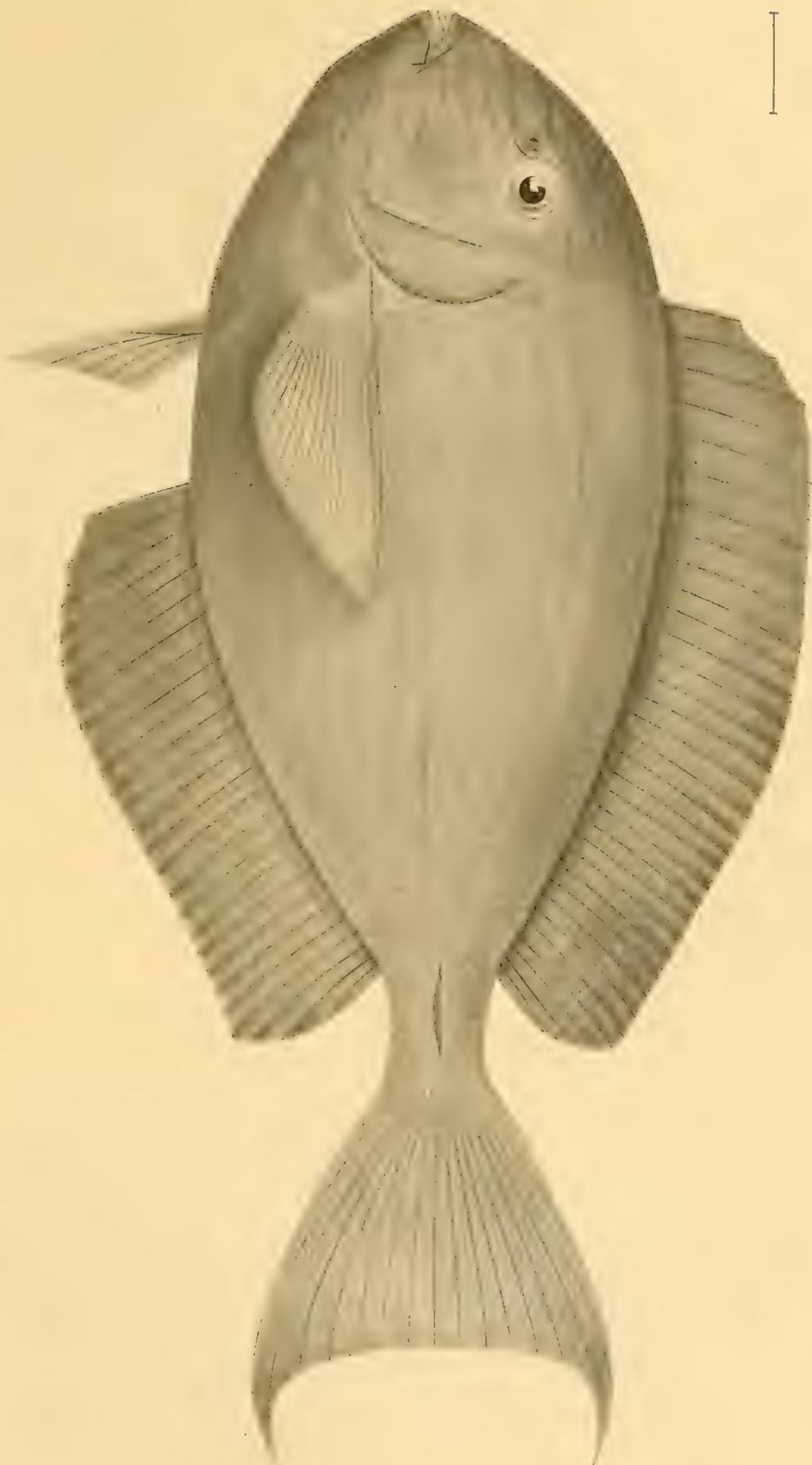
PREMNAS EPIGRAMMATA FOWLER.



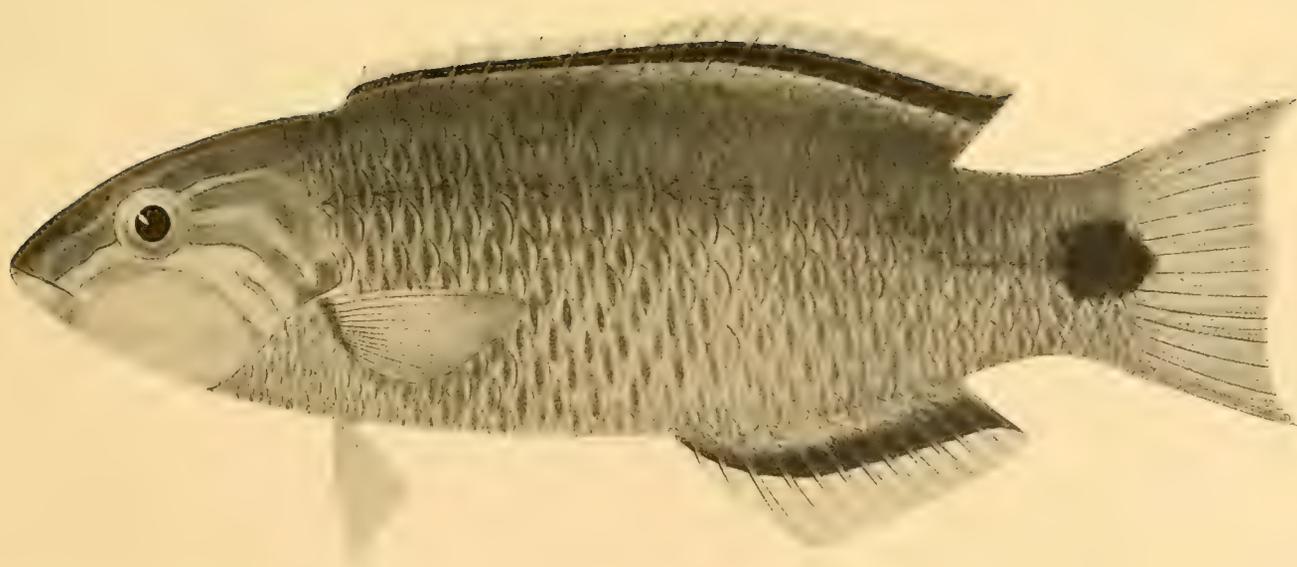
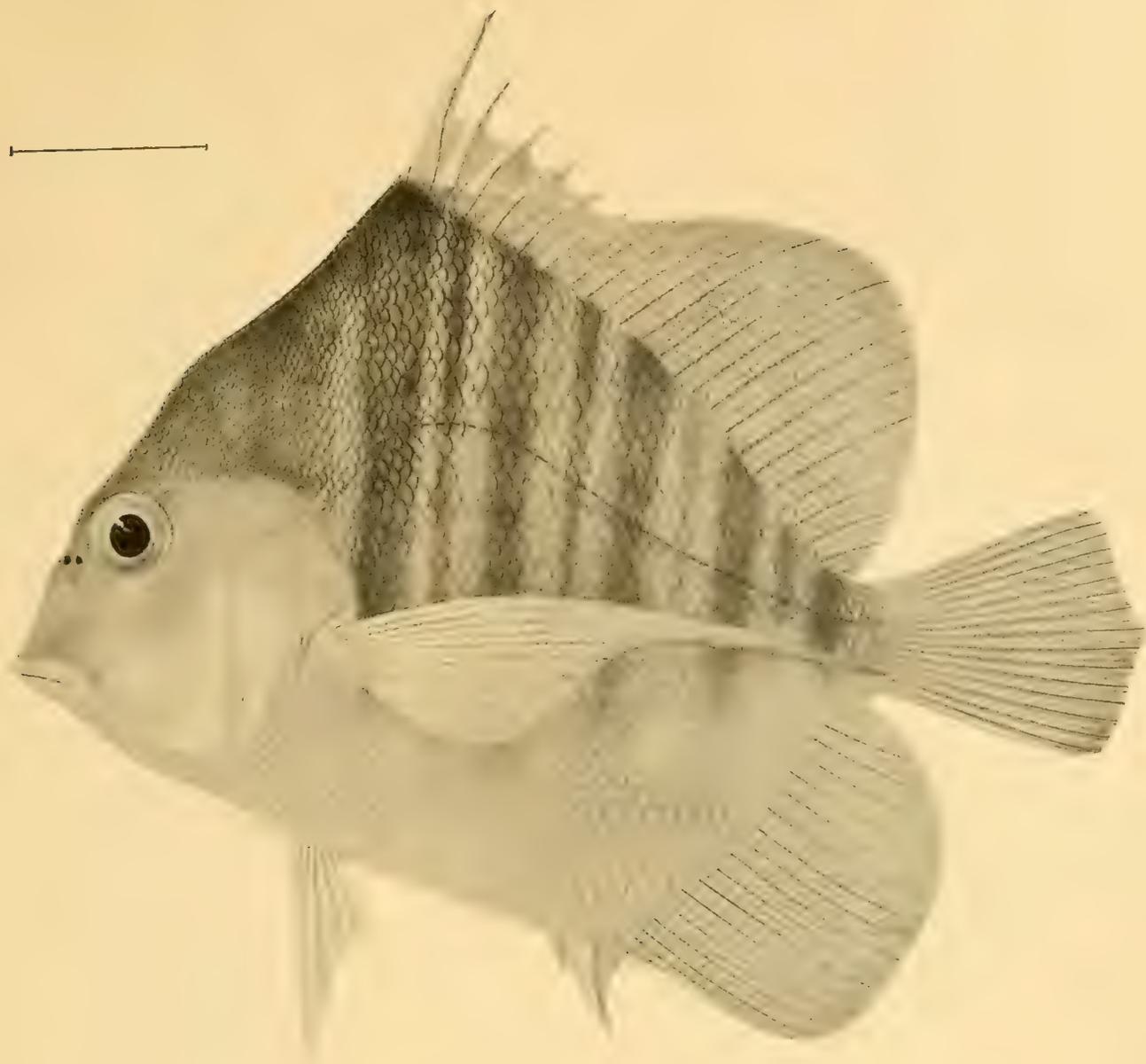
HALICHÆRES ANNULATUS FOWLER.
THALASSOMA MELANOCHIR FOWLER.
HEMIPTERONOTUS LIOGENYS FOWLER.



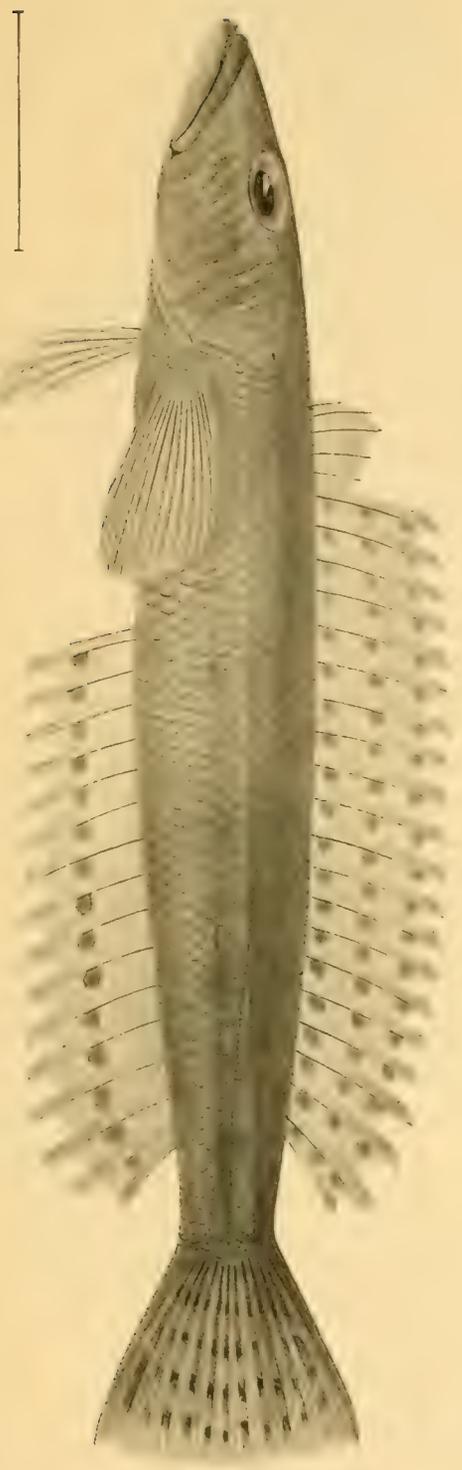
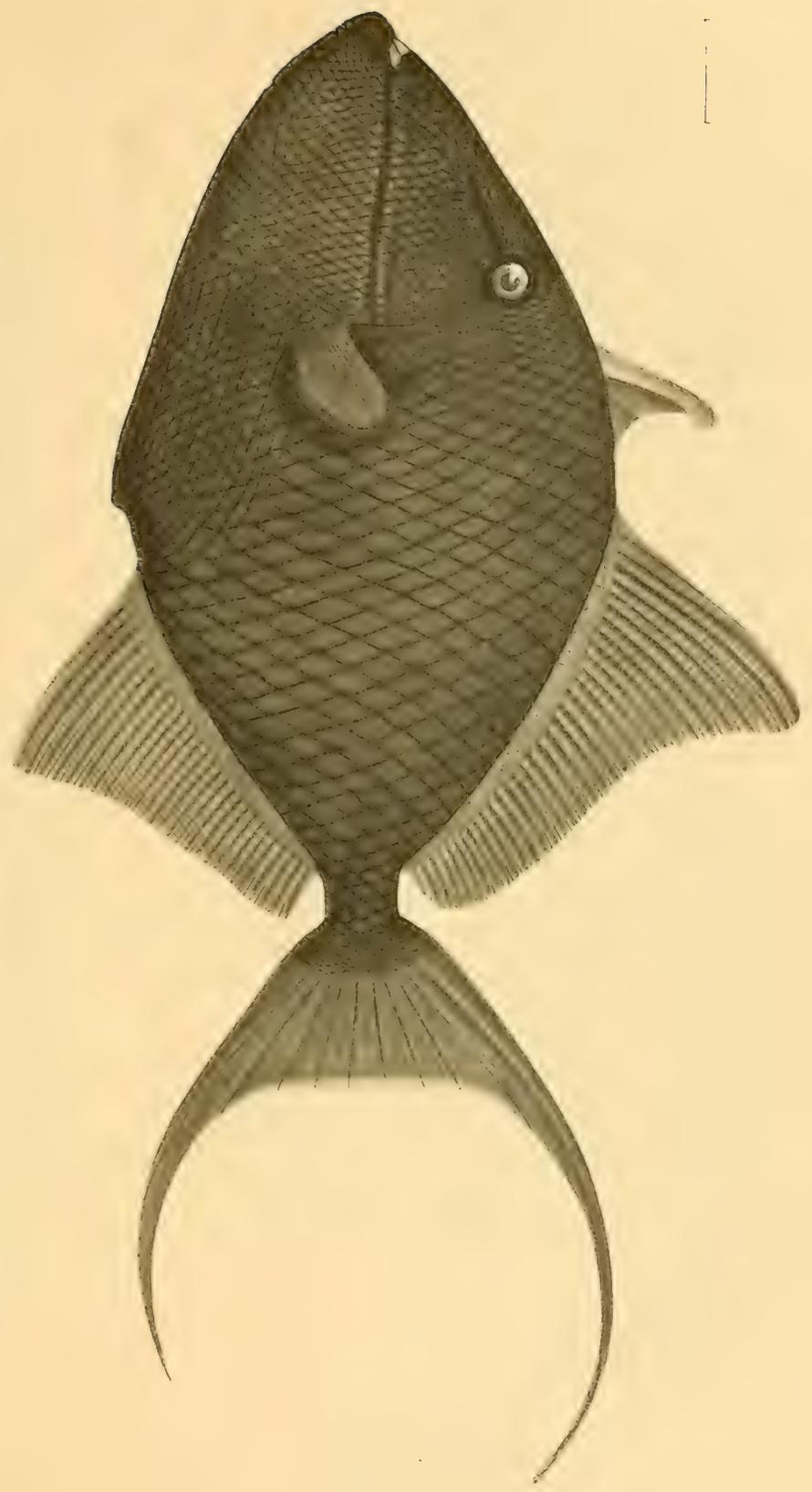
SCARUS PINGUIROSTRATUS FOWLER.
SCARUS CALVUS FOWLER.



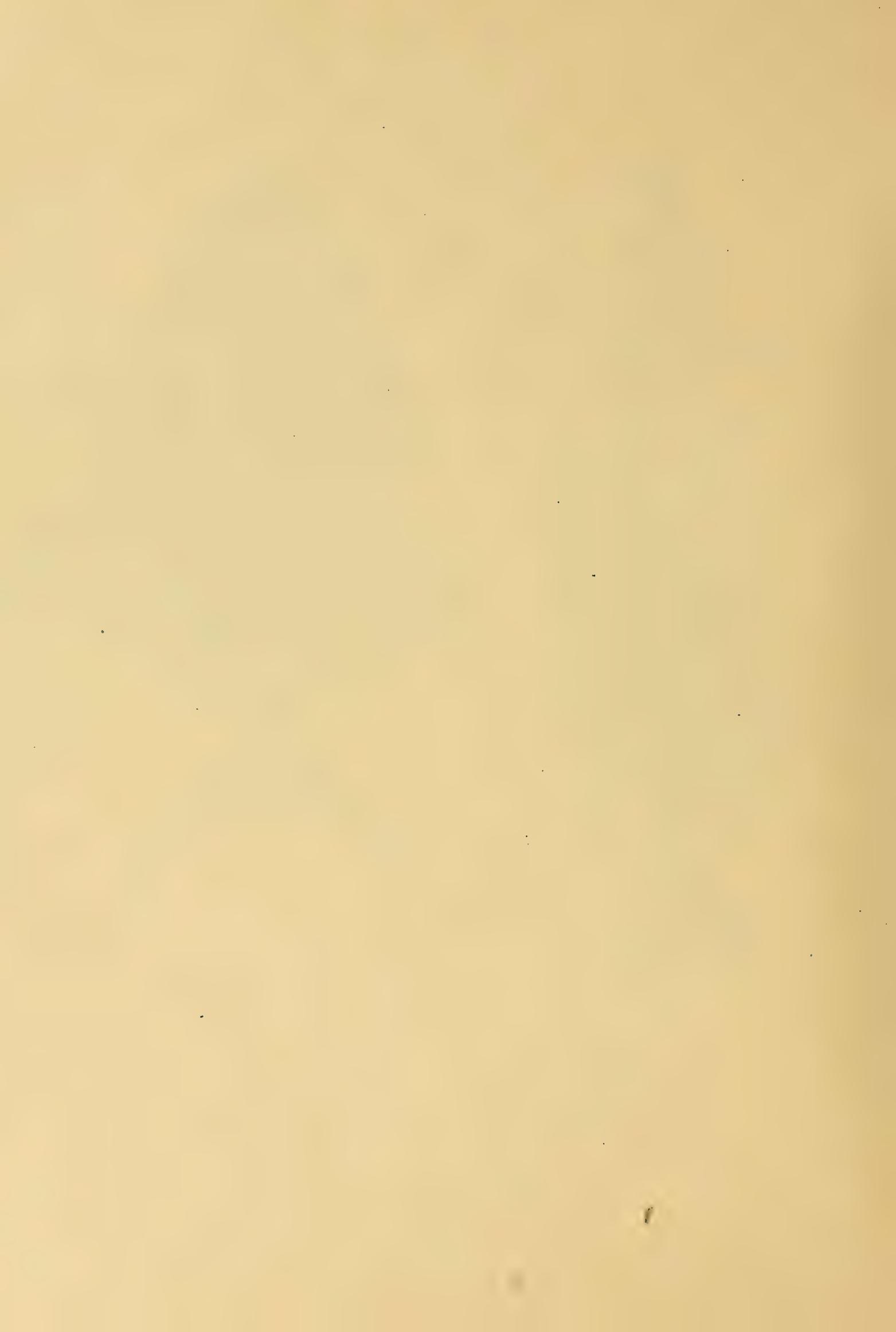
HARPURUS GNOPHODES FOWLER.
MALACANTHUS URICHTHYS FOWLER.



HARPOCHIRUS LONGIMANUS (SCHNEIDER).
THALASSOMA LUNARE (LINNÆUS).



ZENODON CAERULEOLORUM FOWLER.
PARAPERCCIS ATROMACULATA FOWLER.



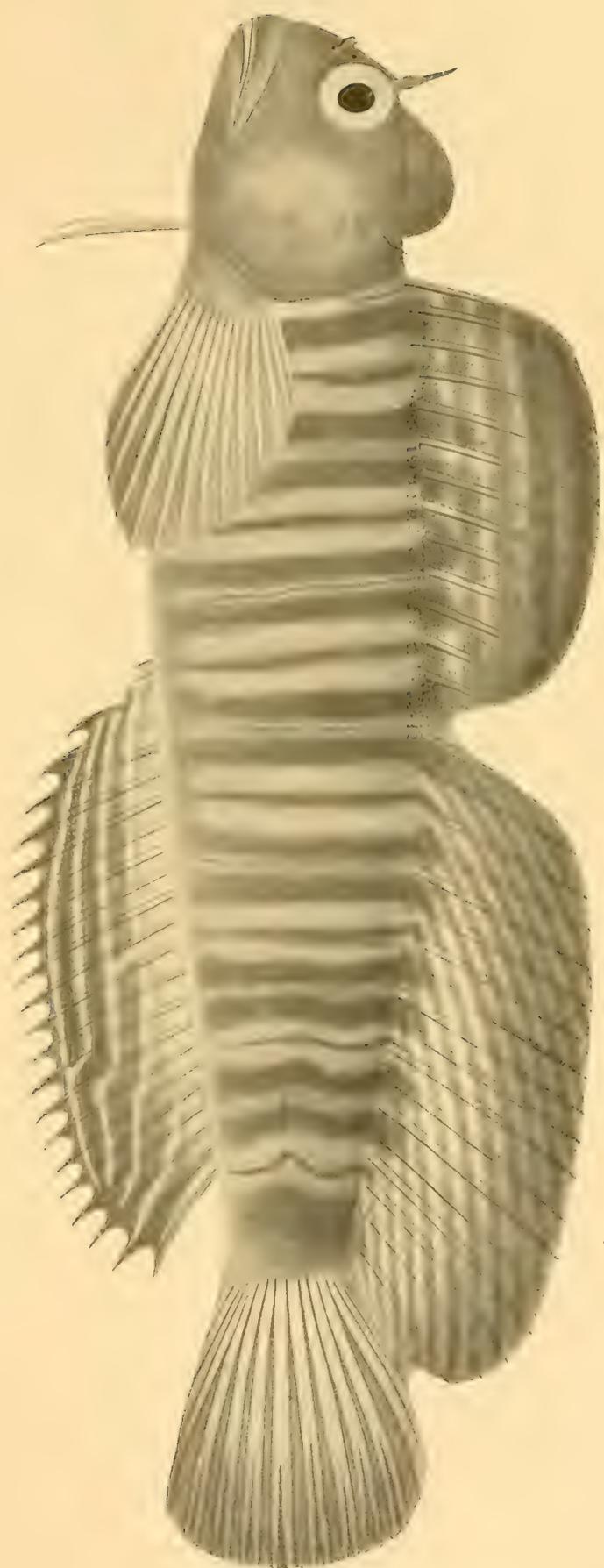
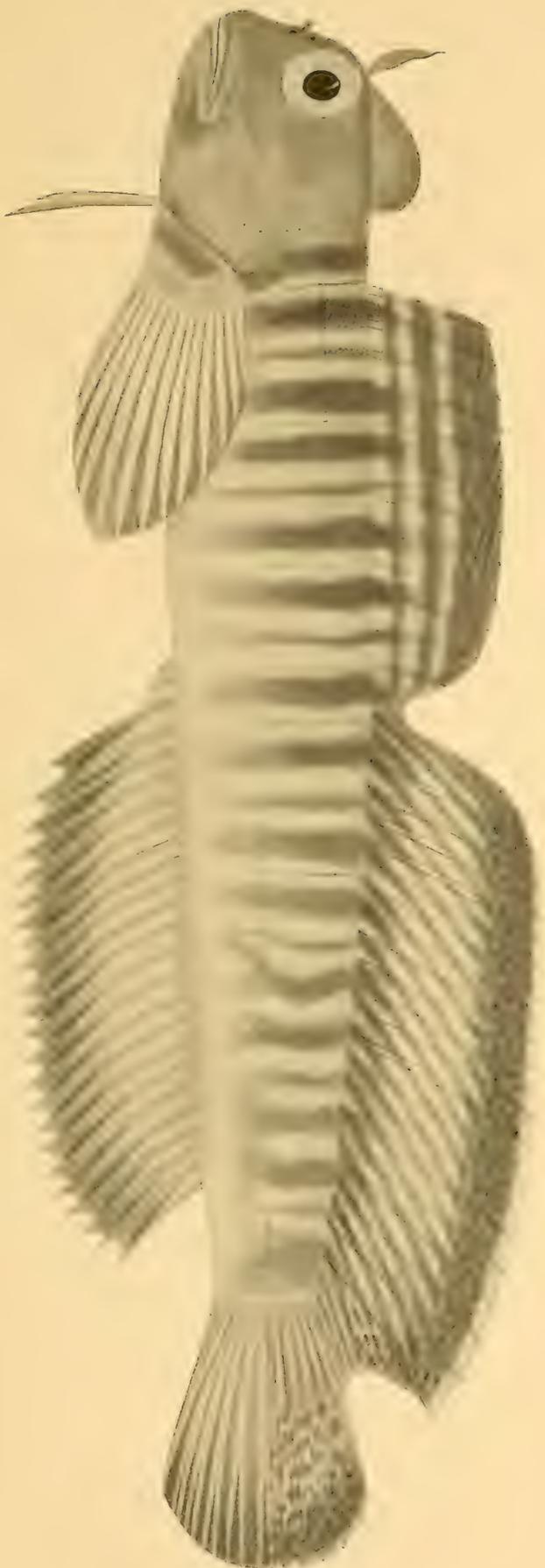
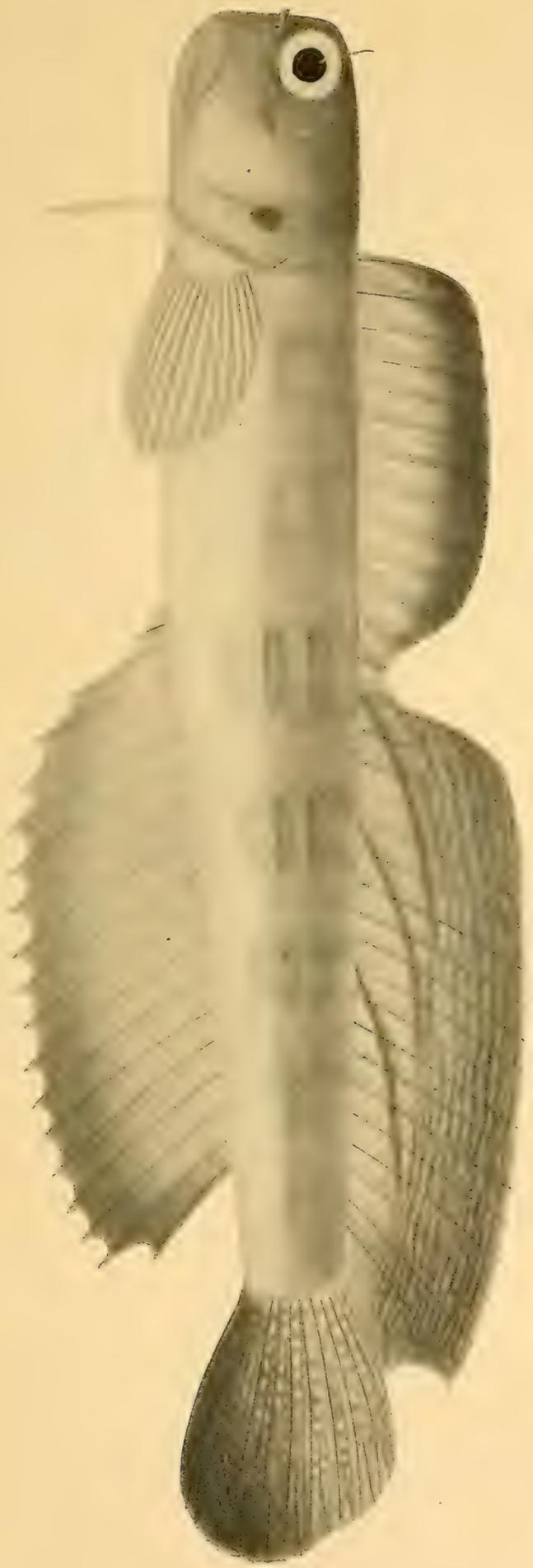
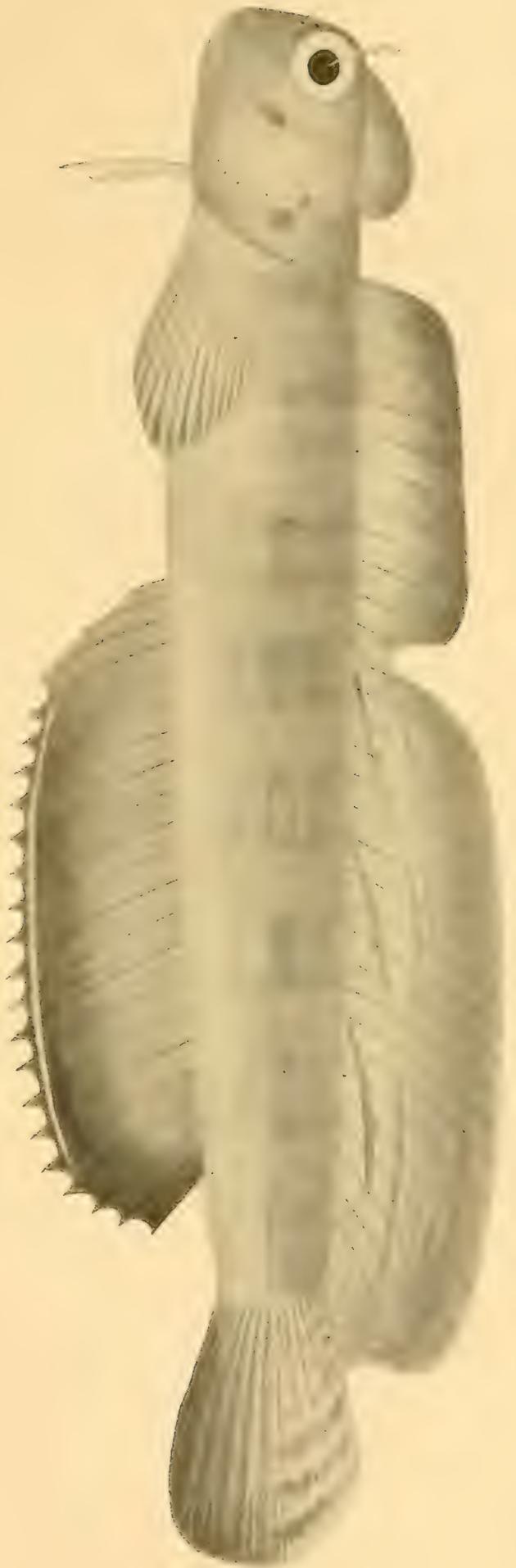


PLATE XXV.

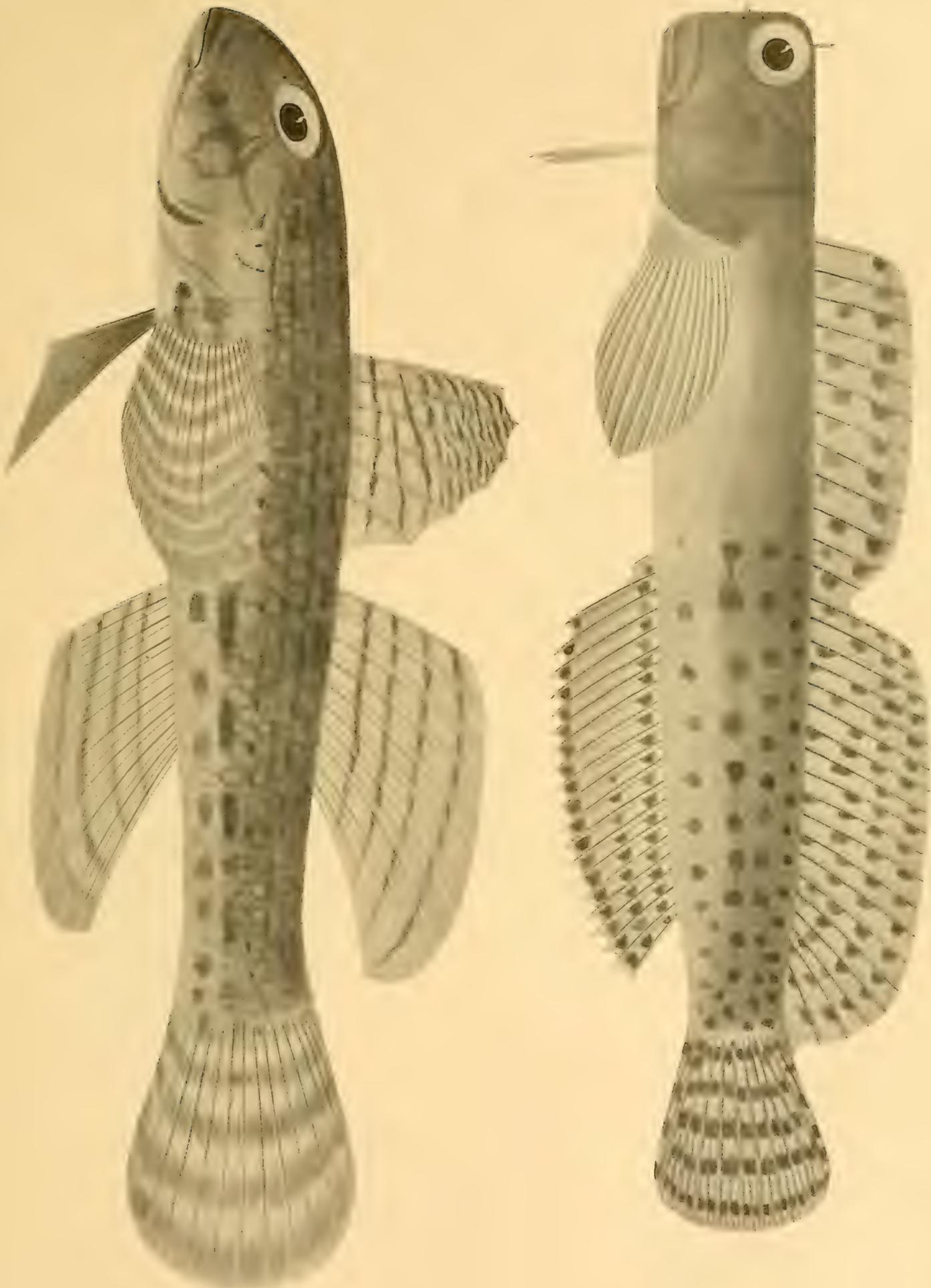


SCARTICHTTHYS BASILISCUS FOWLER.
SCARTICHTTHYS STIGMATOPTERUS FOWLER.

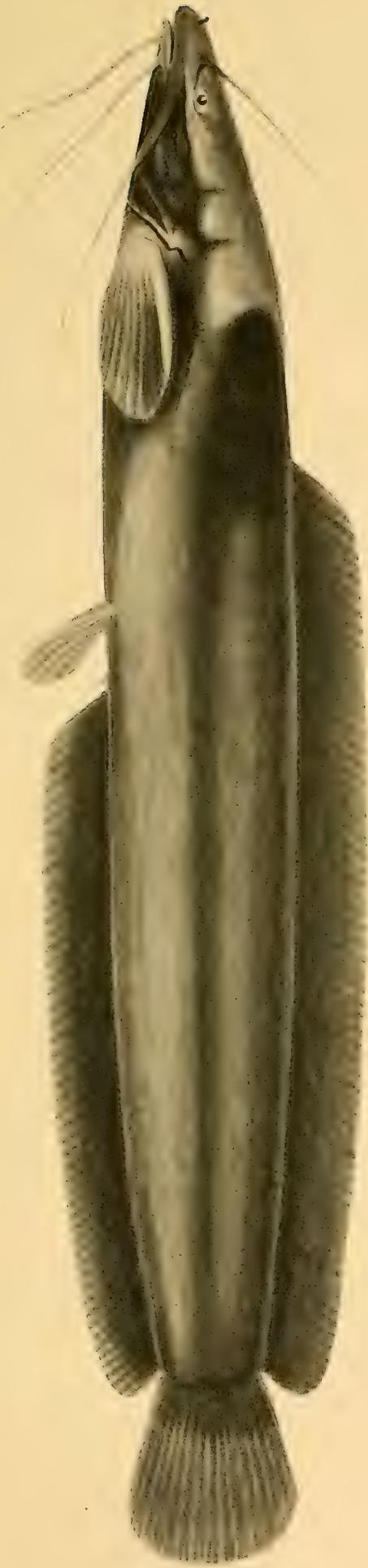
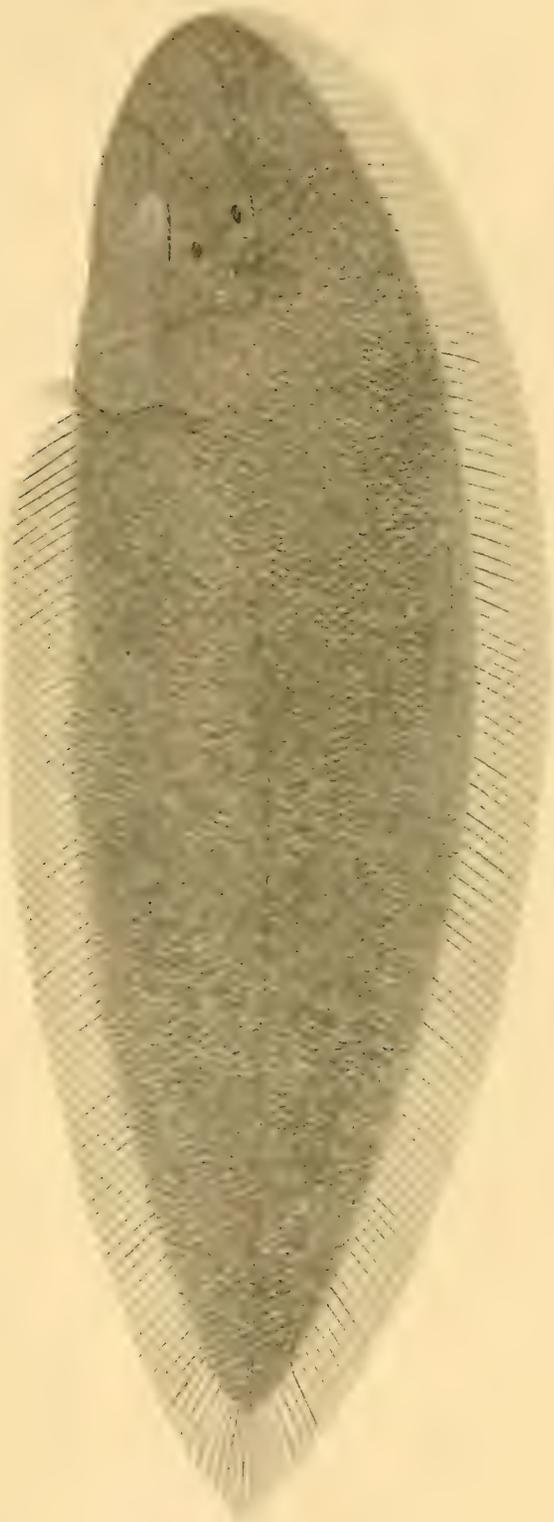




ENTOMACRODUS CALLURUS FOWLER.
(UPPER FIGURE ♂, LOWER FIGURE ♀.)



ENTOMACRODUS LEOPARDUS FOWLER.
GOBIUS VENUSTULUS FOWLER.



CYNOGLOSSUS OS FOWLER.
CHLARIAS OLIVACEUS FOWLER.

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