

929. (22.) *Caranx gallus*.

Zeus gallus, Linn. *Syst. Nat.* i, p. 454.

Caranx gallus, Day, *Fish. India*, p. 224, pl. li, fig. 3 (see synonym.).

Gurrah parah, Tel.; *Nga thenbau*, Arracan.

D. 0-6 | 1/19. P. 17. A. 0-2 | 1/16. C. 19. Sc. 1. 8-10.

Length of head from $3\frac{1}{3}$ at 6 inches to $4\frac{2}{3}$ at 23 inches, height of body $1\frac{3}{4}$ to 3 in the total length. *Eyes*—with only small posterior adipose lids or without any; diameter $3\frac{1}{3}$ to 4 in length of head, $1\frac{1}{2}$ to $1\frac{3}{4}$ diam. from end of snout. Body much elevated, especially in the young, and strongly compressed; central longitudinal crest on the head much raised, causing the dorsal profile before the eyes to be concave. Lower jaw the longer, the maxilla reaches to nearly below the vertical from front edge of orbit. Preorbital very high, from $1\frac{1}{3}$ to $1\frac{2}{3}$ diameters of the orbit. *Teeth*—apparently villiform in young in jaws, vomer, palatines, and tongue, but in adults (23 inches long) they assume an entirely different (or *Sparoid*) character, having rounded crowns, 5 rows in premaxillaries, and 4 in lower jaw, decreasing to 2 or 1 row behind; whilst the vomer has only a single row across it. *Fins*—spinous first dorsal in the young appears in a rudimentary form, becoming absorbed as age advances; the second dorsal commences at the most elevated point of the back; its rays, especially the first 7 or 8, are elongated and have filiform terminations. Pectoral rather longer than the head. Ventral with its two outer rays elongate in the young, not so in the adult. The preanal spines are apparent in the immature. First two or three anal rays elongate, but not so much so as those of the dorsal fin. Caudal deeply forked. *Scales*—rudimentary or absent except along the lateral line; at the free portion of the tail they are keeled, anteriorly they are small and rounded. A low keel on either side of base of tail in adults. *Lateral line*—first ascends, then curves to below the 12th dorsal ray, when it becomes straight. *Pyloric appendages*—numerous. *Colour*—silvery glossed with purple and gold; the young with five wide vertical bands which disappear with age. A small, dark opercular spot in the adult. Filamentous prolongations of fins dark or black.

Hab. Red Sea, seas of India, Malay Archipelago and beyond; attaining at least 2 feet in length (said to reach 5 feet) and not uncommon.

930. (23.) *Caranx ciliaris*.

Zeus ciliaris, Bloch, *Ich.* t. 191.

Caranx ciliaris, Day, *Fish. India*, p. 224 (see synonym.).

D. 6 | 1/19. P. 18. A. 2 | 1/16. C. 19. Sc. 1. 15.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $1\frac{1}{2}$ to $1\frac{3}{4}$ in the total length. *Eyes*—without adipose lids; diameter 3 in length of head,



$\frac{3}{4}$ to 1 diam. from end of snout. Body elevated and compressed, a swelling in dorsal profile opposite eyes, causing a slight concavity below and also above them. Lower jaw the longer; maxilla reaches to below front edge or first third of eye. Greatest height of preorbital from $\frac{3}{4}$ to 1 diameter of the orbit. *Teeth*—villiform in jaws, vomer, palatines, and tongue. *Fins*—spinous first dorsal rudimentary; the second dorsal commencing at the most elevated point of the back; first five or six rays elongate and with filiform terminations. Pectoral as long as head. Ventral reaches anal. Anterior rays of anal elongate like those of second dorsal. Caudal deeply forked. *Scales*—absent except on the lateral line. *Lateral line*—with a strong bend anteriorly, becoming straight below the ninth or tenth dorsal ray. *Colour*—silvery, with five or six vertical bands on the body. Anterior portion of soft dorsal and anal black. An opercular spot.

Hab. From the Red Sea, through the seas of India to the Malay Archipelago and beyond. This species is not nearly so common as *C. gallus*.

931. (24.) *Caranx leptolepis*.

Caranx leptolepis, *Cuv. & Val. H. N. Poiss.* ix, p. 63; *Day, Fish. India*, p. 225, pl. li, fig. 4 (see synon.).

Ramah parah, Tam.

D. 8 | 1/24–26. P. 20. A. 2 | 1/21. C. 17. Sc. 1. 24–28.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $3\frac{2}{3}$ to $4\frac{1}{4}$ in the total length. *Eyes*—with broad posterior adipose lids covering hind third of pupil, an anterior eyelid extending half across iris; diameter $3\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout and also apart. Jaws of about the same length, or lower slightly longer; maxilla reaches to below anterior edge or first third of orbit. Preorbital in its deepest part equals $\frac{2}{3}$ diameter of orbit. *Teeth*—fine in anterior portion of lower jaw, none in the upper jaw, vomer, or palate; a fine band on the tongue. *Fins*—dorsal spines weak, third and fourth longest and $\frac{1}{2}$ height of body; anterior portion of soft dorsal highest and $\frac{1}{2}$ height of body. Pectoral rather longer than head and reaching to above the fourth anal ray; ventral nearly reaches the preanal spines. Last dorsal and anal ray somewhat elongate. *Scales*—over body, chest, cheeks, and superiorly on the head to above middle of eye. *Lateral line*—95 scales; it makes a very gentle curve, becoming straight below the first third of second dorsal; keeled scales begin so gradually under the last portion of second dorsal that it is difficult to decide where they commence, the longest are below commencement of free portion of the tail, and about $\frac{1}{4}$ height of body. *Colour*—silvery, a broad golden stripe from above eye to upper edge of tail; lower two thirds of dorsal fin yellow, upper third dark. Outer third of anal white, the rest yellow: a large deep black spot on the shoulder, said to be sometimes absent (*C. mertensii*).

Hab. Seas of India to the Malay Archipelago and Australia.

932. (25.) *Caranx nigripinnis*.

Caranx nigripinnis, Day, *Fish. India*, p. 225, pl. li, fig. 5 (see synonym.).

D. 7-8 | 1/23-28. P. 23. A. 2 | 1/20-22. C. 19. Sc. l. 55-60.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—with wide anterior and posterior adipose lids (in one specimen with only a very broad posterior one); diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Dorsal and abdominal profiles about equally convex. Snout and lower jaw rather broad and rounded, the width of gape being rather more than the depth of the cleft; lower jaw somewhat the longer; the maxilla reaching to below the front edge of eye. Greatest depth of preorbital equals $\frac{2}{3}$ of diameter of orbit. *Teeth*—in both jaws in a single row of equal size, none on the vomer or palate, some on the tongue. *Fins*—dorsal spines of moderate strength, third longest, from $\frac{2}{3}$ to $\frac{1}{2}$ height of body, and from $\frac{1}{4}$ shorter than to as long as the first rays; last dorsal ray thickened but not prolonged. Pectoral falciform, and from as long as the head to slightly longer. Caudal rather deeply forked. *Scales*—over body, chest, behind the eyes, and on the upper portion of the opercles. No sheath to soft dorsal and anal fins. *Lateral line*—105 scales; moderately curved in front and becoming straight below the fourth or fifth dorsal rays, where the plates commence; they soon become pretty well developed, the depth of the largest equalling from $\frac{1}{11}$ to $\frac{1}{12}$ of that of the body. *Colour*—silvery, shot with gold: first dorsal deep black, anal with a white edge. A wide dark band along the second dorsal; its upper anterior corner white.

Hab. Madras and Andamans.

933. (26.) *Caranx speciosus*.

Scomber speciosus (Forsk.), *Gmel. Syst. Nat.* p. 1332.

Caranx speciosus, Day, *Fish. India*, p. 226, *Suppl.* p. 789 (see synonym.).

Polocsoo parah, Tel.; *Pathi parah* and *Pilli parah*, Tam.; *Nga wen*, Arracan.

D. 7-8 | 1/18-20. P. 22. V. 1/5. A. 2 | 1/15-16. C. 19. Sc. l. 13-15.

Length of head $4\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—in middle of depth of head, without adipose lids, but the skin extends slightly over the edge of the eye all round; diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout. Body oval and strongly compressed. Interorbital space much elevated, having a crest along its middle. Jaws of equal length; maxilla reaches to below first third or middle of orbit. Greatest depth of preorbital equals 1 diameter of eye. Pre-, sub-, and interopercles finely serrated in the young, crenulated or entire in adults. *Teeth*—absent from jaws and palate. *Fins*—spines of first dorsal weak, third or highest $\frac{1}{2}$ height of body; interspinous membrane rather deeply emarginate; the recumbent spine anterior to the fin is very distinct in



the young. Anterior portion of second dorsal highest, decreasing to ninth ray, whence it remains the same height; anterior rays $\frac{3}{4}$ height of body, upper edge of fin emarginate. Pectoral falcate, longer than head, and reaching to beneath the eleventh dorsal ray. Second free anal spine longest. Anal fin commences on the vertical below fifth dorsal ray and is of similar form to second dorsal. Scales—small, some on cheeks, upper edge of opercle, and to above the hind third of the eye, none on the interorbital crest. Body and chest scaled. Lateral line—about 106 scales, the first portion to below the sixth or eighth dorsal ray forms a long curve, from thence it proceeds direct to the centre of the tail; in the first portion of its straight course the plates are small, the last thirteen to fifteen are pretty well developed and about $\frac{1}{15}$ the height of the body. Colour—golden, with vertical black bands alternately narrow and wide, from dorsal to ventral surface. The first wide band descends obliquely through eye; on the body are five more wide bands, the first over the shoulder touching the hind edge of the opercle, and the last over the free portion of the tail. Dorsal fin minutely dotted with fine black points; upper edge of soft dorsal grey, end of caudal lobes black; anal golden. Adults are said to become of a uniform colour, a statement I have not been able to verify.

Hab. Red Sea, throughout the seas of India to the Malay Archipelago and Australia; attaining at least 3 feet in length, and at this size I have found the colours to be still distinct.

2. Genus **MICROPTERYX**, Agass.

Syn. *Seriola*, sp., Cuv.; *Chloroscombrus*, Gir.; *Micropus*, Kner (not Gray).

Branchiostegals seven. Body compressed; abdomen prominent and trenchant. Gape of mouth rather small. Teeth feeble, present on vomer and palatines. Two dorsal fins, the first with 7 spines, and a recumbent, anteriorly directed one in front of the base of the fin; the second and the anal considerably more developed and without finlets posteriorly; two preanal spines. Scales small. Lateral line smooth. Air-bladder bifurcated posteriorly. Pyloric appendages in moderate numbers.

934. (1.) **Micropteryx chrysurus**.

Scomber chrysurus, *Linna. Syst. Nat.* i, p. 494.

Micropteryx chrysurus, *Day, Fish. India*, p. 227 (see synonym.).

D. 7 | 1/26-28. P. 18. A. 2 | 1/25-26. Cæc. pyl. 10-15.

Length of head $4\frac{3}{4}$ to $5\frac{1}{4}$, height of body $2\frac{2}{3}$ to 3 in the total length. Eyes—diameter $3\frac{1}{3}$ in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Abdominal more convex than dorsal profile. Cleft of mouth almost vertical, it commences opposite upper edge of orbit; the lower jaw the longer and its end forming part of the dorsal profile when the mouth is closed; the maxilla reaches to



below the first third of the eye. *Fins*—dorsal spines weak, increasing in length to the third, which is nearly as high as anterior portion of soft dorsal, and $\frac{1}{5}$ height of body. Pectoral falciform and $\frac{2}{3}$ to $\frac{4}{5}$ of total length. Ventral short and equal to $\frac{1}{5}$ height of body. Anal similar to second dorsal. Caudal forked. *Scales*—small, present behind the eyes and over the body, also forming a sheath for bases of dorsal and anal fins. *Lateral line*—forms rather a deep curve in the first third of its course. *Colour*—greenish along the back, becoming silvery on the sides and beneath. A dark blotch over the free portion of the tail. Ventrals white.

Hab. This fish frequents the west coast of Africa and the Atlantic coasts of America; it has also been captured at Pondicherry.

3. Genus *SERIOLA*, Cuv.

Branchiostegals seven; pseudobranchiæ. Body oblong and moderately compressed; abdomen rounded. Cleft of mouth sometimes deep. Preopercle entire. Villiform teeth in the jaws, vomer, and palatine bones. First dorsal fin continuous, its spines not strong, the second dorsal and anal with many more rays; as a rule a pair of preanal spines, remote from the rest of the fin. Scales small or rudimentary. Lateral line unarmed. Air-bladder simple. Pyloric appendages many.

Geographical Distribution. Nearly all temperate and tropical seas.

935. (1.) *Seriola nigrofasciata*. (Fig. 57.)

Nomens nigrofasciatus, Rüppell, *Atl. Fische*, p. 92, t. xxiv, fig. 2.

Seriola nigrofasciata, Day, *Fish. India*, p. 227, pl. li, fig. 6 (see synon.).

D. 5-6 | 1/29-33. P. 19. A. 1/15-17. C. 19.

Length of head from $3\frac{2}{3}$ in the young to $4\frac{1}{2}$ in the adult, height

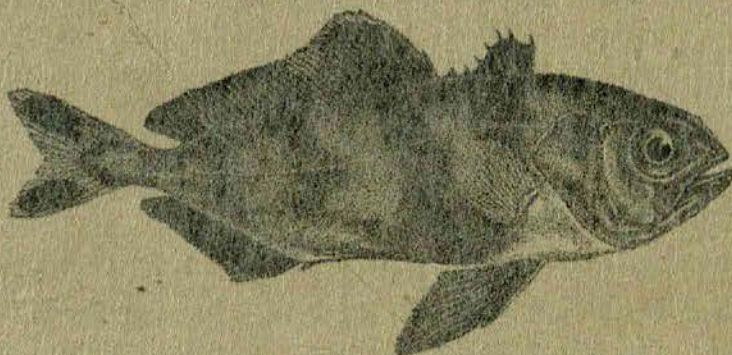


Fig. 57.—*Seriola nigrofasciata*.

of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout. Dorsal profile more convex than abdominal; snout rather obtuse; abdomen broad. Lower



jaw rather the longer. *Fins*—first dorsal spines weak, low, from $\frac{1}{3}$ to $\frac{1}{2}$ height of second dorsal, the anterior portion of which latter is from $\frac{1}{2}$ to $\frac{2}{3}$ height of body. Anal commences below the middle of the soft dorsal. Caudal forked. *Scales*—minute. *Colour*—bluish grey, with five black bands obliquely directed forwards from the back down the body; one or two similar but narrower bands on the head. First dorsal fin black, second dorsal dark, becoming black near its summit and with a white tip. Pectoral yellow. Ventral and anal black, the latter with a white tip. Caudal yellowish, the young having a black blotch in the last portion of each caudal lobe.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond.

4. Genus **SERIOLICHTHYS**, Bleeker.

Syn. *Decaptus*, Poey.

Branchiostegals seven. Body oblong, compressed; abdomen rounded. Cleft of mouth of moderate depth. Preopercle slightly crenulated or entire. Villiform teeth on the jaws, vomer, palatines, and tongue. First dorsal fin continuous, the second and the anal with many more rays, and each having one or two finlets posteriorly; a pair of preanal spines remote from the rest of the fin may be present or absent. Scales cycloid, small. Lateral line unarmed.

936. (1.) *Seriolichthys bipinnulatus*. (Fig. 58.)

Seriola bipinnulata, Quoy & Gaim. *Voy. Uranie et Phys. Zool.* i, p. 363, pl. 61, fig. 3.

Seriolichthys bipinnulatus, Bleeker, *Batavia Nat. Tijdsch.* vi p. 196; Day, *Fish. India*, p. 228, pl. li A, fig. 1, *Suppl.* p. 789 (see synon.).

Kulul and *Poonkolal*, Tam.

D.5 | 1/24-25+i. P.21. A.0-2 | 1-2/16-17+i. L.l.95. L.tr.16/28.

Length of head 5, height of body 5 in the total length. *Eyes*—

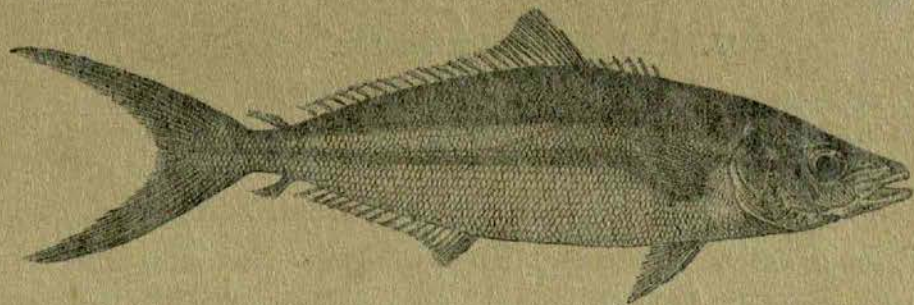


Fig. 58.—*Seriolichthys bipinnulatus*.

diameter 4 in length of head, $1\frac{1}{4}$ diam. from end of snout and also



apart. Body elongate and compressed, its greatest height opposite origin of soft dorsal. Lower jaw slightly the longer, gape of mouth rather narrow. Gill-openings cleft forwards to below anterior edge of orbit. *Fins*—dorsal spines of moderate strength, low, with the interspinous membrane deeply cleft. Anterior portion of second dorsal highest, equalling $\frac{2}{3}$ of body; at a short distance behind this fin are two rays placed close together and forming a finlet; they are rather elongate and reach the root of the caudal fin. Pectoral short, $\frac{1}{3}$ of the total length. Anal of the same form but anteriorly lower than the soft dorsal, being $\frac{2}{3}$ of the height of the body; it has similarly a posterior finlet. Caudal deeply forked. *Scales*—on cheeks, upper edge of opercles, behind the eyes, and over the body. *Colour*—two longitudinal blue bands pass from the eye, the upper to the dorsal finlet, and the lower to the centre of the base of the caudal fin.

Hab. Red Sea; from the east coast of Africa, through the seas of India, to the Malay Archipelago and beyond. This fish attains several feet in length.

5. Genus **NAUCRATES**, Cuv.

Syn. *Nauclerus*, Cuv. & Val. (young).

Branchiostegals seven. Body oblong, subcylindrical. Cleft of mouth moderate. In the very young there is a spine at the angle of the preopercle, which becomes absorbed as age advances. Villiform teeth in the jaws, vomer, and palatine bones. The first dorsal fin, which is continuous in the young, becomes reduced to a few spines in the adult; the second dorsal and anal with many rays; no spurious fins; in the young two preanal spines remote from the soft fin, these become lost with age. Scales small; lateral line unarmed; a keel on either side of the tail. Air-bladder present. Pyloric appendages in moderate numbers.

Geographical Distribution. These "pilot fishes" are spread through all the seas of temperate and tropical regions. Most travellers in sailing vessels have seen them as close attendants upon sharks, leading them, as the sailors consider, to their prey.

937. (1.) **Naucrates ductor**. (Fig. 59.)

Gasterosteus ductor, Linn. *Syst. Nat.* i, p. 489.

Naucrates ductor, Day, *Fish. India*, p. 229, pl. li A, fig. 2 (see synon.).

D. 3-6 | 1/26-28. A. 0-2 | 2/16-17. Cæc. pyl. 12-15. Vert. 10/16.

Length of head 4 to $4\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout. *Fins*—first dorsal fin short, second dorsal highest anteriorly, anal commences under the middle of the second dorsal. Pectoral as long as the ventral, which reaches $\frac{2}{3}$ of way to base of



the anal. Scales—cycloid. Lateral line—a little raised on the side of the tail. Colour—bluish, with five or six dark vertical bands; caudal sometimes with the ends of the lobes white, and

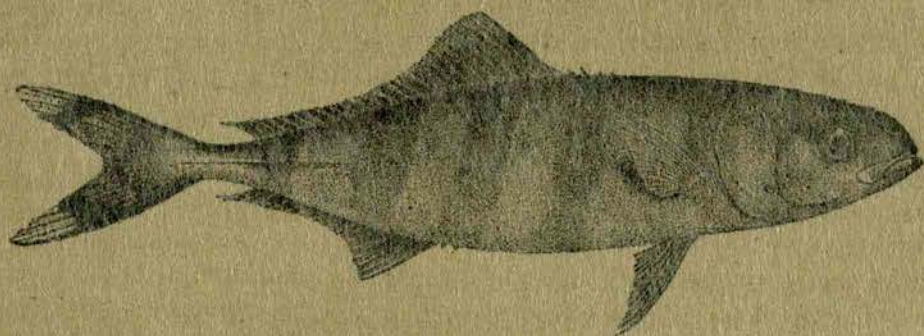


Fig. 59.—*Naucrates ductor*.

having a dark band across their last third. Basal half of anal and centre of dorsal dark grey.

Hab. Seas of temperate and tropical regions.

6. Genus **CHORINEMUS**, Cuv. & Val.

Syn. *Scomberoides*, Lacép.

Branchiostegals seven or eight; pseudobranchiæ. Body oblong and compressed. Eyes lateral. Cleft of mouth moderate or deep. Teeth in jaws, also present on vomer, palatines, and tongue. Two dorsal fins, the first (preceded by an immovable, recumbent spine, directed forwards) has a groove at its base for its reception; it is formed by a few free spines, fewer in number than the rays of the second dorsal or anal, the posterior rays of both of which are either detached or semi-detached; a pair of preanal spines separated by an interspace from the remainder of the fin. Dermal scales mostly lanceolate. Lateral line continuous, not keeled. Air-bladder bifurcated posteriorly. Pyloric appendages numerous.

Geographical Distribution. Indian Ocean and tropical parts of the Atlantic.

Synopsis of Indian Species.

- | | |
|--|-------------------------------------|
| A. Dorsal spines flattened, the end of each does not reach base of next in adults; height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in total length. | 1. <i>C. sancti-petri</i> , p. 174. |
| B. Each dorsal spine overlaps the next. | |
| Height of body $5\frac{1}{4}$ in total length. | 2. <i>C. moadetta</i> , p. 174. |
| Height $3\frac{1}{2}$ to 4 in length. No canines .. | 3. <i>C. lysan</i> , p. 175. |
| Height $3\frac{3}{4}$ in length. Distinct canines in both jaws | 4. <i>C. tala</i> , p. 176. |
| Height $3\frac{1}{2}$ to $3\frac{3}{4}$ in length. No canines in upper jaw | 5. <i>C. toloo</i> , p. 176. |

938. (1.) *Chorinemus sancti-petri*.

Chorinemus sancti-petri, *Cuv. & Val. H. N. Poiss.* viii, p. 379, pl. 236;
Day, Fish. India, p. 230, *Suppl.* p. 789 (see synonym.).

Nga moozin, Arracan.

B. viii. D. 7 | 1/19-21. P. 17. A. 2 | 1/18-19. C. 15.

Length of head $5\frac{1}{4}$ to $5\frac{3}{4}$, of pectoral $4\frac{1}{2}$, of caudal $4\frac{1}{2}$, height of body $4\frac{1}{4}$ to $4\frac{3}{4}$ in the total length. *Eyes*—diameter $\frac{4}{5}$ to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout and also apart. Profile above orbit slightly concave. Maxilla concealed by the pre-orbital except in the last third of its course. Central longitudinal crest on the skull scarcely elevated. Angle of preopercle slightly produced. *Teeth*—several villiform rows anteriorly in both jaws, a single one in last $\frac{2}{3}$ of premaxillaries; two rows in lower jaw; a triangular patch, elongate posteriorly, on the vomer; a pyriform band, largest anteriorly, on the palatines, and also on the tongue. *Fins*—spines of first dorsal flattened, laterally expanded into a lanceolate form, and keeled along their centre; in the adult each spine does not extend so far as the base of the next before it, but they slightly overlap in the young. First portion of second dorsal elevated, $\frac{4}{5}$ height of body, and $\frac{1}{5}$ higher than commencement of anal. Caudal deeply lobed. *Scales*—exposed portions of each lanceolate and pointed, with a line along the middle and the posterior part depressed, behind the exposed lanceolate portion each scale ends in a narrow pedicle rather more than half its entire length. In the young the scales are not quite so pointed, and when removed appear much like a spoon. *Lateral line*—makes an obtuse angle opposite middle of pectoral fin, thence it gradually slopes downwards, becoming straight beneath the first dorsal ray. *Colour*—a bluish-grey spot on the opercle, and a row of from six to eight dark blotches above the lateral line; sometimes, more especially in the adult, a second row beneath it. Summit of soft dorsal black.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond; attaining at least 20 inches in length.

939. (2.) *Chorinemus moadetta*. (Fig. 60.)

Chorinemus moadetta, *Cuv. & Val. H. N. Poiss.* viii, p. 382; *Day, Fish. India*, p. 230, pl. li B, fig. 1, *Suppl.* p. 789 (see synonym.).

B. viii. D. 7 | 1/21. P. 19. A. 2 | 1/18-19. C. 17.

Length of head $5\frac{3}{4}$ to $5\frac{5}{4}$, of caudal $6\frac{1}{2}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{4}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Dorsal profile rather concave above the orbits, the central and lateral ridges on the summit of the head well developed. The lower jaw somewhat the longer, maxilla uncovered from beneath first third of eyes. *Teeth*—in the premaxillaries in a single row, the two anterior teeth large and rather canine-like; teeth in the lower jaw in two rows, the outer



of which is curved rather outwards and upwards, some are enlarged on either side of the symphysis; a longitudinally elongate ovate patch on the vomer; a long pyriform band on the palate, largest anteriorly, also on the tongue. *Fins*—dorsal spines rounded, not flattened, overlapping and twisting laterally when elevated; first portion of second dorsal highest, $\frac{3}{4}$ height of body, and $\frac{1}{3}$ higher than first part of anal. Pectoral as long as head behind middle of eye. Caudal deeply forked. *Scales*—peculiar, resembling needles sharp at both ends, lying close together and interdigitating; it is

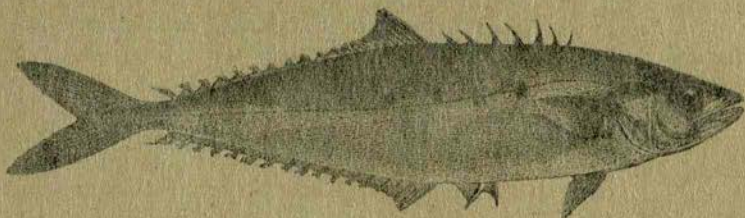


Fig. 60.—*Chorinemus mouletti*.

only near the free portion of the tail that they become at all scale-like. *Lateral line*—rather indistinct and almost straight, making one slight angular elevation above last third of pectoral. *Colour*—silvery along the upper third of the body, becoming white on the sides and below; a series of six or eight blotches along the sides, mostly above the lateral line. A black blotch at the highest point of the second dorsal and at the end of either lobe of the caudal, the other fins yellow.

Hab. Red Sea, east coast of Africa, and seas of India; attaining upwards of 15 inches in length. As food its flesh is dry and tasteless.

940. (3.) *Chorinemus lysan*.

Scomber lysan, *Forsk. Descr. Anim.* p. 54, no. 69.

Chorinemus lysan, *Cuv. & Val. H. N. Poiss.* viii, p. 387; *Day, Fish. India*, p. 231, *Suppl.* p. 789 (see *synon.*).

Toal parah, Tam.; *Parah*, Hind.; *Ngu khumba*, Arracan.; *Mattiamach*, Chittagong.

B. viii. D. 7 | 1/19–20. P. 19. A. 2 | 1/17–18. C. 19. Vert. 10/16.

Length of head $5\frac{1}{2}$ to 6, of caudal $4\frac{1}{2}$, height of body $3\frac{1}{4}$ to 4 in the total length. *Eyes*—diameter 4 in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and rather above 1 apart. Body rather strongly compressed, profile over nape slightly concave. Cleft of mouth deep; the maxilla, which extends nearly half a diameter behind the orbit, is narrow and uncovered by the preorbital from beneath first third of eye. *Teeth*—anteriorly in two rows, posteriorly in one in the premaxillaries; in two rows in the lower jaw, the outer directed outwards and upwards in the young; some of the anterior teeth



in both jaws are rather enlarged; a triangular spot rather prolonged posteriorly in the vomer; a pyriform band, largest anteriorly, on the palatines, also on the tongue. *Fins*—anterior portions of soft dorsal and anal elevated, $\frac{1}{4}$ of length of head; the last 8 or 10 rays semi-detached, the last rather elongate. Caudal deeply forked. *Scales*—distinct and lanceolate. *Lateral line*—has a slight angular elevation soon after its commencement. *Colour*—six to eight large, round, grey spots like finger-marks on the side, the lateral line sometimes going through the first two, while the others are all above it; summit of soft dorsal black.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; attaining to 3 feet or more in length.

941. (4.) *Chorinemus tala*.

Chorinemus tala, *Cuv. & Val. H. N. Poiss.* viii, p. 377; *Day, Fish. India*, p. 231 (see synon.).

B. viii. D. 7 | 1/20. P. 19. A. 2 | 1/17. C. 17.

Length of head $5\frac{3}{4}$, of caudal $4\frac{3}{4}$, height of body $3\frac{3}{8}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal and abdominal profiles equally convex. Lower jaw prominent; maxilla uncovered from below middle of eye. Posterior limb of preopercle nearly vertical, and its angle not produced. *Teeth*—two strong canines directed a little outwards at the symphysis in either premaxillary, and several villiform rows behind them, laterally a single row of rather distantly placed pointed teeth; in the lower jaw at the symphysis are two canines anteriorly pointed a little forward, posteriorly two more directed upwards; laterally two rows of teeth, the inner considerably the larger; a quadrangular patch on the vomer; a pyriform band, larger anteriorly on the palatines, and also on the tongue. *Fins*—dorsal spines overlapping and twisting slightly laterally when elevated; first portion of second dorsal $\frac{1}{11}$ height of body, $\frac{1}{3}$ longer than anterior part of anal. Pectoral as long as head without snout. Caudal deeply forked. *Scales*—rhomboidal, and more or less pointed posteriorly, on being removed the outer half is found to be lanceolate, the posterior more contracted. *Lateral line*—becomes straight below the middle dorsal spine, it has an angular elevation above last $\frac{2}{3}$ of pectoral. *Colour*—leaden silvery in upper third of back, silvery white on the sides and below; a series of seven spots above the middle of the sides, the first two being intersected by the lateral line. Summit of second dorsal black.

Hab. Seas of India; attaining at least $6\frac{1}{2}$ inches in length.

942. (5.) *Chorinemus tolooo*.

Chorinemus tolooo, *Cuv. & Val. H. N. Poiss.* viii, p. 377; *Day, Fish. India*, p. 232, pl. li A, fig. 3 (see synon.).

Falai, Maráthi.



B. viii. D. 7 | 1/19-20. P. 20. A. 2 | 1/17-18. C. 19.

Length of head $5\frac{3}{8}$, of pectoral 8 to $8\frac{1}{2}$, of caudal $4\frac{1}{2}$ to 5, height of body $3\frac{1}{2}$ to $3\frac{3}{8}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. Body elliptical, compressed; upper jaw only uncovered in the last third of its extent. Preorbital narrow, but covering the first $\frac{3}{8}$ of the maxilla; preopercle narrow, having its angle rounded and produced. Central crest of skull distinct. *Teeth*—comparatively large, in a single row in the upper jaw and in two in the lower, the outer of the latter directed somewhat outwards; there are two canine-like teeth on either side of symphysis of lower jaw; a triangular patch on the vomer; an elongate pyriform band, largest anteriorly, on the palatines, and on the tongue. *Fins*—the anterior portion of the soft dorsal elevated, similar to the anal, and $\frac{1}{2}$ height of body; the posterior 8 or 10 rays of either fin semi-detached, and the last rather elongate. Caudal deeply forked. *Scales*—small but distinct, and lanceolate in their exposed portion. *Lateral line*—has a very slightly raised angle in the first part of its course, but its general direction is straight. *Colour*—greenish tinge along back shot with blue, becoming dull silvery below lateral line. Six or eight moderately sized, oval, and indistinct vertical spots or blotches on the side, usually intersected by the lateral line. Vertical fins darkish.

Hab. Seas of India; said to attain 18 inches in length.

7. Genus **TRACHYNOTUS** (Lacép.), Cuv. & Val.

Syn. *Acanthinion* and *Cæsiomorus*, Lacép.

Cuttalli, Tamil.

Branchiostegals seven; pseudobranchiæ absent. Body compressed, more or less elevated, with the frontal region prominent. Eyes lateral. Snout obtuse and swollen; cleft of mouth small. Teeth on the jaws, vomer, and palatines, usually lost with age. Two dorsal fins, the first composed of spines having a small connecting membrane (receivable into a groove at their base), and a horizontal spine, directed forwards, anterior to the fin; rays of second dorsal and of anal more numerous than the spines in the first dorsal; anterior portion of the second dorsal and anal pointed and elongate; two preanal spines separated by an interspace from the remainder of the fin; no finlets. Scales small. Lateral line unarmed. An air-bladder bifurcated posteriorly. Pyloric appendages varying in number.

Geographical Distribution. Indian, Pacific, and Atlantic Oceans, within the tropics.

Synopsis of Indian Species.

Height of body not exceeding $\frac{1}{2}$ of total length.

Ventrals very small; small black spots on l. l. . . 1. *T. baillonii*, p. 178.

Ventrals moderate; large dark blotches above l. l. . . 2. *T. russellii*, p. 178.

Height of body much exceeding $\frac{1}{2}$ of total length; no

spots or blotches 3. *T. ovatus*, p. 179.

943. (1.) *Trachynotus baillonii*.

Cæsiomorus baillonii, Lacép. *H. N. Poiss.* iii, p. 93, pl. 3, fig. 1.

Trachynotus bailloni, Day, *Fish. India*, p. 233, pl. li A, fig. 4 (see synonym.).

Vella oodoo and *Parruvu*, Mal.; *Mookalee*, Tamil; *Nga moozin*, Arracan.

D. 6-7 | 1/22-24. A. 2 | 1/22-24. C. 19. Cæc. pyl. 12. Vert. 9/12.

Length of head $5\frac{1}{3}$ to $5\frac{1}{2}$, of caudal fin $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—dorsal spines moderately strong; second dorsal and anal very much produced in front, and if laid backwards the first dorsal rays reach to nearly the end of that fin, those of the anal to its posterior extremity. Ventral small, equalling $1\frac{1}{2}$ diameters of the orbit. Caudal deeply forked, lobes long, the upper slightly the longer. *Scales*—small, placed in sinuous lines. *Lateral line*—nearly straight. *Colour*—upper surface of head and back silvery yellowish green, becoming lighter on the sides, and silvery white on the abdomen, opercles, and cheeks. Lobes of dorsal, anal, and caudal black, some white likewise on those of the tail; a row of three to five deep black spots along the lateral line.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago; it attains at least 20 inches in length.

944. (2.) *Trachynotus russellii*. (Fig. 61.)

Trachynotus russellii, Cur. & Val. *H. N. Poiss.* viii, p. 436; Day, *Fish. India*, p. 233, pl. li B, fig. 3, *Suppl.* p. 790 (see synonym.).

D. 6 | 1/22-23. P. 17. A. 2 | 1/20-21. C. 17.

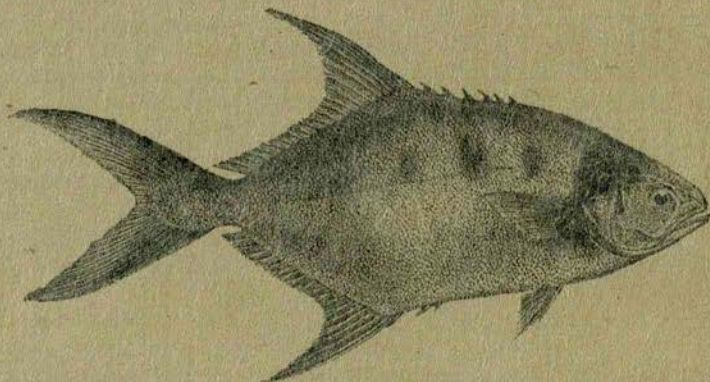


Fig. 61.—*Trachynotus russellii*.



Length of head 5 to $5\frac{3}{4}$, of caudal fin 4 to $4\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, about 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal and abdominal profiles about equally convex, snout obtuse. Central longitudinal crest on the head well developed. *Fins*—spines of first dorsal of moderate strength; anterior rays of second dorsal prolonged, $\frac{2}{3}$ to $\frac{3}{4}$ as long as base of fin, and similar to those of the anal. Ventrals as long as postorbital portion of head in adults; rather longer in young, they reach above halfway to anal in young, but are not quite so long in adults. Caudal deeply forked. *Scales*—in irregular rows, small. *Lateral line*—nearly straight. *Colour*—greenish, dashed with yellow on the back, becoming more golden on the sides and beneath; usually a dark blotch at upper margin of opercle and commencement of lateral line. From 3 to 5 large, dull, rounded blotches a little distance above the lateral line; these often disappear after death; they are much darker and more persistent in the adult than in the young; elongated portions of dorsal and anal fins, also lobes of caudal, orange stained with black.

Hab. Seas of India to the Malay Archipelago and Australasia. Not uncommon at Madras, my largest specimen being 22 inches long, from Canara.

945. (3.) *Trachynotus ovatus*.

Gasterosteus ovatus, Linn. *Syst. Nat.* i, p. 490.

Trachynotus ovatus, Day, *Fish. India*, p. 234, pl. li B, fig. 2, *Suppl.* p. 790 (see synon.)

Katāttitaka, Marāthi; *Kootili*, Tamil; *Roojana*, Arracan.

D. 6-7 | 1/18-21. P. 17. A. 2 | 1/16-19. C. 17. Cæc. pyl. 12.

Length of head $4\frac{1}{2}$, of caudal fin 4, height of body 2 to $2\frac{3}{4}$ in the total length. *Eyes*—in the middle of height of head, diameter 3 to $4\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. (in the young) to $1\frac{1}{4}$ (in the adult) from end of snout, and $1\frac{1}{4}$ apart. Body elliptical and compressed, snout very obtuse; a considerable rise to the first dorsal, but superior and inferior profiles of body equally convex. Mouth oblique. *Teeth*—in young specimens a band of card-like teeth in both jaws, but as the fish increases in size (eight inches in length) they disappear, as well as those on the vomer and palatine bones. *Fins*—second dorsal having its first ray highest, $\frac{1}{2}$ height of body. Ventrals in the young as long as the head behind the middle of the eyes. Caudal with deep lobes. *Scales*—minute. *Lateral line*—at first very slightly ascends, and then forms a slight curve to opposite the eleventh dorsal ray, whence it proceeds straight to centre of caudal. *Colour*—more or less golden; the upper half of first five dorsal rays tipped with black, and the fin generally dotted with minute black points; sometimes the anal and caudal are similarly marked; first three quarters of pectoral grey, last fourth yellow.

Hab. Indian and Atlantic Oceans; attaining at least 20 inches in length. This fish salts well, but when fresh is dry and insipid.

8. Genus **PSETTUS** (Comm.), Cuv. & Val.Syn. *Monodactylus*, Lacép.

Branchiostegals six; pseudobranchiae. Body much compressed and elevated. Eyes lateral. Cleft of mouth small, snout short. Teeth villiform on jaws, vomer, palatine bones, and tongue. A single dorsal fin with seven or eight spines; anal with three, continuous with the rest of the fin; ventrals rudimentary. Scales small, covering the vertical fins. Lateral line unarmed. Air-bladder present, bifurcated posteriorly. Caecal appendages numerous.

Geographical Distribution. Indian, Pacific, and Atlantic Oceans, within the tropics.

Synopsis of Indian Species.

Height of body $\frac{1}{3}$ to $\frac{1}{2}$ total length. No bands. 1. *P. falciformis*, p. 180.

Height of body $\frac{2}{3}$ total length. A black ocular band and a second just behind head. 2. *P. argenteus*, p. 180.

946. (1.) *Psettus falciformis*.

Monodactylus falciformis, Lacép. *H. N. Poiss.* iii. pp. 131, 132.

Psettus falciformis, Day, *Fish. India*, p. 234, pl. li A, fig. 6 (see synon.).

Purrandee, Mal.

D. 8/28-30. P. 16. V. 1/3-5. A. 3/29. C. 17. L. 1. 100.

Length of head 4 to $4\frac{1}{2}$, height of body 2 to $2\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. Cleft of mouth oblique. Angle of preopercle rounded and finely serrated. *Fins*—dorsal spines nearly concealed, anterior rays elongate. Pectoral $\frac{2}{3}$ as long as head. Ventrals placed close together like two spines, the rays being minute. Anal of the same form as the dorsal, its anterior portion as high as the head is long. Caudal rather deeply emarginate. *Scales*—about 120 rows descend to the lateral line. *Lateral line*—forms a long arch, becoming straight on free portion of the tail. *Colour*—silvery, soft dorsal and anal tinged with black.

Hab. Red Sea, seas of India and beyond; attaining at least 9 inches in length.

947. (2.) *Psettus argenteus*. (Fig. 62.)

Chaetodon argenteus, Linn. *Syst. Nat.* p. 461.

Psettus argenteus, Day, *Fish. India*, p. 235, pl. li B, fig. 5 (see synon.).

Nga-pus-soond, Mugh.; *Oo-chra-dah*, Andam.

D. 8/28-30. P. 17. V. 1/2-3. A. 3/28-30. C. 17. L. r. 105/75.

Length of head 4 to $4\frac{1}{2}$, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{3}$ diam. from end of snout, and 1 apart. Cleft of mouth oblique, lower jaw the longer. Angle of opercle rather angular and finely serrated. *Fins*—anterior



dorsal rays elevated, $\frac{1}{2}$ more than those of anal. Pectoral as long as the head excluding the snout. Ventrals placed close together like two spines, the rays being minute. Anterior anal rays as long as the head. Caudal emarginate. *Lateral line*—makes a long, low curve, becoming straight nearly below last fourth of dorsal. *Colour*—silvery, with purplish reflexions, especially about the anal fin:

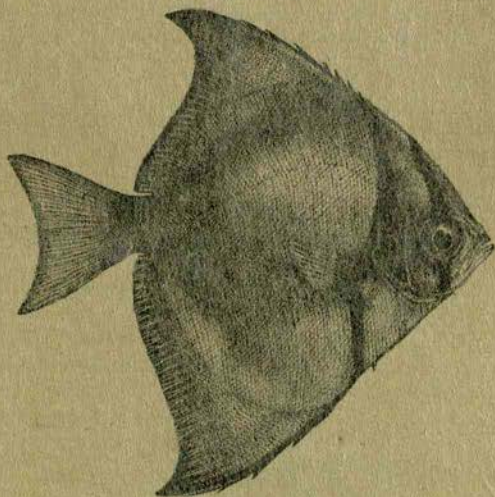


Fig. 62.—*Psættus argenteus*.

the back is yellowish green, which after death rapidly assumes a leaden hue. One rather wide black band passes directly downwards from the nape through the centre of the eye; a second from opposite the first three dorsal spines goes as far as the opercle. Part of the dorsal is stained with black, as is also the anterior portion of the anal though to a less extent. Pectoral and ventral colourless; caudal yellow, with a narrow black posterior edge.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, Australia, and Polynesia; attaining at least 7 inches in length. Most common in Malabar during the monsoon months.

9. Genus **PLATAX**, Cuv. & Val.

Branchiostegals six; pseudobranchiæ. Body compressed and much elevated. Eyes lateral. Cleft of mouth small; snout short. Teeth setiform, trilobed at their summits, some present on the vomer. A single dorsal fin with from three to seven spines, which are nearly hidden; anal with three continuous with the rest of the fin; ventrals well developed. Scales ctenoid, of moderate or small size, extended on to the vertical fins. Lateral line unarmed. Air-bladder simple. Pyloric appendages few.

Geographical Distribution. Indian Ocean.

These fishes appear to alter considerably with age, their anterior profile becoming more obtuse and their fins comparatively short.

Synopsis of Indian Species.

- D. 5/31-33, A. 3/24-27, L. 1. 60-65. Snout obtuse, profile from snout to above eyes vertical. Young with an ocular band as wide as the eye, a second from dorsal spines to between ventral and anal fins; a broad one covers the last half of the back and sides. 1. *P. teira*, p. 182.
- D. 5/35-37, A. 3/26-28, L. 1. 55. Snout not quite vertical. Young with a narrow ocular band $\frac{1}{2}$ as wide as eye; a second from dorsal spines to just before anal; another at commencement of free portion of tail 2. *P. respertilio*, p. 183.

948. (1.) *Platax teira*. (Fig. 63.)

Chaetodon teira, *Forsk. Descr. Anim.* p. 60, no. 82.

Platax teira, *Day, Fish. India*, p. 235, pl. li B, fig. 4. (see *synon.*).

Kahi sandawa, *Teb*; *Kavala*, *Maráthi*.

D. 5/31-33. P. 17. A. 3/24-27. C. 17. L. 1. 80-85/60-65/75.

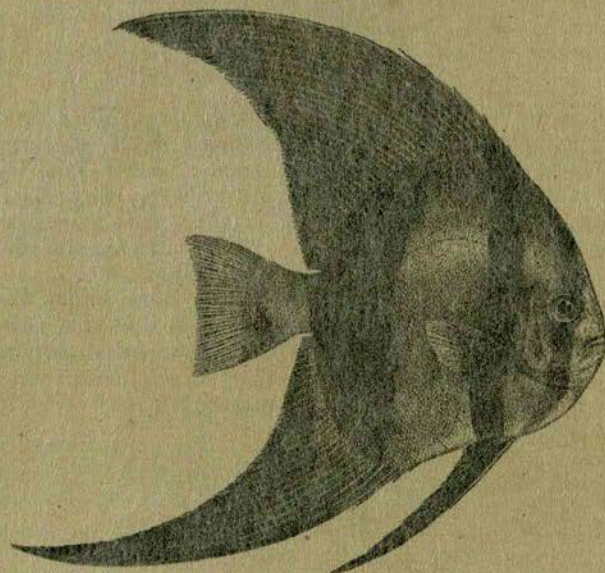


Fig. 63.—*Platax teira*.

Height of body, excluding vertical fins, rather more than, or equal to, its length excluding the caudal fin. *Eyes*—diameter about 3 in



length of head, rather above 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal profile more convex than abdominal, very obtuse from snout to above the eyes. Angle of preopercle rounded and entire. *Fins*—anterior portions of dorsal and anal very prolonged in young, extending (at 6 inches in length) nearly $\frac{1}{2}$ length of entire fish beyond end of caudal, ventral reaching end of caudal; these fins become comparatively much shorter as age advances. Caudal with its central rays slightly prolonged, making the posterior end of the fin concave in each half. *Colour*—in the *young* greyish, with an ocular band about as wide as the eye passing downwards to the ventral fin; a second from dorsal spines and first rays behind the head, includes base of pectoral, and is lost between ventral and anal; a very broad band passes from the last $\frac{2}{3}$ of dorsal to same part of anal; a narrow band over root of caudal. Fins black, with the exception of the pectoral and ventral, which are yellow except at their bases. The bands disappear with age.

Hab. Red Sea, seas of India, Malay Archipelago and beyond; attaining at least 20 inches in length. Russell says the flavour of this fish is excellent, and Cantor makes the same remark.

949. (2.) *Platax vespertilio*.

Chaetodon vespertilio, Bloch, *Ich.* t. 199, fig. 2.

Platax vespertilio, Day, *Fish. India*, p. 236, pl. li A, fig. 5 (see synon.).

D. 5/35-37. P. 17. V. 1/5. A. 3/26-28. C. 17. L. 1.65/55/60.

Height of body, excluding vertical fins, rather more than its length without the caudal fin. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Dorsal profile more convex than abdominal, not quite vertical from occiput to snout. Angle of preopercle rounded, and its lower edge feebly serrated. *Fins*—the anterior portion of the dorsal fin elevated, its height exceeds the length of its base by about $\frac{1}{2}$ the distance between the snout and its front edge. Ventral reaches to about the middle of the base of the anal fin; anal $\frac{4}{5}$ as high as dorsal. Caudal slightly emarginate. *Lateral line*—the upper curve below base of first dorsal ray is at nearly one third of the height of the body from the back. *Colour*—brownish, fins black, and last two thirds of pectoral yellow. In the *young* there is a narrow ocular band scarcely above $\frac{1}{2}$ the width of the orbit, passing through the eye to the base of the ventral fin; a second, also narrow, from just anterior to the base of the dorsal, descends behind the base of the pectoral towards the anal; a third over commencement of free portion of tail, and occasionally a fourth at base of caudal fin, which is yellow.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

10. Genus **PSENES**, Cuv. & Val.

Branchiostegals six. Body compressed and elevated, with the frontal region swollen. Eyes lateral. Cleft of mouth shallow, with a short snout. A single row of fine teeth in the jaws, none on the palate. Two separate dorsal fins, the first continuous; the second the longer and similar to the anal, which last has two or three spines joined to the soft portion of the fin; no finlets. Lateral line unarmed. Air-bladder bifurcated posteriorly.

Geographical Distribution. Seas of India to the Malay Archipelago and beyond.

Some ichthyologists regard this genus as the type of a distinct family.

Synopsis of Indian Species.

- D. 9-10 | 1/24-25, A. 3/24-26, L. 1. 55. Leaden colour 1. *P. javanicus*, p. 184.
D. 10 | 1/14-15, A. 3/15, L. 1. 41-43. Silvery.. 2. *P. indicus*, p. 185.

950. (1.) *Psenes javanicus*. (Fig. 64.)

Psenes javanicus, Cuv. & Val. *H. N. Poiss.* ix, p. 264; *Day, Fish. India*, p. 537, pl. li C, fig. 1, *Suppl.* p. 790 (see synonym.).

D. 9-10 | 1/24-25. P. 19. A. 3/24-26. C. 17. L. 1. 55-60. L. tr. 15/18.

Length of head 4, height of body 3 in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ apart. Dorsal profile elevated, especially above the nostrils. Lower jaw slightly the longer. Cleft of mouth rather oblique. *Teeth*—of comparatively large size, in a single row in each jaw. *Fins*—first dorsal commences above hind edge of opercle, the spines

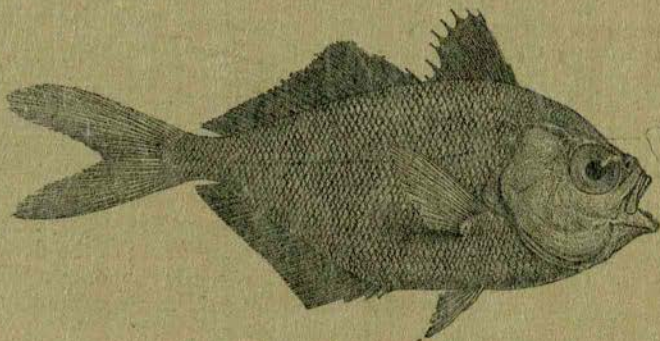


Fig. 64—*Psenes javanicus*.

are weak, the third longest, $\frac{2}{3}$ height of body, and equal to anterior dorsal rays, the interspinous membrane deeply emarginate. Second



dorsal highest anteriorly, the upper margin rather concave. *Scales*—small and cycloid. *Lateral line*—nearly straight. *Colour*—generally leaden, dorsal and anal fins black. Pectoral yellow. Caudal with a yellowish tinge.

Hab. Seas of India and Malay Archipelago. Not uncommon at Madras, but the largest specimen I obtained (October 1867) was $4\frac{1}{2}$ inches in length.

951. (2) *Psenes indicus*.

Cubiceps indicus, Day, *c.* Z. S. 1870, p. 690.

Psenes indicus, Day, *Fish. India*, p. 237, pl. liv, fig. 2 (see synonym.).

D. 10 | 1/14–15. P. 23 V. 1/5. A. 3/15. C. 18. L. 1. 41–43.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $2\frac{2}{3}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 in length of head, $\frac{1}{3}$ to $\frac{1}{2}$ diam. from end of snout, and about 1 apart. Abdominal profile rather more convex than dorsal; snout short. Lower jaw the longer; preopercle entire; opercle ending in a rounded point and spineless. *Fins*—dorsal spines feeble, from the second to the fifth subequal in length, $\frac{1}{3}$ higher than the soft dorsal fin. Pectoral as long as the head excluding the snout. Ventral reaches above halfway to the anal, the spines of which last are low. Caudal deeply forked. *Scales*—very deciduous; some extend on to soft dorsal, anal, and caudal fins. *Lateral line*—on a row of plate-like scales, the tubes branched posteriorly. *Colour*—silvery, with a purplish gloss. Spinous dorsal rather dark in its upper part.

Hab. Madras, where several specimens were captured in the sea (up to $4\frac{1}{2}$ inches in length) during the month of October.

11. Genus **EQUULA**, Cuv. & Val.

Syn. *Leiognathus*, Lacép.

Branchiostegals five or six; pseudobranchiæ. Body oblong, or elevated and strongly compressed. Mouth very protractile. Lower edge of preopercle serrated. Minute teeth of equal size in the jaws, sometimes in a single row; palate edentulous. A single dorsal fin, having fewer spines than rays; anal with 3 spines continuous with the soft portion, which has fewer rays than the soft dorsal; no finlets; ventrals thoracic. Scales small, cycloid, and sometimes deciduous. Lateral line unarmed, usually complete, but in some species ceasing beneath the middle or end of the dorsal fin. Air-bladder terminating anteriorly in two horns. Pyloric appendages few.

The species included in this genus are very similar to each other.

Geographical Distribution. Indian and Pacific Oceans.

Uses. These small fish are extensively sun-dried in India.

*Synopsis of Indian Species.*

- A. Longest dorsal spine not exceeding $\frac{1}{2}$ height of body.
- a. No black on spinous dorsal.
- Supraorbital edge serrated; chest scaleless 1. *E. edentula*, p. 186.
- Supraorbital edge not serrated; chest scaleless 2. *E. dussumieri*, p. 187.
- Supraorbital edge serrated; chest scaly 8. *E. lineolata*, p. 190.
- b. More or less black on spinous dorsal.
- a'. Dorsal profile more convex than abdominal, or both similar. Ventral extends more than halfway to anal.
- a''. Chest scaly.
- Height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in total length 3. *E. splendens*, p. 188.
- Height of body $2\frac{3}{4}$ to $3\frac{1}{4}$ in total length 6. *E. blochii*, p. 189.
- b''. Chest scaleless.
- Supraorbital edge not serrated 4. *E. daura*, p. 188.
- Supraorbital edge serrated 7. *E. brevirostris*, p. 190.
- b'. Abdominal profile more convex than dorsal. Ventrals small, extending only halfway to anal.
- a''. Height of body less than half total length.
- Sides not spotted 5. *E. bindus*, p. 189.
- Sides spotted 9. *E. psidiatrix*, p. 191.
- b''. Height of body half total length 10. *E. ruconius*, p. 192.
- B. Longest dorsal spine more than half height of body.
- Height of body $2\frac{1}{2}$ in total length 11. *E. fasciata*, p. 192.
- Height of body $3\frac{1}{2}$ to 4 in total length 12. *E. oblonga*, p. 193.

952. (1.) *Equula edentula*. (Fig. 65.)Scomber edentulus, *Bl. Ich.* t. 428.*Equula edentula*, *Day, Fish. India*, p. 238, pl. lii, fig. 1 (see synonym.)*Sorookoo nam karé*, Tam.; *Tanka chandee*, Oorah; *Nga-hpee-ma*, Burm.; *Nga oogyee*, Arracan.

B. v. D. 8/15-16. P. 20. V. 1/5. A. 3/14. C. 17. L. 1. 60.

Length of head 4, of caudal fin 4, height of body 2 to $2\frac{1}{4}$ in the total length. Eyes—diameter 3 in length of head, about 1 diam. from end of snout and also apart. Dorsal profile rather more convex than that of the abdomen; snout obtuse. Interorbital cavity anteriorly rather wide, not quite twice as long as broad. A pair of small spines at anterior upper angles of orbit; supraorbital edge minutely serrated. Lower edge of preopercle very finely serrated. Mandible very concave. Fins—dorsal spines moderately strong, the second arched, compressed, and nearly $\frac{3}{4}$ length of head; third and fourth spines anteriorly serrated in their lower



portions. Ventral nearly, or in the young quite, reaches to the anal. Second anal spine as long as head behind middle of eyes or a little more; third spine rather strongly serrated anteriorly in its lower half. *Scales*—small, but distinct, except on chest or breast, to a little above base of pectoral, where they are absent or indistinct; a large scale at base of ventral. *Lateral line*—with about 60 tubes: it first curves upwards, its highest point being below the third

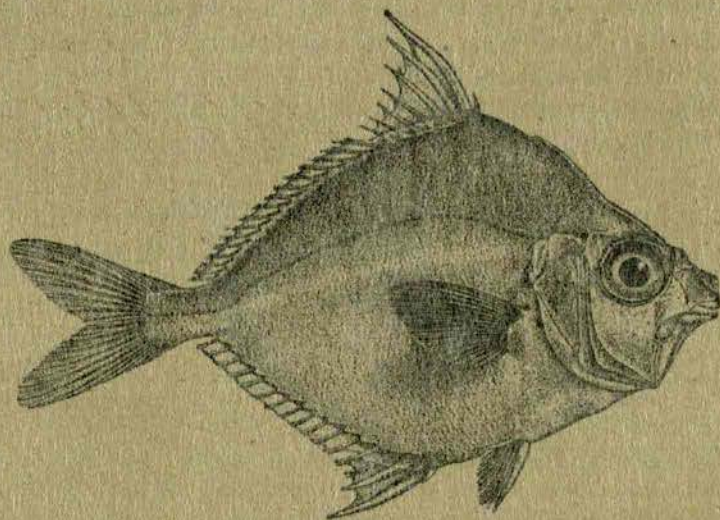


Fig. 65.—*Equula edentula*.

dorsal spine, then it arches to below end of dorsal fin. *Colour*—silvery, greyish along the lateral line; fine vertical lines from the back down the sides; the soft dorsal stained with grey on its upper edge; base of pectoral stained grey.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; attaining 10 inches and more in length. Ascending rivers far above tidal reach, but only apparently whilst young.

953. (2.) *Equula dussumieri*.

Equula dussumieri, *Cuv. & Val. H. N. Poiss.* x, p. 77, pl. 283; *Day, Fish. India*, p. 239, pl. lii, fig. 2 (see *synon.*).

Veri karé, Tam.

B. v. D. 8/16. P. 21. V. 1/5. A. 3/14-15. C. 17. L. 1. 65.

Length of head $4\frac{1}{4}$, of caudal fin $4\frac{1}{4}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $\frac{2}{5}$ of length of head, $\frac{3}{4}$ of a diameter from end of snout, and 1 apart. Dorsal and abdominal profiles equally convex. Interorbital cavity anteriorly rather broad, and not twice as long as wide. A pair of small spines at the anterior upper angle of the orbit. Orbital margin not serrated. Mandibles slightly concave below. Lower margin of preopercle rather strongly serrated. *Teeth*—fine, and in several rows in both jaws. *Fins*—second dorsal spine almost straight and as long as head excluding snout, third nearly as long; front edge of both third and fourth



spines serrated near the base. Ventral does not quite reach the anal. Second anal spine rather weak, it is as long as the head behind first third or middle of eye; third anal spine a little shorter than second and serrated anteriorly. Caudal forked. Scales—small but distinct, except on the breast and chest, which are scaleless. A moderately strong scale at base of ventral. Lateral line—in tubes which are distinct anteriorly, but run into one another behind. Colour—silvery, no black spot on dorsal fin; base of pectoral dark, sometimes black. Dark and narrow vertical lines pass from back over lateral line.

Hab. Seas of India to Malay Archipelago; attaining at least 8 inches in length.

954. (3.) *Equula splendens*.

Equula splendens, Cuv. *Règne Anim.* 2^e ed. 1829, ii, p. 212; *Day, Fish. India*, p. 239, pl. lii, fig. 3 (see synonym.).

Goomorah karah, Tel.; *Kulli karé*, Tam.

B. v. D. 8/16. P. 17. V. 1/5. A. 3/14. C. 17. L. 1. 55-60.

Length of head 4, of caudal fin $4\frac{1}{4}$, height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the total length. Eyes—diameter 3 in length of head, nearly 1 diam. from end of snout and also apart. Dorsal profile much more convex than abdominal. Snout obtuse. Interorbital cavity nearly twice as long as wide. A pair of fine spines, sometimes bifurcated, at anterior upper angle of orbit. Supraorbital edge rather coarsely serrated. Lower preopercular edge strongly serrated. Mandibles slightly concave. Teeth—in a single row in either jaw. Fins—dorsal spines strong, second about $\frac{1}{3}$ height of body, third strongly serrated along anterior edge of lower third, fourth and fifth also serrated. Ventral spine strong, the fin nearly reaches base of anal; second anal spine strong, about $\frac{1}{3}$ height of body, third serrated anteriorly along lower third. Caudal deeply forked. Scales—distinct, in irregular rows, and extended over the breast and chest; a large one at base of ventral. Lateral line—consisting of 60 or 70 short tubes, does not quite reach base of caudal fin. Colour—silvery, with a deep black blotch in upper half of spinous dorsal; a black mark over snout; axilla dark, and base of pectoral black posteriorly.

Hab. Red Sea, seas of India to the Malay Archipelago; attaining at least 5 inches in length.

955. (4.) *Equula daura*.

Equula daura, Cuv. *Règne Anim.* 2^e ed. 1829, ii, p. 212; *Day, Fish. India*, p. 240, pl. lii, fig. 4 (see synonym.).

Dacer karah, Tel.; *Rama karé*, Tam.

B. v. D. 8/15-16. P. 20. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $2\frac{3}{4}$ in the total length. Eyes—diameter 3 in length of head, 1 diam. from



end of snout, and nearly 1 apart. Dorsal profile slightly more convex than abdominal. Interorbital cavity a little more than twice as long as wide. A pair of very small spines at the anterior upper angle of the orbit. Orbital edge not serrated. Mandibles slightly concave; lips thick. Lower preopercular margin finely serrated. *Fins*—dorsal spines of moderate strength, the second nearly $\frac{1}{2}$ height of body, the third slightly serrated anteriorly near base. Ventral does not reach anal. Anal spines comparatively weak, the second $\frac{3}{10}$ height of body, the third serrated anteriorly in lower third. Caudal forked. *Scales*—small but distinct, none on breast or chest; an elongate one at base of ventral. *Lateral line*—with about 60 short tubes, placed on rounded plate-like scales; it does not extend on to caudal fin. *Colour*—silvery, with a golden stripe along side. A dark line along base of dorsal; a darkish triangular spot between occiput and dorsal fin; upper half of spinous dorsal black from second to fifth spines.

Hab. Ceylon and Coromandel coast to the Malay Archipelago; attaining at least 5 inches in length.

956. (5.) *Equula bindus*.

Equula bindus, Cuv. & Val. *H. N. Poiss.* x, p. 78; *Day, Fish. India*, p. 240 (see synonym.).

Bindoo-karah, Tel.; *Tatnam karé*, Tam.

B. iv. D. 8/16. P. 15. V. 1/5. A. 3/15.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{4}$, height of body $2\frac{1}{3}$ in the total length. Abdominal profile more convex than dorsal, which is rather concave over orbits. *Fins*—second dorsal spine equal to about $\frac{1}{3}$ height of body. Ventrals short, scarcely reaching half-way to anal (Russell did not detect any spine in them). Second anal spine weaker and a little shorter than second dorsal. *Colour*—silvery olive over nape, fins hyaline, upper third of spinous dorsal orange, edged inferiorly with black.

Hab. Coromandel coast.

957. (6.) *Equula blochii*.

Equula blochii, Cuv. & Val. *H. N. Poiss.* x, p. 84; *Day, Fish. India*, p. 241, pl. lii, fig. 5 (see synonym.).

B. v. D. 8/16. P. 18. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{3}{4}$ to 5, height of body $2\frac{3}{4}$ to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, from $\frac{3}{4}$ to 1 apart. Dorsal profile rather more convex than abdominal, a slight concavity over occiput; the snout rather pointed and not truncated. Upper surface of orbit serrated; the serrations appear to become obsolete in some old specimens; a pair of small spines at the anterior upper angle. Lower edge of preopercle strongly serrated. Cavity on upper surface of head at least twice as long as wide. *Teeth*—in a single row in the



2
jaws. *Fins*—dorsal spines moderate, the second rather the longest and equal or nearly equal to $\frac{1}{2}$ height of body; the third and fourth serrated anteriorly in their lower halves. Ventral reaches to the anal. Second anal spine $\frac{4}{9}$ height of body; the third finely serrated anteriorly. *Scales*—on body (except base of pectoral fin), breast, and chest; a rather large one at base of ventral. *Lateral line*—with about 60 tubes, situated on rounded scales. *Colour*—silvery, with a dark brown blotch over nape, and a black mark in upper half of spinous dorsal fin from third to sixth spines. Vertical zigzag yellow lines on back and sides, which soon fade after death; base of pectoral posteriorly dark-coloured.

Hab. Seas of India; common. I have this fish from Bombay, Malabar, Madras, Calcutta, and Akyab, and many young from the Sundarbans.

958. (7.) *Equula brevirostris*.

Equula brevirostris Cuv. & Val. H. N. Poiss. x, p. 83; Day, Fish. India, p. 241 (see synonym.).

B. v. D. 8/16. P. 18. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{1}{3}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter nearly $2\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Body oval, dorsal and abdominal profiles equally convex; snout pointed, not obtuse except just at its anterior extremity. Interorbital cavity nearly twice as long as broad. A pair of well-developed spines at anterior upper angle of eye; supraorbital edge finely serrated. Lower jaw very concave below. Lower limb of preopercle finely serrated. *Teeth*—in a single fine row in either jaw. *Fins*—dorsal spines moderately strong and compressed, second $\frac{4}{9}$ (sometimes $\frac{1}{3}$) height of body; third strongly serrated in its lower half, fourth in its lower fourth. Ventral reaches $\frac{2}{3}$ to anal. Second anal spine $\frac{2}{3}$ height of body, the third strongly serrated in lower half. Caudal forked. *Scales*—over body but not on breast or chest. *Lateral line*—with from 58 to 64 distinct tubes, not quite reaching to base of caudal fin. *Colour*—an oval black blotch on upper half of spinous dorsal, from third to seventh spine (it is sometimes very faint), and a dark brown transverse blotch across nape of neck. Pectoral posteriorly black at its base. A narrow yellow band from above the eye to centre of base of caudal.

Hab. Seas of India to China; attaining at least $4\frac{1}{2}$ inches in length.

959. (8.) *Equula lineolata*.

Equula lineolata, Cuv. & Val. H. N. Poiss. x, p. 86; Day, Fish. India, p. 241, pl. li C, fig. 3 (see synonym.).

B. v. D. 8/16. P. 19. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{4}$, of caudal $4\frac{2}{3}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Body oblong; dorsal and abdominal profiles



equally convex, a slight concavity over occiput. Interorbital cavity at least twice as long as wide. A pair of minute spines over anterior third of orbit; supraorbital edge serrated or only a little rough to the feel. Inferior edge of mandible very slightly concave. Lower edge of preopercle minutely serrated. *Teeth*—fine and in a single row. *Fins*—dorsal spines weak, the second arched, and $\frac{1}{2}$ to $\frac{3}{4}$ height of body, the third and fourth anteriorly serrated in their lower halves. Ventral does not quite reach anal. Second anal spine arched, $\frac{1}{3}$ to $\frac{2}{5}$ height of body, the third spine anteriorly serrated. Caudal forked. *Scales*—small but distinct, present on breast and chest. *Lateral line*—disappears nearly at end of free portion of tail; it consists of above 60 tubes placed on a row of plate-like, rounded scales. *Colour*—silvery, with vertical zigzag lines passing down the back; base of pectoral black behind; upper edge of dorsal darkish.

Hab. Seas of India to the Malay Archipelago.

960. (9.) *Equula insidiatrix*.

Zeus insidiator, Bloch, *Ich. t.* 192, figs. 2, 3.

Equula insidiatrix, Day, *Fish. India*, p. 242, pl. li C, fig. 5 (see synonym.).

Paarl coorchee, Mal.

B. v. D. 8-9/16-17. P. 18. V. 1/5. A. 3/14. C. 17.

Length of head from $4\frac{3}{4}$ to 5, of caudal fin 5, height of body $2\frac{1}{2}$ to $2\frac{3}{5}$ in the total length; (the young are much more elongate). *Eyes*—diameter $2\frac{1}{3}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{3}{4}$ to 1 apart. Abdominal profile more convex than dorsal. Premaxillaries very protractile. When fully protracted the mouth remains directed somewhat upwards, when closed the mandible is almost vertical and not concave. Interorbital cavity triangular. Middle third of supraorbital edge finely serrated. One or two minute supraorbital spines directed backwards at the anterior upper edge of the orbit; the external, when two are present, the stronger. Lower edge of preopercle minutely serrated, occasionally almost smooth. *Teeth*—minute, in 1 or 2 rows. *Fins*—dorsal spines weak, smooth; the first minute, the second, third, and fourth subequal in length and $\frac{1}{3}$ height of body. Second anal spine equal to diameter of orbit. Ventral minute, reaching halfway to anal. Caudal forked. *Scales*—minute over the body, breast, and chest, but not at base of pectoral fin. *Lateral line*—nearly parallel with back and generally lost near the tail, but sometimes as far forward as below middle or last third of dorsal. *Colour*—back bluish silver, abdomen whitish silver, the whole glossed over with a slightly golden tint. Upper surface of head, cheeks, and lower jaw burnished silver, often a black streak from eye to throat, joining that of opposite side; a dark mark in axilla. Three or four horizontal lines of black spots, with bronze reflexions, form from eight to ten vertical bands descending along upper half of body.



S. is dorsal tipped with black; ventral white; pectoral light yellow; caudal yellowish, and stained at the end with brown.

Hab. Seas of India and the Malay Archipelago; said to be occasionally captured in fresh water.

961. (10.) *Equula ruconius*.

Chanda ruconius, *Ham. Buch. Fish. Ganges*, pp. 106, 371, pl. xii, fig. 35.

Equula ruconius, *Day, Fish. India*, p. 242, pl. li C, fig. 4 (see synon.).
Jitaku, Maráthi.

B. v. D. 8/16. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{3}{4}$, height of body 2 in the total length ($1\frac{1}{2}$ to $1\frac{2}{3}$ in the young). *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Dorsal profile much more convex than abdominal, a concavity over occiput. Premaxillaries very protractile; the mouth as in *E. insidiatrix*. Posterior half of supraorbital edge minutely serrated; one or two spines close to hind nostril. Lower edge of preopercle serrated, most coarsely anteriorly. *Teeth*—in a single, minute, and deciduous row. *Fins*—second dorsal spine longest, $\frac{2}{3}$ height of body, the third serrated anteriorly in lower third. Ventral reaches halfway to anal, second anal spine equals diameter of orbit. Caudal forked. *Scales*—very deciduous, apparently often absent throughout and usually so above the lateral line; they are from two to three times the size of those in *E. insidiatrix*, and are often extended on to the chest. *Lateral line*—in single tubes, usually ceasing below middle of soft dorsal, but sometimes continued to its last third. *Colour*—back bluish silvery, abdomen silvery white. A well-marked black streak from anterior edge of eye to throat, joining that of opposite side. A dark spot on upper part of opercle, back of base of pectoral black. Vertical lines of black marks having bronze reflexions descend down the upper third of the body and are often subdivided into spots. Spinous dorsal tipped with black.

Hab. Seas of India to the Malay Archipelago and beyond.

962. (11.) *Equula fasciata*.

Clupea fasciata, *Lacép. H. N. Poiss.* v, p. 460.

Equula fasciata, *Cuv. & Val. H. N. Poiss.* x, p. 96; *Day, Fish. India*, p. 243, pl. li C, fig. 2 (see synon.).

Karah, Tel.; *Katáti* Maráthi.

B. v. D. 8/16. P. 19. V. 1/5. A. 3/14. C. 17. Cæc. pyl. 3.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 4, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and nearly 1 apart. Dorsal profile rather more convex than abdominal. A concavity over occiput. Interorbital cavity nearly twice as long as wide. A pair of spines above the anterior upper angle of orbit. Orbital edge not serrated. Lower



edge of preopercle nearly straight and very finely serrated. Mandible slightly concave below. *Teeth*—in a single row in the upper jaw; in villiform bands in the lower. *Fins*—dorsal spines of moderate strength, second elongate, usually about $\frac{4}{5}$ as high as body, third and fourth serrated anteriorly. Ventral reaches $\frac{3}{4}$ of the way to the anal. Second anal spine strong, about $\frac{2}{3}$ height of body but sometimes much longer. Caudal forked. *Scales*—cover body, absent or exceedingly indistinct on chest. *Lateral line*—consists of about 65 tubes, it ceases just before the base of the caudal fin. *Colour*—silvery, with irregular vertical streaks on the body.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond.

963. (12.) *Equula oblonga*.

Equula oblonga, Cuv. & Val. II, N. Poiss. x, p. 85; Day, *Fish. India*, p. 243 (see synon.).

B. v. D. 8/16-17. P. 16. V. 1/5. A. 3/14-15. C. 16.

Length of head 4 to $4\frac{1}{2}$, of caudal fin $5\frac{1}{3}$, height of body $3\frac{1}{2}$ to 4 in total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and 1 apart. Abdominal profile rather more convex than dorsal. Snout rather pointed. Interorbital cavity much longer than wide. Orbital edge not serrated; two spines above anterior edge of eye. Lower preopercular edge finely serrated. Lower edge of mandible slightly concave. *Teeth*—in a single row in either jaw. *Fins*—dorsal spines moderately strong, second $\frac{2}{3}$ height of body. Ventral reaches $\frac{2}{3}$ of way to anal, second spine of latter $\frac{1}{2}$ height of body. Caudal forked. *Scales*—very minute, none on chest. *Colour*—greyish on back, becoming silvery below; a silvery band along the side, irregular angular bands over the back to as low as the lateral line. No black on dorsal fin.

Hab. Red Sea, seas of India to Malay Archipelago and beyond.

12. Genus *GAZZA*, Rüpp.

Branchiostegals five; pseudobranchiæ. Body oblong, elevated, and compressed. Mouth very protractile. Lower preopercular margin serrated. Teeth, a pair of canines besides a row of pointed teeth in the upper, a conical row in the lower jaw. A single dorsal fin, having fewer spines than rays; anal with three spines continuous with the soft portion, which has fewer rays than the soft dorsal; no finlets. Lateral line unarmed.

Geographical Distribution. Red Sea, seas of India to the Malay Archipelago and beyond.

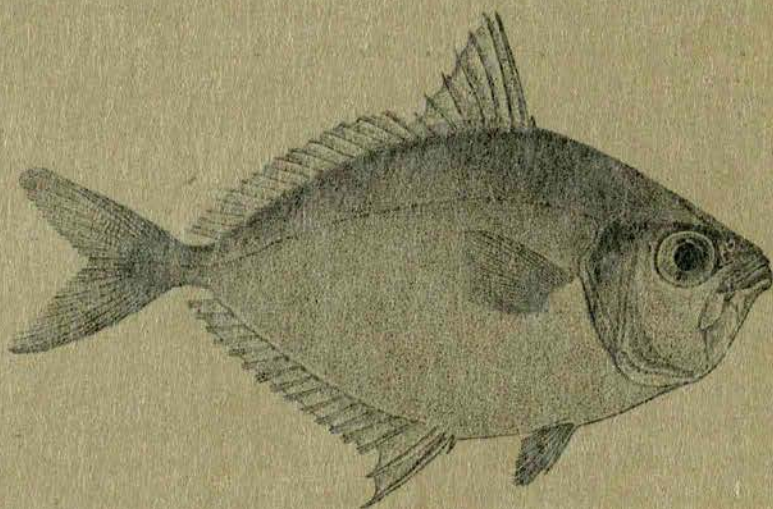
Synopsis of Indian Species.

- | | |
|--|-------------------------------------|
| Silvery, eyes $\frac{3}{4}$ diameter apart | 1. <i>G. minuta</i> , p. 194. |
| Silvery, eyes 1 diameter apart | 2. <i>G. equulaformis</i> , p. 194. |
| Greyish with dark lines, long rows of scales. | 3. <i>G. argentaria</i> , p. 195. |

964. (1.) *Gazza minuta*. (Fig. 66.)*Scomber minutus*, *Bl. Ich.* t. 429, fig. 2.*Gazza minuta*, *Day, Fish. India*, p. 244, pl. liii, fig. 1 (see *synon.*).*Kotoo kare*, Tam.; *Komah-karah*, Tel.; *Gar-chum*, Belooch.

D. 8/16. P. 17. V. 1/5. A. 3/14. C. 19.

Length of head $3\frac{2}{3}$, of caudal fin $4\frac{2}{3}$ to 5, height of body $2\frac{1}{4}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{2}{3}$ to $2\frac{3}{4}$ in length of head, $\frac{2}{3}$ diam. from end of snout, and $\frac{3}{4}$ apart. Supraorbital edge serrated, two spines above anterior third of eye. Lower edge of preopercle coarsely serrated, especially anteriorly. *Teeth*—a pointed row in premaxillaries, and two canines opposite the symphysis; villiform in the lower jaw, with an outer row of large conical ones, increasing in size with age. *Fins*—dorsal spines weak, the second and third about the same height, and $\frac{3}{4}$ of that

Fig. 66.—*Gazza minuta*.

of the body. Ventral reaches $\frac{2}{3}$ of way to the anal. Second anal spine from $\frac{2}{7}$ to $\frac{1}{3}$ height of body. *Scales*—on body, but absent from chest or very inconspicuous. *Lateral line*—on a row of plate-like scales and in about 60 tubes, it ceases either below end of dorsal or close to base of caudal fin. *Colour*—silvery, with irregular bluish or yellowish lines descending from back to lateral line, the axilla black; anterior portion of dorsal fin dark.

Hab. Seas of India to the Malay Archipelago and beyond.

965. (2.) *Gazza equulæformis*.*Gazza equulæformis*, *Rüpp. N. W., Fische*, p. 4, t. i, fig. 3; *Day, Fish. India*, p. 244 (see *synon.*).

B. v. D. 8/16. P. 15. V. 1/5. A. 3/14. C. 17.

Length of head $3\frac{1}{2}$ to 4, of caudal fin 4, height of body $2\frac{1}{3}$ to



3 in the total length. *Eyes*—diameter $2\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Dorsal and abdominal profiles about equally convex. Supraorbital edge serrated, sometimes coarsely so, two spines above front third of each eye. Inferior surface of mandible scarcely concave. Lower margin of preopercle rather strongly serrated. *Teeth*—a row of pointed ones in the upper jaw, having two canines in the median line; villiform in the lower jaw, with an outer row of curved and pointed ones, which increase in size anteriorly, becoming like canines on either side of the symphysis. *Fins*—dorsal spines weak, second and third about the same length, and from $\frac{1}{2}$ to $\frac{3}{4}$ height of body. Ventral reaches $\frac{2}{3}$ of way to anal. Second anal spine stronger than those of the dorsal, and about $\frac{1}{2}$ height of body, the third rough anteriorly in its lower third. Caudal forked. *Scales*—over body, none on breast and chest. *Lateral line*—in single tubes, ceasing opposite last third of soft dorsal. *Colour*—greyish along back, silvery on sides and beneath, zigzag irregular bluish bands descend from back to as low as lateral line. Spinous dorsal fin with brown spots, especially between second and third spines; axilla usually brown or black. The young have a silvery band along the sides.

Hab. Red Sea, seas of India to the Malay Archipelago; attaining at least 6 inches in length. Very common along all the coasts of India as far as Sind.

966. (3.) *Gazza argentaria*.

Zeus argentarius, Bl. Schn. Syst. Ich. p. 96.

Gazza argentaria, Day, Fish. India, Suppl. 1888, p. 790.

Psani pare, Tamil.

Length of head $3\frac{1}{2}$ to 4, of caudal fin 5, height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the total length. *Eye*—diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout. *Teeth*—canines of moderate size. *Fins*—first dorsal higher than second. *Colour*—body greyish, with some dark lines along the rows of scales; light-coloured on the chest; dorsal, anal, and ventral fins nearly black, caudal of a dull yellow.

Hab. Red Sea, Madras to the Malay Archipelago.

13. Genus *LACTARIUS*, Cuv. & Val.

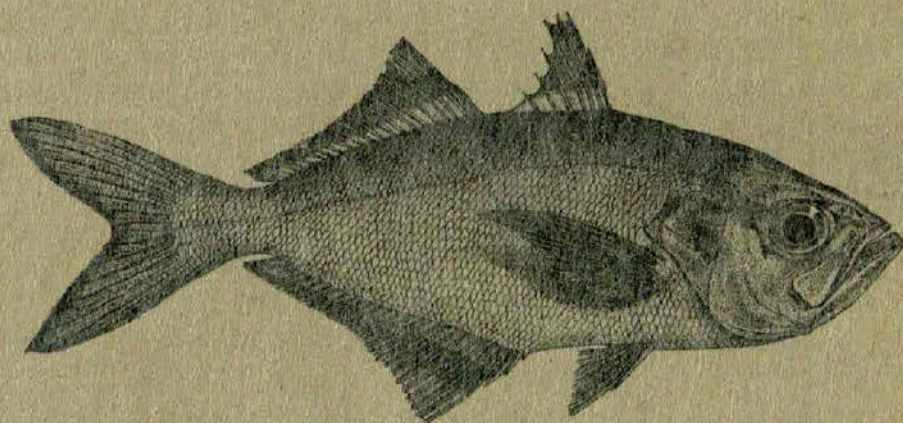
Branchiostegals seven; pseudobranchiæ. Body oblong, compressed. Eyes lateral. Cleft of mouth deep, with the lower jaw prominent. Preopercular margins entire. Teeth in jaws small, with one or two pairs of strong canines. Two dorsal fins, the first with seven or eight feeble spines, second and the anal with many rays; anal with three spines joined to the remainder of the fin. Scales cycloid, of moderate size, some over the second dorsal and anal fins. Lateral line continuous, unarmed. Air-bladder bifurcated both anteriorly and posteriorly. Pyloric appendages few.

Geographical Distribution. Seas of India to the Malay Archipelago.

967. (1.) *Lactarius delicatulus*. (Fig. 67.)*Scomber lactarius*, *Bl. Schn. Syst. Ich.* p. 31.*Lactarius delicatulus*, *Cuv. & Val. H. N. Poiss.* ix, p. 238; *Day, Fish.**India*, p. 245, pl. liii, fig. 2 (see synonym.).*Purruwah*, Mal; *Sudummu*, Telugu (Gopālpur); *Nga thong toong*, Arracan.

D. 7-8 | 1/21-22. P. 17. A. 3/25-28. C. 17. L. 1. 74-80. C. p. 6.

Length of head 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and $\frac{4}{5}$ apart. Mouth oblique and large. Preorbital narrower than the maxillary; preopercle narrow, with its angle rounded. Opercle ending in a soft point. Interorbital space convex. Occipital crest well developed, the lateral ridges moderately so. *Teeth*—a curved canine on each side of the symphysis of the upper jaw, and a single lateral row; a central canine (occasionally two) in lower

Fig. 67.—*Lactarius delicatulus*.

jaw, and laterally a single row of curved teeth. Teeth on vomer, palatines, and tongue. *Fins*—first dorsal spine weak, the third longest; membrane rather deeply notched. Second dorsal highest anteriorly, where it nearly equals the first dorsal. Anal similar to second dorsal. In many specimens taken in Malabar, the anal rays were invariably 26, but amongst several taken in Madras they were in all instances 28. Caudal rather deeply lobed. *Lateral line*—in short single tubes. *Colour*—upper surface of head and back as low as lateral line lead-colour; a black spot on upper and posterior part of opercle. Fins diaphanous, marginal halves of dorsals and caudal minutely dotted with black, sometimes the base is also dark. Iris silvery, upper portion darkish.

Hab. Seas of India, Malay Archipelago, and China. Grows to at least 10 inches in length, is eaten by the natives either fresh or salted, but is insipid. It appears in Malabar in shoals during the months of February and March, but a few are present throughout the year.



Family XVIII. STROMATEIDÆ.

Gill-openings wide. Eyes lateral. The infraorbital bones do not articulate with the preopercle. Small teeth in the jaws, palate edentulous; barbed teeth extend into the œsophagus. One long dorsal fin without any distinct spinous division, or with rudimentary spines anteriorly; ventrals, when present, thoracic. No prominent papilla near the vent. Air-bladder, when present, small. Pyloric appendages few, in moderate numbers, or numerous. Vertebrae exceed 10 in the dorsal and 14 in the abdominal region.

Geographical Distribution. Most tropical and temperate seas. One genus only.

1. Genus STROMATEUS, Artedi.

Syn. *Peprilus*, Cuv.; *Apolectus*, *Seserinus*, Cuv. & Val.; *Stromateoides*, Bleeker; *Chondrophites* and *Peronotus*, Gill.

Branchiostegals five to seven; pseudobranchiæ. Body compressed, more or less elevated. Cleft of mouth narrow or of moderate depth. Teeth small, in a single row in the jaws. A single long dorsal and anal fin, with rudimentary spines anteriorly; ventral fins not present in adults. Scales small, covering the vertical fins. Lateral line, as a rule, smooth (keeled in *S. niger*). Air-bladder absent. Pyloric appendages numerous.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Species.

A. Lateral line not keeled.

Height of body much more than half total length. No spines before dorsal or anal . . . 1. *S. sinensis*, p. 197.

Height of body about half total length. Short spines before dorsal and anal 2. *S. cinereus*, p. 198.

B. Hindermost portion of lateral line keeled.

Height of body $\frac{1}{4}$ to $\frac{1}{3}$ total length 3. *S. niger*, p. 199.

968. (1.) *Stromateus sinensis*.

Stromateus sinensis, *Euphrasin*, *Vetensk. Acad. Nya Handl. Stockh.* ix, p. 49, t. ix; *Day, Fish. India*, p. 246, pl. li C, fig. 6 (young) (see synon.).

Atoo koia, Tel.; *Vella arwoolee*, Mal.; *Mogang voval*, Tam.; *Chándava*, Maráthi; *Omalyta*, Arabi; *White pomfret*.

B. vi. D. 43-50. P. 25. A. 39-42. C. 19.

Length of head $4\frac{1}{2}$ to 5, of pectoral $3\frac{1}{2}$ to 4, of caudal $4\frac{1}{2}$ to 5, height of body $1\frac{1}{2}$ to $1\frac{2}{3}$ in the total length. Eyes—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{2}{3}$ to 1 diam. from end of snout, and $1\frac{2}{3}$ apart. Dorsal and abdominal profiles about equally convex.



The lower jaw the longer, especially in young specimens. *Teeth*—becoming lost with age. *Fins*—first four or five dorsal spines very short, and not appearing above the skin, anterior portion of fin similar to that of anal and equal to length of pectoral. First five anal spines short and not appearing above skin. Caudal with equal lobes, in the young slightly emarginate. *Scales*—small and very deciduous, especially in the immature, in adults they cover the vertical fins. *Colour*—upper surface of head and body as far as the lateral line of a deep neutral tint, the rest of body brownish grey, with metallic reflections, becoming lighter and silvery towards the abdomen; body dotted all over with brown, the larger spots having a silvery point in their centre. Fins silvery grey, the marginal half blackish. Cavity of mouth and tongue pale bluish grey with brown dots, silvery in the centre. Iris reddish silver or copper-coloured, minutely dotted with brown. The young are grey, the head covered with irregular star-shaped spots, and the fins nearly black, especially at their edges.

Hab. Seas of India, Malay Archipelago, and China. This species of Pomfret is that most esteemed for eating; in Malabar it is by no means rare during the S.W. monsoon (from June till September). It should be cooked when quite fresh. The young are common round the coasts and ascend estuaries. I found them numerous during March in the Sundarbans.

969. (2.) *Stromateus cinereus*. (Fig. 68.)

Stromateus cinereus, Bloch, *Ich.* xii, p. 90, t. 420 (semi-adult);
Day, Fish. India, p. 247, pl. liii, fig. 3 (see synon.).

Sudi sandawah, *Tella sandawah*, Tel.; *Vella voval*, Tam.; *Saranga*, Marathi; *Rocjana*, Arracan; *Roop chanda*, Chittagong; *Nga moo* and *Nga pamoung*, Burmese; *Silver pomfret* (immature); *Grey pomfret* (adult).

B. vii. D. 5-9 | 1/38-43. P. 27. A. 5-6 | 1/32-41. C. 19.

Length of head 4 to $4\frac{1}{2}$, of pectoral $2\frac{1}{2}$ to $2\frac{2}{3}$, height of body $1\frac{1}{3}$ to $1\frac{2}{3}$ in the total length excluding the caudal fin. *Eyes*—diameter 4 to 5 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ to 2 apart. Snout projecting over the mouth. *Fins*—the dorsal and anal spines appear in a truncated form above the skin; anterior portion of soft dorsal elevated, but not to so great an extent as the anterior part of the anal, which in the immature reaches to below middle of caudal fin, but as age advances gradually becomes shorter. Pectoral rather pointed. Caudal deeply forked, the lower lobe much the longer in the immature, sometimes being twice as long as the upper. *Colour*—upper surface of head and back as low as lateral line greyish neutral tint with purplish reflexions, sides of head and body silvery grey, fading to white on abdomen, and everywhere covered with minute black dots; a dark spot on upper portion of opercle. Dorsal and anal grey minutely dotted with black, the outer half darker. Caudal and pectoral yellowish white, also



minutely dotted with black, the outer half darker. Iris silvery. The young are much darker, the vertical fins being nearly black.

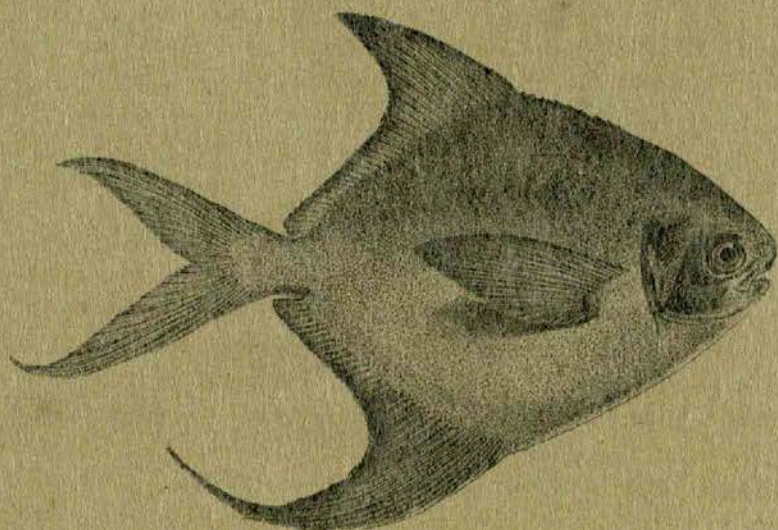


Fig. 68.—*Stromateus cinereus*.

Hab. Seas of India to the Malay Archipelago and beyond; attaining at least a foot in length.

970. (3.) *Stromateus niger*.

Stromateus niger, Bloch, *Ich.* t. 422; Day, *Fish. India*, p. 247, pl. liii, fig. 4 (see synonym.).

| *Sarangu*, Maráthi; *Nala-sanda-wah*, Tel.; *Baal*, Ooriah; *Curroopooroval*, Tam.; *Kar-arwoolee*, Mal.; *Ko-lig-dah*, And.

B. vii. D. 5/42-44. P. 22. A. 3/35-39. C. 19.

Length of head $4\frac{1}{2}$, of caudal 4, height of body $2\frac{1}{2}$ to 3 in total length. *Eyes*—diameter $4\frac{1}{4}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and nearly 2 apart. The lower jaw the longer. *Fins*—dorsal and anal much elevated in front, very low behind, with concave margins. Pectoral $\frac{1}{2}$ longer than head, and falciform: ventrals only apparent in the young; in a specimen $3\frac{3}{10}$ inches in length they are jugular and $\frac{1}{8}$ total length. The spines, before the dorsal and anal fins, which are concealed in the adult fish, are apparent in young specimens. *Lateral line*—gently curves downwards, its last fourth passes straight to middle of tail, in the form of a raised keeled line with lateral shields as in the genus *Caranx*. *Colour*—deep brown or greyish brown with blue reflexions; cheeks, opercles, and abdomen pale neutral or brownish neutral. Dorsal and anal greyish brown, stained black towards their margins; pectoral and caudal brownish, edged with black. Iris brownish blue; in the young grey. The dorsal and anal fins black, and the tail yellow, with three brown cross bands.

Hab. Seas of India to the Malay Archipelago and China. Grows to two feet in length and is excellent eating. It appears in Malabar about the same time as *S. sinensis*; it comes in shoals, and disappears as suddenly as it arrives.



Family XIX. CORYPHÆNIDÆ.

Gill-openings wide. Eyes lateral. The infraorbital bones do not articulate with the preopercle. One long dorsal fin, without distinct spinous division; ventrals thoracic (except in *Pteraclis*, when they are jugular). No prominent papilla near the vent. Air-bladder present or absent. Pyloric appendages few or many. Vertebrae exceed 10/14.

Geographical Distribution. Pelagic, throughout tropical and temperate seas.

Synopsis of Indian Genera.

Dorsal fin commencing on occiput; scales present 1. CORYPHÆNA.
Dorsal fin commencing on the back; scales absent 2. MENE.

1. Genus CORYPHÆNA, Linn.

Syn. *Lampugus* (immature), Cuv. & Val.

Branchiostegals seven; pseudobranchiæ absent. Body rather elongate and compressed. Preopercle entire. Teeth in the jaws, on vomer, palatines, and tongue. A single long dorsal fin extending from the occiput nearly to the caudal, but without distinct spines, neither are they apparent in the anal; ventral thoracic and well developed. Scales small, cycloid. Air-bladder absent. Pyloric appendages numerous.

Geographical Distribution. Seas of temperate and tropical regions.

971. (1.) *Coryphæna hippurus*. (Fig. 69.)

Coryphæna hippurus, Linn. *Syst. Nat.* p. 446; Day, *Fish. India*, p. 248, pl. liii, fig. 6 (see synonym.).

Badahlan, Tam.; *Dolphin*.

D. 58-63. P. 21. V. $1\frac{1}{5}$. A. 25-27. C. 19.

Length of head $5\frac{1}{2}$ to 6, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. Eyes—diameter 4 to 6 in length of head, 3 diam. from end of snout, and $1\frac{1}{2}$ apart. Body elongate and compressed; occipital crest well developed. Cleft of mouth rather oblique, the lower jaw the longer. Teeth—in numerous villiform rows in either jaw, with an outer somewhat enlarged row. Fins—dorsal commences over posterior edge of orbit, first 7 or 8 rays gradually increase in length, last in fin not quite $\frac{1}{2}$ length of highest, the fin reaches to within a short distance of root of caudal. Pectoral falcate; the anal is highest in front, but after the third or fourth ray its margin becomes parallel with the abdomen; caudal with



deeply pointed lobes. *Lateral line*—curved to opposite the end of the pectoral, thence it goes straight to middle of tail. *Colour*—back greyish, shot with gold; abdomen golden, covered with

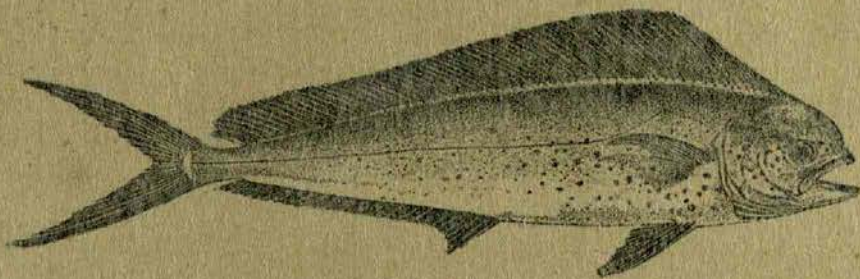


Fig. 69.—*Coryphæna hippurus*.

blue spots, which become black after death; dorsal fin light blue at the base, becoming black towards the summit.

Hab. All tropical and subtropical seas. Attaining 5 feet or more in length. This fish, the dolphin of sailors, is not uncommon in Madras, and is eaten by the natives.

2. Genus **MENE**, Lacép.

Branchiostegals seven. Body oval, strongly compressed, with a prominent and sharp-edged abdomen. Mouth very protractile. Villiform teeth in the jaws, palate edentulous. A single long dorsal fin, commencing on the back and extending nearly to the caudal; anal spineless, having many rays which are enveloped in skin and have very broad free extremities; ventrals thoracic, $1/5$, the first ray very elongate. Scales absent. Air-bladder large and bifurcated posteriorly. Pyloric appendages numerous.

972. (1.) **Mene maculata**. (Fig. 70.)

Zeus maculatus, Bl. Schn. Syst. Ich. p. 95, pl. 22.

Mene maculata, Day, Fish. India, p. 249, pl. liii, fig. 5 (see synon.).

Ambutan parah and *Amatti katti*, Tam., i. e. "rasor," Jerdon.

D. 3-4/40-43. P. 15. V. $1/5$. A. 30-33. C. 18. Cæc. pyl. 25-30.

Length of head 4, of caudal fin 4, height of body $1\frac{3}{4}$ to 2 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, $\frac{4}{5}$ diam. apart, and 1 to $1\frac{1}{3}$ from end of snout. Mouth oblique, the lower jaw projecting, cleft twice as long as the gape; anterior portion of upper jaw formed by premaxillaries, the maxilla smooth and S-shaped. Opercles entire. Occipital crest high. *Fins*—first few dorsal rays undivided and more elevated than remainder. Pectoral rays flat; ventral spine short, the first ray compressed and very long. Anal rudimentary, its rays forming short, wide, and flat processes; caudal deeply lobed. *Lateral line*—sometimes ceasing below end of dorsal fin, or dividing into two branches, the lower of which descends on reaching the upper caudal lobe. *Colour*



—deep blue along the back, becoming silvery white on the sides and abdomen; two or three rows of large spots along the body above the level of the pectoral fin.

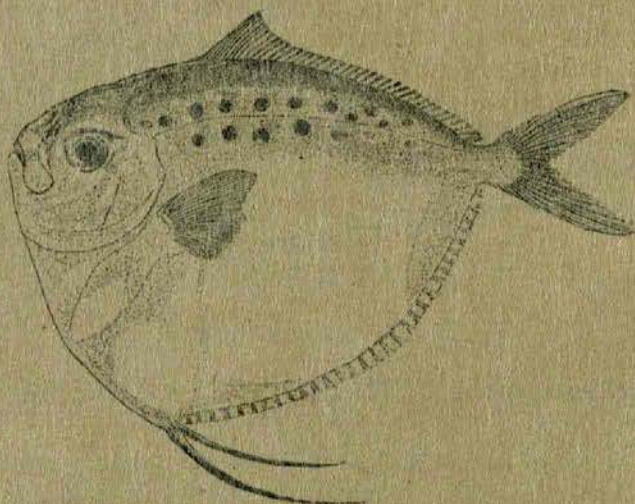


Fig. 70.—*Mene maculata*.

Hab. Seas of India to the Malay Archipelago and beyond; attaining at least $8\frac{1}{2}$ inches in length.

Family XX. SCOMBRIDÆ.

Gill-openings wide; eyes lateral. The infraorbital bones do not articulate with the preopercle. Teeth present in the jaws, absent or present on the palate. Two dorsal fins, the first distinct from the second, which has more rays than the first has spines; finlets present or absent; ventrals thoracic (jugular in *Hypsiptera*); no prominent papilla near the vent. Side of tail sometimes keeled. Scales, if present, small. Air-bladder present or absent. Pyloric appendages moderate, numerous, or dendritical. Vertebrae exceed 10/14.

Synopsis of Indian Genera.

- A. From 5 to 10 finlets behind both dorsal and anal.
 - a. Teeth small, body scaled throughout; 2 low ridges on each side of tail 1. SCOMPER.
 - b. Teeth small, scales on anterior portion of body only, a single longitudinal ridge on each side of the tail.
 - Vomerine and palatine teeth present 2. THYNNUS.
 - Vomerine teeth wanting, palatine present 3. PELAMYS.
 - c. Teeth larger, scales rudimentary or wanting 4. CYBIUM.
- B. No finlets.
 - First dorsal replaced by free spines 5. ELACATE.
 - First dorsal replaced by an adhesive disk 6. ECHENKIS.

1. Genus **SCOMBER**, Artedi.

Branchiostegals seven; pseudobranchiæ. Body rather elongate and compressed. Eyes with adipose lids. Cleft of mouth deep. Small deciduous teeth in the jaws; and in some cases on the vomer and palatine bones. Two dorsal fins, the first spinous and separated by an interspace from the second, behind which and also behind the anal are five or six finlets; the spines in the first dorsal less numerous than the rays in the second or in the anal. Ventrals thoracic. Two slight keels on either side of the root of the caudal fin. Scales small. Air-bladder, when present, simple. Pyloric appendages numerous.

Geographical Distribution. All temperate and tropical seas. This genus contains the mackerels.

Synopsis of Indian Species.

A. No teeth on palate.

Height of body 4 to $4\frac{3}{4}$ in total length . 1. *S. microlepidotus*, p. 203.

Height of body $3\frac{3}{4}$ in total length 2. *S. brachysoma*, p. 204.

B. Teeth in palate; height of body 7 in

total length 3. *S. janesaba*, p. 205.

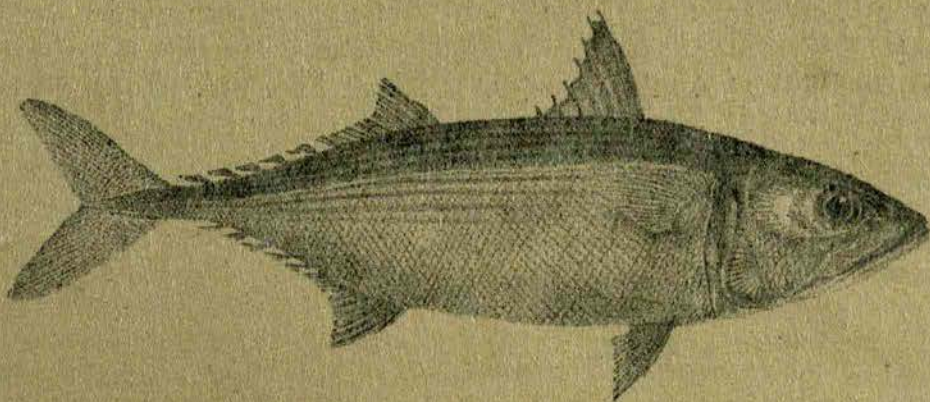
973. (1.) ***Scomber microlepidotus***. (Fig. 71.)

Scomber microlepidotus, Rüppell, *N. W., Fische*, p. 38, t. xi, fig. 2; Day, *Fish. India*, p. 250, pl. liv, figs. 3 (young), 4 (immature), & 5 (adult), *Suppl.* p. 790 (see synonym.).

Mekha, Arabic; Karna-kita or Karnang-kullutan, Tam.; Kanagurta, Tel.; Ila, Mal.; Nga-congree, "Large head," Mugh; Look-wa-dah, Andam.

D. 8-10 | 1/11+v-vi. A. 1/11+v-vi. L. 130 to 150. L.tr. 10/28.

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$, height of body 4 to $4\frac{3}{4}$ in the total length. Eyes—with a broad anterior and posterior adipose lid extending $\frac{1}{3}$ across the eye; diameter 4 to $4\frac{1}{2}$ in length of head, 1 to

Fig. 71.—*Scomber microlepidotus*.

$1\frac{1}{4}$ diam. from end of snout and also apart. Interorbital space flat. Teeth—none on vomer or palate. Fins—dorsal spines weak and receivable into a groove, 2nd to 8th subequal and about



$\frac{1}{2}$ height of body, they rapidly decrease in length behind. The distance between the two dorsal fins equals half the base of the posterior, the upper edge of which is concave; finlets commence just behind the fin and are opposite to and similar to those behind the anal. *Scales*—smaller above than below lateral line, and largest just beneath pectoral fin; the first few rows beneath the lateral line are parallel with it, those below the pectoral are irregularly concave. Minute scales on second dorsal and anal fins. *Air-bladder*—present. *Pseudobranchiae*—largely developed. *Colour*—back greenish, sides and abdomen iridescent, a row of sixteen spots along summit of back, close to base of dorsal fin; summit of head spotted; sides shot with bluish purple. Dorsal fins yellowish, tipped with black; caudal bright yellow, stained with black at its extremity. Pectoral bright yellow, with a dark mark on the body below it; ventral and anal finely dotted with black, which fades soon after death, when the colour becomes dull green with the abdomen lighter. Posterior edge of caudal sometimes blackish with a white outer margin. In large specimens the colours differ, there are from five to eight dark longitudinal bands along the back and upper half of the body, the highest of which is occasionally broken up into spots. There are usually two golden bands below the lateral line, and one along its course.

Hab. Red Sea, seas of India, and the Malay Archipelago. Along the coasts of India this fish is very rarely seen above 10 inches in length, but at the Andamans I obtained what I took for a distinct species, a foot long, and differently coloured, as described above. I have captured this species at Madras, with fully developed ova, in March. In Malabar it is very common throughout the cold season, and is extensively salted and dried. Although good eating, it is seldom brought to the table of Europeans, as it rapidly taints.

974. (2.) *Scomber brachysoma*.

Scomber brachysoma, Bleeker, *Batavia Nat. Tijdsch.* i, p. 356; Day, *Fish. India*, p. 251 (see synonym.)

D. 10 | $1/11+v$. A. $1/11+v$. C. 21. L. l. 135. L. tr. 13/—.

Length of head $3\frac{3}{4}$, height of body $3\frac{1}{4}$ to $3\frac{3}{8}$ in the total length. *Eyes*—with a broad anterior and posterior adipose lid, diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Hind edge of subopercle is vertically behind the level of the hind edge of the opercle. *Teeth*—none on vomer or palate. *Fins*—dorsal spines weak and receivable into a groove, the second and third the highest and rather above $\frac{1}{2}$ height of body, upper edge of second dorsal fin concave, finlets commence just behind the fin and are opposite to and similar to those behind the anal. *Colour*—similar to that of *S. microlepidotus*, except that there are two shining light spots above and behind either eye, and the spinous dorsal is posteriorly edged with black.

Hab. Andaman Islands to the Malay Archipelago.

975. (3.) *Scomber janesaba*.

Scomber janesaba, Bleeker, *Batavia Nat. Tijdsch.* vi, p. 406; Day, *Fish. India, Suppl.* 1888, p. 790.

D. 9-10 | 1/11 + v-vi. A. 1 | 1/10-11 + v-vi. L. l. ca. 180.

Length of head $3\frac{1}{2}$, height of body 7 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout more pointed than in the preceding species. *Teeth*—in pairs of moderate strength and well developed on the head of the vomer and on the palatines. *Colour*—similar to that of *S. microlepidotus*, with the addition of two or more rows of dark spots along the back and also some transverse dark streaks.

Hab. From the Persian Gulf to Japan.

2. Genus **THYNNUS** (Cuv. & Val.), Lütken.

Syn. *Oreynus*, Cuv.; *Grammatorcynus*, Gill.

Branchiostegals seven; pseudobranchiæ. Body oblong, somewhat compressed. Cleft of mouth deep. Small teeth on the jaws and palatine bones, none on vomer. Two dorsal fins, the spines weak, finlets behind the soft dorsal and anal. Scales small; those in the anterior portion of the body form a kind of corselet, behind which the body is scaleless. Lateral line unarmed, a longitudinal keel along either side of the free portion of the tail. Air-bladder, when present, simple. Pyloric appendages numerous.

Geographical Distribution. The "tunny fishes" are found in most open tropical and temperate seas. These fishes are very voracious, and may often be observed in schools pursuing the "flying fishes" or other *Clupeidæ*. As food they are moderately esteemed.

Synopsis of Indian Species.

Pectoral about $\frac{1}{2}$ total length or less.

Height of body contained $4\frac{1}{2}$ times in length

to middle of tail-fin 1. *T. thunnina*, p. 205.

Height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in length to middle

of tail-fin. 2. *T. pelamys*, p. 206.

Pectoral about $\frac{1}{3}$ total length. 3. *T. macropterus*, p. 207.

976. (1.) *Thynnus thunnina*. (Fig. 72.)

Thynnus thunnina, Cuv. & Val. *H. N. Poiss.* viii, p. 104, pl. 212; Day, *Fish. India*, p. 252, pl. liv, fig. 6 (see synonym.).

Choori min and *Suraly*, Tam.

D. 15 | 2-3/10-11 + viii. P. 26. V. 1/5. A. 2-3/10-11 + vii-viii. C. 17.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $4\frac{1}{2}$ in length from snout to middle of posterior edge of caudal fin. *Eyes*—diameter



$6\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. Head rather compressed, snout pointed. Posterior border of preopercle short, angle rounded, and lower edge at least twice as long as vertical. *Fins*—first dorsal spine the broadest, equal in height to second, and $\frac{1}{2}$ as long as head. In some specimens the first dorsal fin is continued to within a short distance of the second, in others (as in the one figured) the last few spines are nearly or quite hidden in the integument. Second dorsal highest anteriorly, having a concave upper edge, its three spines are short and concealed by the skin; finlets rather large. Between the two ventral

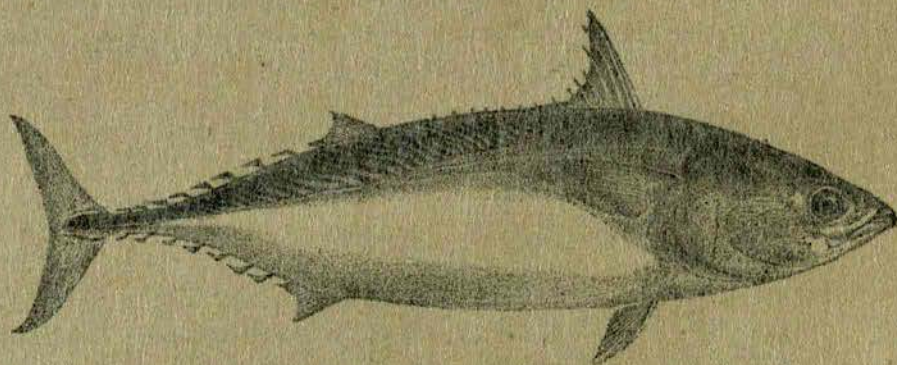


Fig. 72.—*Thynnus thunnina*.

fins an oval or elongate lamella, under which they can be partially received. Anal similar to second dorsal, the three spines equally concealed. *Scales*—forming a corselet anteriorly in three portions separated by two deep emarginations. Superiorly the corselet embraces the two dorsal fins, and is divided from its central portion by an emargination which reaches to below the eighth dorsal spine. The central portion of the corselet is mostly beneath the pectoral fin, and the emargination which divides it from the inferior portion extends to below the base of the pectoral. The lowest portion goes to below and behind the ventral fins. *Colour*—bluish along the back, with a number of undulating oblique dark bands; silvery below the lateral line; sometimes black spots on the chest or breast.

Hab. Red Sea, seas of India to the Malay Archipelago, where this fish is common during the cold months; also found in the Mediterranean, tropical parts of the Atlantic, and in Scandinavian seas. Often seen in the Bombay markets in the cold season up to two feet in length.

977. (2.) *Thynnus pelamis*.

Scomber pelamis, Linn. *Syst. Nat.* i, p. 492.

Thynnus pelamis, Günther, *Cat.* ii, p. 364; Day, *Fish. India*, p. 252 (see synon.).

The Bonito.

D. 15 | 1-2/12 + viii. P. 27. V. 1/5. A. 2/12 + vii.



Length of head $3\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in length from snout to middle of posterior margin of caudal fin. *Eyes*—diameter 5 to 6 in length of head, $1\frac{1}{2}$ diam. from end of snout. The vertical border of the preopercle is $\frac{3}{2}$ the length of its horizontal margin. *Fins*—dorsal spines rather weak, anteriorly $\frac{2}{3}$ height of body and nearly twice as high as second dorsal. Pectoral reaches to below tenth dorsal spine. Anal similar to second dorsal, it commences on the vertical behind last dorsal ray. Caudal with pointed lobes. *Scales*—forming a corselet anteriorly, which extends from the base of the pectoral along the whole length of the spinous dorsal. *Colour*—back bluish, becoming silvery on the sides and beneath. Four or five concave, longitudinal dark bluish bands along the lower half of the abdomen posteriorly, ending on the lateral line below the finlets.

Hab. Indian and Atlantic Oceans; attaining a considerable size.

378. (3.) *Thynnus macropterus*.

Thynnus macropterus, Temm. & Schleg. *Fauna Japon.*, Poiss. p. 98, pl. 51; Day, *Fish. India*, p. 253 (see synonym.).

D. 14 | 3/12 + ix. P. 31. V. 1/5. A. 12 + ix. C. 28.

Length of head and height of body each $3\frac{2}{3}$ in the length from snout to middle of posterior margin of caudal fin. *Eyes*—diameter 5 in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Preopercle with its posterior margin somewhat irregular in shape, angle pretty well developed, its posterior third longer than its lower margin. *Fins*—the anterior dorsal spines about $\frac{2}{3}$ height of body; second dorsal considerably longer than the spinous and falciform. Anal similar to soft dorsal. Caudal with pointed lobes. Corselet with three distinct posterior prolongations, the upper, commencing below the 7th dorsal spine, is continued along the base of the two dorsal fins; the second ceases below the 11th dorsal spine, and a little above the middle of the body; the lowest extends along the abdomen to midway between the end of the ventral and commencement of the anal. A well-developed keel on the lateral line commencing from opposite the tenth finlet. *Colour*—greyish along the back, becoming silvery below, tips of soft dorsal and anal, as well as the finlets, yellow.

Hab. Red Sea, seas of India to Japan.

3. Genus *PELAMYS*, Cuv. & Val.

Syn. *Gymnosarda* and *Orcynopsis*, Gill.

Branchiostegals seven; pseudobranchiæ. Body rather elongate and slightly compressed. Cleft of mouth deep. Rather strong teeth in jaws, none on vomer, present on palatines. Two dorsal fins, the spines feeble or of moderate strength, finlets behind soft dorsal and anal fins. Scales small, those in the anterior portion of



the body form a kind of corselet. Lateral line unarmed, a longitudinal keel along either side of the free portion of the tail. Air-bladder absent. Pyloric appendages dendritical.

Geographical Distribution. Temperate and tropical seas.

979. (1.) *Pelamys chiliensis*. (Fig. 73.)

Pelamys chiliensis, Cuv. & Val. *H. N. Poiss.* viii, p. 163; *Day, Fish. India*, p. 253, pl. lvi, fig. 1 (see synon.).

D. 18 | 3/13+vi. P. 24. V. 1/5. A. 3/12+vi. C. 20.

Length of head $3\frac{1}{2}$, caudal lobes 6, height of body $4\frac{3}{4}$ in the length from snout to middle of posterior edge of caudal fin. *Eyes*—diameter $8\frac{1}{4}$ in length of head, $2\frac{1}{2}$ diam. from end of snout, and 2 apart. Snout pointed. Angle of preopercle rounded, its lower border rather above $\frac{1}{2}$ the length of its vertical one. *Teeth*—in a single row in either jaw, with some rather large ones above the symphysis of the lower. *Fins*—dorsal spines weak, second to fourth subequal, about $\frac{4}{11}$ height of body and very slightly higher than the second dorsal fin, the anterior fin is continued nearly close up to the second. Pectoral $\frac{4}{9}$ length of head; ventral $\frac{3}{4}$ of

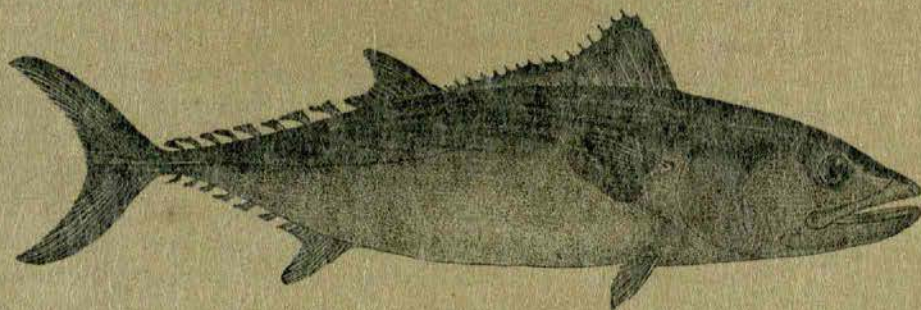


Fig. 73.—*Pelamys chiliensis*.

pectoral. Anal commences on the vertical below first dorsal finlet and is similar to second dorsal fin. *Scales*—forming a corselet anteriorly in three portions, separated by two deep emarginations; the corselet embraces the whole length of the first dorsal; the central portion is narrow and pointed, ending close to end of pectoral; the lower portion is small and just embraces the ventrals, which have a small scale between them. *Lateral line*—makes a low curve to below commencement of second dorsal fin, where it becomes straight. *Colour*—upper half of the body with about eight broad, straight, blue lines passing backwards and a little upwards, silvery below the lateral line, where, however, there are similar lines but very faint.

Hab. Seas of India to Japan and beyond.

4. Genus **CYBIUM**, Cuv.

Syn. *Apodontis* and *Apolectus*, Bennett; *Lepidocybium* and *Acanthocybium*, Gill.

Branchiostegals seven; pseudobranchiæ. Body somewhat elongate. Cleft of mouth deep. Teeth large and strong in the jaws; villiform on vomer, palatines, and tongue. Two dorsal fins, the first with feeble spines, extending to the commencement of the second, more rays in the second dorsal than spines in the first; seven or more finlets behind the second dorsal and anal fins. Scales, when present, rudimentary. A slight keel on either side of the tail. Air-bladder present.

Species of this genus, known as *seer-fishes* in India, when fresh and of the proper size, are amongst the most delicate marine forms for eating. If small, under a foot in length, they are dry, resembling *Trachynotus* and *Chorinemus*; from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet in length they are at their prime size, above this they become coarse.

Geographical Distribution. Atlantic and Indian Oceans.

Synopsis of Indian Species.

- Sides without spots or blotches. 1. *C. kuhlii*, p. 209.
 A. 2/17. Sides with about 3 horizontal rows
 of elongate spots 2. *C. interruptum*, p. 210.
 A. 3/17-19. Sides with about 3 horizontal
 rows of elongate spots 3. *C. guttatum*, p. 210.
 Sides with undulating vertical spots and lines. 4. *C. commersonii*, p. 211.
 A. 5/14. Sides with several rows of elongate
 spots 5. *C. lineolatum*, p. 212.

980. (1.) *Cybium kuhlii*.

Cybium kuhlii, Cuv. & Val. *H. N. Poiss.* viii, p. 178; *Day, Fish. India*, p. 254, pl. lvi, fig. 2 (see synonym.).

Nga-nyo-tha, Arracan.

D. 16 | 5-6/17-18+vi. P. 29. V. 1/5. A. 4/18+vi. C. 21.

Length of head $5\frac{1}{2}$ to 6, of caudal fin $3\frac{3}{4}$ to 4, height of body 5 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. Preopercle emarginate along its vertical border, with the lower limb almost as long as the hind one. *Teeth*—conical and rather compressed, from 15 to 20 in either jaw, those in the lower much the larger; vomerine patch anteriorly rounded; a band along the palatines. *Fins*—first dorsal spines weak, second dorsal anteriorly $\frac{3}{4}$ height of body below it; there are six unarticulated rays at its commencement hidden in the skin; the anal, which commences on a vertical line below its middle, is similar to it but not so high. Pectoral as long as the head behind the middle of the eye. Ventrals $1\frac{1}{2}$ diameters of eye.



in length. Caudal with deeply pointed lobes. *Lateral line*—containing about 200 plate-like rounded scales, each having a simple tube; straight until it arrives opposite middle or end of base of second dorsal, where it curves to below third finlet and then becomes rather wavy, its central keel well developed. *Colour*—bluish above, becoming silvery on the side and below. After death the sides assume a dark hue and have neither bands nor spots. First dorsal black; second dorsal and anal with dark bases; pectoral with a light outer edge, tips of caudal dark.

Hab. Seas of India. This fish attains a large size.

981. (2.) *Cybium interruptum*.

Cybium interruptum, *Cur. & Val. H. N. Poiss.* viii, p. 172; *Day, Fish. India*, p. 254, pl. lvi, fig. 3 (see synonym.).

Wingaram, Tel.; *Buk-ku*, Gwadar; *Tōwar*, Marāthi.

D. 16 | 4/15–16 + viii–ix. P. 21. V. 1/5. A. 2/17 + viii–ix. C. 21.

Length of head $5\frac{1}{4}$, of caudal fin 5, height of body $5\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Vertical limb of preopercle emarginate. *Teeth*—comparatively small, equal sized, conical and somewhat compressed, about 28 or 30 in the upper, and 24 rather larger ones in the lower jaw, placed close together; a patch, rounded anteriorly and slightly emarginate laterally, on the vomer, and a band along the palatines. *Fins*—dorsal spines weak; second dorsal commences midway between anterior nostril and base of caudal fin, it is $\frac{1}{2}$ height of body, its upper edge concave; anal commences below first third of second dorsal, which fin it resembles. *Lateral line*—with a gradual descent. *Colour*—bluish along the back, becoming white on the sides and below; three rows of elongated blotches along the sides, almost forming interrupted bands, the two upper sets of blotches cross the lateral line below the second or third finlet; first dorsal dark, its outer edge nearly black.

Hab. Seas of India. This species attains at least 3 feet in length.

982. (3.) *Cybium guttatum*.

Scomber guttatus, *Bl. Schn. Syst. Ich.* p. 23, fig. v.

Cybium guttatum, *Day, Fish. India*, p. 255, pl. lv, fig. 1 (young), and pl. lvi, fig. 4 (adult) (see synonym.).

D. 16–17 | 4–5/14–15 + viii–x. P. 21. A. 3/17–19 + vii–ix. C. 26.

Length of head 5 to $5\frac{1}{3}$, of caudal fin $4\frac{1}{2}$ to 5, height of body 5 in the total length. *Eyes*—diameter $5\frac{1}{4}$ to $5\frac{1}{2}$ in length of head, 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Vertical limb of preopercle slightly emarginate. *Teeth*—lancet-shaped, laterally compressed, and somewhat wide apart, about 10 to 12 in either jaw, and frequently some smaller ones intercalated, they are much longer



in the lower jaw; a triangular patch on the vomer, and a band on the palatines. *Fins*—first dorsal spines weak and ending in soft points; second dorsal highest in front, where it is $\frac{1}{4}$ of the body below it, and has a concave upper edge; anal commences below first third of soft dorsal. *Lateral line*—having a very gradual descent, it becomes somewhat undulating opposite the commencement of the second dorsal, and very much so below the third and fourth finlets. The keel on the lateral line well developed. *Colour*—bluish above, silvery beneath; back and sides with three rows of round or rather horizontally oval spots, which become most apparent after death; the membrane between the first and eighth dorsal spines black, the rest pure white edged with black; in the young the first dorsal is occasionally almost wholly black.

Hab. Seas of India, Malay Archipelago, and China. Grows to 6 feet in length, is good eating, and salts well. These fish are captured in numbers from October throughout the cold months along all the Indian coasts.

983. (4.) *Cybium commersonii*. (Fig. 74.)

Scomber commersonii, Lacép. ii, p. 690, pl. 20, fig. 1.

Cybium commersonii, Day, *Fish. India*, p. 255, pl. lvi, fig. 5 (see synon.).

Chumbum, Mal.; *Konam*, *Mah-wu-laachi*, or *Ah-ku-lah*, Tam.

D. 16-17 | 3-4/13-14+ix-x. P. 20-23. A. 2-3/12-13+ix-x. C. 21.

Length of head 4 to 5, of caudal fin 5 to $5\frac{1}{2}$, height of body $5\frac{1}{2}$ to 7 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Posterior border of preopercle rather emarginate, and its angle rounded and slightly produced. *Teeth*—strong, conical, compressed laterally, those in the

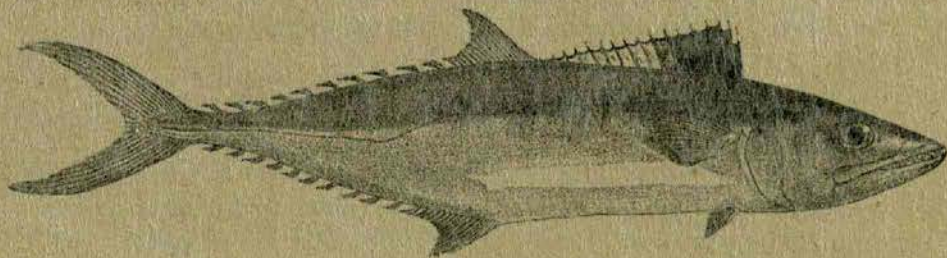


Fig. 74.—*Cybium commersonii*.

upper jaw varying in number from about 11 to 25, the posterior being rather the smallest. In the lower jaw there are from 10 to 15 of the same shape, but the posterior are the largest. A triangular group of villiform teeth on the vomer, and a long narrow band on the palatines. *Fins*—spines of the first dorsal weak, and ending in thin filamentous points that project beyond the membrane,



which is deeply notched. The second dorsal highest in front, with its upper margin concave; it is situated opposite the anal, which it resembles. Ventral small; pectoral pointed; caudal with pointed lobes, each with a raised soft oblique ridge along its base. *Lateral line*—at first in upper third of body; opposite the twelfth or thirteenth dorsal ray it bends down, and again descends abruptly opposite the first to the third pair of finlets, beyond which it passes direct to the centre of the caudal, where it ends in a soft raised keel between the bases of the lobes. *Colour*—bluish above, silvery below; first dorsal black to end of the seventh spine, behind which it is pure white, with a narrow black upper edge; basal half of pectoral black. After death numerous vertical undulating lines and spots appear on the sides; in the specimen figured (from Madras) they are very distinct, but during life they are rather indistinct.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond; attaining at least 4 feet in length.

984. (5.) *Cybiium lineolatum*.

Cybiium lineolatum, *Cuv. & Val. H. N. Poiss.* viii, p. 170; *Day, Fish. India*, p. 256 (see *synon.*)

D. 16 | 4/12+ix. P. 21. V. 1/5. A. 5/14+x. C. 15.

Length of head 5, of caudal 5, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ apart. *Teeth*—about 18 in either jaw, triangular and strongly compressed, the central ones in the lower being the largest; a triangular pointed patch on the vomer, and a band on the palatines. *Fins*—spines of first dorsal slender. Pectorals $8\frac{1}{2}$ in the total length; ventral $\frac{1}{3}$ of pectoral. *Lateral line*—at first in upper fourth of body, descends gradually towards end of second dorsal fin until it arrives below the fifth finlet. *Colour*—bluish above, silvery on sides and beneath; several rows of elongated black blotches on the body, three rows of them, like interrupted lines, below the lateral line.

Hab. Seas of India to the Malay Archipelago.

5. Genus *ELACATE*, Cuv.

Syn. Meladerma, Swainson.

Branchiostegals seven; pseudobranchiæ. Body fusiform; head depressed. Villiform teeth on the jaws, vomer, palatine bones, and tongue. The first dorsal reduced to a few free spines; the second with many rays and somewhat similar to the anal; no finlets. Scales very small. No keel on the side of the tail. Air-bladder absent. Pyloric appendages dendritical.

The young of this fish, in the seas of India, has its central caudal rays much prolonged; in a specimen $8\frac{1}{2}$ inches long the fin becomes more obtuse, but still the central rays are rather the longest; in a specimen of 12 inches the fin is obtuse, in another 11 inches long it is slightly emarginate; in the adult it becomes concave or almost lobed, the lower lobe being usually the longer.

985. (1.) *Elacate nigra*. (Fig. 75.)

Scomber niger, Bloch, *Ich.* t. 337.

Elacate nigra, Day, *Fish. India*, p. 266, pl. lv, fig. 2 (see synonym.).

Sakala, Marathi; *Cuddul verari*, Tam.

D. 8/28-36. P. 21. V. 1/5. A. 2/25-29. C. 17. Vert. 12/13.

Length of head $4\frac{3}{4}$ to 5, of caudal fin $5\frac{1}{4}$ to 6, height of body $7\frac{1}{4}$ to 8 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{3}$ to 2 diam. from end of snout, and about 2 apart. Mouth wide. Greatest width of head equals its height. Upper surface of head flat and stellately rugose. *Fins*—dorsal free spines with a very short interspinous membrane; second dorsal highest

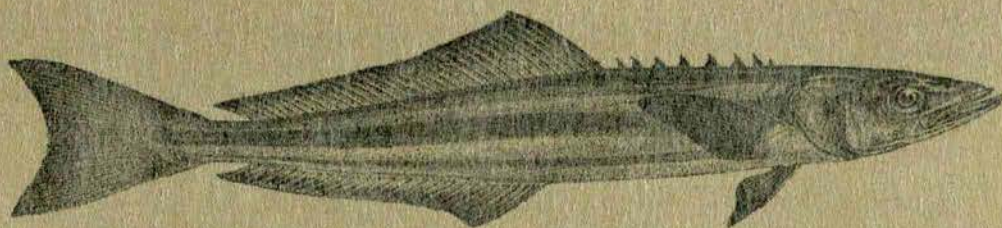


Fig. 75.—*Elacate nigra*.

anteriorly, where its rays are as high as the body, upper edge slightly concave. Anal similar to second dorsal, but rather lower, it arises on the vertical below 7th or 8th dorsal ray, its first two rays short and undivided. Pectoral $\frac{1}{2}$ longer than ventral. *Colour*—olivaceous brown, a dark band along back below base of dorsal fin and another along middle of side. Fins brownish, with dark or black edges. Outer edges of caudal lobes white.

Hab. Seas of India to Japan, also found in the tropical Atlantic and along the shores of the United States. There is a specimen 4 feet 12 inches in length in the Madras Museum. In March 1867 I took a female, 30 inches long, full of well-developed ova.

6. Genus *ECHENEIS*, Artedi.

Syn. *Remoropsis*, *Rhombochirus*, *Remilegia*, *Leptecheneis*, *Platheirichthys*, Gill.

Branchiostegals seven or eight; pseudobranchiæ. Body elongate, fusiform; head depressed and furnished above with an adhesive organ. Eyes lateral or directed downwards and outwards. Cleft of mouth deep. Villiform teeth on the jaws, vomer, palatine bones, and generally on the tongue. The first dorsal fin modified into an adhesive disk; a long second dorsal and anal; no finlets; ventral, pectoral. Scales very small. No keel on the side of the tail. A ladder absent. Pyloric appendages in moderate numbers.

Geographical Distribution. These fishes appear to be inhabitants of nearly all seas. In those of India they are most commonly captured adhering to sharks, and are consequently considered to be



parasitic on those animals. Van Beneden (Bull. Ac. Belg. 1870, xxx, pp. 181-185) has shown that sometimes, at least, they prey upon fishes, but they belong to the commensal division of parasites, and merely profit by the greater powers of locomotion possessed by their host.

The shape of the caudal fin in these fishes changes with age, as in *Elacate*.

Synopsis of Indian Species.

- Pairs of lamellæ in disk 21-25..... 1. *E. naucrates*, p. 214.
Pairs of lamellæ in disk 17-18..... 2. *E. remora*, p. 215.
Pairs of lamellæ in disk 15-16..... 3. *E. brachyptera*, p. 215.
Pairs of lamellæ in disk 12-13..... 4. *E. albescentis*, p. 215.

986. (1.) *Echeneis naucrates*.

Echeneis naucrates, Linn. *Syst. Nat.* i, p. 446; Day, *Fish. India*, p. 257, pl. lvii, fig. 1 (see synon.).

Nachuk, Maráthi.

B. vii. D. 21-25*/33-41. P. 20. V. 1/5. A. 32-38. C. 17.

Length of head $5\frac{1}{3}$ to 6, of disk $4\frac{1}{4}$ to 5, of pectoral $7\frac{2}{3}$ to 8, of caudal fin 8, width between pectorals $10\frac{1}{4}$ to $11\frac{1}{2}$, height of body $11\frac{1}{2}$ to $12\frac{1}{2}$ in the total length. *Eyes*—transversely oval, $2\frac{1}{2}$ to 3 diameters in postorbital length of head, 2 to 3 from end of snout, and $3\frac{1}{2}$ to $4\frac{1}{2}$ apart above. The disk is about $\frac{2}{3}$ as wide as long, and contains from 21 to 25 transverse laminae, each having a tooth-like posterior margin, whilst along the central line there runs a smooth elevation, so that the vacuum may be confined to one half the disk. The anterior laminae are directed slightly forwards; those in the second quarter of the disk are nearly transverse, and the posterior slant backwards, the change in direction being very gradual. Outside the disk is a wide fleshy membrane, which extends behind to over the occiput, but does not reach forward as far as the end of the upper jaw. Maxilla extending to beneath the third lamina in a specimen $2\frac{1}{2}$ feet in length. Mandible pointed and covered above with numerous rows of villiform teeth, forming a triangular toothed space in front of the pointed upper jaw. *Fins*—second dorsal and anal opposite each other, both highest in front, where the rays are $\frac{4}{5}$ to $\frac{3}{5}$ length of disk; outer edge of both fins rather concave, and the last rays slightly produced. Caudal with its posterior margin straight, but having four short notches at its extremity. *Lateral line*—rather undulating. *Colour*—generally brownish grey, external margins of caudal and anterior tips of dorsal and anal fins edged with white; pectoral deep brown; anal tipped with dark brown; centre of caudal nearly black. Sometimes a blackish band along middle of side.

Hab. Tropical and temperate seas generally, attaining at least 3 feet in length; this is the commonest form in the Indian seas.

* The first figures under D. in the fin formula of this genus represent the number of pairs of lamellæ in the disk.

987. (2.) *Echeneis remora*.

Echeneis remora, Linn. Syst. Nat. i, p. 446; Day, Fish. India, p. 258 (see synonym.).

B. vii. D. 17-18/22-24. A. 24-25. Cæc. pyl. 6. Vert. 12/15.

Length of head $4\frac{1}{3}$, of disk $3\frac{1}{4}$, of caudal fin 6, height of body 9, breadth between pectoral fins 6 to 7, length of pectorals $7\frac{3}{4}$, of ventrals $8\frac{1}{4}$ in the total length. Eyes—in middle of length of head, $3\frac{1}{2}$ diameters from end of snout, and 5 apart superiorly. Mouth rounded. Teeth—the outer lateral row in the lower jaw enlarged. Fins—greatest width of disk equals half its length; second dorsal commences midway between base of pectoral and base of caudal, its highest rays are as long as the head excluding the snout. Anal opposite second dorsal. Caudal forked in a specimen 9 inches long. Colour—brown.

Hab. Seas of temperate and tropical regions.

988. (3.) *Echeneis brachyptera*. (Fig. 76.)

Echeneis brachyptera, Lowe, P. Z. S. 1839, p. 89; Day, Fish. India, p. 258, pl. lv, fig. 3 (see synonym.).

B. vii. D. 15-16/26-32. P. 20. V. 1/5. A. 24-27. C. 17.

Length of head $4\frac{1}{2}$, of disk alone $4\frac{1}{8}$, of caudal fin $6\frac{1}{3}$, height of body $8\frac{1}{4}$, width at pectorals $6\frac{3}{4}$ to $7\frac{1}{2}$, length of pectoral 10, of ventral $7\frac{1}{4}$ in the total length. Eyes—diameter $2\frac{1}{4}$ in postorbital portion of head, $2\frac{1}{2}$ diam. from end of snout, $3\frac{1}{2}$ apart above. Upper jaw rather angular; the maxilla reaches to beneath fourth lamina of disk. Teeth—outer lateral row in lower jaw somewhat enlarged.

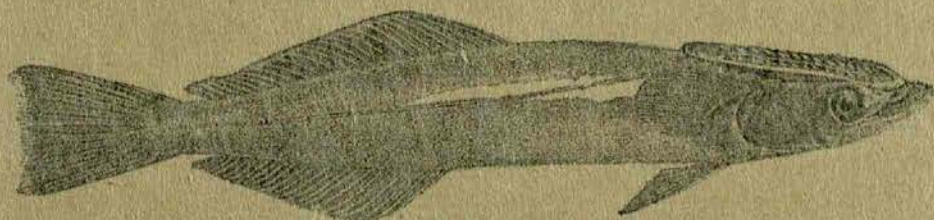


Fig. 76.—*Echeneis brachyptera*.

Fins—greatest width of disk equals half its length; the second dorsal commences midway between posterior edge of eye and base of caudal, highest portion equals postorbital length of head. The anal commences on vertical below the third or fourth dorsal ray, to which fin it is similar. Caudal very slightly emarginate. Colour—light brown, with posterior edge of caudal whitish.

Hab. Seas of India to China, also in the Atlantic.

989. (4.) *Echeneis albescens*.

Echeneis albescens, Temm. & Schleg. Faun. Japon., Poiss. p. 272, pl. 120, fig. 3; Day, Fish. India, p. 258, pl. lvii, fig. 2 (see synonym.).



B. vii. D. 12-13/17-22. P. 19. V. 1/5. A. 19-22. C. 15.

Length of head $4\frac{3}{4}$, of disk 4, width of body between pectorals $5\frac{1}{2}$, of caudal $8\frac{1}{4}$ in the total length. *Eyes*— $2\frac{1}{2}$ diameters in post-orbital portion of head, $2\frac{1}{4}$ from end of snout, 6 apart above. Body wide anteriorly, width of disk equals $\frac{2}{3}$ of length. Mouth obtuse; lower jaw the longer, the maxilla reaches to below third lamina of disk. *Teeth*—an outer enlarged series in lower jaw and vomer. *Fins*—second dorsal commences in second third of distance between bases of pectoral and caudal fins and opposite anal. Ventral as long as distance between eye and base of pectoral. Caudal very slightly emarginate. *Colour*—uniform brown.

Hab. Seas of India, Japan, and the Cape.

Family XXI. URANOSCOPIDÆ.

Koraké, Tamil.

Body low and more or less cylindrical. Gill-openings wide. Eyes on upper surface of head. Head mostly cuirassed with bony plates. Infraorbital ring of bones does not articulate with the preopercle. Usually villiform teeth in both jaws, canines present or absent. One or two dorsal fins, the spines fewer in number than the rays. Ventral with one spine and five rays. Pectoral rays branched. No prominent papilla near the vent. Scales when present rudimentary. Lateral line continuous. Air-bladder absent. Pyloric appendages when present few or in moderate numbers.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Genera.

Two dorsal fins	1. URANOSCOPUS.
A single dorsal fin	2. ICHTHYSCOPUS.

1. Genus URANOSCOPUS, Cuv.

Syn. *Nematagnus*, Gill.

Branchiostegals six; pseudobranchiæ. Head large, broad, and partly covered with bony plates. The opercles and shoulder-bones usually armed. Besides the posterior gill-opening there is generally a rounded orifice above the opercle. Cleft of mouth vertical, with a filament below or before the tongue. Villiform or cardiform teeth on the jaws, vomer, and palatine bones; no canines. Two dorsals, the first with from three to five spines; ventrals jugular. Scales small and rudimentary. Air-bladder absent. Pyloric appendages in moderate numbers.

Geographical Distribution. Indo-Pacific, Mediterranean, and Atlantic.

990. (1.) *Uranoscopus guttatus*. (Fig. 77.)

Uranoscopus guttatus, Cuv. & Val. *H. N. Poiss.* iii, p. 305; Day, *Fish. India*, p. 260, pl. lv, fig. 4 (see synonym.).

D. 4-5/12-13. P. 17. A. 13. C. 13.

Length of head $3\frac{1}{2}$ to $3\frac{1}{2}$, height of body 4 to $4\frac{1}{4}$ in the total length. Eyes— $\frac{1}{2}$ diameter from end of snout and $1\frac{1}{4}$ apart. Greatest width of head rather exceeds its height. Lips with a narrow fringe; nostrils situated in front of the centre of the eye. Four to seven spines along lower edge of preopercle, and one on subopercle. Two large spines on shoulder-bone, the lower the larger and as long as 2 diameters of orbit. Posterior border of occiput with one central and on each side two little bony lobes, the posterior lateral lobes with one or two spines. Bones of the head roughened. Fins—dorsal spines weak, first longest, but only $\frac{2}{3}$ as high as soft dorsal. Caudal rather rounded. Scales—present on

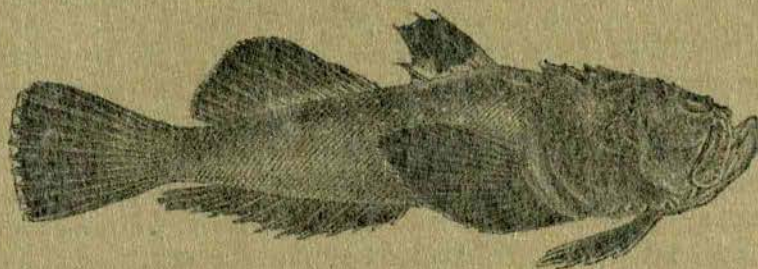


Fig. 77.—*Uranoscopus guttatus*.

body, except above first part of lateral line, and on breast and chest to commencement of anal; they are not imbricate but are covered by skin, and in rows bounded by muciferous channels. Lateral line—from shoulder to base of second dorsal, along which it is continued, it has a few rounded scales above it behind base of second dorsal spine. Colour—chestnut or slaty brown, with two or three rows of bluish-white spots along the back and halfway down the sides. First dorsal pure white, with its upper two thirds black, from the first to midway between the third and fourth spines, or in large examples to the fourth; second dorsal black along the upper two thirds; caudal with a wide vertical black band covering its middle third; anal white with a black base; pectoral dark, its lower margin edged with white.

Hab. Seas of India, said to attain a foot in length; I have obtained it from Madras up to 10 inches in length.

2. Genus *ICHTHYSCOPUS*, Swainson.

Syn. *Uranoscopus*, sp., Cuv. & Val.; *Upselonphorus*, Gill; *Kathetostoma* and *Anema*, Günther (= *Genyagnus*, Gill, = *Gnathagnus*, Gill, = *Lynnema*, Haast); *Astrocopus*, Brev. (= *Agnus*, Günther).

Branchiostegals six; pseudobranchiæ. Body somewhat cylindrical. Head large, broad, and partly covered with bony plates.



Gill-openings without any superior orifice. Cleft of mouth vertical. Some of the bones of the head may be armed. No filament below or before the tongue. Villiform teeth on upper jaw, vomer, and palatines, a single conical row in the lower jaw. One continuous dorsal fin, with fewer spines than branched rays; ventrals jugular. Scales rudimentary. Air-bladder absent. Pyloric appendages in moderate numbers.

991. (1.) *Ichthyoscopus inermis*. (Fig. 78.)

Uranoscopus inermis, Cuv. & Val. *H. N. Poiss.* iii, p. 310, pl. 65.

Ichthyoscopus inermis, Swainson, *Lardner's Cab. Cycl., Fishes, &c.* ii, p. 269; *Day, Fish. India*, p. 261, pl. lv, fig. 5 (see synon.).

Nillum koranjan, "A diver into the mud," Tam.

D. 8 | 3-4/16-18. P. 18. A. 16-19. C. 11. Cæc. pyl. 9 (8).

Length of head 3 to $3\frac{1}{4}$, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—situated considerably before middle of head. Greatest width of head equals $\frac{3}{4}$ of length. Lips covered with numerous branched papillæ. Anterior nostril round, situated in front of the centre of the eye and surrounded with papillæ resembling those on the lips, similar papillæ surround the large oval posterior nostril on inner side of orbit. No spines on head or shoulder; posterior edge of opercle fringed. An elongate angular flap edged with papillæ behind the shoulder. *Fins*—dorsal spines weak, and not so high as the rays. Caudal slightly

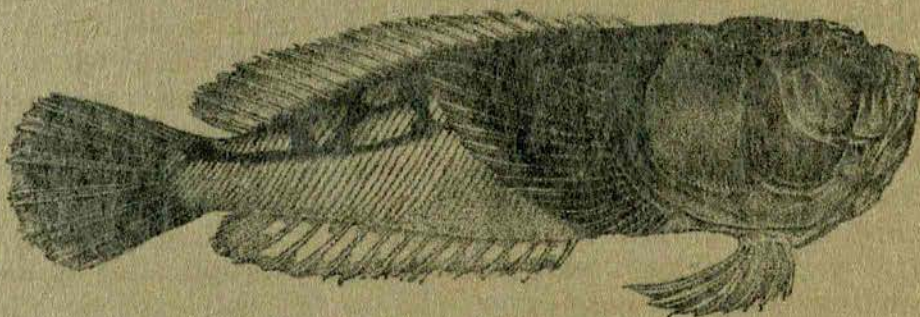


Fig. 78.—*Ichthyoscopus inermis*.

rounded. *Scales*—present on the body, except above the lateral line, on the breast, chest, and to about the sixth anal ray; they are not imbricate but are covered by the skin, and in rows, each bounded by a muciferous channel. *Lateral line*—from shoulder to base of third dorsal spine, and continued close to the base of dorsal in its whole length. *Colour*—canary-yellow, with buffy-brown markings along the sides, enclosing pure white round or oval spots, also some white spots on pectoral and dorsal fins. Upper surface of head brownish; caudal brownish yellow with dark extremities, a dark bar across pectoral and caudal fins.

Hab. Seas and estuaries of India to Japan, said to live in the mud and be taken with difficulty; attaining to at least 2 feet in length.



Family XXII. TRACHINIDÆ.

Body more or less elongate, posteriorly compressed; head often large. Some bones of the head usually armed; the suborbital ring of bones does not articulate with the preopercle. Teeth in the jaws, present or absent on the vomer and palatines. Dorsal fins sometimes in two distinct portions but more or less connected; anal generally similar to the soft dorsal; ventrals thoracic; pectorals with or without appendages. Air-bladder present or absent. Pyloric appendages few.

Geographical Distribution. Almost world-wide.

Synopsis of Indian Genera.

- First dorsal with 4 or 5 spines. Ventrals a little anterior to pectorals 1. PERCIS.
First dorsal with 9 to 12 spines. Ventrals not anterior to pectorals 2. SILLAGO.

1. Genus PERCIS, Bl. Schn.

Syn. *Parapercis*, Bleeker.

Branchiostegals six; pseudobranchiae. Body subcylindrical; head a little depressed. Eyes lateral, directed somewhat upwards. Cleft of mouth slightly oblique; lower jaw the longer. Opercle with one or two spines; pre- and subopercles sometimes slightly serrated. Villiform teeth in the jaws, with an outer enlarged row some of which are canine-like; teeth also on the vomer, but not on the palatines. The first dorsal fin with four or five spines, more or less continuous with the second dorsal, which has a moderate number of rays and is similar to the anal; ventrals slightly anterior to the pectorals, the rays of which are branched. Scales ctenoid, rather small. Air-bladder absent. Pyloric appendages, when present, few.

Geographical Distribution. Red Sea, Indian and tropical Pacific Oceans, seas of India to the Malay Archipelago and beyond.

Synopsis of Indian Species.

- L. tr. 5/16. Caudal slightly rounded 1. *P. punctata*, p. 219.
L. tr. 5/18. Caudal cut square, with its upper ray a little prolonged 2. *P. pulchella*, p. 220.
L. tr. 7/21 3. *P. hexophthalma*, p. 221.
L. tr. 2½/9 4. *P. cylindrica*, p. 221.

992. (1.) *Percis punctata*. (Fig. 79.)

Percis punctata, Cuv. & Val. H. N. Poiss. iii, p. 264; Day, Fish. India, p. 262, p. lviii, fig. 1 (see synonym.).

Kul oolova, Tam.



D. 5/21-22. A. 2/17-18. C. 15. L. 1. 58-60. L. tr. 5/16.

Length of head $4\frac{1}{2}$ to 5, of caudal fin 7 to $7\frac{1}{2}$, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and $\frac{1}{4}$ apart. Snout sharp. Greatest depth of preorbital equals half the diameter of the eye. Preopercle coarsely serrated along its posterior border; edge of subopercle serrated. A shoulder-spine. *Teeth*—above the symphysis of the lower jaw an outer enlarged row of about eight curved teeth, the outermost of which are the largest. *Fins*—spines of first dorsal of moderate strength, the fourth longest and $1\frac{1}{3}$ diameter of eye in length, the third a quarter shorter; ventral

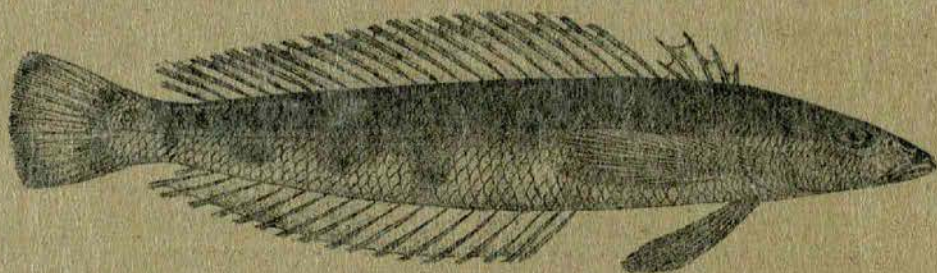


Fig. 79.—*Percis punctata*.

reaches the vent. Caudal cut square or a little rounded. *Colour*—whitish, with reddish-brown vertical bands and blotches above the lateral line, which are interrupted along the middle of the body; on these bands are a few black spots. A bright golden line from below orbit to base of dorsal fin, and another from centre of eye to snout. Spinous dorsal with or without a row of black spots; soft dorsal with three rows on the rays; caudal with two greyish bands, one at its base, the other on its posterior third, and sometimes an ocellus at upper part of base; anal yellowish; ventrals slate-coloured.

Hab. Coromandel coast of India and ? Ceylon; attaining at least 5 inches in length.

993. (2.) *Percis pulchella*.

Percis pulchella, Temm. & Schleg. *Fauna Japon.*, Poiss. p. 24, pl. 10, fig. 2; Day, *Fish. India*, p. 263, pl. lviii, fig. 2 (see synonym.).

Varna natiooli, Tam.

D. 5 | 21-22. P. 18. A. 1/17. C. 17. L. 1. 60-62. L. tr. 5/18.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$, of caudal fin 7, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. Snout not so pointed as in *P. punctata*. Greatest depth of preorbital equals half diameter of eye. Preopercle entire; subopercle with two or three serrations just below the opercle. *Teeth*—anterior row in front of both jaws enlarged; there are some enlarged teeth laterally in the mandibles. *Fins*—spines of first dorsal rather strong, first short, fourth longest and equal to diameter of eye, the fifth about equals the



second. Ventral does not quite reach the vent. Caudal cut square, with its upper ray a little prolonged. *Colour*—reddish, with six darker cross bands; a light pinkish band along side, becoming yellow along centre of caudal fin; head spotted with dark purplish-black marks above; three well-marked vertical blue bands across the sub- and interopercles, and sometimes a fourth crosses the breast in front of and below the pectoral fin. Dorsal fins yellow, black in their lower halves; the soft dorsal with a single row of spots along its upper half; anal yellowish in its lower two thirds, with five rows of round canary-coloured spots; its outer third reddish; ventrals reddish, stained at their edges. Caudal yellow along the middle, dark reddish in its lower, some fine vertical bars in its upper half.

Hab. East coast of Africa, seas of India to Japan.

994. (3.) *Percis hexophthalma*.

Percis hexophthalma (Ehrenb.), *Cuv. & Val. H. N. Poiss.* iii, p. 271, vii, p. 507; *Day, Fish. India*, p. 263, pl. lvii, fig. 4 (see synon.).

D. 5 | 19-21. P. 17. A. 17-18. C. 15. L. 1. 62. L. tr. 7/21.

Length of head 4, of caudal fin $6\frac{1}{2}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly $\frac{2}{3}$ apart. Snout somewhat pointed. Greatest depth of preorbital equals 1 diameter of eye. Preopercle entire; a spine at shoulder. *Teeth*—outer row in upper jaw enlarged, as are also 8 or 10 of the anterior ones in the lower jaw, also four or five of the outer ones in the middle of the lateral teeth. *Fins*—fourth dorsal spine longest and equal to 1 diameter of the orbit. Ventral reaches anal. Caudal cut square, having its upper ray a little prolonged. *Colour*—upper half of body and head greyish brown with irregular vertical grey lines, also one or two narrow and interrupted or entire lines along the side; three or more white spots, each having a black centre, along either side of the abdomen. Some narrow dark lines pass obliquely backwards and downwards from the eye over the sides of the head, others go directly backwards. A black spot on base of first dorsal, edges of fin also dark; three rows of black spots along the dorsal, which also has a dark edge, one row of spots along the anal. A large black blotch on the caudal extending half its length, and having a large white blotch behind it, the whole of the fin vertically barred with spots.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond.

995. (4.) *Percis cylindrica*.

Sciæna cylindrica, *Bloch, Ich. t.* 299, fig. 1.

Percis cylindrica, *Cuv. & Val. H. N. Poiss.* iii, p. 267; *Günther, Catal.* ii, p. 239; *Day, P. Z. S.* 1888, p. 260; *Fish. India, Suppl.* p. 790.



D. 5/21. P. 15. V. 1/5. A. 17-18. C. 15. L. 1. 44. L. tr. $2\frac{1}{2}/9$.

Length of head 4, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{4}$ in the total length. Eyes—diameter $3\frac{1}{4}$ in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. The greatest depth of the preorbital equals one third diameter of eye. All the opercles entire; a well-marked spine on the opercle and another on the subopercle, no shoulder-spine. Teeth—two enlarged ones on either side, above the symphysis of the lower jaw; fine ones on the vomer. Fins—second dorsal spine longest, equalling three fourths diameter of eye. Ventral one fourth longer than head, reaching base of seventh anal ray. Caudal slightly rounded. Colour—reddish brown, with five wide and dark vertical bands, extending from the back to the lower surface, these bands being darkest at their edges and disappearing about the middle of the body, where there are also some dark spots. A brown ocellus at upper part of base of caudal fin, which has some brown spots on it. Numerous brown spots on snout and upper surface of head and cheeks, some on upper edge of eye, where there are two dark narrow bands. Ventrals white. First dorsal fin nearly black between the spines; soft dorsal and anal with fine dots between the rays.

Hab. Andamans. Two small specimens received.

2. Genus **SILLAGO**, Cuv.

Syn. *Sillaginodes* and *Sillagnopsis*, Gill.

Branchiostegals six; pseudobranchiæ. Body elongate, somewhat cylindrical. Head conical, with its muciferous system well developed. Gill-openings wide, eyes lateral or directed slightly upwards. Cleft of mouth short; the upper jaw the longer. Villiform teeth in the jaws with the outer row rather conical; also present on vomer, none on the palatines. Two dorsal fins, the first with nine to twelve spines; soft dorsal similar to anal; ventrals thoracic, with one spine and five rays; lower pectoral rays branched. Scales ctenoid. Lateral line not continued on to the caudal fin. Air-bladder simple. Pyloric appendages few.

These fishes have much the appearance of *Sciæna* and were placed in that genus by Bloch; they are esteemed light and wholesome food; as they ascend rivers and tidal estuaries, they may be captured almost throughout the year.

Geographical Distribution. Red Sea, seas of India to the Malay Archipelago and Australia.

Synopsis of Indian Species.

- A. Second dorsal spine very elongate, eye $3\frac{1}{2}$ to 4 diam. from end of snout. 1. *S. panijus*, p. 223.
B. Second dorsal spine not exceeding height of body.
Second and third dorsal spines longest. 2. *S. sihama*, p. 224.
Third, fourth, and fifth dorsal spines longest. 3. *S. maculata*, p. 224.

996. (1). *Sillago panijus*. (Fig. 80.)

Cheilodipterus panijus, Ham. Buch. *Fish. Ganges*, pp. 57, 367; Day, *Fish. India, Suppl.* 1888, p. 791.

Sillago domina, Day, *Fish. India*, p. 264, pl. lviii, fig. 3 (see synonym.).

Yarra-soring, Tel.; *Tool-danti*, Oorah; *Nga-roén*, Arracan; *Soondra*, Chittagong; *Nga-pulwoey*, Burmese.

D. 9 | 1/25-27. P. 24. A. 1/26-27. L. 1. 90. L. tr. 5-6/14. Cæc. pyl. 4.

Length of head $3\frac{3}{4}$ to 4, of pectoral 6, of caudal fin 7 to 8, height of body 7 to 8 in the total length. *Eyes*— $3\frac{1}{2}$ to 4 diameters from end of snout, and $1\frac{1}{2}$ to 2 apart. Body subcylindrical. Head depressed, pyriform; cheeks swollen. Greatest width of head equals $\frac{4}{5}$ and its height $\frac{2}{3}$ of its length; upper jaw the longer; opercle with a very small spine; preopercle entire. *Teeth*—the largest

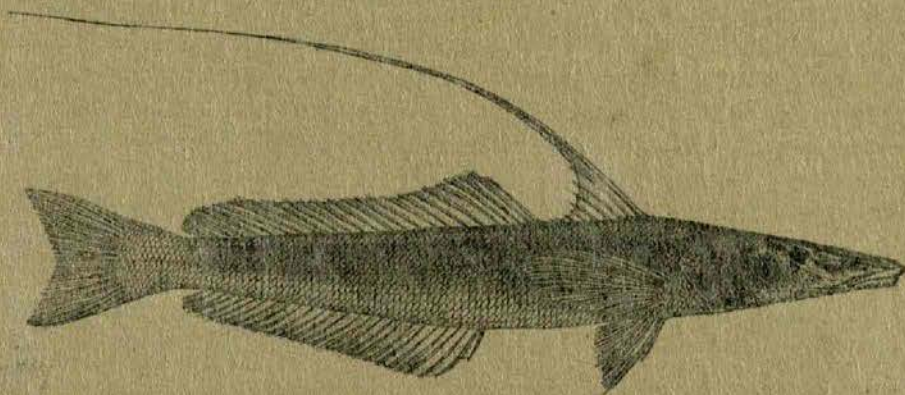


Fig. 80.—*Sillago panijus*.

(four) in the centre of the upper jaw. A transverse semicircular villiform band on the vomer. *Fins*—dorsal commences slightly behind pectoral; first dorsal spine short, second of varying length, but in large specimens usually extending to base of caudal fin; there are some fine scales on the interspinous membrane between it and the third spine. Second dorsal a little the highest in front, where it equals $\frac{2}{3}$ height of body; pectoral rounded. First two rays of anal undivided and with articulated extremities, form of fin similar to that of the second dorsal; caudal lobed, the upper lobe the longer. *Scales*—in regular horizontal rows, extending over cheeks and between the eyes, as far forward as the anterior nostril; some fine ones over the base of the pectoral and nearly to the extremity of caudal. *Lateral line*—descends very gently to about opposite seventh anal ray, whence it proceeds direct to middle of tail. *Colour*—greenish yellow shot with purple.

Hab. Coromandel coast of India, where it is caught in shoals in October, also in the Ganges, in Burma, and in the Malay Archipelago; attaining at least 10 inches in length.

997. (2.) *Sillago sihama*.

Atherina sihama, *Forsk. Descr. Anim.* p. 70, no. 102.

Sillago sihama, *Günther, Catal.* ii, p. 243; *Day, Fish. India*, p. 265, pl. lvii, fig. 3 (see synonym.).

Nudadi, Maráthi; *Soring*, or *Tella-soring*, *Arriti-ki*, Tel.; *Culingah*, Tam.; *Cudeerah*, Mal.; *Thol-o-dah*, And.; *Nga-rai*, Mugh; *Nga-pullovey*, Burmese.

D. 10-11 | 1/20-23. A. 1/22-23. L. 1. 70-74. L. tr. 5-6/12. C. p. 3-4.

Length of head 4 to $4\frac{1}{2}$, of caudal fin 8 to 9, height of body 6 to $7\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, $1\frac{1}{3}$ to $2\frac{1}{4}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Snout pointed. Greatest width of head equals its height or half of its length. Upper jaw slightly the longer. Vertical limb of preopercle serrated in its lower half. Opercle with a well-developed spine. *Teeth*—in a semicircular band on the vomer. *Fins*—dorsal spines of moderate strength, second and third subequal in length and as high as the body below them; second dorsal highest anteriorly, where it equals $\frac{1}{4}$ height of body. Anal below soft dorsal, and similar but not so high. Caudal emarginate or obtuse. *Air-bladder*—extends posteriorly to opposite the first third of the anal fin. *Colour*—olive-green along the back, becoming light on the abdomen, the whole having a brilliant purple reflexion; a silvery longitudinal band; minute black points on the dorsal and anal fins.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; ascending tidal rivers. This fish is known as *Whiting* at Madras. It attains a foot in length.

998. (3.) *Sillago maculata*.

Sillago maculata, *Quoy & Gaim. Voy. Uranie et Phys.*, Zool. p. 261, pl. 53, fig. 2; *Day, Fish. India*, p. 265, pl. lviii, fig. 4. (see synonym.).

D. 11 | 1/19-20. P. 17. A. 1/20-21. C. 18. L. 1. 70. L. tr. 6/10.

Length of head $3\frac{3}{4}$, of caudal fin $7\frac{1}{3}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and $\frac{3}{4}$ apart. Greatest width of head $\frac{3}{4}$ and its height $\frac{2}{3}$ of its length. Snout rather pointed, upper jaw a little the longer. Vertical limb of preopercle finely serrated; opercle with a small spine. *Fins*—dorsal spines weak, third to fifth subequal in length, nearly as high as body, and rather higher than soft portion of fin. Anal similar to second dorsal. Caudal lobed. *Colour*—greyish along the back, becoming dull white on the abdomen; some irregular blackish blotches along the sides, also a silvery median longitudinal band. Upper half of first dorsal black, outer edges of second dorsal and anal dark, and a grey band along the upper third of soft dorsal.

Hab. Andamans, Malay Archipelago to South-east Australia. Said to attain 8 or 9 inches in length.



Family XXIII. PSEUDOCROMIDES.

Body more or less elongate. Cleft of mouth oblique. Bones on the head unarmed (opercle sometimes obtusely pointed); head not cuirassed. The suborbital ring of bones articulates with the preopercle. Teeth in the jaws, present or absent on the vomer and palatines. Dorsal fin consisting of two portions which are connected; usually more rays than spines; anal similar to, or of less extent than, the soft dorsal; ventrals thoracic or jugular; pectorals without appendages. Scales feebly cycloid or ctenoid. Lateral line interrupted or incomplete. Air-bladder present or absent. Pyloric appendages, when present, in small numbers.

Synopsis of Indian Genera.

Cleft of mouth large. Palate edentulous.

Scales cycloid. Lateral line incomplete. 1. OPISTHOGNATHUS.

Lower jaw the longer. Teeth in jaws, vomer, and palate. Scales ctenoid.

Lateral line interrupted 2. PSEUDOCROMIS.

1. Genus OPISTHOGNATHUS, Cuv.

Syn. *Gnathypops*, Gill.

Branchiostegals six; pseudobranchiæ. Body rather compressed behind. Upper profile of snout parabolic. Eyes lateral, large. Cleft of mouth deep, the upper jaw being either produced in a styliform process to beyond the angle of the preopercle, or truncated a little behind the level of the hind edge of the eye. Fine teeth in jaws, with an outer enlarged row; palate edentulous. Dorsal spines weak and flexible (10-13), rays (13-17) similar to those of the anal; anal with two flexible spines; ventrals jugular; pectoral rays branched. Scales cycloid, small. Lateral line not continued so far as the caudal fin. Air-bladder small. Caecal appendages absent.

Geographical Distribution. Red Sea, seas of India to Malay Archipelago and beyond; also Brazil.

Synopsis of Indian Species.

- D. 14/12. Maxilla produced backwards to beyond angle of preopercle 1. *O. nigromarginatus*, p. 226.
D. 10/14. Maxilla truncated, reaching to just behind posterior edge of eye. 2. *O. rosenbergii*, p. 226.