

999. (1.) *Opisthognathus nigromarginatus*. (Fig. 81.)

Opisthognathus nigromarginatus, Rüppell, *Atl. Fische*, p. 114, t. xxviii, fig. 4; Day, *Fish. India*, p. 266, pl. lvii, fig. 5 (see synon.).

D. 14/12. P. 20. A. 16-18. C. 12.

Length of head 4, of caudal 9 to 10, height of body 6 in the total length. *Eyes*—diameter 4 in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{4}$ apart. Snout obtuse; the maxilla is elongate and its posterior extremity reaches to the base of the pectoral fin, it has a membranous connexion with the cheek. Opercles entire. *Fins*—dorsal spines weak, not quite so high as

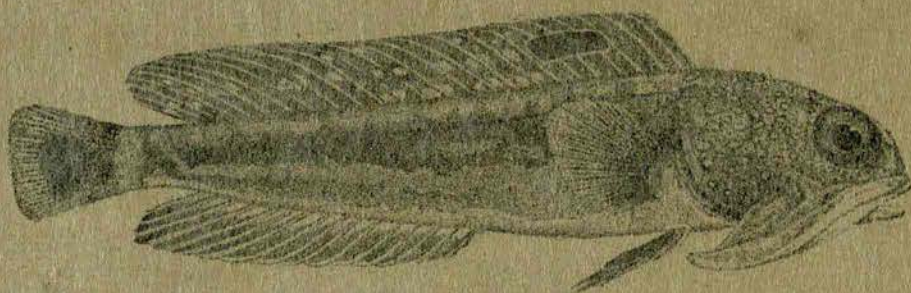


Fig. 81.—*Opisthognathus nigromarginatus*.

the rays. Pectoral $\frac{4}{5}$ length of head; ventral slightly longer; caudal rounded. *Lateral line*—ceases below middle of dorsal fin. *Colour*—yellowish marbled with brown, inside of upper jaw with two deep bluish bands on a white ground, one of which shows along the upper edge of the maxilla. Dorsal fin with a dark blue ovate spot between its fourth and eighth spines, cloudy marks and spots throughout the fin; base of anal light coloured, externally dark.

Hab. Red Sea; seas of India.

1000. (2.) *Opisthognathus rosenbergii*.

Opisthognathus rosenbergii, Bleeker, *Batavia Nat. Tijdsch.* xii, p. 220; Day, *Fish. India*, p. 267, pl. lviii, fig. 5 (see synon.).

Natsooli, Tara.

D. 10/14. P. 21. A. 2/14. C. 12. L. 1. 76.

Length of head $4\frac{1}{4}$, of caudal $6\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{8}$ apart. Snout obtuse; the maxilla (length of which equals that of postorbital portion of head) reaches to rather beyond vertical from hind edge of eye, it is truncated and does not nearly extend to angle of preopercle. Opercles entire. *Fins*—dorsal spines weak, and not so high as the rays. Pectoral as long as the head behind the eye; ventral reaches more than halfway to vent. Caudal rounded. *Scales*—about 26 rows below lateral line to commencement of anal fin, none above it so far as end of



spinous dorsal. *Lateral line*—on raised scales, smaller than those on the body, the tubes are short and unbranched. *Colour*—appears to vary somewhat: one from Madras has the body somewhat blotched, the dorsal and anal fins edged with black, and four large black blotches on the lower two thirds of that fin; ventrals black. In a drawing amongst Sir W. Elliot's collection the dorsal and caudal are blacker, with five white bands on the former, and two white spots on the latter fin. Bleeker's figure shows five black blotches along the lower half of the dorsal fin, and the caudal white with two wide black bands.

Hab. Seas of India to the Malay Archipelago; probably a small species, and apparently rare.

2. Genus **PSEUDOCROMIS**, Rüpp.

Syn. *Labristoma*, Swains.; *Leptochromis*, Bleeker.

Branchiostegals six; pseudobranchiæ. Body rather elongate and compressed. Eyes lateral. Cleft of mouth slightly oblique, lower jaw the longer. Jaws with a single row of teeth laterally, an outer enlarged row anteriorly in premaxillaries, canines in the lower jaw; teeth on vomer and palate. A single dorsal fin having a few (2-7) spines anteriorly; pectoral rays branched; ventrals thoracic. Scales of moderate size. Air-bladder present. Pyloric appendages absent.

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

1001. (1.) *Pseudochromis fuscus*. (Fig. 82.)

Pseudochromis fuscus, Müll. & Trosch. *Hor. Ich.* 1849, iii, p. 23, t. iv, fig. 2.

Pseudochromis xanthochir, Bleeker, *Batavia Nat. Tijdsch.* viii, p. 443; *Day, Fish. India*, p. 267, pl. lviii, fig. 6, *Suppl.* p. 791 (see *synon.*).

D. 3/26. P. 17. V. 1/5. A. 3/15. C. 17. L. 1.41. L. tr. 3-5/14.

Length of head $3\frac{2}{3}$, of caudal $5\frac{1}{4}$, height of body $3\frac{2}{3}$ in the

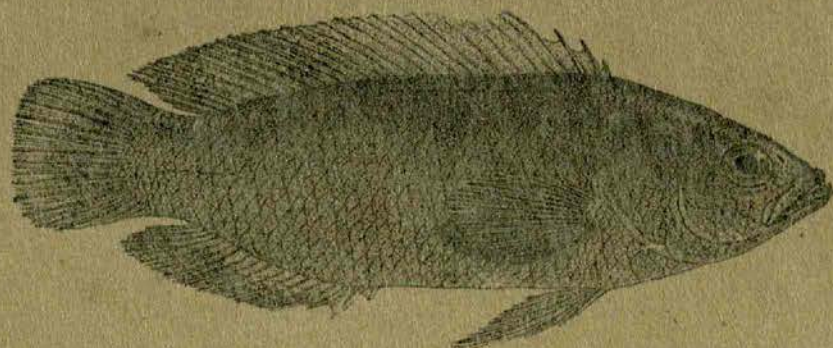


Fig. 82. — *Pseudochromis fuscus*.

total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Preopercle slightly crenulated



at its angle. *Fins*—dorsal spines short, third the longest, and about half as high as first ray, the first 11 to 15 rays unbranched; end of fin rather pointed. Caudal rounded. *Scales*—finely ctenoid. *Colour*—dull olive, upper half of soft dorsal with numerous yellow spots, the outer half of anal with brown ones. Caudal yellow in its last half, its base with brown spots between the rays.

Hab. Andaman Islands, where this species is not rare, to perhaps the Philippines.

Family XXIV. BATRACHIDÆ.

Pediculati, pt., Cuv.

Branchiostegals six; pseudobranchiæ present. Body low and more or less elongate; head large; the muciferous system well developed. Gills three. The gill-openings narrow, in the form of a slit before the pectoral fin. Opercles armed. Teeth conical and of moderate size or small. First dorsal with few spines; the second and the anal with many rays; ventral with two rays, jugular. Scales, when present, small. Air-bladder present.

Geographical Distribution. Coasts of tropical and temperate regions.

These carnivorous fishes apparently delight in mud and dirty water; they frequent the shores, ascending tidal rivers and estuaries. At Pinang "the natives attribute poisonous qualities to these fishes, and reject them even as manure" (Cantor, Catal. p. 206). They are, however, eaten at Bombay by the poorer classes. Dr. Günther has described a species of *Thalassophryne* (belonging to this family) from the Pacific coast of Panama (P. Z. S. 1864, p. 155), possessing "as perfect a poison-organ as that of the venomous serpents. Each operculum terminates in a long spine similar to the two dorsal spines: each spine is perforated at the extremity and at the base, and has a canal in its interior. The canal leads to a sac at the base of each spine, in which a considerable quantity of the poisonous substance was found; on the slightest pressure it flowed freely from the opening of the spine." (Zool. Record, 1864, p. 155.)

1. Genus **BATRACHUS**, Bl. Schn.

Body anteriorly somewhat cylindrical, and posteriorly compressed; head broad, depressed. Gill-openings narrow. Eyes lateral. Gape of mouth wide. Gill-covers with several spines. Teeth on jaw, vomer, and palate. No distinct canines. First dorsal with three strong spines. Scales, if present, very minute. Air-bladder divided into two lateral parts. Pyloric appendages absent. Vertebrae 12/17-27.

Geographical Distribution. That of the family.

Cantor observed that these fishes live some period after removal from the water.

*Synopsis of Indian Species.*

Eyes 1 diam. from end of snout; a foramen in axilla. 1. *B. grunniens*, p. 229.
 Eyes 3 diam. from end of snout; no foramen in axilla. 2. *B. gangene*, p. 229.

1002. (1.) *Batrachus grunniens*. (Fig. 83.)

Cottus grunniens, Bloch, *Ich.* t. 179.

Batrachus grunniens, Bl. Schn. *Syst. Ich.* p. 43; Day, *Fish. India* p. 269, pl. lix, fig. 1 (see synon.).

Nga owk, Arracan; *Beng muchee*, Chittagong.

D. 3 | 20-22. P. 21. V. 1/2. A. 15-18. C. 15.

Length of head $3\frac{1}{2}$, of caudal $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter 5 in length of head, nearly 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Head depressed, its greatest width equals its length behind the middle of the eyes. Gill-covers with four backwardly directed spines, two on the opercle and two on the subopercle, the lower of these last being often indistinct (*B. trispinosus*), sometimes only two spines are visible on each gill-cover.



Fig. 83.—*Batrachus grunniens*.

Snout broad and depressed, surrounded by a wreath of tentacles, those above the orbit very distinct. A round foramen in the upper part of the axilla. *Teeth*—several sharp, pointed rows in both jaws, becoming a single row laterally, one or two rows on vomer and a single row on palatines. *Fins*—first dorsal triangular, spines moderately strong, the second longest; caudal wedge-shaped. *Air-bladder*—in two rounded lateral portions, connected across the body of the vertebra. *Colour*—yellowish, marbled darker.

Hab. Seas of India (most numerous along the Malabar coast) to the Malay Archipelago.

1003. (2.) *Batrachus gangene*.

Batrachoides gangene, Ham. Buch. *Fish. Ganges*, pp. 34, 365, pl. 14, fig. 8; Day, *Fish. India*, p. 270, pl. lx, fig. 1 (see synon.).

D. 3 | 20-22. P. 21. V. 1/2. A. 16-18. C. 15.

Length of head $3\frac{1}{3}$, of caudal $7\frac{1}{2}$ to 8, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 7 to 8 in length of head, 3 diam. from end of snout, and $3\frac{1}{2}$ apart. Head broad, depressed, its greatest width nearly equal to its length. Four backwardly directed spines on the gill-covers, two on the opercle, the other



two on the subopercle. Snout broad, depressed, surrounded by tentacles, which are most distinct along the edge of the mandible, some also round the eye, and numerous fine ones over the surface of the head. No foramen in axilla. *Teeth*—two or more rows of teeth in the centre of either jaw, a single row laterally, those in the mandibles the largest and directed a little inwards; two rows of teeth on vomer; a single one on palatines. *Fins*—as in the last species. *Colour*—light reddish brown, marbled darker.

Hamilton Buchanan observed that this fish is an ugly animal, does not exceed a span in length, and when frightened emits a remarkable creaking noise.

Hab. Estuaries of the Ganges and other large Indian and Burmese rivers; attaining at least a foot in length.

Family XXV. PEDICULATI.

Branchiostegals five or six; pseudobranchiæ absent. Skeleton fibro-osseous. Head and anterior portion of the body large, the former depressed or compressed. Gills two and a half or three and a half; gill-opening reduced to a small foramen, situated in or near the axilla. Teeth minute, villiform or cardiform. The spinous dorsal, when present, composed of a few isolated spines; the carpal bones prolonged, forming a sort of arm for the pectoral fin; ventrals, when present, jugular, with four or five soft rays. Air-bladder present or absent. Pyloric appendages few or absent.

Geographical Distribution. All seas.

The modified dermoneurals, forming the cephalic tentacles of *Antennarius*, are reproduced when injured (Owen). These fishes attach themselves to any object by means of their pectoral and ventral fins, and Mr. Whitmee observed that one placed in a basin containing about a pint of water produced so strong a current by sucking in water with its expansive jaws and subsequently expelling it with much force through the branchial orifice that a rapid rotatory motion was produced. The gulf-weed (*Sargassum bacciferum*) assists the migration of these fishes; during the winter months the prevailing gales bring to the islands of the Bermudas large fields as well as isolated patches of weed, on which many fishes find a home and among them *Antennarius*. Here it makes its wonderful nest suspended by means of silk-like fibres, which prove strong enough to support the large bunches of eggs that hang like grape-clusters within their orbicular case (see J. M. Jones, 'Nature,' February 20, 1879, xix. p. 363); and M. Vaillant has shown that "each nest is made of one seaweed, the different twigs being brought together and made fast to each other by the fish by means of a pasty sort of substance provided by the animal itself" ('Nature,' December 29, 1887, xxxvii, p. 208).

*Synopsis of Indian Genera.*

- Head and body compressed. Teeth on palate.
 Gills lateral. 1. ANTENNARIUS.
 Head and body strongly depressed. No teeth on
 palate. Gills on upper surface of body ... 2. HALIEUTÆA.

1. Genus **ANTENNARIUS** (Comm.), Cuv.

Syn. *Chironectes*, pt., Cuv.

Head large, elevated and compressed. Only one half of the anterior branchial arch provided with lamellæ. Cleft of mouth nearly vertical. Eyes lateral. Gill-openings lateral. Cardiform teeth in the jaws and palate. The spinous dorsal in the form of three isolated spines, the anterior of which, situated upon the snout, is modified into a tentacle; the second dorsal of moderate length; anal short. Body smooth, granulated, or covered with minute spines, and sometimes with cutaneous tentacles. Air-bladder large and simple. Pyloric appendages absent.

Geographical Distribution. Pelagic, chiefly tropical. These fishes, as a result of their mode of progression, have a wide geographical range. Their pediculated pectoral fins allow them to walk or hop over moist ground or slimy rocks in quest of their prey, and even clasp pieces of wood or seaweeds. Although bad swimmers, M. Dussumier observed that they inflate themselves and float on the water like a *Diodon*. The "Anglers," to which this genus belongs, conceal themselves in the mud, displaying only the erectile first ray, situated on the head, and which bears an excrescence on its extremity resembling a worm or piece of meat. By agitating this, smaller fishes are attracted and fall a prey.

The species of this genus, owing to variation in colour, to change in the form of the spines on the body with age, and to the abnormal increase or decrease in the number of rays, are difficult to discriminate one from another.

Synopsis of Indian Species.

- Skin rough. Yellow, with brown spots and
 streaks 1. *A. hispidus*, p. 231.
 Skin rough. Greyish brown, with a black
 ocellus on the side, another at base of
 middle of dorsal fin. Fins spotted 2. *A. nummifer*, p. 232.
 Skin generally smooth, but with fleshy
 excrescences. Colours various, sides
 with white spots 3. *A. marmoratus*, p. 233.

1004. (1.) **Antennarius hispidus**. (Fig. 84.)

Lophius hispidus, Bl. Schn. Syst. Ich. p. 142.

Antennarius hispidus, Day, Fish. India, p. 271, pl. lx, fig. 2 (see synon.).

Kappa mura moia, Tel.; *Kend*, Maráthi.



B. vi. D. 3 | 12. P. 10. V. 5. A. 7. C. 9.

Mouth subvertical, lower jaw a little compressed, the width of the gape of the mouth exceeding that of the cleft. *Eyes*—high up, from 2 to $2\frac{1}{2}$ diameters from end of snout. *Fins*—first dorsal spine about as long as the second, and ending in a fleshy knob, second about as long as the third, and each with a skinny flap posteriorly, that from the third nearly or quite joining the second dorsal fin, the last three rays of which are branched. Pectoral and ventral rays unbranched. Last six anal rays branched, as are also

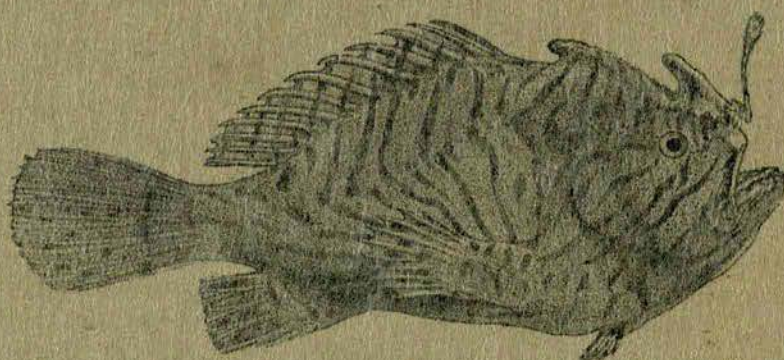


Fig. 84.—*Antennarius hispidus*.

those of the caudal. *Skin*—universally roughened, with spiny points extending over the fins, except some of the rays of the pectoral, ventral, and caudal. *Lateral line*—ceases below middle of second dorsal. *Colour*—yellow, with brown spots and streaks, some radiating from the eye, others descending from the back and many down the sides. Small streaks and blotches or spots on the fins.

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

1005. (2.) *Antennarius nummifer*.

Chironectes nummifer, *Cuv. Mém. Mus.* iii, p. 430, pl. xvii fig. 4.

Antennarius nummifer, *Day, Fish. India*, p. 272, pl. lix, fig. 2 (see synon.).

B. vi. D. 3 | 12. P. 10–13. V. 5. A. 7. C. 9.

Mouth almost vertical, with the lower jaw compressed towards its extremity, the width of the gape equalling the extent of the cleft. *Eyes*—high up, but little more than 1 diameter from end of snout. *Fins*—first dorsal spine not quite so long as the second, and ending in a fringed extremity, second rather above $\frac{1}{2}$ as long as third, which latter has a flap of skin posteriorly, which does not extend so far as to the base of the second dorsal, the last two rays of which are divided at their outer extremities. Pectoral and ventral rays unbranched. Anal commences under middle of second dorsal, has branched rays, its last just reaches the base of the caudal. Caudal rounded, its rays branched; last dorsal rays just reach the base of the caudal fin. *Skin*—universally roughened,



with points extending over fins except some of the rays of the pectoral, ventral, and caudal. *Lateral line*—ceases below the commencement of the second dorsal. *Colour*—greyish brown with a purplish tinge; a black ocellus having a yellow edge behind and above the end of the base of the pectoral fin. Fins yellow, the dorsal with a black yellow-edged ocellus below its seventh and eighth rays, its end with black bands and spots, as have also the pectoral, ventral, caudal, and anal fins. Tongue whitish, with green marks; eyes golden.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond. Grows to at least $6\frac{1}{2}$ inches in length.

1006. (3.) *Antennarius marmoratus*.

Lophius marmoratus, Bl. *Schn. Syst. Ich.* p. 141.

Antennarius marmoratus, Day, *Fish. India*, p. 272 (see synonym.).

B. vi. D. 3 | 12. P. 9-10. V. 5. C. 9. A. 7. Vert. 9/9.

The variations in this species due to age or locality are so considerable that two specimens are very rarely found possessing complete similarity. *Eyes*—about 1 diameter from end of snout. The skin may be smooth, minutely or distinctly granulated, while the length of the third dorsal spine varies from one half to less than one third of the height of the body. The anterior dorsal spine is short and slender, and terminates in a small knob having a minute tentacle attached, sometimes it is very short, or it may be entirely absent; the second and third spines are fringed on their summits. The last two dorsal rays branched, the last if laid backwards extends to or slightly beyond the root of the caudal. Skin usually smooth, or sometimes granular, rarely rough. Head and body with cutaneous tentacles, those at the angle of the mouth and on the abdomen being the largest. Stomach a large sac. *Air-bladder*—large and simple. *Colour*—variable, generally reddish yellow marbled with brown, and brown spots mostly edged with white, radiating from the eye; round white spots on sides and on abdomen. In some the fins are banded. Iris golden, with radiating brown lines.

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

2. Genus *HALIEUTÆA*, Cuv. & Val.

Syn. Astrocanthus, Swainson.

Body and head depressed, the latter very large and broad, anteriorly forming the arc of a circle. Eyes antero-lateral. Cleft of mouth horizontal, rather wide, with the upper jaw rather protractile. A transverse bony ridge across snout, beneath which is a retractile tentacle. Gill-opening near the axilla on the upper surface of the body. Gills two and a half; the anterior branchial arch destitute of laminae. Small teeth on jaws and tongue; palate



edentulous. A short dorsal and anal fin; fin-rays unbranched. Body and head covered with small spines. Air-bladder and pyloric appendages absent.

1007. (1.) *Haliutæa stellata*. (Fig. 85.)

Lophius stellatus, *Wahl. Skr. Nat. Kjöb.* iv, p. 214, t. iii, figs. 3, 4;
Bl. Schn. Syst. Ich. p. 142.

Haliutæa stellata, *Day, Fish. India*, p. 273, pl. liv, fig. 1 (see
synon.).

B. vi. D. 4. P. 13. V. 1/5. A. 4. C. 9. Vert. 7/10.

Eyes—lateral, with the interorbital space rather concave. The retractile tentacle above the mouth has a trefoil extremity. Gill-openings above the axilla in about the middle of the total length.

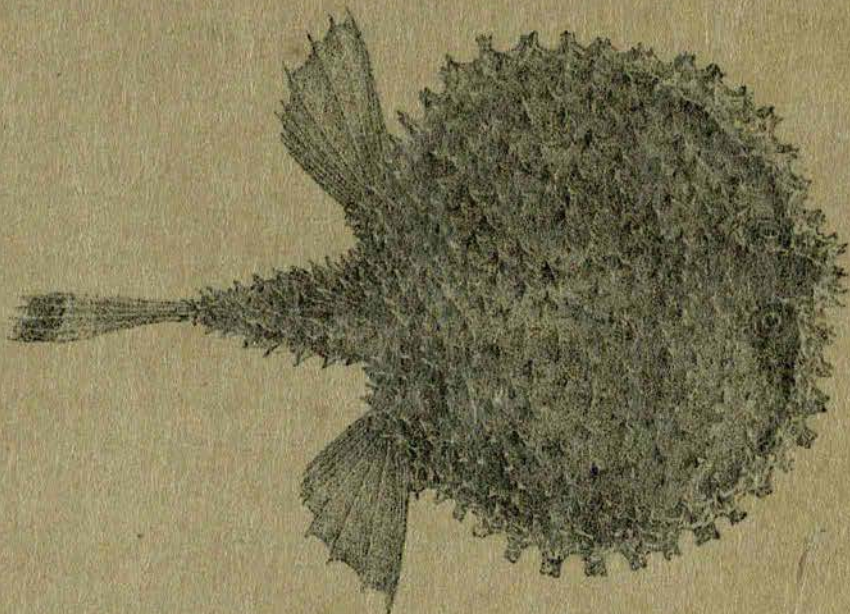


Fig. 85.—*Haliutæa stellata*.

Fins—dorsal fin situated in the third fifth of the total length, and slightly behind the pectorals. Body covered with rather distantly placed spines, each of which as a rule has four or more roots; the lateral spines are the largest, and in the anterior half of the body have three or even four points at their outer edges. *Colour*—pinkish.

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



Family XXVI. COTTIDÆ.

Platicephalinæ (subfam.), Swainson.

Body oblong or subcylindrical. Eyes lateral or partly directed upwards and outwards. Cleft of mouth lateral. Some of the bones of the head armed. Infraorbital bones articulate with the preopercle. Teeth villiform, no canines. Two separate dorsal fins or one fin in two distinct portions, the spinous less developed than the soft or than the anal; ventrals thoracic, sometimes scarcely developed. Air-bladder generally absent. Pyloric appendages few, or in moderate numbers.

Geographical Distribution. Almost all seas, a few species living in fresh water.

Synopsis of Indian Genera.

Head broad, depressed. No pectoral appendages. 1. *PLATYCEPHALUS*.
Head paralleliped. Three pectoral appendages. 2. *TRIGLA*.
Head paralleliped. Two pectoral appendages;
body covered with bony scale-like plates 3. *PERISTETHUS*.

1. Genus *PLATYCEPHALUS*, Bl. Schn.

Ulu parti, Tam.; *Chorbombil*, Maráthi. *Flat heads* or *Crocodile Fishes*.

Branchiostegals six or seven; pseudobranchia. Head broad, depressed, and armed with spines. Lower jaw the longer. Eyes lateral or superior. Villiform teeth in the jaws, vomer, and palatines, with larger ones sometimes intermixed. Two dorsal fins, the first having a small isolated spine anterior to it; the soft portion similar to the anal; ventrals thoracic; no pectoral appendage. Scales present, ctenoid, small or rather so. Lateral line complete, in some species armed with spines. Air-bladder absent. Pyloric appendages in moderate numbers.

These fishes are termed "Crocodile fishes" in Malabar, and wounds from their spines are dreaded because of the violent irritation they occasion. Their eyes are peculiar; the iris possesses two semicircular flaps, one above, the other below, the upper being usually the larger; these flaps can be brought close together, probably under the stimulus of light. The comparative width of the head to its length differs in individuals, also with age, becoming broader in the adult. I have captured specimens full of well-developed ova as early as February. These fishes are eaten by the lower classes of natives.

Geographical Distribution. Coasts of Indo-Pacific Ocean.

*Synopsis of Indian Species.*

- A. Lateral line with spines throughout . . 1. *P. scaber*, p. 236.
 B. Anterior third of l. l. spiny, remainder smooth.
 L. 1. 53-55. Width of head $\frac{4}{5}$ of length. 2. *P. tuberculatus*, p. 237.
 L. 1. 75. Width of head $\frac{1}{2}$ of length . . 3. *P. macracanthus*, p. 238.
 C. Lateral line without spines.
 D. 1 | 7 | 13. (First dorsal with 7 spines.)
 Head as broad as long 4. *P. insidiator*, p. 238.
 D. 1 | 8 | 12. Eyes $\frac{1}{2}$ to $\frac{2}{3}$ diameter apart. 5. *P. punctatus*, p. 239.
 D. 1 | 8 | 12-13. Eyes $\frac{1}{4}$ diam. apart;
 crests on head serrated, not spiny . . . 6. *P. serratus*, p. 240.
 D. 1 | 8 | 12-13. Eyes $\frac{1}{4}$ diam. apart;
 crests on head spiny 7. *P. carbunculus*, p. 240.

1008. (1.) *Platycephalus scaber*. (Fig. 86.)

Cottus scaber, *Linn. Syst. Nat.* i, p. 451.

Platycephalus scaber, *Day, Fish. India*, p. 275, pl. lx, fig. 3 (see synon.).

Irwa, Tel.; *Vet-col-pa-thy*, Tam.

B. vi. D. 1 | 7-8 | 12. P. 21. A. 12. C. 15. L. r. 105.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, of caudal fin 8, height of body 8 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to $5\frac{1}{4}$ in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ apart. Interorbital space concave. Greatest width of head $\frac{1}{2}$ of its length. A sharp spine at anterior upper edge of orbit; supraorbital margin serrated, and from it a spiny ridge goes to the occiput; a similar ridge from hind edge of eye to shoulder; a third from preorbital to angle of preopercle, where there are two spines, the upper as long as $\frac{1}{2}$ or $\frac{2}{3}$ distance to orbit; a third short spine at anterior base of larger one.

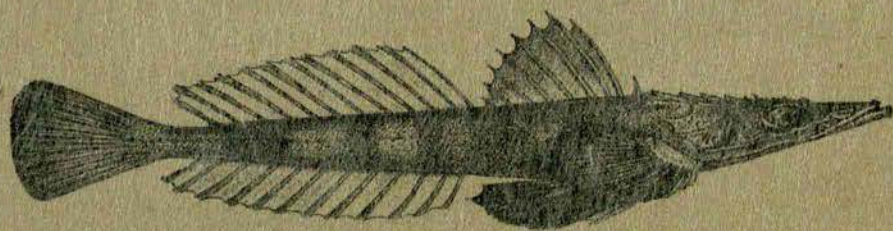


Fig. 86.—*Platycephalus scaber*.

In a young specimen 5 inches long the preopercular spine if laid forwards would reach as far as the orbit. No spines at nostrils, but in some specimens, on the median ridge, opposite the nostrils, are two small ones. Two opercular spines. *Teeth*—small in jaws, in two oval parallel patches, about as long as the eye, on the vomer; in an elongate band on either palatine. *Fins*—second dorsal spine equals $\frac{3}{8}$ to $\frac{1}{2}$ length of head, and is not quite so high as the two next, second dorsal about same height as first. Ventral nearly reaches anal, which commences slightly behind vertical from first dorsal ray. Caudal cut nearly square. *Scales*—4 or 5 rows between the lateral line and base of first dorsal fin, each of those on



the cheeks is furnished with a small spine, which in old individuals is occasionally divided into several. *Lateral line*—with about 55 rather strong spines directed backwards, and extending along its entire length, one on every alternate scale. *Colour*—brownish, becoming dull white beneath; more or less distinct vertical bands pass from the back to the sides. First dorsal clouded with black, second dorsal spotted. Pectoral and ventral usually dark externally. Caudal greyish in its last half. The young are more distinctly banded than the adults, and the first dorsal, pectorals, and ventrals are nearly black.

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

1009. (2.) *Platycephalus tuberculatus*.

Platycephalus tuberculatus, *Cuv. & Val. H. N. Poiss.* iv, p. 258;
Fay, Fish. India, p. 275, pl. lx, fig. 5 (see synonym).

B. vi. D. 1 | 7-8 | 11-12. P. 21. A. 11-12. C. 15. L. 1. 53-55.

Length of head 3 to $3\frac{1}{4}$, of caudal fin 7, height of body 6 in the total length. *Eyes*—directed upwards and somewhat outwards; diameter $3\frac{2}{3}$ to 4 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{4}$ apart. Interorbital space concave. Width of head between preopercular spines $\frac{4}{5}$ of its length. Supraorbital margin serrated, with two sharp spines anteriorly; from it a serrated ridge runs back to occiput, a second from behind eye to upper opercular spine; a third ridge from preorbital to angle of preopercle. A few spines in median line midway between eye and snout; a spiny ridge passes forwards from the spines on either side above the limbs of the premaxillaries. A serrated bony ridge across opercle to a strong spine at middle of its hind edge. Angle of preopercle with a strong spine which equals half distance between its base and orbit; this spine has one above at end of serrated ridge, another a little longer below, situated on lower margin of preopercle, which bears from 2 to 4 more, decreasing in size anteriorly and all pointing backwards. Several spines at the shoulder, and a strong one above the axilla. *Teeth*—villiform in jaws, in two oval parallel patches on vomer, and in an elongate band on palatines. *Fins*—second dorsal spine $\frac{1}{4}$ length of head, and not quite so high as third, soft dorsal as high as spinous. Ventral nearly reaches anal, which arises below the second dorsal; caudal slightly rounded. *Scales*—4 or 5 rows between lateral line and base of first dorsal fin; most of those on the cheeks have a rudimentary spine. *Lateral line*—with from 15 to 20 spines in the first third of its course. *Colour*—brown, becoming lighter beneath, vertical bands pass from back to sides. First dorsal blackish brown; second dorsal spotted. Pectoral with brown spots in its upper two thirds, and a black margin with a white edge along its lower border; outer half of ventrals grey.

Hab. Seas of India.

1010. (3.) *Platycephalus macracanthus*.

Platycephalus macracanthus, Bleeker, *Versl. en Meded. Ak. Wet. Amsterd.* 1867, p. 7, c. fig.; *Day, Fish. India*, p. 276, pl. lix, fig. 3.

B. vii. D. 1 | 8 | 12. P. 23. A. 12. C. 13. L. r. 75/65. L. tr. 4/15.

Length of head $3\frac{1}{3}$, of caudal $7\frac{1}{2}$, height of body $7\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{3}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and about $\frac{1}{2}$ apart. Interorbital space concave. Width of head between preopercular scales equal to about $\frac{1}{2}$ its length. Supraorbital margin with six strong denticulations, and the ridge from it to occiput with about five more; ridge from eye to shoulder with about five spines; that from preorbital to preopercular spine with six (besides being serrated). A small spine on inner side of front nostril, which is furnished with a cirrus. Spine at angle of preopercle reaching to the base of the pectoral, a short spine below succeeded by another still more minute. *Teeth*—villiform, in two parallel patches on vomer, and in a narrow band along either palatine. *Fins*—second dorsal spine $\frac{1}{3}$ length of head, and nearly as high as commencement of second dorsal fin. Pectoral $\frac{1}{3}$ length of head, ventral slightly longer. Anal commences below second ray of dorsal; caudal cut square. *Scales*—those on the head not spiny. *Lateral line*—with about 15 small spines in the first portion of its course. *Colour*—brownish above, becoming dull white beneath, first dorsal and end of caudal darkish, second dorsal with brown spots on the rays.

Hab. Madras; Amboina.

1011. (4.) *Platycephalus insidiator*.

Cottus insidiator, *Forsk. Descr. Anim.* p. 25.

Platycephalus insidiator, *Day, Fish. India*, p. 276 (see *synon.*).

Irra, Tel.; *Ool-pa-thy*, Tam.; *Nga-paying-ki*, Mugh; *A-ra-wud-dah* or *Chou-ur-dah*, And.; *Nga-prang-khyt* and *Kuéy meedong*, Arracan; *Moor bullia*, Chittagong.

D. 1 | 7 | 13. A. 13. L. r. 120–125/100–120. L. tr. 12/24. C. p. 14.

Length of head $3\frac{2}{3}$, of caudal 7, height of body 7 in the total length. *Eyes*—superior, diameter $6\frac{3}{4}$ to 7 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. Head strongly depressed, its upper surface triangular, the base between the preopercular spines $\frac{1}{3}$ of the length. Interorbital space flat or slightly concave, two ridges extending back from orbit, the inner dividing over the occiput, whilst the outer or temporal terminates at the shoulder in two blade-like spines. One spine at anterior lower angle of orbit, none at nostrils, which are patent but not tubular. Preorbital with three raised grooves starting in a stellate form from a common centre. Preopercle with most of its surface forming a portion of the flattened upper plane of the head, and having two very strong spines at its angle, the inferior of which is the longer and some-



times equals the diameter of the eye. Opercle with two spines. *Fins*—first dorsal spines weak, the first slightly the longest, inter-spinous membrane very slightly emarginate. A small, stout, single spine before first dorsal, and sometimes another fine one between first and second dorsal, the rays of which anteriorly are as high as the spines of the first dorsal. Caudal obtuse or even rounded. *Colour*—brownish above, becoming dirty white beneath; fins spotted. Caudal yellow, with a deep black band, having a white border, obliquely crossing its upper lobe, a second along its lower lobe.

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

1012. (5.) *Platycephalus punctatus*.

Platycephalus punctatus, *Cuv. & Val. II. N. Poiss.* iv, p. 243; *Day, Fish. India*, p. 277, pl. lx, fig. 3 (see synonym.).

B. vii. D. 1 | 8 | 12. P. 21. A. 11-12. L. 1. 110/100. L. tr. 8/25.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, of caudal 8 to 9, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter from 5 to $5\frac{1}{2}$ in length of head, $1\frac{2}{3}$ to 2 diam. from end of snout, and $\frac{1}{2}$ to $\frac{2}{3}$ apart. Inter-orbital space slightly concave. Width of head between preopercular spines equals half its length. Supraorbital margin with four or five spines, the ridge from it towards occiput with two more small ones; ridge from eye to shoulder-spine with three or four spines; ridge from preorbital to preopercular spine with two or three spines. A small spine on the inner side of each front nostril. Spine at angle of preopercle strong, its length about $\frac{1}{4}$ that of head, a small one above its base, and a large one below directed slightly downwards as well as backwards. Posterior nostril rather tubular, anterior also tubular and with a valve which sometimes terminates in a short filament. A small spine above the axilla. *Teeth*—villiform in jaws, in two parallel bands on vomer, and in a long narrow patch along palatines. *Fins*—second spine of first dorsal not so high as third, spines from that to sixth subequal in length, and $\frac{1}{2}$ length of head; second dorsal anteriorly $\frac{3}{4}$ height of spinous. Pectoral $\frac{1}{2}$ and ventrals $\frac{2}{3}$ length of head. Anal commences before second or third ray of dorsal. Caudal cut square. *Scales*—about 10 rows between lateral line and base of spinous dorsal; those on head and cheeks have no trace of any spine. *Lateral line*—smooth in its entire extent, tubes with one or two simple branches. *Colour*—brown, becoming lighter beneath; four or five wide and dark bands pass from the back to the middle of the sides; numerous black spots over head and body. First dorsal stained nearly black, second dorsal and anal yellowish, the first with brown points. Pectoral covered with dark markings so as to appear almost black. Ventral dark in its last two thirds. Caudal dark.



Hab. Seas of India to the Malay Archipelago; attaining at least 15 inches in length.

1013. (6.) *Platycephalus serratus*.

Platycephalus serratus, *Cuv. & Val. H. N. Poiss.* iv, p. 259; *Day, Fish. India*, p. 277 (see *synon.*).

B. vii. D. 1 | 8 | 11-12. P. 19. V. 1/5. A. 11. C. 13.

Length of head 4 in the total length. Interorbital space $\frac{1}{2}$ of transverse diameter of eye. The crests on the various bones of the head and suborbital ring are serrated but destitute of spines. The supraorbital ridge is elevated; that across the opercle is smooth. The ridge from eye to angle of preopercle is elevated and finely denticulated, above it is another less pronounced and smooth. Upper spine at the angle of the preopercle the largest, it is succeeded by a shorter one, and on the border of the interopercle are two more small ones; there does not appear to be any spine directed anteriorly, or if there is it is but a little one. *Teeth*—line. *Scales*—with rough borders. *Lateral line*—smooth. *Colour*—reddish brown, with six or eight irregular brown bands descending from the back to the white abdomen. Fins grey, with black points. On the top of the dorsal a black blotch. Ventrals bluish above and whitish below.

Hab. Trincomalee, growing to 7 inches in length.

1014. (7.) *Platycephalus carbunculus*.

Platycephalus carbunculus, *Cuv. & Val. H. N. Poiss.* ix, p. 461; *Day, Fish. India*, p. 278 (see *synon.*).

B. vii. D. 1 | 8 | 11-12. A. 11-12. L. 1.75-80/65-70. L. tr. 6/26.

Length of head 3 to $3\frac{1}{2}$, of caudal 5 to 6, height of body $6\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. Supraorbital edge with one or two spines anteriorly and a strongly serrated edge; the line from the orbit to the occiput has six, and that to the shoulder-spine five spines. From the preorbital a raised line armed with 10 or 12 spines runs to the two preopercular spines, the upper (which has a small one at its base) longer than the lower. Two, or even three, turbinal spines; no nasal tentacle. Two well-marked opercular spines, and another in the axilla. *Fins*—ventral reaches origin of anal; caudal cut square. *Scales*—ctenoid, present on the head, but without spines or raised points. *Lateral line*—smooth. *Colour*—brownish, with numerous brown spots; three vertical bands on body, one broad one through anterior half of first dorsal to abdomen, a second through middle of second dorsal, and a third over free portion of tail; opercle dark; posterior half of first dorsal black;



second dorsal spotted; pectoral with several lines of spots and a dark mark near its base; caudal dark, with one or two ill-defined vertical bands.

Hab. Western coast of India, Madras, and the Malay Archipelago. Cantor observes that this fish occurs, although not numerous, at all seasons at Pinang, and is eaten by the natives; his largest specimens were $6\frac{1}{2}$ inches in length.

2. Genus **TRIGLA**, Artedi.

Syn. *Hoplonotus*, Guichenot.

Branchiostegals seven; pseudobranchiæ present. Head paralelopiped, with its superior and lateral surfaces bony, infraorbital bone enlarged, covering the cheeks. Villiform teeth in both jaws, and usually on the vomer, but none on the palatines. Two dorsal fins, the first being of less extent than the second; three free filaments at the base of the pectoral fin. Air-bladder well developed, generally provided with lateral muscles, and sometimes partially divided internally by partitions. Pyloric appendages few or in moderate numbers.

Geographical Distribution. Tropical and temperate seas. This genus contains the gurnards.

1015. (1.) *Trigla hemisticta*.

Trigla hemisticta, Temm. & Schl. *Faun. Japon.*, Poiss. p. 36, pl. xiv, figs. 3, 4, pl. xiv, B; Day, *Fish. India*, Suppl. p. 791 (see synonym.).

D. 7/11-12. P. 11+iii. V. 1/5. A. 11-12. C. 16.

Length of head about 3, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. Eyes— $1\frac{1}{2}$ diameters from end of snout and $1\frac{1}{4}$ apart. Profile from upper edge of orbit to the snout scarcely concave. Preorbital produced anteriorly into a flattened spine; two spines on the preopercle, the upper the larger. Opercle ending behind in a strong spine as long as the orbit; shoulder-bone with two spines. Teeth—villiform. Fins—dorsal spines strong, third and fourth longest; a bony plate along the base of the dorsal fin, wider in small than in large examples. Pectoral reaches to above third anal ray. Scales—small. Colour—upper part of body rosy, with numerous small rounded or oblong black spots; lower half of body white. First dorsal with a large black oblong blotch and a row of small round black dots along the middle of the second dorsal; inter-radial membrane of pectoral bluish black.

Hab. An example 9 inches long has been obtained from Muscat; the species has likewise been brought from Japan.

3. Genus **PERISTETHUS**, Kaup.

Branchiostegals seven; pseudobranchiæ present. Head paral-
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leloped in shape, the sides and upper surface cuirassed with bone; the preorbital prolonged anteriorly into a flat projecting process. One or more barbels on the lower jaw. Teeth absent. One or two dorsal fins, the posterior of which is most developed. Two free pectoral appendages. Body covered with bony, scale-like plates. Pyloric appendages few or in moderate numbers. Air-bladder present.

Geographical Distribution. South coast of Britain, Mediterranean, Atlantic and Indian Oceans to China, and Sandwich Islands.

1016. (1.) *Peristethus halei*.

Peristethus halei, Day, *Fish. India*, Suppl. 1888, p. 791 (see synon.).

D. 7/15. V. 1/5. A. 15. L. 1. 34.

"Preorbital processes short, their length being contained $3\frac{1}{2}$ times between their extremity and the anterior margin of the orbit. A pair of spines on the occiput, on either side of which is a low ridge terminated by a small spine. Anterior vertical plates longer than broad. The opercular ridge forms a strong spine. Lower jaw with barbels. Colour—uniform red." (*Halcy.*)

Hab. A single specimen taken at Galle in deep water in April, 1883.

Family XXVII. CATAPHRACTI.

Infraorbital bones articulate with the preopercle. Head and body more or less angular, cuirassed with plates, or keeled scales entirely cover the body. The opercular pieces may or may not be ankylosed. Teeth present or absent in the jaws, in one species present on the vomer. One or two dorsal fins; ventrals thoracic, with five or less rays.

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

Synopsis of Indian Genera.

- | | |
|---|-------------------|
| A long spine at angle of preopercle. Dorsal fin with detached rays anteriorly; pectorals very elongate, with the anterior portion detached and shorter than the rest of the fin | 1. DACTYLOPTERUS. |
| No spine at angle of preopercle. Pectorals rather elongate and with unbranched rays | 2. PEGASUS. |

1. Genus **DACTYLOPTERUS** (Lacép.).

Branchiostegals six. Head with its surfaces more or less flattened, bony above and on the sides. The angle of the preopercle and the shoulder-bone each produced into the form of a long spine. Granular teeth in the jaws only. Two dorsal fins of nearly equal length; pectorals much elongate, the anterior portion detached from and shorter than the upper. Scales on body keeled and of a moderate size. Lateral line absent. Air-bladder in two lateral portions, each furnished with a large muscle.

Geographical Distribution. Tropical Atlantic and Pacific, Mediterranean, and Indian Ocean.

1017. (1.) *Dactylopterus orientalis*. (Fig. 87.)

Dactylopterus orientalis, Cuv. & Val. *H. N. Poiss.* iv, p. 134, pl. 76;
Day, Fish. India, p. 279, pl. lx, fig. 6; *Suppl.* p. 792 (see synonym.).

Shoshana, Arabic; *Ana toumbi*, Tam.

D. 1 | 1 | 5-6 | 8. P. 30. V. 6. A. 6. C. 9. Vert. 9/13. C. p. 18-19.

Length of head (including preopercular spine) 3 to $3\frac{1}{2}$, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—nearly one diameter from end of snout and also apart. Interorbital space concave. Spine at angle of preopercle more than half length of rest of head. Bony covering of head produced backwards to below second or third dorsal spine. A shoulder-spine. *Fins*—an elongated filament arises over occiput and is $\frac{1}{2}$ longer than head; a second, also detached, midway between it and first dorsal spine, than which it is half

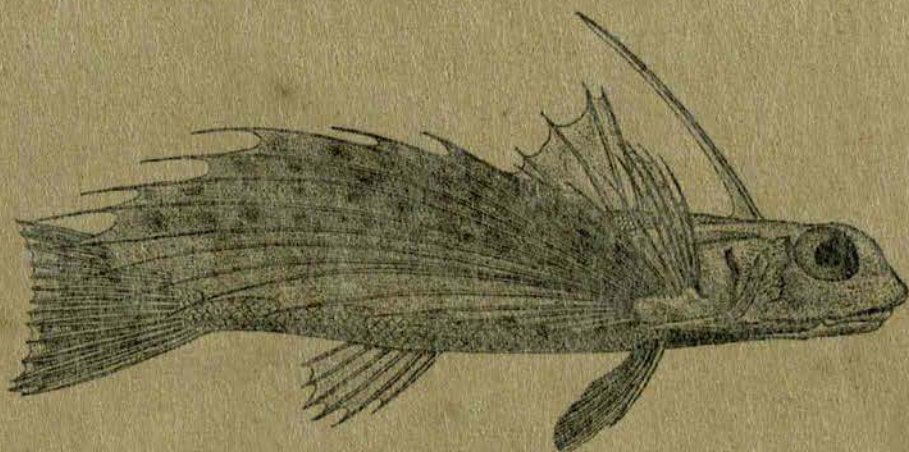


Fig. 87.—*Dactylopterus orientalis*.

shorter. Fin-rays unbranched except last few of dorsal and sometimes of anal, those of the caudal are bifid. Pectoral reaching to end of caudal, its first few rays are short, and rather detached from the remainder of the fin, its middle rays are longest. *Scales*—with a ridge along each; a large scale forms an oblique



keel along either side of base of caudal fin. *Colour*—pinkish, with a tinge of blue along the abdomen; dorsal and caudal rays spotted; pectoral grey along the middle, and the whole of the fin spotted, in the young it appears to have a large round black spot edged with white.

Hab. Seas of India to the Malay Archipelago and beyond. The figure is taken from a specimen in the British Museum.

2. Genus *PEGASUS*, Linn.

Branchiostegal one; pseudobranchiae absent. Gills four; gill-opening narrow, in front of the pectoral fin. Body broad and depressed, covered with bony plates, which are anchylosed on the trunk and movable on the tail. Gill-cover formed of one bony plate, and a small interopercle concealed by it. No teeth. One short dorsal and anal fin opposite to one another; pectorals horizontal and long, composed of simple rays, some of which may be spinous; ventral with one or two rays, the outer elongate. Air-bladder absent.

Geographical Distribution. Shores of Indian Ocean.

1018. (1.) *Pegasus draconis*. (Fig. 88.)

Pegasus draconis, Linn. *Syst. Nat.* i, p. 418; Day, *Fish. India*, p. 280, pl. lxi, fig. 1 (see synonym.).

D. 5. P. 11. V. 2. A. 5. C. 8.

Body broad and depressed. *Eyes*— $2\frac{1}{2}$ diameters from end of snout and 2 apart. Interorbital space transversely concave, two deep grooves on the neck. Under surface nearly flat, the expanded

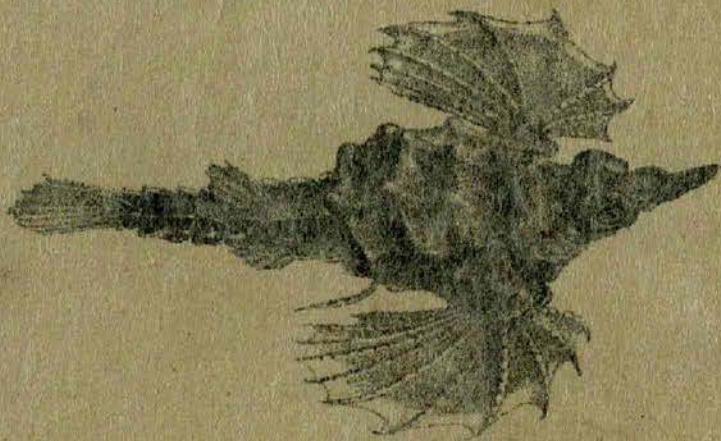


Fig. 88.—*Pegasus draconis*.

portion with two median and two lateral longitudinal ridges and three cross ridges; at the meeting-points of the various ridges are



obtuse points. Caudal portion composed of eight rings, most of the anterior five of which have a lateral spiny elevation. Lateral edges of snout denticulated; a serrated ridge runs along the upper edge of orbit and is continued along the snout to its end. *Fins*—anterior pectoral rays the shortest. Vent midway between posterior edge of orbit and root of caudal fin. *Colour*—body with brown reticulations, snout and last caudal ring black. Pectoral grey, its rays spotted, with a white outer edge and sometimes a white band.

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

Family XXVIII. GOBIIDÆ.

Pseudobranchiæ present, sometimes rudimentary. Body generally elongate. The infraorbital ring of bones does not articulate with the preopercle. A single rayed dorsal fin, sometimes divided into two portions; the spines are flexible, and the spiny part of the fin has fewer rays than the remainder; anal similar to the soft dorsal; ventrals sometimes united so as to form a disk, or arising close together. Air-bladder generally absent. Pyloric appendages, if present, few.

Geographical Distribution. Shores of tropical and temperate regions, some inhabiting fresh water.

Synopsis of Indian Genera.

First group. GOBIINA.

Ventrals forming a disk and united throughout or only in their basal halves; two dorsal fins.

- | | |
|---|---------------------|
| A. Eyes not remarkably prominent, base of pectoral not peculiarly developed. | |
| a. Teeth in more than one row in one or both jaws. | |
| a'. Ventrals not adherent to abdomen throughout. | |
| Body elongate, generally scaly | 1. GOBIUS. |
| Body compressed, scaleless | 2. GOBIODON. |
| b'. Ventrals adherent to abdomen throughout | 3. SICYDIUM. |
| b. Teeth in a single row in both jaws. | |
| A pair of posterior canines above mandibular symphysis | 4. APOCRYPTES. |
| No canines above mandibular symphysis .. | 5. APOCRYPTICHTHYS. |
| B. Eyes remarkably prominent and close together; base of pectoral largely developed, very muscular. | |
| Teeth erect in both jaws | 6. PERIOPHTHALMUS. |
| Teeth in lower jaw horizontal | 7. BOLEOPHTHALMUS. |



Second group. ELEOTRINA.

Ventrals not joined. Two dorsals.

- Vomerine teeth present 8. BOSTRICHTHYS.
 No teeth on vomer or palate 9. ELEOTRIS.

Third group. AMBLYOPINA.

All the vertical fins more or less united.

- No cavity above the opercle. Scales rudimentary or wanting 10. GOBIOIDES.
 A blind cavity above opercle. Scales small but distinct 11. TRYPAUCHEN.

First group. GOBIINA.

1. Genus GOBIUS, Artedi.

Branchiostegals generally five; pseudobranchiae. Gill-openings of moderate width. Body low and elongate. Opercles unarmed. Simple teeth in one or more rows in the upper, and two or more in the lower jaw; the outer row in each often enlarged; canines sometimes present. Anterior portion of dorsal fin with from five to six flexible spines; ventrals united, forming a disk, which is only attached by its base, each has one spine and four or five rays. Caudal rounded or pointed. Scales present or absent. Lateral line absent. Air-bladder, when present, generally small. Pyloric appendages usually absent.

The fishes comprised in this genus have the form of the body variously modified, some being much deeper than others. They are either wholly scaled, or the head may be scaleless, and even the body partially or entirely devoid of scales. Very often the scales on the posterior portion of the body are longer than those near the head and on it. Barbels or warts on the head or a crest on the occiput may be present or absent.

The dentition is subject to considerable modification. Some specimens possess a recurved canine on the outer side of the enlarged lateral row in the lower jaw; this is more commonly found in marine than in freshwater species. Variations may, however, occur in specimens of the same species.

These fishes are found in numbers along the shores and estuaries of India, but on account of their rapid decomposition after death, full collections have yet to be made.

Geographical Distribution. Fresh, brackish, and salt waters of tropical and temperate regions.

Synopsis of Indian Species.

A. Lateral, recurved canines present in the lower jaw.

D. 6 | 1/18-19. Scales minute, three or four vertical bands on body ..

1. *G. gymnocephalus*, p. 249.



- L. 1. 65, L. tr.* 16. Two longitudinal bands, and some cross bars from the back 2. *G. bryocensis*, p. 249.
- D. 6 | 11, A. 10. Scales minute. Six vertical bands 3. *G. seefasciatus*, p. 250.
- D. 6 | 1/10, A. 10, L. 1. 44, L. tr. 14. Scales very small to below the commencement of second dorsal fin. Olive, with a dark median band. L. 1. 42, L. tr. 14. Olivaceous, with black spots 4. *G. brevirostris*, p. 250.
- L. 1. 28-30, L. tr. 8. Purplish black; a yellow-edged ocellus at upper portion of base of caudal fin 5. *G. griseus*, p. 251.
- L. 1. 33. Vertical fins with dark streaks 6. *G. polynema*, p. 252.
- L. 1. 34-48, L. tr. 9. Olive, with some blotches along the sides, some scales with brilliant green centres 7. *G. macrostoma*, p. 252.
- L. 1. 33, L. tr. 8. Olive with small green spots, blotches along the sides; a yellow ocellus at top of last half of caudal fin 8. *G. viridipunctatus*, p. 253.
- L. 1. 28, L. tr. 10. Grey with black fins, and blue spots on the body. L. 1. 28-30, L. tr. 8. Short barbels. Olive, many scales with blue spots, a blue mark on shoulder. L. 1. 26-32, L. tr. 12-13. No scales before the first dorsal. Olivaceous with black blotches and spots. L. 1. 30, L. tr. 8. Five longitudinal rows of interrupted bands 9. *G. ocellatus*, p. 253.
- L. 1. 28-29, L. tr. 8-9. Olive with rusty spots, fin-rays yellow, spotted and barred with purplish red. L. 1. 32, L. tr. 11. With cloudy dark markings, upper half of first dorsal dusky, a large bluish spot from first to fourth spine 10. *G. masoni*, p. 254.
- L. 1. 27, L. tr. 6. A blue spot on opercle, body with angular bands. L. 1. 28-30, L. tr. 7-8. Some large blotches along the sides, a black ocellus with a white edging in hind portion of first dorsal fin, dorsal fins white-spotted 11. *G. cyanomos*, p. 254.
- L. 1. 28-29, L. tr. 7. Irregular vertical black bands: vertical fins spotted 12. *G. criniger*, p. 255.
- L. 1. 28, L. tr. 7. Ochreous, upper 13. *G. thurstoni*, p. 255.
- 14. *G. puntang*, p. 256.
- 15. *G. bleekeri*, p. 257.
- 16. *G. zonalternans*, p. 257.
- 17. *G. biocellatus*, p. 258.
- 18. *G. madraspatensis*, p. 258.

* L. tr. in the Gobies indicates the number of rows of scales between the origin of the second dorsal and that of the anal fin.



- two thirds of body blotched and with dark marks; upper portion of first dorsal yellow, some of the fins barred 19. *G. neilli*, p. 259.
- L. 1. 24, L. tr. 7. Light brown, scales of body with dark marks; vertical fins spotted 20. *G. melanostictus*, p. 259.
- B. No lateral recurved canines in the lower jaw.
- D. 6 | 1/12, A. 1/13, L. 1. 50. Greenish with clouded spots on sides 21. *G. microlepis*, p. 260.
- D. 6 | 14, A. 14, L. 1. 50-60, L. tr. 11-12. A crest. A light ocellus at base of pectoral. body spotted and blotched; caudal spotted in its upper half 22. *G. cristatus*, p. 260.
- D. 6 | 1/12, A. 1/13, L. 1. 60, L. tr. 10. An orbital tentacle; tail acutely pointed. Dull green with reddish spots; vertical fins spotted 23. *G. tentacularis*, p. 261.
- D. 6 | 1-10/11, A. 1/11, L. 1. 25-28, L. tr. 6-7. Tail acutely pointed. Some blotches along the body, a brown band from the eye over the cheeks; dorsal fins longitudinally barred 24. *G. acutipinnis*, p. 261.
- D. 6 | 1/10, A. 10, L. 1. 56-60, L. tr. 14. Yellowish, with some blotches along the sides; fins barred in spots 25. *G. striatus*, p. 262.
- D. 6 | 1/10, A. 1/10, L. 1. 55, L. tr. 14. Light brown, with vermiculated markings 26. *G. personatus*, p. 263.
- D. 6 | 1/10, A. 1/10, L. 1. 50, L. tr. 9. First dorsal with a black crescentic mark 27. *G. malabaricus*, p. 263.
- D. 6 | 1/10, A. 10, L. 1. 46, L. tr. 15. Head wide. Olive, fins dark grey, a black mark at base of pectoral 28. *G. planifrons*, p. 264.
- D. 6 | 1/10, A. 1/9, L. 1. 36, L. tr. 9. Blotched and banded 29. *G. elegans*, p. 264.
- D. 6 | 1/10, A. 1/8-9, L. 1. 26-28, L. tr. 7. Many oblong brown spots and yellow dots; fins dotted with black 30. *G. ornatus*, p. 265.
- D. 6 | 1/10, A. 11. Dark spots clustered into cloud-like blotches; vertical fins spotted 31. *G. gutum*, p. 265.
- D. 6 | 1/9, A. 1/8, L. 1. 35-40, L. tr. 11-12. Brownish, irregularly marbled, head and body spotted, some of the spots white 32. *G. albopunctatus*, p. 265.
- D. 6 | 1/8-9, A. 1/8-9, L. 1. 30-34, L. tr. 8-9. Brown, with blotches along the sides; dorsal and caudal barred in spots 33. *G. giuris*, p. 266.



- D. 6 | 1/9, A. 8, L. 1. 28, L. tr. 9.
Chestnut, with red bands on the head and below the first dorsal fin 34. *G. semitoliatus*, p. 266.
- D. 6 | 1/8, A. 9, L. 1. 38, L. tr. 10.
Maxilla reaches to below hind edge of eye. Brown, spotted .. 35. *G. magniloquus*, p. 267.
- D. 6 | 1/8, A. 9, L. 1. 38, L. tr. 10.
Maxilla reaches to below first third of eye. Dark brown angular bands on the body 36. *G. planiceps*, p. 267.
- D. 6 | 1/8, A. 1/8, L. 1. 28-30, L. tr. 8.
Greenish, with large black spots. 37. *G. sadanundio*, p. 268.
- L. 1. 22, L. tr. 6. A dark band from eye to snout. Ventrals white .. 38. *G. littoreus*, p. 269.
- D. 6 | 1/8, A. 10, L. 1. 22-25, L. tr. 9.
Black 39. *G. melanosoma*, p. 269.
- D. 5 | 1/9, A. 9, L. 1. 30, L. tr. 10.
Six black belts round the head and body 40. *G. nusus*, p. 269.

1019. (1.) *Gobius gymnocephalus*.

Gobius gymnocephalus, Bleeker, *Batavia Nat. Tijdsch.* iv, p. 473;
Day, Fish. India, Suppl. 1888, p. 792 (see synon.).

Karum natsooli, Tam.

D. 6 | 1/18-19. P. 17. V. 1/5. A. 1/19. C. 13.

Length of head 6, of caudal fin $4\frac{1}{4}$, height of body 8 to 9 times in the total length. *Eyes*—high up, diameter $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout and close together. Head higher than broad; snout obtuse; cleft of mouth oblique, the maxilla reaching to below hind edge of eye. *Teeth*—canines in both jaws. *Fins*—dorsal spines nearly as high as body; caudal lanceolate. *Scales*—minute. *Colour*—greenish stone-colour, becoming lighter beneath; three or four vertical bands on the body and another on the nape, with indistinct narrow intermediate ones. Dorsal fins darkish, unspotted; caudal also dark and reddish externally, said to have several blue and red streaks. Anal with a narrow and nearly median band along its extent, which is red externally and blue inferiorly.

Hab. Madras to the Malay Archipelago. Jerdon's figure is 6·4 inches in length.

1020. (2.) *Gobius bynoensis*.

Gobius bynoensis, Richardson, *Zool. Erebus and Terror, Ich.* p. 1, pl. 1, figs. 1, 2; *Day, Fish. India*, p. 284, pl. lxi, fig. 3 (see synon.).

D. 6 | 1/16. P. 19. V. 1/5. A. 1/15-16. L. 1. 65. L. tr.* 16.

* Between origin of second dorsal and that of anal, see note, p. 247.



Length of head $4\frac{1}{2}$ to 5, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Head rather higher than broad; snout obtuse; cleft of mouth a little oblique, the maxilla reaches to below anterior edge or first third of orbit. *Teeth*—an outer row of about 10 large ones in the premaxillaries; outer row in lower jaw enlarged, elongate, and subhorizontal, the outer one or two teeth on either side large, obliquely placed, canines. *Fins*—the two dorsals of about equal height, and separated by a very short interspace. Caudal rounded. *Scales*—ctenoid, in front of dorsal fin they are very small, and are continued forwards to opposite the eyes, those on free portion of the tail are largest. *Colour*—greenish, back with from eight to ten darkish cross bars. Two longitudinal bands, the upper from snout through eye, at first black, becoming yellow on body and ending at extremity of soft dorsal; the second from the mouth becoming a black spot at base of pectoral, and continued as a golden band to centre of base of caudal; the last fin has a dark spot at the upper part of its base; anal with a dark margin.

Hab. Andamans, Malay Archipelago to Australia.

1021. (3.) *Gobius sexfasciatus*.

Gobius sexfasciatus, Day, *Fish. India*, p. 285, pl. lix, fig. 4.

D. 6 | 11. P. 19. V. $1\frac{1}{5}$. A. 10. C. 15.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, not $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{5}$ apart. Greatest width of head $\frac{4}{5}$ of length, its height equals length including snout. Anterior profile of head very obtuse. Lower jaw the longer; cleft of mouth oblique, maxilla reaches to below hind edge of eye. *Teeth*—in the mandibles smaller than in upper jaw, about 16 at anterior extremity of mandible, the outer recurved. *Fins*—third dorsal spine about as long as the body is high. Anterior dorsal rays not half so long as spines, last rays longest. Ventral does not reach the vent. Anal commences below second dorsal ray. Caudal wedge-shaped, extremity rounded. *Scales*—minute over body, somewhat larger towards tail. *Colour*—greyish brown, six dark bands descending from back to middle of sides; opercle covered with a large dull blotch. Fins greyish, stained darker at their edges. Upper half of caudal yellow, and barred with light brown spots. A black mark between first two dorsal spines, about halfway up.

Hab. A specimen was captured at Madras in June, 1867.

1022. (4.) *Gobius brevirostris*.

Gobius brevirostris, Günther, *Catal.* iii, p. 41; Day, *Fish. India*, p. 285, pl. lxiii, fig. 5.

D. 6 | $1\frac{1}{10}$ –11. P. 17. V. $1\frac{1}{5}$. A. 10. C. 13. L. 1. 44. L. tr.



Length of head $4\frac{1}{4}$, of caudal fin $5\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter 5 in length of head, 1 diam. from end of snout and apart. Upper profile of head parabolic. Width of head equals height and its length behind middle of orbit. Mouth oblique, the maxilla extends to below anterior third of orbit. *Teeth*—a recurved canine at either extremity of enlarged row in lower jaw. *Fins*—the second or longest dorsal spine is as long as postorbital portion of head. Ventral extends halfway to anus; caudal rounded. *Scales*—ctenoid, increasing in size behind; a few rows on the head in old specimens, none in young. *Colour*—olivaceous, a blotched irregular band from mouth to centre of base of caudal; a narrow brown band from eye to above opercle terminating above axilla in a large light blue ocellus. Two small bluish spots on opercle at its upper margin, another at upper edge of base of caudal. Basal half of dorsal fins violet. Anal white, with a violet band along its middle, lightish blue superiorly and white externally. Caudal with blackish margins.

Hab. Kurrachee to China.

1023. (5.) *Gobius griseus*.

Gobius griseus, Day, *Fish. India*, p. 285, pl. lxiii, fig. 3.

D. 6 | 1/10. P. 17. V. 1/5. A. 10. C. 14. L. 1.42. L. tr. 14.

Length of head $4\frac{2}{3}$, of caudal fin $5\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—upper margin near the dorsal profile; diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. Head as wide as high or as its length without the snout. Lower jaw the longer, cleft of mouth rather oblique, the maxilla reaches to below first third of eye. Numerous rows of warts on the cheeks and opercles, which are but little apparent in the young. *Teeth*—outer row in premaxillaries much enlarged near symphysis; the outer eight or ten in front of lower jaw are still larger, and outermost on either side is a large recurved canine. *Fins*—spines of first dorsal ending in filamentous prolongations, and rather higher than body, base of fin ends close to commencement of second dorsal, the last ray of which reaches base of caudal. Pectoral as long as head; ventral reaches halfway to anal. Caudal wedge-shaped, but not pointed. *Scales*—ctenoid and angular, very small before the dorsal fin, extending as far as the eyes; the scales do not show a sudden increase in size under the commencement of second dorsal as in *G. brevisrostris*. *Colour*—olivaceous, with bands and many well-marked deep brown or black spots. Pectoral fin and contiguous portions of body finely dotted with small chestnut spots. Base of first dorsal yellowish with three or four horizontal brown bands; second dorsal yellowish with a dark outer edge. Ventral, anal, and caudal with dark outer edges.

Hab. Madras, in the backwaters, up to $3\frac{1}{2}$ inches in length. This fish dies when placed in fresh water.

1024. (6.) *Gobius polynema*. (Fig. 89.)

Chaeturichthys polynema, Bleeker, *Batav. Genootsch. Verhand.* xxv, Japan, p. 44, fig. 4.

Gobius polynema, Day, *Fish. India*, p. 286, pl. lxi, fig. 8 (see synon.).

D. 6 | 11. P. 21. V. $1\frac{1}{5}$. A. 10. C. 13. L. 1. 28-30. L. tr. 8.

Length of head 5, of caudal fin 4, height of body 6 to 8 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, about 1 diam. from end of snout, and $\frac{2}{3}$ apart. Head rather flat superiorly, as broad as high, or as its length excluding the snout. Snout moderately rounded, cleft of mouth oblique, jaws of equal length in front; the maxilla reaches to below first third of orbit. *Barbels*—several small ones below lower jaw, and nearer its posterior than its anterior extremity. *Teeth*—a small recurved canine tooth



Fig. 89.—*Gobius polynema*.

on each side of enlarged row in lower jaw. *Fins*—first dorsal about half as high as body, lower than second, which is as high as the body; pectoral as long as head; ventrals reach two thirds of distance to anal; caudal pointed. *Scales*—ctenoid, extending forwards to snout and sides of head. *Colour*—purplish black, fins blackish; a black ocellus edged with white or yellow on upper portion of base of caudal fin.

Hab. Seas of India to China and Japan. Very common at Bombay throughout the year and not uncommon at Madras.

1025. (7.) *Gobius macrostoma*.

Gobiopsis macrostomus, Steind. *Sitzungsb. Wien. Akad.* 1860, xlii, p. 291, t. i, fig. 6.

Gobius macrostoma, Day, *Fish. India*, p. 286.

D. 6/11. A. 10. L. 1. 33.

Length of head $3\frac{2}{3}$ to $3\frac{3}{4}$, pectoral $5\frac{1}{2}$, height of body $7\frac{1}{2}$ in the total length. *Eyes*—diameter $6\frac{2}{3}$ in length of head, 1 to $1\frac{1}{2}$ diam. apart. Head depressed, broader than high. Cleft of mouth extending to behind posterior margin of orbit. *Teeth*—canines present. *Scales*—cycloid anteriorly, ctenoid posteriorly. *Fins*—spines of first dorsal with filamentous terminations, not so high as



the body, soft dorsal higher than spinous or than body, the two dorsal fins a short distance apart. Caudal rounded. Colour—vertical fins with dark streaks.

Hab. Bombay.

1026. (8.) *Gobius viridipunctatus*.

Gobius viridipunctatus, Day, *Fish. India*, p. 286, pl. lxi, fig. 4, pl. lxiii, fig. 4 (abnormal), and pl. lix, fig. 5 (male), *Suppl.* p. 793 (see synon.).

Nuna mottah, Tel.; *Bichu gende*, Tam. "Scorpion goby."

D. 6 | 1/10. P. 20. V. 1/5. A. 1/9. C. 15. L. 1 3/4–38. L. tr. 9.

Length of head $4\frac{1}{2}$ to $4\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body $4\frac{1}{2}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, rather above 1 diam. from end of snout, and $\frac{1}{2}$ apart. Head as broad as high, or as its length behind middle of eyes. Cheeks swollen, with many rows of warts, and also pitted in large specimens; a large open pore in interorbital space. Lower jaw the longer, cleft of mouth oblique; the maxilla reaching to below middle of orbit. *Teeth*—an external enlarged row in premaxillaries, and two or four canines; in the lower jaw from 12 to 16 enlarged teeth, the outermost recurved canines, there are also from two to four canine-like teeth in the internal row above the symphysis. *Fins*—dorsal spines with short filamentous endings, height of first dorsal $\frac{2}{3}$ that of body; the second dorsal and anal vary considerably, the last ray sometimes reaches only $\frac{2}{3}$ of the way to the caudal, sometimes extends beyond the commencement of that fin. Caudal rounded. *Scales*—ctenoid, small anteriorly. *Colour*—olive, with a series of four or five large badly defined blotches along the sides; many scales with a light centre; this in life is emerald-green; dorsals dark at their bases, usually having light edges. Ventral, anal, and caudal grey, the last with a light upper edge.

Hab. Sind, to the Malay Archipelago; most common at Bombay and Madras; growing to at least 5 inches in length.

1027. (9.) *Gobius ocellatus*.

Gobius ocellatus, Day, *P. Z. S.* 1873, p. 107; *Fish. India*, p. 287, pl. lxi, fig. 7.

Kharbi, Maráthi.

D. 6 | 1/10. P. 20. V. 1/5. A. 1/10. C. 12. L. 1 3/4–33. L. tr. 8.

Length of head $4\frac{1}{2}$ to $4\frac{1}{2}$, of caudal fin 5 to 6, height of body 6 to 7 in the total length. *Eyes*—diameter 5 to 6 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Head slightly broader than high, its width equal to length of postorbital portion. A pair of short barbels under symphysis of lower jaw. Cleft of mouth somewhat oblique; lower jaw a little the longer; maxilla extends to beneath anterior margin of orbit. *Teeth*—moderate or small recurved canines in mandibles and in large specimens in



upper jaw. *Fins*—the two dorsals not widely separated, second dorsal spine elongate in some specimens, being nearly as long as the head, last dorsal ray divided to base. Pectoral rays silk-like, second dorsal and anal about equally developed and highest posteriorly; caudal wedge-shaped, rounded behind; ventral reaches halfway to vent. *Scales*—ctenoid on body, cycloid on head, much smaller, in front of dorsal fin; they cover the cheeks, opercles, and top of head to snout, and are in rather irregular rows. *Colour*—olive, a dark green spot above upper margin of opercle, about six indistinct blotches along sides; dorsal and caudal fins stained dark and indistinctly spotted or barred; a yellow ocellus, with a black centre, at the top of the caudal fin in its last half; anal whitish, basal half covered with fine black dots; ventrals yellow.

Hab. Bombay and Sind, growing to 6 inches in length.

1028. (10.) *Gobius masoni*.

Gobius masoni, Day, P. Z. S. 1873, p. 107; *Fish. India*, p. 287, pl. lxi, fig. 6.

B. vii. D. 6 | 1/10-11. P. 19. A. 1/9. C. 12. L. 1. 28. L. tr. 10.

Length of head $4\frac{1}{2}$, of caudal fin 5 to $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—somewhat superior, diameter $5\frac{1}{2}$ to 6 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Profile of head bluntly rounded, its width equalling its length excluding the snout, its height a little more; cleft of mouth oblique; lower jaw anterior, posterior extremity of maxilla extends to below middle of orbit. Numerous rows of fine wart-like glands along the opercles, nape, and mandibles. *Teeth*—an enlarged row in upper jaw, with two large canines; from 12 to 15, also enlarged, in front of lower jaw, on either side a very large recurved canine. *Fins*—first dorsal low, longest spine about half height of body; rays longer behind; pectoral destitute of silk-like rays; caudal wedge-shaped, rounded behind. *Scales*—ctenoid, rounded before first dorsal, and smaller than in remainder of body, where they are angular; none on cheeks, a few along upper margin of opercles. *Air-bladder*—large. *Colour*—olive, with numerous brilliant blue spots on nape and behind the pectorals; some blackish ones along the sides. Dorsal, anal, ventral, and caudal black; pectoral yellow, margined with black.

Hab. Bombay, growing to 4 inches in length.

1029. (11.) *Gobius cyanomos*.

Gobius cyanomos, Bleeker, *Batav. Genootsch. Verhand.* xxii, *Ble. m. en Gob.* p. 25; Day, *Fish. India*, p. 287, pl. lxi, fig. 5 (see *synon.*).

D. 6 | 1/10. P. 18. V. 1/5. A. 10. C. 11. L. 1. 23-30. L. tr. 8.



Length of head $4\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—somewhat superior, diameter 5 to 6 in length of head, $1\frac{1}{3}$ diam. from end of snout, and $\frac{1}{2}$ apart. Greatest width of head $\frac{2}{3}$ of length, height equals length without snout. Cheeks swollen. The orifice of a canal behind posterior lower angle of eye. Mouth oblique, jaws of equal length, maxilla extends to below anterior third of orbit. *Barbels*—a short pair below symphysis of mandible. *Teeth*—anterior 10 in premaxillaries large and canine-like, the outer 10 or 12 in lower jaw also enlarged, but not to the same size, the external one on either side is a recurved canine. *Fins*—dorsal spines, especially second and third, filiform and prolonged far beyond membrane; rays increase in length to the last, which reaches base of caudal fin, and is as high as the body, it is divided to its base. Caudal wedge-shaped or rather rounded. *Scales*—small, rounded, and cycloid anteriorly; none on the head; those on remainder of the body angular and feebly ctenoid. *Colour*—olive, many of the scales with light bluish spots, a deep blue spot on shoulder, second dorsal and anal dark, with a reddish outer edge; ventral and last two thirds of caudal grey.

Hab. Seas of India to the Malay Archipelago.

1030. (12.) *Gobius criniger*.

Gobius criniger, *Cuv. & Val. H. N. Poiss.* xii, p. 82; *Day, Fish. India*, p. 288, pl. lxii, fig. 2 (see synon.).

D. 6 | 10. P. 19. V. $1\frac{1}{5}$. A. 10. C. 13. L. 1. 26-32. L. tr. 12-13.

Length of head 4, of caudal fin $5\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ to 4 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Snout obtuse; jaws of about the same length anteriorly. Cleft of mouth oblique; maxilla reaches to below front edge of first third of eye. Greatest width of head equals height, or length excluding snout. Several rows of fine warts across the cheeks, opercles, upper surface of head, and nape of neck; an open pore between eyes. *Teeth*—small recurved canines in lower jaw. *Fins*—the two dorsals with a narrow space between, and of about equal height or $\frac{1}{5}$ of total length, the second and third spines often with filamentous terminations; last dorsal ray divided to base. Pectoral of similar length to ventral. Caudal rounded. *Scales*—ctenoid, none in front of base of first dorsal. *Colour*—pale ochreous; head, body, dorsal and caudal fins irregularly spotted and blotched with black; caudal and anal with dark edges.

Hab. East coast of Africa, seas of India, to the Malay Archipelago and beyond. Common at Madras all the year round in the sea and backwaters.

1031. (13.) *Gobius thurstoni*.

Gobius thurstoni, *Day, Fish. India, Suppl.* 1888, p. 793.



D. 6 | 1/10. P. 22. V. 1/5. A. 10. C. 14. L. 1. 30. L. tr. 8.

Length of head $4\frac{2}{3}$, of caudal fin $4\frac{2}{3}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—near dorsal profile, diameter $4\frac{1}{4}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and $\frac{1}{4}$ apart. Head $\frac{1}{5}$ wider than long, its height equals its length without the snout. Upper jaw slightly the longer, cleft of mouth rather oblique, posterior extremity of maxilla hardly reaching to beneath front edge of eye. A single row of warts across the cheeks. No barbel. *Teeth*—small canines in both jaws. *Fins*—first dorsal separated by a short interspace from second, spines flexible, the longest as high as body; last rays of second dorsal somewhat prolonged, $\frac{1}{4}$ longer than dorsal spines, and reaching to base of caudal fin. Pectoral as long as head, its lower rays the shortest, some of its upper rays silk-like. Ventral reaches vent; caudal wedge-shaped. *Scales*—strongly ctenoid and angular, before the dorsal fin comparatively small; none on head. *Colour*—slaty grey, with 5 rows of dark and interrupted narrow brown bands in anterior portion of body, becoming brown spots from pectoral fin, on base of which are two well-marked brown blotches. Numerous small blue spots on the body; first dorsal with brown spots; ventral black, and with a dark outer edge.

Hab. One specimen $4\frac{1}{2}$ inches long, sent by Mr. Thurston from Madras.

1032. (14.) *Gobius puntang*.

Gobius puntang, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 692 (? ii, p. 486); *Day, Fish. India*, p. 288, pl. lxii, fig. 1 (see synon.).

D. 6 | 1/10. P. 17. V. 1/5. A. 10. C. 11. L. 1. 28-29. L. tr. 8-9.

Length of head $4\frac{1}{2}$ to $5\frac{1}{2}$, of caudal fin $3\frac{1}{3}$, height of body $4\frac{3}{4}$ to $5\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart. Upper profile of head rounded, a considerable rise from snout to forehead. Greatest width of head $\frac{2}{3}$ and its height $\frac{3}{4}$ of its length. Cleft of mouth very slightly oblique, the maxilla reaches to below middle of orbit; two open pores between orbits. *Teeth*—the enlarged row in lower jaw ends laterally in small canines. *Fins*—dorsal spines with filamentous terminations, the first three longest and much longer than second dorsal, the hind rays of which are as high as the body and reach base of caudal. Pectoral as long as head and half longer than ventral. Caudal pointed. *Scales*—ctenoid, extending as far forward as the orbits, also on the cheeks and opercles. *Colour*—olive, spotted all over with rusty; fin-rays yellow, barred and dotted with purplish red. Anal with a yellow margin and sometimes with transverse purplish-red streaks.

Hab. Andamans to the Malay Archipelago; this species appears to prefer brackish water.

1033. (15.) *Gobius bleekeri*.

Gobius bleekeri, Day, P. Z. S. 1868, p. 195; *Fish. India*, p. 289, pl. lxii, fig. 5.

D. 6 | 1/9. P. 16. V. 1/5. A. 1/8. C. 13. L. 1. 32. L. tr. 11.

Length of head 5, of caudal fin 6, height of body 5 in the total length. *Eyes*—directed upwards and slightly outwards, closely approximating superiorly; diameter $3\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout. Height of head equal to length excluding snout. Lower jaw the longer, cleft of mouth oblique, maxilla reaches to beneath anterior half of orbit. *Teeth*—a recurved conical canine on either side of mandibles. *Fins*—dorsal spines slender, with filamentous prolongations, and higher than rays. Pectoral $\frac{1}{4}$ longer than head, ventral does not reach anal; caudal wedge-shaped. *Scales*—ctenoid, extending as far forward as posterior margin of orbit, none on cheeks or base of pectoral, smaller in front of dorsal fin. *Colour*—olivaceous, clouded with darker blotches and irregular spots, very fine black spots on scales; first dorsal dusky in its upper half, with a large bluish spot extending from first to fourth spine, and a light mark along its base from that spine to end of fin, the spines orange; second dorsal studded with black points most numerous towards base, its first half minutely edged with white, some blue spots on its posterior half; anal covered with minute black points; pectoral orange, a blue ocellus on upper half of base, lowest ray deep blue; ventral blackish. Caudal nearly black, having three or four rows of bluish-white spots between each ray.

Hab. Madras; growing to $2\frac{1}{2}$ inches long.

1034. (16.) *Gobius zonalternans*.

Gobius zonalternans, Day, *Fish. India*, p. 289.

D. 6 | 1/9. P. 17. V. 1/5. A. 1/9. C. 13. L. 1. 27. L. tr. 6.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{4}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{6}$ apart. Width of head equals half its length, and height equals length excluding snout. Lower jaw slightly the longer; maxilla reaches to below first third of eye. No warts or barbels on the head. *Teeth*—in the lower jaw a pair of large recurved canines. *Fins*—spines of first dorsal very thin, with filamentous terminations, and much higher than the body; last dorsal and anal rays long, reaching the caudal fin. Pectoral and ventral reach anal. Caudal pointed. *Scales*—cycloid, very small before first dorsal, and not extending to hind edge of eyes. *Colour*—a large blue spot surrounded with black on the opercle; body with angular brown bands from back to abdomen, the angle directed backwards; a dark band over tail just before base of



caudal fin, which has a black basal band; its outer half is grey. First dorsal with a white band along its base, and a dark blotch between last dorsal spines. Other fins dark grey.

Hab. Madras; two specimens obtained, up to $1\frac{3}{4}$ inch, from brackish water (Adyar river).

1035. (17.) *Gobius biocellatus*.

Gobius biocellatus, *Cuv. & Val. H. N. Poiss.* xii, p. 73; *Day, Fish. India*, p. 289, pl. lxiii, fig. 8 (see synonym.).

D. 6 | $1/9$. P. 19. A. $1/8$. C. 15. L. 1. 28-30. L. tr. 7-8.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 6, height of body 6 in the total length. *Eyes*—high up; diameter 4 to 5 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, $\frac{1}{4}$ apart. Height and breadth of head equal, and as long as head behind middle of eyes. Cleft of mouth rather oblique, lower jaw the longer; the maxilla reaches to below the middle of the orbit. A large open pore in posterior third of interorbital space. Several rows of fine warts on the cheeks. *Teeth*—a pair, recurved and canine-like, in lower jaw in large specimens. *Fins*—first dorsal spines weak, the fifth slightly the longest, the first as high as the second dorsal, the last ray of which is as long as the head; ventral extends beyond vent. *Scales*—ctenoid, none on cheeks; some on opercle, much smaller than those on rest of body, where they are angular. *Colour*—variable, generally greyish brown, with some large irregular blotches along the sides, and a slight brownish line along the middle of each row of scales. Dorsal fin generally yellowish, with a greyish tinge, and several irregular whitish lines along its lower half; usually also a black blotch with a white edge between its fifth and sixth spines; second dorsal with several rows of irregular white spots; pectoral, ventral, and anal greyish, the last with some white dots; caudal dark grey, with some lines of dark spots.

Hab. Coasts of India as high as Sind, extending to the Malay Archipelago.

1036. (18.) *Gobius madraspatensis*.

Gobius madraspatensis, *Day, P. Z. S.* 1868, p. 152; *Fish. India*, p. 290, pl. lxii, fig. 3.

D. 6 | $1/9$. P. 17. V. $1/4$. A. $1/9$. C. 13. L. 1. 28-29. L. tr. 7.

Length of head 5 to $5\frac{1}{4}$, of caudal fin $5\frac{1}{4}$ to 6, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—upper margin near profile; diameter 4 in length of head, $\frac{3}{4}$ diam. from end of snout, $\frac{1}{4}$ apart. Width of head equals postorbital length; height of head its length without snout. Some rows of warts across cheeks; two open glands in interorbital space. Cleft of mouth oblique, the lower jaw the longer; the maxilla extending to beneath the anterior margin of the orbit. *Teeth*—about 14 enlarged in the lower jaw, ending on each side in a large recurved canine. *Fins*—first dorsal spine with



a filamentous termination, the fin ending near the commencement of the second dorsal, which is rather higher. Pectoral as long as head, and equal to the ventrals. Anal commences below second or third dorsal ray. Caudal rounded. *Scales*—ctenoid, extending forwards nearly to posterior margin of orbit, smaller on nape than on remainder of body; none on the head. *Colour*—olivaceous, with irregular, ill-defined brownish blotches and dots; from five to eight very narrow vertical black lines from back to abdomen, between base of ventrals and middle of anal. Fins greyish, first dorsal with two rows of black blotches; second dorsal irregularly blotched and dotted. Pectoral and anal unspotted. Ventrals tipped with black. Caudal minutely dotted in rows.

Hab. Madras backwaters; growing to about 3 inches in length.

1037. (19.) *Gobius neilli*.

Gobius neilli, Day, *P. Z. S.* 1868, p. 152; *Fish. India*, p. 290, pl. lxii, fig. 4.

D. 6 | 1/8. P. 17. V. 1/5. A. 9. C. 13. L. 1. 28. L. tr. 7.

Length of head $3\frac{1}{2}$, of caudal fin 5, height of body 4 in the total length. *Eyes*—directed upwards and slightly outwards; diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and less than $\frac{1}{6}$ apart. Head as broad as high, or as its length behind middle of eye. Cheeks swollen. No warts or barbels, but an open pore in front of interorbital space and another at posterior lower angle of eye; cleft of mouth very oblique; maxilla extending beneath anterior third of orbit. *Teeth*—a large recurved canine in lower jaw. *Fins*—first dorsal spines prolonged, termination of second in adult filamentous; pectoral as long as head; ventrals reach anal; caudal somewhat pointed. *Scales*—in regular rows, ctenoid, extending three fourths of distance from first dorsal to orbits; none on head. *Colour*—ochreous above, becoming dirty white on abdomen; cheeks, head, and upper two thirds of the body with various sized rusty brown spots of irregular shape, forming oblique bands on the head. Pectorals and ventrals unspotted; first dorsal with a black mark on basal half between first and fifth spine, above this it is yellow, the ends of the spines black, last two spines brown-spotted; second dorsal brown externally, with a longitudinal yellow and black band dividing it from the lower three fourths of the fin, which is spotted with light brown; caudal barred with eight or nine chestnut spots.

Hab. Madras; up to $3\frac{1}{4}$ inches in length.

1038. (20.) *Gobius melanostictus*.

Gobius melanostictus, Day, *Fish. India*, p. 290, pl. lxiii, fig. 2.

D. 6 | 1/8-9. P. 17. V. 1/5. A. 9. C. 13. L. 1. 24. L. tr. 7.

Length of head 5 to $5\frac{1}{4}$, of caudal fin $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in



the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{3}$ apart. Greatest width of head equals its height, or its length excluding the snout. Upper jaw slightly the longer; cleft of mouth oblique; the maxilla reaches to below the last third or middle of the eye. Scales cover opercles. *Teeth*—a pair of small recurved canines in lower jaw. *Fins*—first dorsal spines with filamentous terminations, the fin rather higher than the second, last rays of which are as high as body. Pectoral as long as head; ventral reaches halfway to vent. Caudal rounded. *Scales*—scarcely ctenoid. *Colour*—light brown, most of the body-scales with a dark spot or vertical mark; a dark blotch on opercle, and another below the eye. Dorsal and caudal fins with numerous dark spots forming bars. Pectoral with a dark mark at its base.

Hab. Backwaters of Madras; growing to 2 inches in length.

1039. (21.) *Gobius microlepis*.

Gobius microlepis, Bleeker, *Batav. Genootsch. Verhand.* xxii, *Blenn. en Gob.* p. 35; Day, *Fish. India, Suppl.* 1888, p. 793 (see *synon.*).

D. 6 | 1/12. P. 22. V. 1/5. A. 1/13. C. 17. L. 1. 50.

Length of head 6, of caudal fin 3 to $3\frac{1}{4}$, height of body from $7\frac{1}{2}$ to 9 in the total length. *Eyes*—high up, and placed rather close together; diameter 4 in length of head, and about 1 diam. from end of snout. Cleft of mouth oblique, lower jaw the longer; the maxilla reaches to below the hind edge of the eye. Snout obtuse. *Teeth*—in a single row without canines, those in upper jaw a little longer and further apart than those in lower jaw. *Fins*—both dorsals higher than body, in some examples fifth ray of first dorsal has a filamentous prolongation. Caudal lanceolate. *Colour*—greenish or brownish buff, with some clouded spots on back and sides, a black dot at edge of most scales; sometimes a black spot at base of caudal fin. Fine dark spots on dorsal rays; anal and caudal stained dark, especially externally.

Hab. Madras, to the Malay Archipelago and China.

1040. (22.) *Gobius cristatus*.

Euctenogobius cristatus, Day, *P. Z. S.* 1873, p. 109.

Gobius cristatus, Day, *Fish. India*, p. 291, pl. lxii, fig. 8 (see *synon.*).

D. 6/14. P. 21. A. 14. C. 13. L. 1. 50–60. L. tr. 11–12.

Length of head $5\frac{1}{2}$, of caudal fin 3 to 4, height of body 6 in the total length. *Eyes*—rather high up, with a very narrow and concave interorbital space; diameter 4 in length of head, 1 diam. from end of snout. Greatest width of head equals length behind middle of eyes, height a little more. Cleft of mouth oblique, lower jaw the longer, the maxilla reaches to below middle of orbit. Several rows of fine warts across the cheeks. A low black-stained crest extends from nape to base of first dorsal. *Teeth*—a single row in upper jaw,



above two in lower. No canines. *Fins*—all spines in first dorsal elongated beyond the membrane; last rays of second dorsal the longest, the two fins close together. Caudal pointed and elongate. Ventral reaches vent. *Scales*—cycloid, in irregular rows and very small before the second dorsal. *Colour*—olivaceous; one or two black spots on posterior upper angle of eye; a light ocellus having a brown edge at base of pectoral; body blotched and spotted; some black bars on upper half of dorsal, and a badly defined violet ocellus edged with yellow on its last ray; caudal spotted in its upper half.

Madras specimens differ in having a light edge to the anal, ventrals dark grey, and no ocellus on the dorsal, whilst the caudal fin is longer.

Hab. Madras and Bombay, where, in the month of March, the species was breeding.

1041. (23.) *Gobius tentacularis*.

Gobius tentacularis, Cuv. & Val. H. N. Poiss. xii, p. 128; Day, Fish. India, p. 291, pl. lxiv, fig. 4 (see synonym.).

D. 6 | 1/12. P. 20. V. 1/5. A. 1/13. C. 15. L. 1. 60. L. tr. 10.

Length of head $5\frac{1}{2}$ to $6\frac{1}{2}$, of caudal fin $3\frac{2}{3}$, height of body 7 to 8 ($9\frac{1}{2}$) in the total length. *Eyes*—high up and close together; diameter $3\frac{3}{4}$ in length of head, 1 diam. from end of snout. Width of head equals its length behind middle of eye; height equals length excluding snout. Snout somewhat obtuse and rounded, cleft of mouth oblique, lower jaw the longer; the maxilla reaches to below last third of eye. A simple tentacle above posterior third of the eye, about $\frac{2}{3}$ length of orbit. *Teeth*—a single row in premaxillaries; two or three rows in lower jaw, without any canines. *Fins*—dorsal spines extending far beyond the membrane and equal to height of body, second dorsal about equally high, distance between bases of the two fins not so much as diameter of eye. Pectoral as long as head, and $\frac{1}{4}$ longer than ventral. Anal commences below origin of second dorsal; caudal acutely pointed. *Scales*—ctenoid in posterior part of body; they extend forward nearly to the eyes, none on crest or head; they are very much smaller in front of second dorsal and anal fins. An anal papilla. *Colour*—dull green, with some reddish spots. First dorsal with four to six narrow bands of horizontal spots, and six or eight along the second dorsal. Caudal grey, with some spots on its upper half. Anal grey, with a narrow white band at its base.

Hab. Seas of India to the Malay Archipelago.

1042. (24.) *Gobius acutipinnis*.

Gobius acutipinnis, Cuv. & Val. H. N. Poiss. xii, p. 80; Day, Fish. India, p. 291, pl. lxi, fig. 2 (see synonym.).

Mang-moo-goo-da-lah-dah, Andam.



D. 6 | 1/10-11. P. 19. A. 1/11. C. 19. L. 1. 25-28. L. tr. 6/7.

Length of head from 5 to 6, of pectoral $4\frac{1}{2}$ to 5, of caudal fin 3 to $3\frac{1}{2}$, height of body 5 to 6, of first dorsal 3 to 4, of second dorsal 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{1}{8}$ apart. Snout obtuse and rounded; cleft of mouth oblique. The maxilla reaches to beneath anterior edge of eye. Greatest width of head equals its length behind middle of eye, height equals length excluding snout. A narrow row of warts across the cheeks, a large opening of mucous canals opposite posterior lower angle of orbit. *Teeth*—no canines. *Fins*—spines of first dorsal weak, with filamentous terminations; last dorsal ray divided at its base. Caudal lanceolate. *Scales*—angular, ctenoid, none in front of first dorsal fin. *Colour*—greyish brown above, becoming dull white beneath; four or five (sometimes more) dull blotches almost forming bands from the back down the sides; a dark mark at base of caudal fin; a brown band from eye to behind angle of mouth; four lines of spots or bands along both dorsal fins; some obscure brownish bands sometimes present on the caudal, especially on its central rays; the fins generally dark grey, with a light outer edge. Pectoral, ventral, and anal stained slate-colour.

Hab. Seas of India to the Andaman Islands; very common up to $3\frac{1}{2}$ inches in length.

1043. (25.) *Gobius striatus*.

Euctenogobius striatus, Day, P. Z. S. 1868, p. 272, fig.

Gobius striatus, Day, Fish. India, p. 292, pl. lxii, fig. 6 (see synonym.).

Coondallum and *Coondallum oolaway*, Tam.; *Mahturi*, *Naeli* (young), Oorah.

D. 6 | 1/10. P. 15. A. 10. L. 1. 56-60. L. tr. 14. Vert. 11/16.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 5 to $5\frac{1}{4}$, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. *Eyes*—not prominent, directed upwards and outwards; diameter 6 to 7 in length of head, 2 to $2\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart. Body elongate; sides compressed. Snout elongate, cheeks inflated. Head $\frac{1}{4}$ as broad as long, height $\frac{1}{2}$ of length. No tentacles. Cleft of mouth nearly horizontal; the maxilla reaches to nearly below front edge of eye. *Teeth*—no canines. *Fins*—first dorsal spines weak, not filamentous, and $\frac{3}{4}$ height of body; second dorsal rays of about the same height; last dorsal ray divided to its root, it only reaches halfway to base of caudal; caudal slightly rounded. *Scales*—ctenoid, those anterior to dorsal fin smaller than the rest on the body; none on head. *Colour*—generally light fulvous, with a bluish tinge along the sides, becoming dirty white beneath; some irregular bands pass from the back towards the middle of the body, also some thin black lines proceed upwards on the abdomen opposite to the anal fin; cheeks glossed with silver; pectoral, ventral, and anal whitish yellow;



both dorsals diaphanous, with five or six rows of brown dots; caudal with eight or nine vertical rows of spots in its upper half or two thirds.

Hab. Fresh and backwaters of Madras, Canara, and Orissa.

1044. (26.) *Gobius personatus*.

Gobius personatus, Bleeker, *Batav. Genootsch. Verhand.* xxii, *Blenn. en Gob.* p. 34, and *Batavia Nat. Tijdsch.* i, 1851, f. 4; *Day, Fish. India*, p. 292, pl. lxiii, fig. 6 (see synon.).

D. 6 | 1/10. P. 16. V. 1/5. A. 1/10. C. 12. L. 1. 55. L. tr. 14.

Length of head $3\frac{3}{4}$ to 4, of caudal fin 5 to $5\frac{1}{2}$, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 6 in length of head, 2 diam. from end of snout, and nearly 1 apart. Greatest width of head equals its length behind middle of eyes, height half its length. No warts or tentacles on the head. Cleft of mouth slightly oblique, upper jaw a little the longer; the maxilla reaches to below the front edge of the eye. *Teeth*—no canines. *Fins*—dorsal spines with filamentous terminations as high as the body, and equalling last rays of dorsal fin, which are longest and extend to base of caudal. Pectoral $\frac{3}{4}$ length of head and $\frac{1}{4}$ longer than ventral. Caudal cut nearly square. *Scales*—ctenoid, much smaller before dorsal fin, extending forwards as far as the eye; those on body angular. *Colour*—light brown, a little darker along the back and upper surface of the head, a black spot at posterior upper angle of opercle; head and upper two thirds of body with numerous vermiculated black lines and spots; dorsal fin with three or four rows of spots forming bars, and sometimes a dark mark in the outer half from fifth spine to end of fin. Anal with a white outer edge. Caudal with five or six angular bars or irregularly placed spots.

Hab. Seas of India to the Malay Archipelago, apparently preferring estuaries and backwaters. The colour appears subject to considerable variation.

1045. (27.) *Gobius malabaricus*.

Gobius malabaricus, *Day, P. Z. S.* 1865, p. 27; *Fish. India*, p. 293 (see synon.).

D. 6 | 1/10. P. 13. V. 1/5. A. 1/10. C. 13. L. 1. 50. L. tr. 9.

Length of head 5, of caudal fin 4, height of body 5 in the total length. *Eyes*—diameter 6 in length of head, 1 diam. from end of snout, $\frac{1}{2}$ apart. Height of head $\frac{2}{3}$ of its length, snout obtuse; cleft of mouth oblique, lower jaw the longer; maxilla extends to beneath anterior third of orbit. *Teeth*—no canines. *Fins*—dorsal spines weak, not filiform, not quite so long as second dorsal, the last rays of which reach base of caudal, which is rounded, with the middle rays rather the longest. *Scales*—ctenoid, angular, none on the head. *Colour*—light brown, with irregular dusky bands on the back and sides, a dark band descends from the eye, and some brown



blotches about the head. A deep black crescentic mark on first dorsal, commencing between second and third spines and continued to the last, above this is a white curved band bordered with black. Second dorsal, anal, and caudal brownish, barred with several rows of darker spots.

Hab. Backwaters in Madras, also in some of the rivers of Malabar; growing to about 4 inches in length.

1046. (28.) *Gobius planifrons*.

Gobius planifrons, Day, P. Z. S. 1873, p. 108; *Fish. India*, p. 293, pl. lxiii, fig. 9.

D. 6 | 1/10. P. 19. V. 1/5. A. 10. C. 13. L. 1. 46. L. tr. 15.

Length of head $4\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—very high up; diameter 6 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Greatest width of head equals length excluding snout, its height equals half its length. Upper surface of head flat. Cleft of mouth horizontal, the jaws of about the same length; the maxilla reaches two diameters of the orbit behind its posterior edge. Fine tentacles near the nostrils, and rows of warty glands along the scaleless head. *Teeth*—a little enlarged; no canines. *Fins*—first dorsal low, about half as high as body; the second higher; ventral reaches halfway to anal; caudal rounded. Anal papilla rather large. *Scales*—those on body finely ctenoid, the rows very irregular, they extend forward to half-way between first dorsal and hind edge of eye. *Colour*—olive; fins very dark grey, second dorsal spotted; a black blotch at base of pectoral.

Hab. Bombay.

1047. (29.) *Gobius elegans*.

Gobius elegans (Kuhl & v. Hass.), Cuv. & Val. II. N. Poiss. xii, p. 58; Day, *Fish. India*, p. 293 (see synonym.).

D. 6 | 1/10. P. 18. V. 1/5. A. 1/9. C. 18. L. 1. 36. L. tr. 9.

Length of head 5, height of body 6 in the total length. Snout obtuse. *Teeth*—small and equal. *Fins*—first dorsal rather lower than second, which is as high as body. Caudal rounded. *Colour*—buff, with a tinge of olive, minutely dotted with brown; the upper half of sides with three or four indistinct lines, each formed by a series of very short brown streaks, beneath are a series of indistinct brown spots; a blackish spot at posterior margin of orbit; a second at upper part of root of pectoral fin, and a third at lower part of root, spreading on to gill-membrane. Membranes of fins very pale bluish green, minutely clouded with brown; those of the dorsals, particularly the second, with three or four indistinct series of blackish spots, and a few similar on the caudal membrane. The rays of the anterior dorsal have two or three series of brown spots. Iris pale greenish silvery, minutely dotted with brown. (*Cantor*.)

Hab. Bombay to the Malay Archipelago; this appears to be a small marine or estuarine species.

1048. (30.) *Gobius ornatus*.

Gobius ornatus, Rüpp. *Atl. Fische*, p. 135; N. W., *Fische*, p. 137; Day, *Fish. India*, p. 294, pl. lxiii, fig. 1 (see synonym.).

D. 6 | 1/10. P. 21. V. 1/5. A. 1/8-9. C. 13. L. 1. 26-28. L. tr. 7.

Length of head 4 to $4\frac{1}{2}$, of caudal fin 5, height of body 6 to 7 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, $\frac{1}{4}$ apart. Snout obtuse, convex. Head as broad as high, breadth equalling two thirds of length. Jaws about equal. Cleft of mouth very slightly oblique, the maxilla reaching to below first third of orbit. *Teeth*—in villiform rows, no canines. *Fins*—first dorsal somewhat lower than the second or than the body. Pectoral as long as the head; caudal rounded. *Scales*—ctenoid, extending on to crown of head. *Colour*—green, with numerous oblong brown spots, generally in three or four rows; also yellow dots in the centre of some of the scales; all the fins, except the ventral, dotted with black.

Hab. Red Sea to the Malay Archipelago.

1049. (31.) *Gobius gutum*.

Gobius gutum, Ham. Buch. *Fish. Ganges*, pp. 50, 366; Day, *Fish. India*, p. 294 (see synonym.).

D. 6 | 1/10. P. 13. V. 1/5. A. 11. C. 17.

Head small, narrower than the body. *Eyes*—small. Mouth large, the upper jaw the longer. *Teeth*—sharp. *Fins*—pectoral and caudal rounded. *Scales*—ctenoid. *Colour*—greenish, with many black dots clustered into irregular spots resembling clouds in form; dorsal and caudal fins spotted. A figure of this species $2\frac{3}{10}$ inches in length exists amongst Hamilton Buchanan's MSS. drawings at Calcutta.

Hab. Lower portion of the Hooghly; growing to three or four inches in length.

1050. (32.) *Gobius albopunctatus*.

Gobius albopunctatus, Cuv. & Val. H. N. Poiss. xii, p. 57; Day, *Fish. India*, p. 294, pl. lxiii, fig. 7 (see synonym.).

D. 6 | 1/9. P. 21. V. 1/5. A. 1/8. C. 13. L. 1. 35-40. L. tr. 11-12.

Length of head $4\frac{1}{4}$ to $4\frac{3}{4}$, of caudal fin $4\frac{3}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and $\frac{3}{4}$ apart. Greatest width of head equals its length excluding the snout, whilst its height equals its length behind the eye. Cleft of mouth slightly oblique, the maxilla reaching to below the first third of eye. *Teeth*—no canines. *Fins*—first dorsal lower than, or equal to, the second, the anterior rays of which equal the height of the body. Ventral does not quite reach anus. Caudal rounded. *Scales*—those on the nape rounded, cycloid, those on the rest of the body feebly ctenoid. An anal papilla. *Colour*—brownish, irregularly marbled; sides of head and body studded with white spots; dorsal and caudal greyish, dotted with



black, forming three rows on the first and second dorsal fins; the other fins unspotted. In some instances the dorsal, caudal, and pectoral are blackish, with a row of white dots.

Hab. Red Sea, Andamans, Mauritius, Feejee Islands, and Port Essington.

1051. (33.) *Gobius giuris*.

Gobius giuris, *Ham. Buch. Fish. Ganges*, pp. 51, 366, pl. 33, fig. 15
Day, Fish. India, p. 294, pl. lxvi, fig. 1 (see synonym.).

Kharpa, Maráthi; *Wartee-poolah*, Poon, and *Kurdán*, Mal.; *Nullatan*, Ooloonway, Tam.; *Tsikideondoo* and *Issakee doondoo*, Tel.; *Gulah* and *Bali gulah*, Oorah; *Nga-ka-tha-bok*, Burmese; *Owcha fo*, Arracan; *B'ailla*, Chittagong; *Poo-dah*, Andam.; *Ab-bro-ny*, Canarese; *Goo-loo-rah*, and *Boul-la*, Punj.; *Gooloo*, Sind. and N.W. Prov.

B. iv. D. 6 | 1/8-9. P. 20. A. 1/8-9. C. 17. L. 1. 30-34. L. tr. 8-9.

Length of head $3\frac{1}{2}$ to 4, of caudal fin 4 to $5\frac{1}{2}$, height of body 5 to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 6 to 8 in length of head, 2 to $2\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ to $\frac{3}{4}$ apart. Interorbital space slightly concave, with an open gland. Width of head $\frac{1}{2}$ to $\frac{2}{3}$ of length, height about $\frac{1}{2}$ the length. Lower jaw the longer, the maxilla extends to below anterior edge of orbit. *Teeth*—no canines. *Fins*—length of spines and rays variable, as might be anticipated in a fish which is so extensively used for stocking ponds. In some the spines of first dorsal are a little higher than the body, in others a little lower; sometimes the posterior rays of second dorsal reach above caudal, in others not above halfway to that fin. Caudal somewhat pointed or rounded. *Scales*—extend above nearly to hind edge of eyes, before the dorsal fin they are smaller than those on the body, which are angular and ctenoid. *Colour*—variable, generally fawn-colour, with cloudy markings on the head, and irregular bands, spots or blotches on the back and sides of body; vertical fins spotted.

Hab. East coast of Africa, and in all pieces of fresh water throughout the plains of India, Ceylon, Burma, Sind, the Malay Archipelago and beyond; attaining a foot and a half in length. The variety (? species) *G. kokius* never exceeds a span, and appears to be entirely confined to the sea and estuaries all along the coasts of India, and also at the Andamans. This form has a narrow snout, four or five large blotches on the sides, and the fins with rows of spots.

1052. (34.) *Gobius semidoliatus*.

Gobius semidoliatus, *Cuv. & Val. H. N. Poiss.* xii, p. 67; *Day, Fish. India*, p. 295, pl. lix, fig. 6 (see synonym.).

B. v. D. 6 | 1/9. P. 17. V. 1/5. A. 8. C. 13. L. 1. 28. L. tr. 9.

Length of head $4\frac{1}{4}$, of caudal fin $4\frac{1}{4}$, height of body $4\frac{1}{4}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{1}{2}$ apart. Dorsal profile more convex than abdominal. Greatest width of head equals length behind middle of eyes, its height slightly more. Lower jaw the longer, cleft of



mouth oblique; maxilla reaches to below middle of orbit. Neither scales, row of warts, nor barbels on the head. *Teeth*—last of outer row in lower jaw is slightly recurved, but can scarcely be considered a canine. *Fins*—dorsal spines having filamentous terminations, the fin is at least as high as the body, and $\frac{1}{3}$ higher than the second. Pectoral as long as the head. Caudal rounded. *Scales*—strongly ctenoid. *Colour*—chestnut, with three rather wide, pale, black-edged, transverse interorbital bands; between the eye and dorsal fin are three more bands which cross the back, and four or five more descend from below the commencement of the second dorsal fin to $\frac{1}{2}$ down the sides. Three bands descend from the eye, another over the opercle, and one in front of the pectoral fin. Both dorsal fins with brown spots.

Hab. Red Sea to the Andamans. I obtained two small specimens at the Andamans.

1053. (35.) *Gobius magniloquus*.

Gobius magniloquus, Day, *Fish. India*, p. 296.

D. 6 | 1/8. P. 17. V. 1/5. A. 9. C. 13. L. 1. 38. L. tr. 10.

Length of head $4\frac{1}{4}$, of caudal fin $5\frac{1}{3}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ apart. Greatest width of head equals half its length; its height equals its length behind the eyes. Snout slightly depressed. Cleft of mouth rather oblique, lower jaw the longer; the maxilla reaches to below the hind edge of the eye. *Teeth*—outer row enlarged, but without canines, two or three posterior canines in the middle line above the symphysis of the lower jaw. *Fins*—dorsal spines with filamentous terminations, $\frac{2}{3}$ as high as the body; an interspace of five scales between bases of two dorsal fins; last dorsal rays are two thirds height of body and reach halfway to base of caudal. Pectoral as long as the head behind the eyes. Caudal wedge-shaped. *Scales*—ctenoid, extending forwards to opposite hind edge of eyes, where there is a large one (as in an *Ophiocephalus*); 15 rows between it and base of first dorsal scarcely smaller than those on body. Opercles scaled. *Colour*—light brown, covered with fine black dots and spots on the scales; a dark band from eye across opercles; a dark spot on upper edge of base of pectoral. Dorsal and caudal spotted in rows.

Hab. Madras; growing to $1\frac{3}{4}$ inches in length.

1054. (36.) *Gobius planiceps*.

Gobius planiceps, Day, *Fish. India*, p. 296.

D. 6 | 1/8. P. 17. V. 1/5. A. 9. C. 13. L. 1. 38. L. tr. 10.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{2}{3}$, height of body $4\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Head broad and flattened superiorly, its greatest width equalling its length behind middle of eyes, its height rather less. Cleft of mouth oblique; maxilla extends to below



middle of eye. *Teeth*—no canines. *Fins*—dorsal spines $\frac{3}{4}$ height of body, a distance equal to four scales between bases of two dorsal fins; last dorsal ray divided to its base, and nearly as high as the body. Caudal rounded. *Scales*—ctenoid, they suddenly become larger below the second dorsal fin, where they are angular. *Colour*—dark brown, every scale on the body with a dark purplish band down its centre; a dark spot above axilla. A black band across base of pectoral. Caudal with eight angular bars of spots.

Hab. Madras; attaining $1\frac{1}{2}$ inches in length.

1055. (37.) *Gobius sadanundio*. (Fig. 90.)

Gobius sadanundio, *Ham. Buch. Fish. Ganges*, pp. 52, 366; *Day, Fish. India*, p. 296, pl. lxiii, fig. 10, *Suppl.* 1888, p. 793 (see *synon.*).

Oontoo-mossal, Mugh (Akyab).

D. 6 | $\frac{1}{8}$. P. 19. V. $\frac{1}{5}$. A. $\frac{1}{8}$. C. 15. L. 1. 28–30. L. tr. 8.

Length of head $4\frac{1}{2}$, of caudal fin 5 to 6, height of body $4\frac{1}{2}$ to 5. *Eyes*—diameter from 3 to $3\frac{1}{2}$ in length of head, $\frac{1}{2}$ to $\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Greatest width of head equals its length excluding the snout, and its height is a little more. Mouth almost horizontal; jaws of equal length; the maxilla reaches to below the middle or last third of the orbit. *Teeth*—no canines. *Fins*—second and third dorsal spines elongate, filamentous; four scales between the two dorsal fins. Caudal rounded. *Scales*—ctenoid; they exist on the opercles and are extended on the head

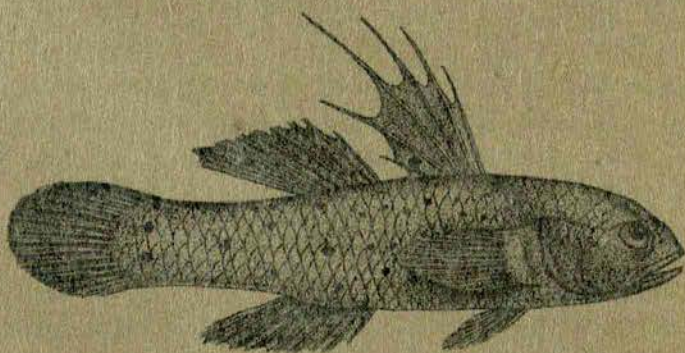


Fig. 90.—*Gobius sadanundio*.

to between the eyes, on the cheeks they are rudimentary. *Colour*—olive, with very large deep black, white-edged blotches scattered over the body; first dorsal black, with a white ring on its last three rays, second dorsal with two rows of black spots along its base, and a third of white dots along its centre. Ventral black in the centre, and having orange edges. Anal dark olive, margined with black. Caudal with numerous fine black dots.

Hab. Mouths of the Ganges, and along the Chittagong and Burmese coasts; attaining at least 3 inches in length.

1056. (38.) *Gobius littoreus*.

Gobius littoreus, Day, P. Z. S. 1888, p. 261; *Fish. India*, Suppl. p. 793.

D. 6/11. P. 15. V. 1/5. A. 10. C. 14. L. 1. 22. L. tr. 6.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ diam. from the end of the snout and close together. The greatest width of head $\frac{2}{3}$ of its length, height equals length excluding snout. Anterior profile of head somewhat obtuse. Cleft of mouth oblique, lower jaw slightly the longer; maxilla reaches to beneath first third of eye. No warts on the head. *Teeth*—none enlarged. *Fins*—dorsal spines of moderate strength, the longest nearly half the length of the head. Pectoral as long as the head, some of its rays fine and silk-like; caudal pointed. *Scales*—finely ctenoid, none on the head. *Colour*—yellowish, with a few dark spots on the body and a dark band from the eye to the snout, also a dark mark on the opercle. Upper half of eye black. Dorsal, anal, and caudal fins with a grey outer edging; ventrals white.

Hab. A small species from Madras.

1057. (39.) *Gobius melanosoma*.

Gobius melanosoma, Bleeker, *Batavia Nat. Tijdsch.* iii, p. 703; Day, *Fish. India*, p. 297, pl. lxiv, fig. 1 (see synonym.).

D. 6 | 1/8. P. 21. A. 10. C. 15. L. 1. 22-25. L. tr. 8-9.

Length of head 3 to $3\frac{1}{3}$, of caudal fin 5, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{2}$ diam. apart. Form of body elevated and compressed. Anterior portion of head and jaws covered with warty tubercles and fine hairy barbels. Cleft of mouth very oblique; the maxilla reaching to below the front margin of the eyes. Height of head equals length without snout. *Teeth*—villiform, with one or two posterior canines above the symphysis of the lower jaw. *Fins*—first dorsal somewhat higher than second, but not quite half height of body; the last dorsal ray reaches rather above halfway to base of caudal. Pectoral as long as head excluding snout; ventral reaches halfway to anal. Caudal rounded. *Scales*—ctenoid, extending forwards to opposite middle of first dorsal fin. *Colour*—brownish, the head may be light-coloured; dorsal, anal, and caudal very dark; ventrals nearly black, having a reddish edge; caudal reddish.

Hab. Andamans and Nicobars to the Malay Archipelago. This appears to be a small species.

1058. (40.) *Gobius nusus*.

Gobius nusus, Ham. Buch. *Fish. Ganges*, pp. 54, 366; Day, *Fish. India*, p. 297 (see synonym.).



D. 5 | 1/9. P. 17. V. 1/5. A. 9. C. 15. L. 1. 30. L. tr. 7.

Length of head $4\frac{1}{3}$, of caudal fin 5, height of body 5 in the total length. *Eyes*—small, in anterior part of head, 1 diam. from end of snout. Greatest width of head equals its height and half its length. Cleft of mouth very oblique, lower jaw the longer; the maxilla reaches to below the hind edge of the eye. *Teeth*—external row in lower jaw enlarged, the outer tooth rather recurved. *Fins*—first dorsal spines with filamentous prolongations; caudal wedge-shaped. *Scales*—ctenoid, extended over head and cheeks. *Colour*—reddish brown, with seven black belts, the first through the eye, the second over the opercles, and five more down the body, the last at root of caudal fin, these bands are extended on to the vertical fins.

Hab. River Hooghly, also Burma in streams; the specimen described is hardly an inch in length.

2. Genus **GOBIODON**, Bleeker.

Gill-openings of moderate width. Body oblong and compressed; head large. Teeth conical and fixed; a pair of posterior canines generally present near the symphysis of the lower jaw. Two dorsal fins, the first with six spines and united at its base to the second; ventrals united. Scales absent.

Geographical Distribution. Coasts of Indian Ocean.

Synopsis of Indian Species.

- Head with vertical orange stripes; two or three orange bands or rows of blotches on the body 1. *G. rivulatus*, p. 270.
Brown, with black fins 2. *G. erythrosphilus*, p. 271.
Blue black-edged vertical streaks on head; another band along bases of dorsal and anal fins, 3. *G. citrinus*, p. 271.

1059. (1.) **Gobiodon rivulatus**.

Gobius rivulatus, Rüpp. *Atl. Fische*, p. 136, & *N. W., Fische*, p. 138; *Day, Fish. India, Suppl.* 1888, p. 794 (see synon.).
Gobiodon quinquestrigatus (Cuv. & Val.), *Day, Fish. India*, p. 297 (see synon.).

D. 6 | 1/10-11. P. 19. V. 1/5. A. 1/8-9. C. 15.

Length of head 4, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Body elevated and strongly compressed. *Teeth*—two large posterior canines above symphysis of lower jaw. *Fins*—first dorsal only half as high as the second, which is as high as length of the head behind middle of eyes. Ventrals reach $\frac{1}{3}$ of the way to the anal. Caudal rounded. *Colour*—head with five



vertical orange stripes; two irregular bands of the same colour pass along the body, breaking up into blotches, a row of spots along the posterior third of the body, sometimes a black spot at tip of opercle. The colours fade in spirit.

Hab. Andamans and Nicobars, growing to $2\frac{1}{4}$ inches in length; also in the Malay Archipelago.

1060. (2.) *Gobiodon erythrospilus*.

Gobiodon erythrospilus, *Bleeker, Archiv. Néerland.* x. 1875, p. 122; *Day, Fish. India*, p. 298 (see *synon.*).

D. 6 | 1/10-11. P. 19. V. 1/5. A. 1/9. C. 15.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, less than 1 diam. from end of snout, and $\frac{1}{2}$ to $\frac{2}{3}$ apart. Cleft of mouth slightly oblique. *Teeth*—two small posterior canines above symphysis of lower jaw. *Fins*—in some specimens the first dorsal spine is somewhat produced, otherwise the two dorsal fins are of about the same height or half of that of the body. Ventral reaches $\frac{2}{3}$ of way to the anal. Caudal rounded. *Colour*—body brown, covered with small black spots, fins blackish. Caudal sometimes with a white base, or entirely white.

Hab. Ceylon, Andamans, Nicobars, to the Malay Archipelago.

1061. (3.) *Gobiodon citrinus*. (Fig. 91.)

Gobius citrinus, *Rüpp. N. W., Fische*, p. 139, t. xxxii, fig. 4.

Gobiodon citrinus, *Day, Fish. India*, p. 298, pl. lxiv, fig. 2 (see *synon.*).

D. 6 | 1/10. P. 20. V. 1/5. A. 1/8-9. C. 13.

Length of head 4, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, $\frac{2}{3}$ diam. from end of snout and also apart. Cleft of mouth slightly oblique. *Teeth*—a posterior enlarged row in lower jaw, the outermost of which are

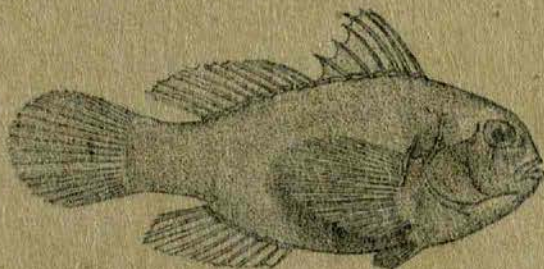


Fig. 91.—*Gobiodon citrinus*.

lateral recurved canines. *Fins*—dorsals of about the same height, and as long as head excluding snout; rays of second dorsal and anal almost reach base of caudal. Ventral reaches halfway to anal. *Colour*—yellow, a blue black-edged horizontal streak goes



along the bases of the dorsal and anal fins, in some specimens higher than in others; there are four similar vertical bands, two descending from the eye, one from summit of head to opercles, and a fourth in front of pectoral fins. A black spot at posterior extremity of opercle.

Hab. Red Sea, Andamans, and Nicobars.

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

Syn. *Sicyopterus*, Gill; *Cotylopus*, Guich.; *Sicydiops* and *Microsicydium*, Bleeker.

Branchiostegals four or five; pseudobranchiæ; a slit behind the fourth gill. Body subcylindrical. Upper jaw rather prominent, cleft of mouth nearly horizontal. Teeth in the upper jaw small, one row mostly implanted in the gums, and as a rule movable, their apices may be compressed and dilated or bilobed; in the lower jaw they are in one or two rows, if two, the outer is fine and movable. Two dorsal fins, the first with six flexible spines; the caudal not united to the dorsal or the anal; ventrals united, forming a disk, which is more or less adherent to the abdomen. Scales ctenoid, of varying size. Air-bladder absent.

Geographical Distribution. This genus has a wide range in fresh and brackish waters, having been captured in Mauritius, Bourbon, Burma, the Malay Archipelago and beyond; also in the West Indies.

Synopsis of Indian Species.

- | | |
|---|----------------------------------|
| L. tr.* 16. A dark interorbital band..... | 1. <i>S. halei</i> , p. 272. |
| L. tr. 25. Vertical bands | 2. <i>S. griseum</i> , p. 273. |
| L. tr. 19. Brown, banded, spotted, and with dark fins | 3. <i>S. fasciatum</i> , p. 273. |

1062. (1.) **Sicydium halei**.

Sicydium halei, Day, *Fish. India, Suppl.* 1888, p. 794.

B. v. D. 6/12. P. 19. V. 1/5. A. 11. C. 14. L. 1. 56. L. tr. 16.

Length of head $5\frac{1}{2}$, of caudal fin $7\frac{1}{4}$, height of body 7 in the total length. *Eyes*—upper margin on dorsal profile, diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. Interorbital space nearly flat, snout obtuse and rounded. Upper jaw the longer and overhung by the snout; lips thick. *Teeth*—upper, in two rows divided by a considerable interspace, the outer movable, almost horizontal; a large recurved canine on either side of symphysis of lower jaw. *Fins*—spines of first dorsal ending in filamentous prolongations, but the longest is not quite so

* Between origin of second dorsal and that of anal, see note, p. 247.



high as the body below it. A considerable interspace between first and second dorsal fins; the rays of the latter are equal to about half the height of the body. Ventral does not extend halfway to the anus. Caudal rounded at the extremity. *Scales*—strongly ctenoid, the first few anterior rows somewhat small, the remainder on the body of about the same size. *Colour*—greenish brown, a black inter-orbital band from eye to angle of mouth; some dark vertical bands on body; a dark outer edge to ventral and anal, also a dark band to outer edge of caudal, margined externally with white, which is widest at the angles.

Hab. Ceylon, whence Mr. Haly has sent me an example 3 inches long.

1063. (2.) *Sicydium griseum*.

Sicydium griseum, Day, Jour. Linn. Soc., Zool. xiii, 1878, p. 140; *Fish. India*, p. 747.

B. iv. D. 6 | 1/10. P. 17. V. 6. A. 11. C. 13. L. 1. 80. L. tr. 25.

Length of head $5\frac{1}{2}$, of caudal fin $6\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter 4 in length of head, rather above 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Lips thick, the edge of the upper coarsely fringed. Snout not overhanging the mouth. *Teeth*—the outer row in lower jaw horizontal, posterior to them and opposite the symphysis are two strong recurved canines. *Fins*—dorsal spines filiform, projecting beyond the membrane; caudal rounded. *Scales*—strongly ctenoid, of irregular sizes and shapes, and in irregular rows; they extend forwards nearly to the eyes; none on sides of head. *Colour*—brownish, with eight or nine rings of a darker tint encircling the body, and wider than the ground-colour. Fins dark, most deeply so at their edges.

Hab. South Canara, where I procured two examples in fresh water, the largest 3 inches in length.

1064. (3.) *Sicydium fasciatum*. (Fig. 32.)

Sicydium fasciatum, Day, *Fish. India*, p. 299, pl. lxiv, fig. 7.

B. iv. D. 6 | 1/10. P. 17. V. 6. A. 11. C. 13. L. 1. 67. L. tr. 19.

Length of head $5\frac{1}{4}$, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, nearly $1\frac{1}{2}$ diam. from end of snout, and $1\frac{3}{4}$ apart. Body subcylindrical; head rather flattened superiorly and broader than high; lips rather thick; snout overhanging the mouth. *Teeth*—inner row in lower jaw large, conical, recurved, some distance apart, with two canines near the symphysis. *Fins*—dorsal spines filiform, projecting beyond the membrane, $\frac{3}{4}$ as high as the body, and $\frac{1}{2}$ higher than second dorsal. Ventrals short, forming a complete disk, and not reaching halfway to the anal fin. Caudal rounded. *Scales*—strongly ctenoid, somewhat irregularly arranged, extending forwards nearly



as far as the eyes; those anterior to the dorsal fin and anal smaller than the others, and more or less cycloid. None on opercles or cheeks. *Colour*—reddish brown, with about six vertical darker

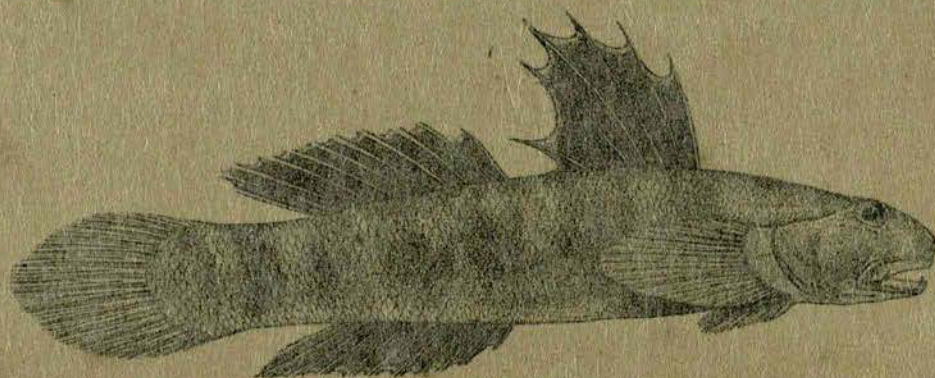


Fig. 92.—*Siegidium fasciatum*.

bands on body wider than ground-colour; there are also some dark spots; the under surface is dirty yellowish brown. Fins nearly black, with a light, nearly white, edge.

Hab. Burma, growing to $2\frac{1}{4}$ inches in length.

4. Genus **APOCRYPTES**, Cuv. & Val.

Branchiostegals four; pseudobranchiæ rudimentary; gill-openings of moderate width. Body elongate. Teeth conical in a single fixed row in either jaw, with usually a pair of canines in the lower, and above the symphysis, posterior to the fixed row; sometimes canines in the upper jaw. The first portion of the dorsal fin contains five or six flexible spines. Ventrals united, forming a disk, and only attached by their bases. Scales, when present, small, becoming larger posteriorly.

Geographical Distribution. Coasts of India, Burma, Andamans, and the Malay Archipelago. The species ascend estuaries and rivers, sometimes even above tidal influence.

Synopsis of Indian Species.

- A. Less elongate, height 7 to 9 times in total length.
 - a. The two dorsals not united.
 - a'. Scales towards tail regular. Six rows between posterior terminations of dorsal and anal 1. *A. serperaster*, p. 275.
 - b'. Scales small and irregular throughout.
 - D. 5 | 31-32. A. 29-30 5 *A. lanceolatus*, p. 277.
 - D. 5 | 21-22. A. 33 7. *A. bato*, p. 278.
 - b. The two dorsals united at the base 3. *A. bleekeri*, p. 276.
- B. More elongate, height 11 to 14 in total length.
 - a. Dorsals not united 4. *A. batoides*, p. 277.



b. Dorsals united.

- D. 6/24-27. A. 25-29. Caudal fin $\frac{1}{3}$ of total length 2. *A. rictuosus*, p. 275.
 D. 5/32. A. 31. Caudal fin $\frac{2}{3}$ of total length 6. *A. dentatus*, p. 278.

1065. (1.) *Apocryptes serperaster*. (Fig. 93.)

Apocryptes serperaster, Richardson, *Ich. China*, p. 206; Day, *Fish. India*, p. 300, pl. lxvi, fig. 2 (see synonym.).

B. iv. D. 6 | 27. P. 21. V. 1/5. A. 27. C. 13. L. 1.65-70. L.tr. 20.

Length of head $6\frac{1}{2}$, of caudal fin 5, height of body 7 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{4}$ apart. Lower jaw slightly the longer. Cleft of mouth oblique, maxilla reaching to below hind edge of eye. Greatest width of head equals its height, and its height its length behind the eye. *Teeth*—an outer enlarged row of from four to eight directed downwards on either side of symphysis of upper jaw; a single row in lower jaw directed outwards, and a single canine or a pair internally above the symphysis. *Fins*—dorsal fins not continuous, the first twice as high as the second, spines weak and with filamentous terminations, last dorsal ray reaches to beyond commencement of caudal fin. Ventrals reaching as far as pectorals.



Fig. 93.—*Apocryptes serperaster*.

Anal slightly lower than second dorsal. Caudal lanceolate. *Scales*—wanting on interorbital space, snout, and jaws, small and irregular before origin of anal, behind this they are in regular rows, much larger in hinder portion of body, there being only six rows between last dorsal ray and base of anal fin. *Colour*—dull greenish along back, becoming dull white on sides and abdomen; five or six irregular bands pass from back halfway down the sides. A narrow grey band along the lower third of both dorsals, which are dark externally. Caudal grey, with a light yellowish outer edge. Pectoral grey, its upper and five lower rays yellowish white. Anal with a narrow grey band along the middle, its outer edge dark, and its last rays nearly black.

Hab. Seas and estuaries of India and China.

1066. (2.) *Apocryptes rictuosus*.

Apocryptes rictuosus, Cuv. & Val. *H. N. Poiss.* xii, p. 151; Day, *Fish. India*, p. 300 (see synonym.).

B. iv. D. 6/24-27. P. 20. V. 1/5. A. 25-29. C. 13. L. 1. ca. 75.



Length of head $7\frac{1}{2}$, of caudal fin 3, height of body 11 to 13 in the total length. *Eyes*—diameter 6 to 7 in length of head, about 1 diam. from end of snout, and $\frac{1}{3}$ apart. Width of head equals half its length and its height equals its length behind the eyes. Cleft of mouth deep, extending at least 1 diameter beyond the orbit. *Teeth*—from 20 to 28, pointed, in either ramus of lower jaw, the outermost recurved; a rather large number, also pointed, in upper jaw; a pair of small canines, internally, above mandibular symphysis. *Fins*—dorsals continuous at their bases, spines of first dorsal with filamentous prolongations, but not much higher than second; last dorsal ray extends to base of caudal. Pectoral of equal length with ventral. Caudal pointed and very elongate. *Scales*—in irregular rows, very small anterior to dorsal fin, becoming larger posteriorly. *Colour*—greyish, lighter towards the abdomen, with badly defined oblique bands passing downwards and forwards from base of dorsal fin halfway to abdomen. Ventral whitish. Pectoral, anal, first and second dorsal whitish, externally stained with grey, sometimes spotted with brown; usually a black spot surrounded by a yellow ring on the last few dorsal rays. The inside of the mouth with black spots.

Hab. Seas and estuaries of India, attaining 7 inches in length.

1067. (3.) *Apocryptes bleekeri*.

Apocryptes bleekeri, Day, *Fish. India*, p. 300, pl. lxiv, fig. 3 (see synonym.).

B. iv. D. 6/22-25. P. 19. V. 1/5. A. 22-23. C. 13. L. 1. 55-60. L. tr. 13.

Length of head $4\frac{1}{2}$ to 5, of caudal fin 5 to $5\frac{1}{2}$, height of body 7 to 8 in the total length. *Eyes*—diameter 5 to 6 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart; interorbital space concave. Greatest width of head equals half its length and its height equals its length behind the eyes. Snout somewhat compressed, cleft of mouth nearly horizontal; maxilla reaches about one or two diameters of orbit behind posterior edge of eye. *Teeth*—25 to 30 teeth, notched at their extremities, in anterior half of lower jaw on either side; 15 or 20 pointed ones on either side of the premaxillaries, extending further backwards than in the mandibles and not placed so closely together. *Fins*—first dorsal higher than second, and from $\frac{2}{3}$ height of body to equally high, the membrane of first dorsal extends to second, which fin is higher than the anal. Ventral reaches nearly halfway to the anal. Caudal pointed. *Scales*—cycloid and arranged in regular rows, largest in the posterior portion of the body, they extend on to the head. *Colour*—greyish or olive-brown, with five light brown spots along the sides, usually forming bands over the back; numerous fine dots over the head and body. Pectoral deep olive or nearly black, with a white lower edge. First dorsal mostly with a dark mark in its upper fourth between its third and fifth spines. Second dorsal and caudal with some rows of fine dots. Ventrals white.



Variety. Without scales on the head, an ocellus at end of soft dorsal, and last third of anal with a grey band along its base.

Hab. Seas of India to the Malay Archipelago, attaining at least 4 inches in length.

1068. (4.) *Apocryptes batoides*.

Apocryptes batoides, Day, *Fish. India*, p. 301, pl. lxvi, fig. 3.

B. iv. D. 6 | 23. P. 21. V. 1/5. A. 23. C. 13.

Length of head $6\frac{1}{3}$, of caudal fin $3\frac{2}{3}$, height of body 12 in the total length. *Eyes*—high up, diameter $6\frac{1}{2}$ in length of head, 2 diam. from end of snout, and $\frac{3}{4}$ apart. Greatest width of head equals its height or $\frac{1}{2}$ its length. Cleft of mouth nearly horizontal. *Teeth*—eight or ten pointed ones on either side of both jaws, none are notched, all are of a brown colour, two moderately sized posterior canines in the lower jaw. *Fins*—the two dorsals of about the same height, equal to that of the body. Ventral reaches halfway to the anal. Caudal lanceolate. *Scales*—cycloid, large and small ones intermixed, becoming larger posteriorly, they extend on to the head. *Colour*—greyish along the back, becoming whitish below; fins without marks.

Hab. Moulmein, where an example 10 inches long was obtained.

1069. (5.) *Apocryptes lanceolatus*.

Eleotris lanceolata, Bl. *Schn. Syst. Ich.* p. 67, t. 15.

Apocryptes lanceolatus, Day, *Fish. India*, p. 301, pl. ixiv, fig. 5 (see *synon.*).

Nullah ramah, Tel.; *Pitallu*, Oorah; *Nga-yat*, Arracan; *Cheering*, Chittagong; *Nga-pjan*, Burm.

B. iv. D. 5 | 31-32. P. 21. V. 1/5. A. 29-30. C. 11.

Length of head 7 to $7\frac{1}{2}$, of caudal fin $4\frac{1}{2}$ to $6\frac{1}{2}$, height of body 7 to 9 in the total length. *Eyes*—diameter 6 to 7 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Greatest width of head half or more than half its length, and its height $\frac{2}{3}$ of its length. Maxilla reaches to beneath middle or hind edge of orbit. *Teeth*—of moderate size in upper jaw, with blunt free extremities as if cut off, or else slightly swollen; those in lower jaw horizontal, occasionally the outer one is slightly recurved and a little enlarged; pair of posterior canines above symphysis. *Fins*—the membrane of first dorsal fin scarcely reaches to second, the two fins of about the same height, equal to half that of the body. Ventral reaches out $\frac{1}{3}$ of the way to the anal. Caudal lanceolate. *Scales*—minute, becoming more distinct in the posterior portion of the body. *Colour*—dull greenish above, with numerous fine brown spots; usually many dark bands descend from the back towards



the abdomen; dorsals with several rows of fine spots; caudal barred in a few or many rows.

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

1070. (6.) *Apocryptes dentatus*.

Apocryptes dentatus, *Cuv. & Val. H. N. Poiss.* xii, p. 148; *Day, Fish. India*, p. 301 (see *synon.*).

B. iv. D. 5/32. A. 31. Vert. 12/15.

Length of head 8, of caudal fin $4\frac{1}{2}$, height of body 14 in the total length. *Eyes*—diameter 6 in length of head, rather more than 1 diam. from end of snout, and $\frac{1}{2}$ apart. Cleft of mouth horizontal and extending to behind the posterior margin of the orbit. *Teeth*—20 in each jaw, the central ten the largest, a pair of canines near the symphysis. *Fins*—dorsal low, the first connected by its membrane to the second. Caudal lanceolate. *Scales*—very small. *Colour*—olive or brownish, palest above; caudal reddish dotted with brown.

Hab. Coromandel coast of India.

1071. (7.) *Apocryptes bato*.

Gobius bato, *Ham. Buch. Fish. Ganges*, pp. 40, 365, pl. 37, fig. 10.

Apocryptes bato, *Day, Fish. India*, p. 302, pl. lxiv, fig. 6 (see *synon.*).

Ruttia, Orissah.

B. iv. D. 5 | 21–22. P. 23. V. 1/5. A. 23. C. 13.

Length of head 6 to $6\frac{1}{2}$, of caudal fin $4\frac{2}{3}$, height of body 7 in the total length. *Eyes*—rather high up, diameter $5\frac{1}{2}$ to 6 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Interorbital space slightly concave. Greatest width of head equals its height or $\frac{2}{3}$ of its length; cleft of mouth nearly horizontal; the maxilla reaches to below the first third or centre of the eye. *Teeth*—about 24 on either side of both jaws, all of which are notched at their extremities, those in the mandible horizontal; two moderately sized posterior canines in lower jaw. *Fins*—dorsal and anal fins of about the same height, and $\frac{2}{3}$ of that of the body. Pectoral half as long as head, ventral reaches halfway to anal. Caudal lanceolate, most expanded in examples from Orissa. *Scales*—cycloid, large and small ones intermixed, becoming larger posteriorly, and extended on to the head. *Colour*—greenish white, with about twelve ill-defined narrow bands, descending from the back towards the abdomen; scales with brown points; fins white, but also with minute dots; a dark band at base of pectoral.

Hab. Orissa and Lower Bengal within tidal reach; attaining inches in length.

5. Genus **APOCRYPTICHTHYS**, Day.

Branchiostegals five. Gill-openings rather small. Body elongate. Teeth in a single fixed row in either jaw, those in the premaxillaries curved, pointed, elongate, and with a long canine on either side of the symphysis; those in the lower jaw subhorizontal, rather swollen at their free extremities, and without posterior canines. Two separate dorsal fins, the first with six flexible spines, the second elongate. Ventrals united, forming a disk, and only connected to the body by their bases. Caudal lanceolate. Scales cycloid, absent from the head, becoming larger posteriorly.

1072. (1.) *Apocryptichthys cantor*. (Fig. 94.)

Apocryptes cantor, Day, *P. Z. S.* 1870, p. 693.

Apocryptichthys cantor, Day, *Fish. India*, p. 302, pl. xlii, fig. 7.

D. 6 | 27. P. 19. V. 1/5. A. 26. O. 17. L. 1 ca. 90. L. tr. 17.

Length of head 4, of caudal fin 5, height of body 9 in the total length. Eyes—not prominent, diameter 6 in length of head, 1 diam. from end of snout, and $\frac{2}{3}$ apart. Head rather depressed, its lower surface flat; greatest width equals its height or $\frac{2}{5}$ of its



Fig. 94.—*Apocryptichthys cantor*.

length. An angular pendulous flap of skin from the preorbital on side of upper jaw. Fins—the membrane of the first dorsal continued almost to the base of the second. Base of pectoral not muscular. Colour—greyish olive; first dorsal dark, longitudinally banded; caudal dark with some spots in its upper half.

Hab. Madras and Andamans.

6. Genus **PERIOPHTHALMUS**, Bl. Schn.

*Mud-skipper*s.

Branchiostegals five; pseudobranchiæ rudimentary. Gill-openings rather narrow. Body elongate, subcylindrical anteriorly. Profile from eyes to snout very steep. Eyes placed close together, very prominent, and the eyelids well developed. Teeth in both jaws, erect, conical, fixed, and in one or two rows. Two dorsal fins, the first with a varying number of flexible spines; base of pectoral muscular; ventrals more or less united in their lower two thirds; caudal with its inferior edge obliquely truncated. Air-bladder absent. Scales small or of moderate size, cycloid or feebly ctenoid, covering the body and the base of the pectoral fins.

Geographical Distribution. Coasts and estuaries round Indo-Pacific Ocean, also West Africa.



These fishes, from the muscular development at the base of the pectoral fins, are able to use them for progression on mud or for climbing. It is most curious to see *P. schlosseri* along the side of the Burmese rivers; at a distance the fishes appear like large tadpoles, stationary, contemplating all passing objects, or else snapping at flies or insects; suddenly startled by something, away they go with a hop, skip, and a jump, either inland among the trees, or on to the water like a flat stone or a piece of slate sent skimming by a schoolboy. They climb on to trees and large pieces of grass, leaves, and sticks, holding on by their pectoral fins exactly as if these were arms. Now and then they plant these firmly as organs of support, the same as one places one's elbows on a table, then they raise their heads and take a deliberate survey of surrounding objects.

Synopsis of Indian Species.

- L. l. 75. Brown with white or blue dots 1. *P. koelreuteri*, p. 280.
L. l. 55. Brownish with emerald-green spots. . . 2. *P. schlosseri*, p. 281.

1073. (1.) *Periophthalmus koelreuteri*. (Fig. 95.)

Gobius koelreuteri, *Pall. Spic.* viii, p. 8, t. ii, figs. 1, 2, 3.

Periophthalmus koelreuteri, *Day, Fish. India*, p. 303, pl. lxiv, fig. 8 (see synon.).

Chood-mud-dah, Andam.

D. 10-15 | 12-13. P. 15. V. 1/5. A. 11-14. C. 11. L. l. 75.

Length of head 4 to $4\frac{2}{3}$, of caudal fin $4\frac{3}{4}$, height of body 7 in the total length. *Eyes*—elevated and close together, diameter 4 in length of head, and 1 diameter from end of snout. *Teeth*—about 24 conical, pointed ones in each jaw. *Fins*—the first dorsal fin is much more elevated in some specimens than in others, being

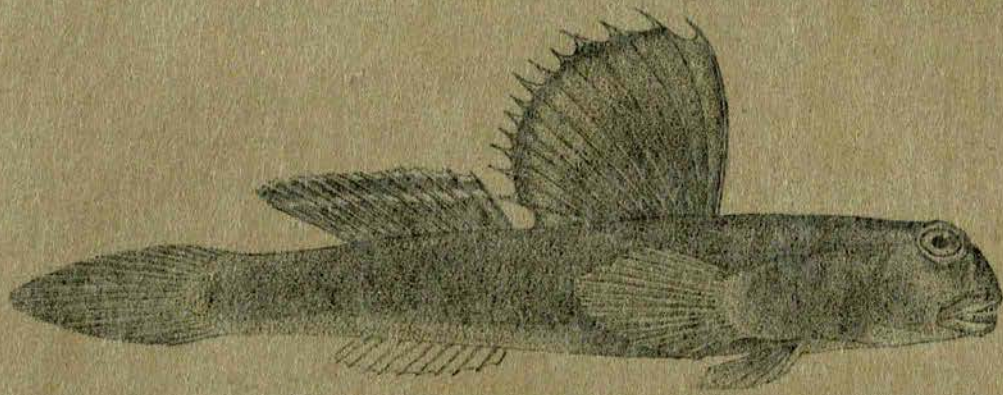


Fig. 95.—*Periophthalmus koelreuteri*.

shortest in the immature. Ventrals short. *Colour*—head sometimes with blue spots. Body olive-brown, with white or blue dots; first dorsal bluish with a dark edge, a white tip, and occasionally white spots at its base; second dorsal generally with a black, white-edged longitudinal band in its upper half or upper third, lowest



portion with white dots. Pectoral and caudal often with brown dots.

Hab. Red Sea, seas and coasts of India, ascending estuaries and tidal rivers, also found at the Andamans, in the Malay Archipelago, and Pacific islands.

1074. (2.) *Periophthalmus schlosseri*.

Gobius schlosseri, *Pall. Spic.* viii, p. 3, t. 1, figs. 1-4.

Periophthalmus schlosseri, *Day, Fish. India*, p. 304, pl. lxvi, fig. 4 (see synon.).

D. 0-15 | 1/12. P. 9. V. 1/5. A. 1/12. C. 12. L. 1.55. L. tr. 11/12.

Length of head 4 to $4\frac{1}{2}$, of caudal fin 5 to 6, height of body 5 to 6 in the total length. *Eyes*—high up, diameter $4\frac{1}{4}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diameters from end of snout, and $\frac{1}{4}$ of a diameter apart. *Teeth*—front six in premaxillaries the longest. *Fins*—the first dorsal fin may be entirely absent, composed of very short spines, or of moderate development, or the anterior spine elongate in the males. Ventrals united in their basal third or free. *Colour*—when alive, brownish banded with emerald-green spots, most distinct on the head, but in certain lights all over the body. First dorsal black, becoming bluish above, and edged with white, a scarlet band along the middle with a white dot between each ray. Second dorsal the same, but the base lighter and spotted; anal edged with white. In the *male* the first dorsal fin has a black band, becoming cobalt externally and with a scarlet edging.

Hab. Coasts and large tidal rivers of Bengal, Burma, Andamans, the Malay Archipelago and beyond; attaining at least 9 inches in length.

7. Genus **BOLEOPHTHALMUS**, Cuv. & Val.

Branchiostegals five; pseudobranchiæ; a slit behind the fourth gill. Gill-openings narrow. Body subcylindrical; head oblong. Eyes very prominent, situated close together, the outer eyelids well developed. Cleft of mouth nearly horizontal, the upper jaw sometimes slightly the longer. Teeth in a single row, the anterior in the upper jaw enlarged and stronger than the others; those in the lower jaw in a single horizontal row, of about equal size and having a pair of posterior canines near the symphysis. Two dorsal fins, the anterior with five flexible spines; the second with many rays equalling or exceeding those in the anal; pectoral with its basal portion muscular and generally free; ventrals more or less united; caudal with its inferior edge obliquely truncated. Air-bladder present or absent. Scales when present rudimentary or small, generally largest posteriorly.

Geographical Distribution. Coasts of tropical Indo-Pacific, ascending tidal rivers.

It should be remarked that although the eyes are very promi-



nent during life, this peculiarity is not so well seen after death. These fishes are essentially dwellers in the mud, and if placed in an aquarium in deep water appear to be rapidly drowned.

Synopsis of Indian Species.

- A. Height of body contained about 10 times in total length.
Second dorsal not united to caudal fin... 1. *B. tenuis*, p. 282.
Second dorsal connected by membrane with caudal 5. *B. viridis*, p. 285.
- B. Height of body $7\frac{1}{2}$ to 9 times in total length.
a. Two dorsals not connected together by membrane.
First dorsal not higher than body 2. *B. dussumieri*, p. 283.
First dorsal much higher than body 4. *B. glaucus*, p. 284.
b. Two dorsals connected by membrane .. 3. *B. dentatus*, p. 283.
- C. Height of body 5 to 6 in total length.
Body and dorsals spotted with blue, vertical bands on sides 6. *B. boddaerti*, p. 285.
No spots on body or fins, vertical bands on sides 7. *B. sculptus*, p. 286.
No vertical bands, body with greenish, dorsal with blue spots 8. *B. pectinirostris*, p. 286.

1075. (1.) *Boleophthalmus tenuis*.

Boleophthalmus tenuis, Day, *Fish. India*, p. 305, pl. lxx, fig. 1.

D. 5 | 28-29. P. 13. V. $1\frac{1}{5}$. A. 26. C. 13.

Length of head $5\frac{1}{3}$ to $6\frac{1}{4}$, of caudal fin $4\frac{1}{5}$ to $4\frac{3}{4}$, height of body 10 in the total length. *Eyes*—situated close together, diameter 6 in length of head, 1 diameter from end of snout. Upper jaw the longer, snout rounded in both directions, skin loose but without any angular flap. Eight or ten short barbels along lower edge of each ramus of lower jaw, but no central barbels under symphysis. *Teeth*—from 7 to 9 large, pointed canines on each side of the middle of the upper jaw, outside them are about 10 more one third of their size, and also pointed; those in the lower jaw are compressed, subhorizontal, pointed, and about 17 on each side, two moderately sized posterior canines above symphysis. *Fins*—first dorsal about $\frac{1}{3}$ higher than second, and about as high as the body, the interspace between the two fins in a large specimen equals height of first dorsal; second dorsal reaches nearly to base of caudal, which is lanceolate. Anal not so high as second dorsal. *Scales*—absent. *Colour*—Greyish above, white below; numerous black spots on upper surface of head and commencement of body, which latter has cloudy marks and bands from the second dorsal fin. First dorsal black above and with some dark bands below; second dorsal with about nine or ten oblique black bands in its lower two thirds continued on to the body, posteriorly its upper edge white with a black margin, as is also upper edge of caudal. Pectoral and ven-



tral grey, anal white; caudal blackish with white spots, each having a black centre.

Hab. Estuaries near Karachi. Largest specimen obtained 6½ inches in length. This species is common in Sind, but does not appear to extend so far east as Bombay.

1076. (2.) *Boleophthalmus dussumieri*.

Boleophthalmus dussumieri, *Cuv. & Val. H. N. Poiss.* xii, p. 207, pl. 354; *Day, Fish. India*, p. 305, pl. lxiv, fig. 9 (see synonym.).

Nicti, Maráthi.

D. 5 | 27-28. P. 19. V. 1/5. A. 26. C. 13. L. 1 ca. 125.

Length of head $5\frac{1}{2}$, of caudal fin $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $7\frac{1}{4}$ to 8 in total length. *Eyes*—rather prominent, diameter 7 in length of head, 1 diameter from end of snout, and $\frac{1}{2}$ apart. *Barbels*—absent. *Teeth*—three on each side of the middle of the upper jaw, pointed, and directed downwards; about 25 small, conically-shaped along either branch of upper jaw. *Fins*—first dorsal nearly or quite as high as body, its base slightly longer than its height, it does not extend to the second dorsal; dorsal rays about half as high as spines and equal throughout. Ventrals extending halfway to the vent; anal commencing under the fourth dorsal ray, its posterior rays slightly the longest and about half as high as those of the second dorsal; caudal pointed. *Scales*—distinct on the body, but somewhat indistinct on the head. *Colour*—grey, first dorsal purplish, covered with round black spots; the second with two or three rows of oblong white spots; caudal black.

Hab. Bombay and coast of Sind, growing to 6 inches in length.

1077. (3.) *Boleophthalmus dentatus*. (Fig. 96.)

Boleophthalmus dentatus, *Cuv. & Val. H. N. Poiss.* xii, p. 208, pl. 355; *Day, Fish. India*, p. 306, pl. lxiv, fig. 10.

D. 5 | 27. P. 19. V. 1/5. A. 26-27. C. 15.

Length of head 5 to $5\frac{1}{2}$, of caudal fin 4 to $4\frac{1}{2}$, height of body $7\frac{1}{2}$ to $8\frac{1}{2}$ in the total length. *Eyes*—rather prominent, diameter 7 in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and $\frac{1}{2}$ or less apart. *Barbels*—absent. *Teeth*—three on either side of the middle of the upper jaw, elongate, about 25 conical ones along either branch of the upper jaw; 35 to 40 teeth on either branch of the lower jaw, with their summits tricuspidate or else with a slight lobe on the outer side. *Fins*—first dorsal one-fourth higher than body below it, its rays extend beyond the membrane, which last extends to base of second dorsal; rays about half as high as spines of first dorsal, and equal throughout; ventrals not extending halfway to the vent; anal commencing under fourth ray of second dorsal, posterior rays a little the longest and rather above half the height of those of second dorsal. *Scales*—only distinct in a narrow

band on the abdomen, along either side of the anal fin, some along the sides below the second dorsal fin, and a few towards the head, elsewhere they look like rough points. *Air-bladder*—small, but present. *Colour*—olive-grey, with dull vertical bands on body.



Fig. 96.—*Boleophthalmus dentatus*.

First dorsal purplish, covered with black spots with whitish edges, upper margin of fin yellowish; second dorsal with about five rows of oblong white spots, and some black ones having white edges along the first half of its base. Upper margin of the caudal with a white band and yellow spots between its black rays.

Hab. Bombay and Kurrachée; growing to $7\frac{1}{2}$ inches in length.

1078. (4.) *Boleophthalmus glaucus*.

Boleophthalmus glaucus, Day, *Fish. India*, p. 306, pl. lxx, fig. 43.

D. 5 | 27. P. 19. V. $1\frac{1}{5}$. A. 25. C. 13.

Length of head 5 to $5\frac{1}{2}$, of caudal fin $4\frac{1}{3}$, height of body 8 to 9 in the total length. *Eyes*—prominent, situated close together at the summit of the head, diameter 5 in length of head, $1\frac{1}{4}$ diam. from end of snout. A few short tentacles along lower edge of mandibles, none below the symphysis. *Teeth*—13 large, pointed, canine-like in front of upper jaw, the outer on either side a little enlarged and recurved, laterally there are 13 more teeth as large as those in the mandibles. *Fins*—first dorsal elevated, its height from $\frac{1}{5}$ to $\frac{1}{8}$ the total length, second dorsal about $\frac{2}{3}$ height of body. Caudal lanceolate. *Scales*—minute, but visible in last half of body. *Colour*—greenish, tinged with violet along abdomen, cloudy bands on head, a few widely scattered black spots on the cheeks and upper fourth of body. Second dorsal with dark horizontal lines, most distinct posteriorly. Pectoral grey, with a yellowish outer edge. Anal yellowish. Caudal light in its lower third, whilst superiorly it is dotted or covered with white spots surrounded by a black ring.

Hab. Andamans; it, along with *Periophthalmus koelreuteri* and other allied forms, frequents in hundreds large mud-flats, but is most difficult to capture, as it dives down into the semifluid mud on the slightest sign of danger. It is said that crows and birds of prey never trouble themselves to pursue these fishes, as to catch them is an almost hopeless task.

1079. (5.) *Boleophthalmus viridis*.

Gobius viridis, Ham. Buch. Fish. Ganges, pp. 42, 366, pl. 32, fig. 12.
Boleophthalmus viridis, Day, Fish. India, p. 307, pl. lxvi, fig. 5 (see synon.).

D. 5 | 26. P. 21. V. 1/5. A. 26. C. 15.

Length of head $5\frac{1}{2}$, of caudal fin $4\frac{1}{3}$, height of body 10 in the total length. *Eyes*—very protuberant, close together, diameter 6 in length of head, and $1\frac{1}{4}$ diam. from end of snout. A few short tentacles along lower edge of each ramus of lower jaw, and a larger one under the symphysis. *Teeth*—14 large, pointed, canine-like ones in front of the upper jaw, the outer of which is the largest but not recurved. *Fins*—first dorsal from two to three times as high as the body, and with a very narrow base; second dorsal low, a membranous connection between its last ray and the base of the caudal. Caudal lanceolate. *Scales*—microscopic. *Colour*—greenish, becoming white beneath. Some black spots rather widely separated upon head, body, and dorsal fins; caudal with its upper two thirds having dark angular bands, its lower third white. In two specimens in the British Museum there are some narrow, vertical, dark bands on the sides.

Hab. Estuaries and coasts of Bengal to the Malay Archipelago and beyond.

1080. (6.) *Boleophthalmus boddaerti*.

Gobius boddaerti, Pall. Spic. viii, p. 11, pl. 2, figs. 4, 5.
Boleophthalmus boddaerti, Day, Fish. India, p. 307, pl. lxv, fig. 2 (see synon.).

Nettee kunla mottah, Tel.; *Kharla nista*, Marāt.

D. 5 | 24-25. P. 17. V. 1/5. A. 24. C. 13. L. 1. 70. L. tr. 19-21.

Length of head $4\frac{1}{4}$ to 5, of caudal fin 5 to 6, height of body 5 to 6 in the total length. *Eyes*—high up, projecting, diameter from 6 to 7 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart. *Barbels*—absent. *Teeth*—the six central ones in the premaxillaries are canines pointing downwards. In the lower jaw the teeth are horizontal, about 30 on either ramus, truncated at their summits, whilst some have a slight lobe on either side. *Scales*—cycloid, scarcely, if at all, imbricate on the head although extended all over it, on each scale on the head and anterior portion of the body is a rough elevation, sometimes pitted in the centre, and as the fish becomes older it appears as if in place of scales its anterior portion were covered with small rough elevations; eight rows between posterior terminations of dorsal and anal fins. *Air-bladder*—present, but small. *Colour*—greenish blue, with seven or eight vertical black bands; body covered with opaque blue spots; first dorsal likewise blue-spotted, and three rows on the second, with four large series along its base. Pectoral orange with a black edge,