

1363. (3.) *Doryichthys deocata*.

Syngnathus deocata, Ham. Buch. Fish. Ganges, pp. 14, 363.

Doryichthys deocata, Day, Fish. India, p. 680 (see synonym.).

D. 30. P. 15. A. ? C. 17 ? Osseous rings 16 + 32.

Snout longer than in *D. cuneatus*. Fins—dorsal on six rings, two of which belong to the body. Colour—generally brown; bright red under lateral line and dotted with blue. In Gray and Hardwicke's figure the lower surface is red, vertically banded with darker stripes edged with blue, at the upper end of each dark stripe is a white dot or angular mark.

Hab. Rivers of Bengal and Behar.

4. Genus **NEROPHIS**, Rafinesque.

Syn. *Netasomata*, Eichwald; *Scyphius*, Risso; *Entelurus*, A. Duméril.

Body rounded, and ridges when present very indistinct; the tail tapering to a point, caudal fin rudimentary or wanting. Dorsal fin of moderate length, placed opposite the vent; pectorals absent. Ova attached to loose integument of abdomen in males, and not covered by lateral cutaneous folds.

Geographical Distribution. Bombay, Atlantic, and the coasts of Europe.

1364. (1.) *Nerophis dumerilii*.

Nerophis dumerilii, Steindachner, Sitzungsber. Ak. Wiss. Wien, 1868, lvi, 1 Abth. p. 1002; Day, Fish. India, p. 680 (see synonym.).

D. 37. C. 7. Osseous rings 27 + 65.

Length of trunk from snout to vent $\frac{1}{3}$ total length. Snout half as long as head. Forehead concave; an obtuse ridge above opercle continued to hind edge of orbit. Fins—dorsal commences behind twentieth ring; its base is on ten rings, 3 of which belong to the tail. Caudal rudimentary.

Hab. Bombay.

Second group. HIPPOCAMPINA.

5. Genus **GASTROTOEUS** (Heckel), Kaup.

Syn. *Syngnathoides* and *Solegnathus*, Bleeker.

Body depressed, having smooth shields and a prehensile tail, which is not so long as the body. Pectorals and anal present; caudal absent. The lateral line passes along the edge of the abdomen. Ova imbedded in soft integument on the abdomen of the males, but there is no pouch.

Geographical Distribution. Indian Ocean, China, and Australia.

1365. (1.) *Gastrotocus biaculeatus*. (Fig. 167.)*Syngnathus biaculeatus*, Bloch, *Aust. Fische*, iv, p. 10, t. 121.*Gastrotocus biaculeatus*, Kaup, *Lophobr.* p. 19; Day, *Fish. India*, p. 681, pl. clxxiv, fig. 5 (see *synon.*).

D. 40-45. P. 17-23. A. 4. Osseous rings 16-18+45-55.

Length of head about 3 in distance between snout and vent; tail shorter than trunk. *Eyes*—nearer to base of pectoral fin than to end of snout. A well-defined supraorbital spine above hind edge of eye; interorbital space concave. Occiput with a distinct

Fig. 167.—*Gastrotocus biaculeatus*.

blunt projection; usually a barbel-like filament on mandible, and in some examples cutaneous filaments on lower surface of jaws and on body. *Fins*—dorsal on 10 rings, commencing on that anterior to the anal, or on anal ring. Anal fin in a depression; a projection covered with well-developed papillæ just in front of vent. *Colour*—varies in different localities. Pale green or brown above, orange or buff on the under surface, a light spot edged with very pale vermillion on side of each body-ring; in some, black spots are scattered along sides of abdomen. Lower surface of head with dark spots or bands.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, China, and Australia; attaining to at least 9 $\frac{3}{4}$ inches in length.

6. Genus *ACENTRONURA*, Kaup.

Body rather compressed, with shields without tubercles, and a prehensile, finless tail; occiput compressed into a crest without any coronet. Pectorals present. Ova carried by the males in a sac, which is situated below the tail and opens near the vent.

1366. (1.) *Acentronura gracillima*. (Fig. 168.)*Hippocampus gracillimus*, Temm. & Schleg, *Faun. Japon.*, Poiss. p. 274, t. cxx, fig. 6.*Acentronura gracillima*, Day, *Fish. India*, p. 681, pl. clxxvi, fig. 1 (see *synon.*).

D. 16-17. P. 15. A. 2. Osseous rings 13+41-45.

Tail a little longer than body. Snout $\frac{2}{3}$ length of head. *Fins*—dorsal on four rings, two of which belong to the tail; its base not elevated. *Colour*—brownish, covered with small white dots and little brown markings, which in the female almost form bands, especially across ventral surface. A row of dark spots along upper third of dorsal fin, forming a band. *Male* darker and of a bluish colour, with a milk-white spot on each body-ring.



Hab. Japan and the Andamans, where two small specimens were



Fig. 168.—*Acentronura gracillima*.

dredged by Mr. J. Wood-Mason, in 35-40 fathoms. Greatest known length 3 inches.

7. Genus **HIPPOCAMPUS**, Leach.

Trunk compressed and somewhat elevated, with from 10 to 12 rings. The shields furnished with tubercles or spines. Occiput compressed and forming a coronet at its posterior upper angle, which is usually surmounted by spines or knobs. Pectoral fins present; the tail prehensile and finless. Males furnished with an egg-sac situated below the tail and opening near the vent.

Geographical Distribution. Generally distributed throughout tropical and temperate seas. These fishes attach themselves (by means of their prehensile tails) to floating substances and are carried for long distances; they are consequently widely distributed.

Synopsis of Indian Species.

- | | |
|--|-------------------------------------|
| D. 19-20. Tubercles variable | 1. <i>H. trimaculatus</i> , p. 468. |
| D. 16-17. Tubercles blunt | 2. <i>H. guttulatus</i> , p. 469. |
| D. 17-18. Tubercles developed into spines. . | 3. <i>H. hystrix</i> , p. 469. |

1367. (1.) **Hippocampus trimaculatus**. (Fig. 169.)

Hippocampus trimaculatus, Leach, *Zool. Misc.* i, p. 104; Day, *Fish. India*, p. 682, pl. clxxiv, fig. 7 (see synon.).

D. 19-20. P. 17. A. 4. Osseous rings 11+36.

Eyes—diameter 8 in length of head. Length of snout equals



Fig. 169.—*Hippocampus trimaculatus*.

distance between front edge of the eye and gill-opening. Tubercles



variously developed, in some long and acute, in others low; coronet similarly high or low, with a tubercle anteriorly, and surrounded by 5 rudimentary or well-developed spines; a low supraorbital spine. *Fins*—dorsal situated upon last 2 rings of trunk and first of tail. *Colour*—pale yellow-ochre; two rows of blackish spots along dorsal fin, and occasionally three large brown blotches along edge of back on first, fourth, and seventh body-rings; in some there are numerous fine black dots over body. Sometimes light marks exist on side of back, and the body is banded.

Hab. Andamans, Tenasserim to Pinang, and the seas of China.

1368. (2.) *Hippocampus guttulatus*.

Hippocampus guttulatus, *Cuv. Règne Anim.* 2^e éd. 1829, ii, p. 363;

Day, Fish. India, p. 682, pl. clxxiv, fig. 6 (see synonym.).

D. 16-17 (18). P. 17. A. 4. Osseous rings 11+33.

Eyes—diameter 6 to 7 in length of head, anterior margin of the orbits midway between end of snout and posterior extremity of head. Two supraorbital spines directed backwards and outwards. Coronet rather low, with from 4 to 6 blunt tubercles. Tubercles on body and tail generally obtuse. *Fins*—dorsal fin on last two body- and first two tail-rings. *Colour*—varies, generally greyish marbled with darker and covered with light or dark spots; or brown with black spots or cross bands. Dorsal fin sometimes having a dark intramarginal band with a white outer edge.

Hab. Red Sea, Indian Ocean to Japan, also tropical parts of the Atlantic; attaining 11 or 12 inches in length.

1369. (3.) *Hippocampus hystrix*.

Hippocampus hystrix, *Kaup, Lophobr.* p. 17, t. 2, fig. 5.

Hippocampus hystrix, *Günther, Catal.* viii, p. 206; *Day, Fish. India*, p. 683, pl. clxxvi, fig. 2 (see synonym.).

D. 17-18. P. 16. Osseous rings 11+36-37.

Coronet high, with 5 spines, and a tubercle anteriorly, in front of which is another spine. Snout slender, as long as distance between front margin of orbit and first nuchal spine; several spines round orbit. All tubercles (except those on end of tail) in the form of slender and pointed spines. *Colour*—grey, or yellowish white, with numerous brown and smaller white dots; 6 or 7 light patches on tail, covered with dark spots, and one or more similar spots on the body. Snout dark, with light ring. Each spine black at the tip.

Hab. Zanzibar, Reunion, Aden, Andamans, and Japan. An example from Aden in the Calcutta Museum is 4.5 inches long.



Order V. PLECTOGNATHI.

Skeleton incompletely ossified: vertebræ few. Gill-openings narrow, immediately in front of the pectoral fins; gills pectinate. Head often large. Mouth narrow; bones of the upper jaw mostly united. A single soft-rayed dorsal fin belonging to the caudal portion of the vertebral column, and opposite the anal; a rudimentary spinous dorsal is also present in some forms; ventrals, when existing, in the form of spines. Skin either smooth, or with rough scales, or ossified in the form of plates or spines. Air-bladder destitute of a pneumatic duct.

Geographical Distribution. Mostly marine, but a few species are found in large rivers, and several in estuaries in temperate and tropical portions of the globe.

Synopsis of Indian Families.

- I. Distinct teeth in the jaws. **Sclerodermi.**
II. Jaws modified into a beak **Gymnodontes.**

Family I. SCLERODERMI.

Body compressed or angular; snout somewhat produced. Distinct teeth in small numbers in the jaws. The elements of a spinous dorsal and of ventral fins generally present, but variously modified. Skin rough or spiny, or the scales in the form of a firm carapace.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Genera.

First group. TRIACANTHINA.

Body compressed, dermal scutes small, rough, scale-like;
a pair of strong ventral spines.

Spinous dorsal with from 4 to 6 spines 1. TRIACANTHUS.

Second group. BALISTINA.

Body compressed, dermal covering rough or with movable scutes;
ventrals, if present, consisting of a single pelvic projection.

Three dorsal spines, no barbel 2. BALISTES.
One or two dorsal spines, no barbel 3. MONACANTHUS.
A barbel under chin; one dorsal spine 4. ANACANTHUS.

Third group. OSTRACIONTINA.

Body angular, dermal covering forming a carapace.

Spinous dorsal and ventral fins wanting 5. OSTRACION.



First group. TRIACANTHINA.

1. Genus TRIACANTHUS, Cuvier.

Body oblong, compressed, ending in a somewhat elongated tail. Eyes lateral, high up, situated near the hind edge of head. Teeth in two rows in both jaws, the outer incisor-like; the inner more molariform. First dorsal fin consisting of a long and strong spine, followed by from 3 to 5 smaller and weak ones; ventrals formed by a pair of strong spines articulated by a joint or ossified to the pelvic bones; caudal lobed. Scales minute and rough. Lateral line present. Air-bladder strong.

Geographical Distribution. Seas of India and Australia.

Synopsis of Indian Species.

Second dorsal spine about as long as third. . 1. *T. brevirostris*, p. 471.
Second dorsal spine 3 times as long as third. 2. *T. strigilifer*, p. 472.

1370. (1). *Triacanthus brevirostris*. (Fig. 170.)

Triacanthus brevirostris, Temm. & Schleg. *Faun. Japon.*, Poiss. p. 294, t. 129, fig. 2; Day, *Fish. India*, p. 685, pl. clxxv, fig. 1 (see synonym.).

Bowree or Abatoo, Tel.; Satvra, Oorish; Moolean, Tamil; Ko-tah-thoo-lay-po-dah, Andamanese; Ankatilla, Singhalese; Turgooreh, Baluchistan; Ghoda, Maráthi.

B. vi. D. 5 | 22-25. P. 14. V. 1. A. 16-20. C. 12.

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

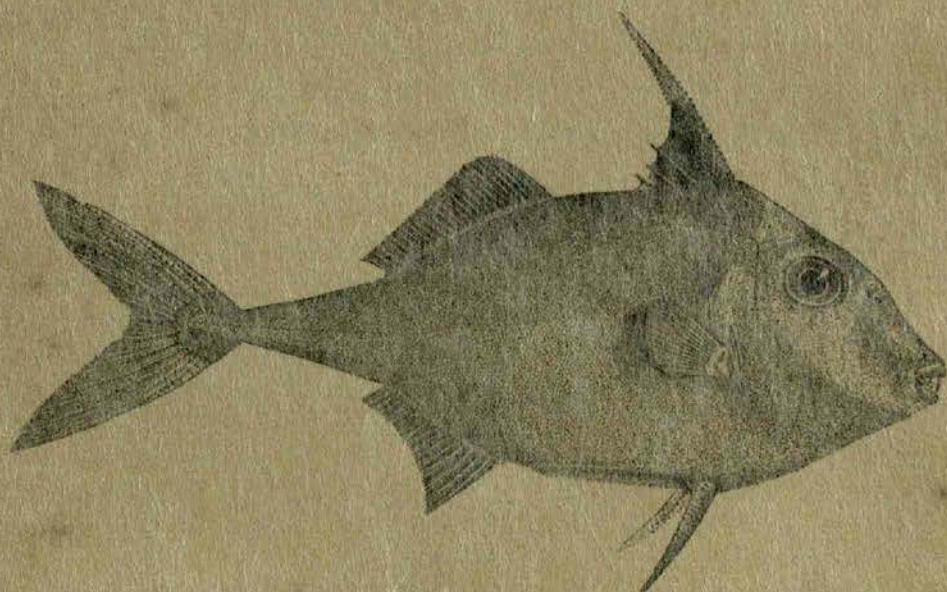


Fig. 170.—*Triacanthus brevirostris*.

length. Eyes—high up; diameter 4 in length of head, $2\frac{1}{2}$ diameters



from the end of snout, and $1\frac{1}{2}$ apart. *Teeth*—outer row in upper jaw 8, inner row 6, the two middle ones longest; in the mandibles 10 in outer and 2 in inner row, smaller than those in upper jaw, but otherwise similar. *Fins*—first dorsal spine very strong; second and third spines weak and about equal in length; dorsal fins close together in the very young, not so in the adult. Anal highest anteriorly, its lower edge concave, the length of its base $\frac{2}{3}$ of that of the head. *Colour*—silvery, with a black spot on the first dorsal fin, extending a short distance on to the back; usually a dark supraorbital blotch.

Hab. Seas of India to the Malay Archipelago, and Japan; attaining at least $9\frac{1}{2}$ inches in length.

1371. (2.) *Triacanthus strigilifer*.

Triacanthus strigilifer, *Cantor, J. A. S. B.* xviii, p. 1345, pl. ix; *Catal.* p. 363; *Day, Fish. India*, p. 685, pl. clxxv, fig. 2 (see synonym.).

Rama moolean, Tamil.

B. vi. D. 5 | 22. P. 14. V. 1. A. 15-16. C. 12.

Length of head 4 to $4\frac{1}{4}$, height of body $3\frac{3}{4}$ in the total length. *Eyes*—high up; diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, $2\frac{1}{2}$ diameters from end of snout, and $1\frac{1}{4}$ apart. *Teeth*—8 form outer row in upper jaw, 4 the inner row; 10 in outer and 2 in inner row of lower jaw. *Fins*—first dorsal spine very strong and longer than the head, the others weak; the second more than $\frac{1}{2}$ as long as the head and 3 times as long as the third; length of base of anal only about $\frac{1}{2}$ that of head. *Colour*—silvery, with some wide irregular yellow lines and blotches on head and body.

Hab. Persian Gulf, seas of India to the Malay Archipelago, China, and the Philippines.

Second group. BALISTINA.

2. Genus **BALISTES**, Linn.

Syn. *Balistapus*, Tiles.; *Xenodon*, *Erythrodon*, and *Pyrodon*, Rüppell; *Melichthys* and *Leurus*, Swainson.

Kend, Maráthi.

Branchiostegals six. Body compressed. No barbels. Upper jaw with a double series of incisor-like teeth, 8 in the outer, 6 in the inner row; mandibles with 8 similar teeth in one row. The first dorsal fin consisting of a strong spine succeeded by two weak ones; ventrals as an osseous appendage. Scales forming a carapace.

Geographical Distribution. Tropical and subtropical seas.

Eating the flesh of these fishes occasions in places symptoms of most virulent poisoning.

*Synopsis of Indian Species.*

- A. Free portion of tail depressed. L. tr. 26 * .. 1. *B. stellaris*, p. 473.
- B. Free portion of tail compressed.
- a. Teeth white, uneven, notched.
- a'. A groove before eye.
- a''. No enlarged osseous scutes behind gill-opening. L. tr. 28..... 2. *B. maculatus*, p. 474.
- b'. Enlarged osseous scutes behind gill-opening.
- a. No spines at side of tail.
- Cheeks covered with scales. L. tr. 35-37..... 3. *B. vetula*, p. 475.
- Cheeks with rows of tubercles a little apart. L. tr. 27-31..... 8. *B. fuscus*, p. 477.
- β. Spines at side of tail.
- aa. Cheeks entirely scaled.
- Black, yellow lips; tail white-tipped. L. l. 45-47..... 4. *B. niger*, p. 475.
- Brown, yellow ring round lips. L. l. 55-65..... 5. *B. mitis*, p. 475.
- Dark, large white spots along lower half of body..... 6. *B. conspicillum*, [p. 476.]
- Brownish olive, lips black. L. l. 30-34..... 7. *B. viridescens*, [p. 476.]
- bb. Cheeks not entirely scaled. L. tr. 19-21..... 9. *B. flavimarginatus*, [p. 477.]
- γ. ? spines at side of tail; olive-green, with numerous purple bands..... 10. *B. ellioti*, p. 478.
- b'. No groove before eye.
- Greyish, blue bands from eye to pectoral, white oblique stripes above anal..... 11. *B. aculeatus*, p. 478.
- Olive, a broad black blue-edged band from eye to anal..... 12. *B. rectangulus*, [p. 478.]
- Brownish, with numerous curved yellow lines on sides..... 13. *B. undulatus*, p. 479.
- b. Teeth white, even, incisor-like..... 14. *B. buniva*, p. 479.
- a. Teeth reddish brown; lower jaw projecting. [p. 480.]
- L. tr. 17..... 15. *B. erythrodon*,

1372. (1.) *Balistes stellaris*. (Fig. 171.)*Balistes stellaris*, *Bl. Schn. Syst. Ich.* p. 476.*Balistes stellatus*, *Day, Fish. India*, p. 687, pl. clxxvii, fig. 1 (see synonym.).

D. 3 | 26-27. P. 15. A. 24-25. C. 13. L. l. 42-46. L. tr. 26.

Length of head $3\frac{3}{4}$ to $4\frac{1}{2}$, height of body $2\frac{2}{3}$ to 3 in the total length. *Eyes*—diameter $2\frac{1}{4}$ to $2\frac{3}{4}$ from end of snout and $1\frac{1}{2}$ apart; a groove in front of eye. *Teeth*—uneven, notched. Tail posteriorly depressed. *Fins*—ventral spine movable. Posterior edge of caudal concave, ends of lobes often produced in adults. *Scales*—covering cheeks; some enlarged scutes behind gill-opening. Two ridges on either side of tail in adults, represented in the young by spines on the scales. *Colour*—generally grey, dashed with olive-green. Three large white blotches extend from back some distance down sides;

* From origin of second dorsal fin to that of anal.



numerous small bluish spots scattered over the back; lower half of body white, with light green bands and spots, or numerous yellow spots on the abdomen; 3 or 4 yellow lines from mouth towards base of pectoral. Pectoral yellow with a dark base. First dorsal nearly white, with irregular dark bands, and shorter yellow bands with dark edges. Second dorsal diaphanous, with 7 or 8 tortuous

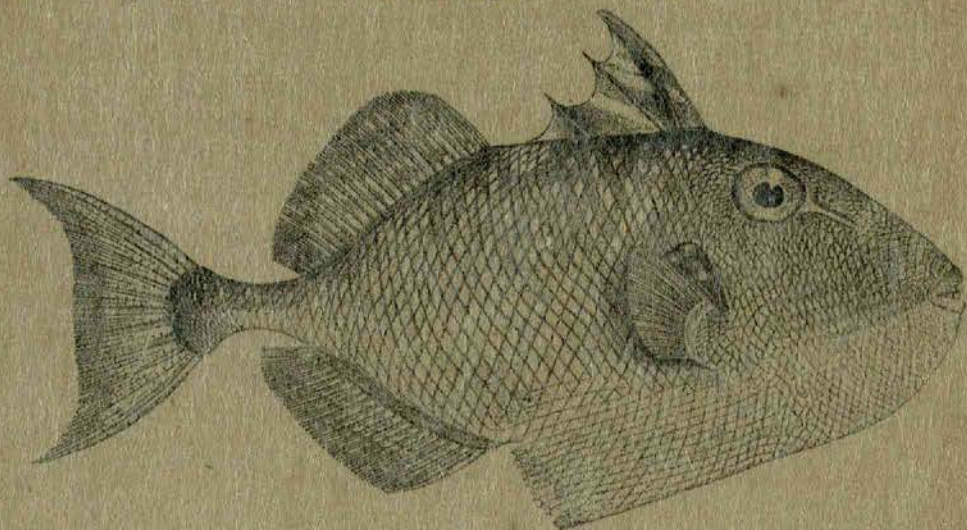


Fig. 171.—*Balistes stellaris*.

almost horizontal olive bands. Caudal light grey, with tortuous vertical white lines. Anal light brown, with 5 white bands. *Young*—an example 1 inch long is white, with a broad black interorbital band; black along the upper $\frac{3}{4}$ of the sides, with 4 white blotches over the back.

Hab. Seas of India and throughout the Indian and Pacific oceans. This is the commonest species of the genus at Madras, and attains at least 2 feet in length.

1373. (2.) *Balistes maculatus*.

Balistes maculatus, Gmel. *Syst. Nat.* i, p. 1468; Day, *Fish. India*, p. 687, pl. clxxv, fig. 3 (see synonym.).

D. 32 | 6-27. P. 15. A. 24-25. C. 12. L. 1. 46-55. L. tr. 28.

Length of head $3\frac{2}{3}$ to 4, height of body $2\frac{1}{2}$ to 3 in the total length. *Eyes*—2 to $2\frac{1}{2}$ diameters from end of snout and 2 apart. A groove in front of eye. *Teeth*—white, uneven, notched. *Fins*—anterior dorsal spine strong and nearly $\frac{1}{2}$ as long as the head. Ventral spine usually movable. Posterior edge of caudal convex or undulated. Second dorsal and anal high anteriorly, especially in adults. *Scales*—cheeks entirely scaled; no osseous scutes behind gill-opening. Scales rough and granulated, but without spines or prominent tubercles except in the immature. *Colour*—bluish black, young examples covered with numerous light blue blotches, more especially in the lower half of the body; these spots are less numerous and larger in adults. Dorsal spine black. Eyes hazel.

Hab. Indian, Pacific, and Atlantic Oceans. Very common at Madras, attaining at least 16 inches in length.

1374. (3.) *Balistes vetula*.

Balistes vetula, *Linn. Syst. Nat.* i, p. 406; *Day, Fish. India*, p. 688 (see synon.).

D. 3 | 30-32. P. 16. A. 29. C. 12. L. 1. 50-60. L. tr. 35-37.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ in the total length, excluding the caudal filaments. *Eyes*—4 diameters from end of snout and $1\frac{1}{2}$ apart. A groove in front of eye. *Fins*—first dorsal commences just behind eye, its spine strong and half as long as head. In adults the anterior dorsal rays and caudal lobes may be filamentous. *Scales*—cheeks entirely scaly; a patch of enlarged scutes behind gill-opening. No spines or tubercles on side of tail. *Colour*—in the immature some oblique black lines along rows of scales. In adults there are two curved blue dark-edged bands along side of head, and some narrow black ones between the eyes over the head, also continued below eyes; caudal with its upper and lower edge blue, and a bluish band near its posterior extremity; transverse bluish bands on dorsal and anal fins.

Hab. Coromandel coast of India and tropical parts of Atlantic. An example in the Madras Museum is 15 inches in length.

1375. (4.) *Balistes niger*.

Balistes niger, *Mungo Park, Trans. Linn. Soc.* iii, p. 37; *Day, Fish. India*, p. 688, pl. clxxxi, fig. 1 (see synon.).

D. 3 | 26-28. P. 14. A. 23-25. C. 12. L. 1. 45-47. L. tr. 23-26.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—4 diameters from end of snout and $1\frac{1}{3}$ apart. A groove in front of eye. *Teeth*—compressed and notched. *Fins*—first dorsal commences above first third of pectoral, anterior spine strong and $\frac{1}{2}$ as long as head. Ventral spine movable. Caudal truncated or undulated. *Scales*—entirely cover cheeks. Some osseous scutes behind gill-opening; 6 to 8 rows of small recurved spines on side of tail. *Colour*—rich brown, lips yellow and a yellow ring behind the lips; caudal dark, with a light upper and lower edge, and a white posterior extremity; second dorsal and anal yellow.

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

1376. (5.) *Balistes mitis*.

Balistes mitis, *Bennett, P. Z. S.* 1831, p. 169; *Day, Fish. India*, p. 689, pl. clxxvii, fig. 3 (see synon.).

Rahtee Yellakah, Tel.

D. 3 | 29-31. P. 14. A. 26-28. C. 13. L. 1. 55-65.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $4\frac{1}{2}$ from end of snout, and $1\frac{1}{4}$ to $1\frac{1}{2}$ apart. A well-marked groove in front of eye. *Teeth*—compressed, notched,



increasing in size anteriorly. *Fins*—first dorsal spine coarse, rather more than $\frac{1}{2}$ length of head. Caudal with its posterior edge sinuous or truncated. *Scales*—cover cheeks; some enlarged scutes behind gill-opening; each scale in caudal region with a round tubercle, most distinct on 7 or 8 rows in middle of side. *Colour*—dull yellowish brown; pectoral and ventral spines straw-coloured; the other fins blackish with lighter bases, which posteriorly have a yellowish tint; ventral rays and membrane dark. A yellow band passes from round mouth towards base of pectoral.

Hab. East coast of Africa, seas of India, Malay Archipelago, and beyond.

1377. (6.) *Balistes conspicillum*.

Balistes conspicillum, *Bl. Schn. Syst. Ich.* p. 474; *Day, Fish. India*, p. 689 (see *synon.*).

D. 3 | 25-26. P. 14. A. 20-22. C. 12. L. 1. 44-54. L. tr. 27-31.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ to $2\frac{2}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of snout. A groove in front of eye. *Teeth*—white, compressed, notched. *Fins*—second dorsal and anal rather low. Ventral spine short, movable. Caudal rounded. *Scales*—covering cheeks and snout; some osseous scutes behind gill-opening; $2\frac{1}{2}$ or 2 whole and 2 half rows of tubercles on side of tail. *Colour*—brownish, with large round white or yellow blotches along lower half of body; below first dorsal a light patch in which are numerous dark spots. A white band across snout from eye to eye; a light ring round the mouth, with a narrow one behind it. Caudal fin with a dark band in its outer fourth edged with white.

Hab. Indian and Pacific Oceans.

1378. (7.) *Balistes viridescens*.

Balistes viridescens, *Bl. Schn. Syst. Ich.* p. 477; *Day, Fish. India*, p. 689, pl. clxxvii, fig. 2 (see *synon.*).

D. 3 | 24-26. P. 14. A. 23-24. C. 12. L. 1. 30-34. L. tr. 17.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ to $2\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of snout, $1\frac{1}{2}$ diam. apart. A groove in front of eye. *Teeth*—white, compressed, notched. *Fins*—soft dorsal and anal rather elevated. Caudal truncated or rounded. *Scales*—covering cheeks and snout; some osseous scutes behind gill-opening. Four and a half rows of recurved spines on side of tail. *Colour*—a light ring round muzzle joining one from below, and dividing the black lip from a black band on the forehead; body brownish olive, each scale darkest in centre; a wide blackish band from eye to base of pectoral; vertical fins yellowish with dark margins and sinuous lines; large blue blotches on first dorsal; sometimes base of caudal dark.



Hab. Red Sea, east coast of Africa, Andamans to the Malay Archipelago.

1379. (8.) *Balistes fuscus*.

Balistes fuscus, *Bl. Schn. Syst. Ich.* p. 471; *Day, Fish. India*, p. 690, pl. clxxviii, fig. 4 (see synon.).

D. 3 | 25-26. P. 14. A. 23-26. C. 12. L. 1. 45-55. L. tr. 27-31.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*— $2\frac{1}{2}$ diameters from end of snout and 1 apart. Cheeks with naked grooves. *Teeth*—compressed and notched. *Fins*—dorsal commences above base of pectoral, its spine strong and $\frac{2}{3}$ length of head. Ventral spine movable. Caudal rounded in the young, truncated in the immature, deeply emarginate in the adult, with the outer rays often prolonged. *Scales*—those on cheeks in form of osseous tubercles, placed in rows a short distance apart; some osseous scutes behind the gill-opening; no spines on side of tail. *Colour*—dull yellow, with brown stripes and spots, which sometimes enclose spaces. Three dark narrow interorbital bands. Vertical fins spotted with dark in the young, with yellow in the adult. Old examples brown, with the vertical fins light-edged.

Hab. Red Sea, east coast of Africa, seas of India and Malay Archipelago; attaining upwards of a foot and a half in length.

1380. (9.) *Balistes flavimarginatus*.

Balistes flavimarginatus, *Rüpp. Atl. Fische*, p. 33; *id. N. W., Fische*, p. 54, t. xv, figs. 1, 2; *Day, Fish. India*, p. 690, pl. clxxviii, fig. 1 (see synon.).

D. 3 | 26-27. P. 15. A. 23-24. C. 14. L. 1. 30-35. L. tr. 19-21.

Length of head $3\frac{2}{3}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*— $3\frac{1}{2}$ diameters from end of snout and $1\frac{1}{2}$ apart. A groove in front of eye. *Teeth*—compressed and notched. *Fins*—ventral spine movable. Caudal rounded in the very young, truncated in the immature, deeply concave and having the lobes produced in adults. *Scales*—anterior part of snout partly covered with tubercular rudimentary scales; in adults the cheeks are not entirely scaled; a few scutes behind gill-opening. Four to six rows of rather small recurved spines on side of tail. *Colour*—above bluish stone, lighter on the sides and below, where it becomes buff. Lower surface of mouth and chest orange, fading into yellow; immature with dark spots in the centre of some of the scales; vertical fins with a dark base and a light outer half along the centre of which is a dark band. Adults nearly uniform in colour.

Hab. Red Sea, Andamans to the Malay Archipelago. The largest example I myself captured was 20 inches in length.

1381. (10.) *Balistes ellioti*, sp. nov.*Varri korawa*, Tamil.

A groove in front of snout. *Fins*—second dorsal and anal rather high anteriorly; caudal deeply lunate. *Scales*—cover cheeks. *Colour*—olive, dashed with green along the back and sides, becoming light on the abdominal surface; four purplish bands along the cheek; numerous narrow purple bands extend obliquely along the whole length of the body, the superior ones ending along the dorsal profile, the inferior broken up. Vertical fins bluish, with a dark band along the base of each; caudal light grey, with carmine outer edges and posteriorly carmine edged with yellow.

Hab. Madras. Described from a figure in Sir W. Elliot's drawings. The figure is $8\frac{1}{2}$ inches long.

1382. (11.) *Balistes aculeatus*.

Balistes aculeatus, Linn. *Syst. Nat.* i, p. 406; Day, *Fish. India*, p. 690, pl. clxxviii, fig. 3 (see synonym.).

D. 3 | 24-25. P. 14. A. 21-22. C. 12. L. 1. 38-40. L. tr. 22.

Length of head $3\frac{1}{4}$, height of body $2\frac{3}{5}$ in the total length. *Eyes*—5 diameters from end of snout and $1\frac{1}{3}$ apart. No groove in front of eye. *Teeth*—compressed, notched, those in middle of lower jaw longer than those in upper. *Fins*—ventral spine movable. Caudal rounded in young, undulated in adult. *Scales*—entirely cover cheeks; some osseous scutes behind gill-opening. Two and a half rows of recurved spines on side of tail. *Colour*—greyish, with a large dark blotch along side of body extending to anal fin. Four dark blue interocular bands divided by three black ones; three blue lines from eye to base of pectoral, the first two separated by a black band, an orange band from angle of mouth to same place; four or five oblique white bands from middle of body to anal fin; caudal spines black and situated on a white base.

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

1383. (12.) *Balistes rectangulus*.

Balistes rectangulus, Bl. *Schn. Syst. Ich.* p. 465; Day, *Fish. India*, p. 691, pl. clxxviii, fig. 2 (see synonym.).

D. 3 | 23. P. 14. A. 20-22. C. 12. L. 1. 42. L. tr. 24-28.

Length of head 3, height of body $2\frac{3}{5}$ in the total length. *Eyes*—5 diameters from end of snout and 2 apart. No groove in front of eye. *Teeth*—compressed and notched. *Fins*—dorsal spine strong, and $\frac{2}{3}$ length of head. Ventral spine movable. Caudal slightly rounded or cut nearly square. *Scales*—entirely cover cheeks; some osseous plates behind gill-opening; $3\frac{1}{2}$ rows of recurved spines on either side of tail. *Colour*—olive, a blue-edged black band passes from below eye to gill-opening and widening is con-



tinued to vent and anterior two thirds of base of anal fin; in front of this band a yellow one, also having a blue outer edge, runs from eye to anterior portion of base of pectoral, another narrow blue-edged black band from behind gill-opening towards end of soft dorsal; a black angular band edged with blue, the angle pointing forwards, on free portion of tail. Three very narrow black interocular bands, dividing four wider blue ones. A light blue band edged with black across the snout; fins light-coloured, first dorsal bluish, with a light edge, which has a narrow brown base and a black outer margin; pectoral with a black base.

Hab. East coast of Africa, seas of India, Malay Archipelago, and beyond.

1384. (13.) *Balistes undulatus*.

Balistes undulatus, *Mungo Park*, *Trans. Linn. Soc.* iii, p. 37; *Day Fish. India*, p. 691, pl. clxxvii, fig. 4 (see synonym).

Mol-kotah, "Rice pounder," Singhalese.

D. 3 | 25-26. P. 14. A. 22. C. 12. L. 1. 40. L. tr. 23-26.

Length of head $3\frac{2}{3}$, height of body $2\frac{1}{3}$ in the total length. *Eyes*—high up and not above $\frac{1}{2}$ diameter from posterior end of head, $1\frac{1}{2}$ diam. apart. No groove in front of eye. *Fins*—second dorsal and anal fins rather low, the corners rounded. Ventral spine movable. Posterior edge of caudal fin convex or undulated. *Scales*—cheeks entirely scaly; a patch of a few enlarged scutes behind gill-opening; 4 to 6 strong spines on either side of the tail in two rows. *Colour*—brownish, with numerous curved yellow lines from eye and back to anal and caudal fins; three or four from angle of mouth and lips to between ventral and anal fins; a dark band along base of second dorsal and anal; and a black margin to inter-spinous membrane between first and second dorsal spines. In some examples a black blotch exists at side of tail near base of caudal fin.

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

1385. (14.) *Balistes buniva*.

Balistes buniva, *Lacép. H. N. Poiss.* v, p. 669, pl. xxi, fig. 1; *Day, Fish. India, Suppl.* 1888, p. 808 (see synonym).

D. 2-3 | 31-33. P. 15. A. 28-30. L. 1. 53 (65, Bleeker).

Length of head 4, height of body nearly 2 in the total length. *Eyes*—5 diameters in length of head, $3\frac{1}{2}$ from end of snout. A groove before eye. *Teeth*—white, even, and incisor-like. *Fins*—first spine of dorsal fin very strong; caudal posteriorly with an S-shaped outline, in old specimens the lobes are slightly produced. *Scales*—enlarged osseous plates behind gill-opening. Seven or



eight raised spiny lines on side of tail. *Colour*—black, with a raised white line along bases of second dorsal and anal fins.

Hab. Tropical parts of Atlantic, Indian, and Pacific Oceans. This fish has been captured in Ceylon (*Haly*), where it appears to be common.

1386. (15.) *Balistes erythron*.

Balistes erythron, *Günther, Catal. viii, p. 228; Day, Fish. India, p. 692, pl. clxxv, fig. 4 (see synonym.).*

D. 3 | 35. P. 14. A. 30. C. 12. L. 1. 33-35. L. tr. 17.

Length of head $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—3 diameters from end of snout and $1\frac{1}{2}$ apart. A shallow scaly groove in front of eye. Lower jaw projecting. *Teeth*—reddish brown, strongly compressed, notched; tooth on each side of central pair in upper jaw considerably projecting. *Fins*—caudal deeply concave, with its outer rays prolonged. Second dorsal and anal elevated, especially anteriorly. *Scales*—cheeks entirely scaly; some enlarged scutes behind gill-opening. Scales roughened, those along middle of body and tail with a small elevated tubercle on each, but no prominent spines. *Colour*—deep brown, a black stripe after encircling the mouth goes to base of pectoral. Vertical fins nearly black, the caudal with a white posterior edge.

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

3. Genus *MONACANTHUS*, Cuvier.

Syn. *Abutarius*, Cuv.; *Stephanolepis*, Gill; *Cheptodermis*, *Paramonacanthus*, *Amanses*, Gray; *Pseudomonacanthus*, *Lomonacanthus*, *Oxymonacanthus*, *Branchaluteres*, *Acanthaluteres*, *Ceratacanthus*, *Paraluteres*, *Pseudaluteres*, and *Aluteres*, Bleeker.

Body compressed. No barbels. Incisor-like teeth in both jaws, in two rows in the upper with six in the outer row, and a single row of six in the mandibles. First dorsal fin composed of a spine which may be feeble or strong, occasionally a second rudimentary one; ventral fin, when present, reduced to a single osseous process, movable or fixed. Scales minute and rough. Vertebrae 7/11-14.

Geographical Distribution. Tropical and subtropical seas.

Synopsis of Indian Species.

A. Dorsal spine with 2 rows of barbs.

a. Profile from snout to first dorsal almost straight.

Dorsal spine from highest point of back

1. *M. setifer*, p. 481.

Origin of second dorsal as high as base of spine

2. *M. cherocephalus*, p. 481.



- b. Profile from snout to first dorsal
 concave..... 3. *M. tormentosus*, p. 482.
 B. Dorsal spine not barbed.
 Height of body about $\frac{1}{3}$ total length.. 4. *M. monoceros*, p. 482.
 Height of body less than $\frac{1}{4}$ total
 length 5. *M. scriptus*, p. 483.

1387. (1.) *Monacanthus setifer*.

Monacanthus setifer, Bennett, P. Z. S. 1831, p. 112; Day, *Fish. India*, p. 692 (see synonym.).

B. vi. D. 1 | 28-34. P. 12. A. 29-33. C. 9.

Length of head $3\frac{1}{4}$ to $3\frac{2}{3}$, of caudal fin $4\frac{1}{2}$, height of body $2\frac{1}{3}$ to $2\frac{2}{3}$ in the total length. *Eyes*—in posterior half of head, 2 to $2\frac{1}{4}$ diameters from end of snout. *Fins*—the first dorsal at highest point of dorsal profile; the spine may be strong or weak, prolonged or not. Anterior ray of second dorsal occasionally with a filamentous prolongation. Ventral spine small, movable, attached to abdominal membrane. Caudal rounded. *Scales*—present but small, the skin velvety. *Colour*—dull brown, with dark blotches and streaks; caudal fin with two dark vertical bands.

Hab. East coast of Africa, seas of India, China, and Japan; also tropical and subtropical Atlantic.

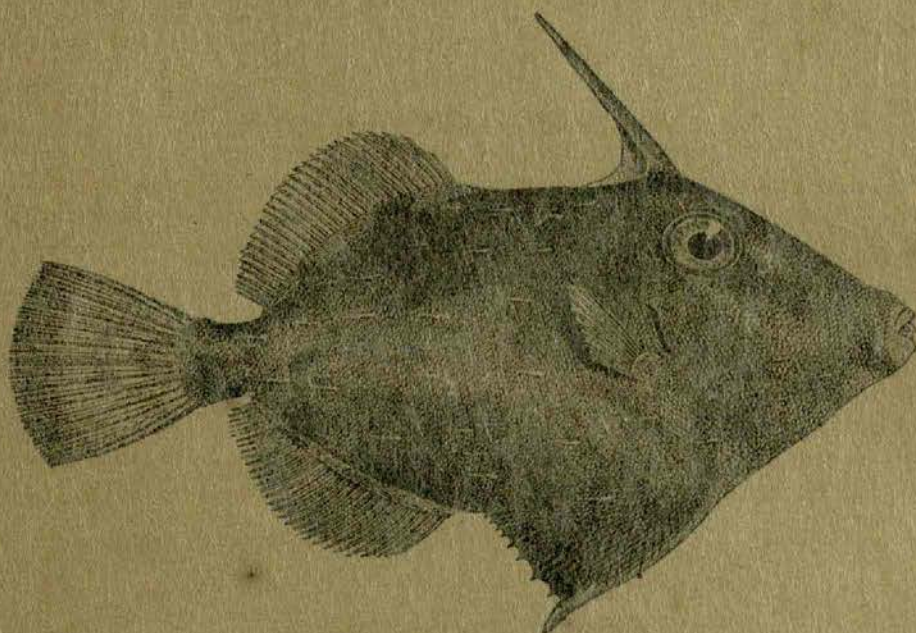


Fig. 172.—*Monacanthus chairocephalus*.

1388. (2.) *Monacanthus chairocephalus*. (Fig. 172.)

Monacanthus chairocephalus, Bleeker, *Batav. Genootsch. Verhand.* xxiv, *Balist.* p. 19, pl. ii, fig. 4; Day, *Fish. India*, p. 693, pl. clxxix, fig. 3 (see synonym.).



B. vi. D. 1 | 28. P. 13. A. 28-30. C. 12.

Length of head $3\frac{1}{2}$, of caudal fin 5, height of body $2\frac{2}{3}$ in the total length. *Eyes*—in posterior half of head; $2\frac{1}{4}$ diam. from end of snout and 1 apart. Profile from snout to first dorsal fin almost straight. Origin of second dorsal at nearly highest point of dorsal profile. *Fins*—dorsal spine rather weak, rough anteriorly, and with a row of small barbs on either side of its posterior surface. Ventral spine movable. Caudal rounded, sometimes a setiform prolongation of one of its upper rays. *Scales*—indistinctly visible, skin not very rough; numerous small fleshy tentacles on sides of body. *Colour*—grey stone, with irregular and rather large black blotches; two dark bands across caudal fin.

Hab. Madras (not rare) to the Malay Archipelago.

• 1389. (3.) *Monacanthus tomentosus*.

Balistes tomentosus, *Linn. Syst. Nat.* i, p. 405.

Monacanthus tormentosus, *Day, Fish. India, Suppl.* 1888, p. 808 (see synon.).

B. vi. D. 1 | 26-29. P. 11. A. 25-27. C. 10.

Length of head 4, of caudal fin $5\frac{1}{4}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—high up in posterior half of head over gill-opening, and 2 diam. from end of snout. Profile from snout to first dorsal somewhat concave. *Fins*—dorsal spine strong, about as long as head, armed posteriorly with a double row of recurved spines. Ventral spine movable, with small curved spines posteriorly, second dorsal and anal fins low; caudal rounded. *Scales*—small, each with 4 or 5 marginal spines; the male on either side of the tail has a long patch of short setiform spines, sometimes wanting in the female. Some short fleshy tentacles on side of body. *Colour*—brown, spotted and marbled with black, a light band along anterior half of body. Caudal fin with two dark vertical bands.

Hab. Obtained by Mr. Haly at Karativoe, Ceylon; found also in the Malay Archipelago, Chinese and Australian seas.

1390. (4.) *Monacanthus monoceros*.

Balistes monoceros, *Linn. Syst. Nat.* i, p. 404.

Monacanthus monoceros, *Day, Fish. India*, p. 693, pl. clxxix, fig. 2 (see synon.).

B. vi. D. 1 | 46-48. P. 14. A. 48-53. C. 12.

Length of head about 4, of caudal fin 8, height of body from $2\frac{2}{3}$ to $3\frac{1}{3}$ in the total length. *Eyes*—rather small, situated between upper end of gill-opening and dorsal spine. Body oblong; snout moderately produced, with its upper profile convex. *Fins*—vertical ones low; dorsal spine weak. No ventral spine. Caudal truncated or very slightly convex. *Colour*—brownish or blackish, the fins yellow.



Hab. Seas of India, Indian Ocean generally, and Japan; Atlantic off tropical America. An example in the Madras Museum is 15 inches in length.

1391. (5.) *Monacanthus scriptus*.

Balistes scriptus, *Osbeck's Voyage*, transl. by Forster, i, p. 174.

Monacanthus scriptus, *Day, Fish. India*, p. 694, pl. clxxvi, fig. 3 (see *synon.*).

B. vi. D. 1 | 44-48. P. 15. A. 47-52. C. 12.

Length of head 4 to $4\frac{1}{4}$, of caudal fin $3\frac{1}{3}$ to $3\frac{2}{3}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—of moderate size, situated between upper end of gill-opening and first dorsal. Body oblong; snout produced, its upper profile concave. *Fins*—vertical ones low, dorsal spine weak. No ventral spine. Caudal wedge-shaped. *Colour*—buff, covered with small brown spots and blue lines.

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

4. Genus **ANACANTHUS**, Gray.

Syn. *Psilocephalus*, Swainson; *Pogonognathus*, Bleeker.

Body compressed, elongate. A fleshy barbel below the symphysis of the lower jaw. Incisor-like teeth in both jaws, in two rows in the upper and one row in the lower jaw. First dorsal in the form of a single flexible spine; the second and the anal with many rays; ventral absent. Body covered with fine asperities. Vertebrae 29-30.

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



Fig. 173.—*Anacanthus barbatus*.

1392. (1.) *Anacanthus barbatus*. (Fig. 173.)

Balistes (*Anacanthus*) *barbatus*, *Gray & Hardw. Ill. Ind. Zool.* i, pl. 84, fig. 2 (male).

Anacanthus barbatus, *Day, Fish. India*, p. 694, pl. clxxix, fig. 1 (female) (see *synon.*).

Crassi kola and *Watamoo kola*, Tamil.

B. iii. D. 1 | 49-52. P. 10. A. 57-64. C. 12.

Length of head about $\frac{1}{3}$ of that of body excluding caudal fin.



Eyes—high up, behind and above gill-opening. Body strongly compressed; a fleshy barbel below symphysis of lower jaw. In the male there is a skinny prolongation from throat continued nearly as far as anal and supported by a prolongation of the pelvic bone. *Fins*—second dorsal and anal low; caudal wedge-shaped, its central rays the longest. *Colour*—dull brown or grey, fins yellow, caudal with about six vertical or angular dark bands not so wide as ground-colour.

Hab. Seas of India to the Malay Archipelago. This fish is very common at Madras, especially the young, and attains at least 10 inches in length.

Third group. OSTRACIONTINA.

5. Genus OSTRACION, Linnaeus.

Syn. *Isetophrys*, *Tetrosomus*, and *Rhinesomus*, Swains.; *Acanthostracion*, Bleeker; *Cibotia*, Kaup.

Branchiostegals six. Body shortened and angular, with the integuments modified into a solid carapace composed of angular osseous plates in juxtaposition with one another, but leaving the snout, bases of the fins, and the hind portion of the tail covered by soft skin. The carapace three- to five-ridged, and closed behind the anal fin. Mouth small; premaxillaries and maxillaries coalescent. Teeth slender and in one row. A single spineless dorsal fin opposite the anal. Ventrals absent.

The spines observed on some of the species vary with the age of the individual.

Geographical Distribution. Tropical and subtropical seas.

Synopsis of Indian Species.

- | | |
|---|----------------------------------|
| A. Carapace 3-ridged, armed with spines .. | 1. <i>O. turritus</i> , p. 484. |
| B. Carapace 4-ridged, spineless. | |
| Brownish, with small blue black-edged ocelli | 2. <i>O. cubicus</i> , p. 485. |
| Reddish brown, with numerous small white spots | 3. <i>O. punctatus</i> , p. 486. |
| C. Carapace 5-ridged, spineless | 4. <i>O. nasus</i> , p. 486. |
| D. Carapace 4-ridged, and furnished with spines | 5. <i>O. cornutus</i> , p. 486. |

1393. (1.) *Ostracion turritus*. (Fig. 174.)

Ostracion turritus, *Forsk. Descr. Anim.* p. 75, no. 113; *Day, Fish. India*, p. 695, pl. clxxxi, fig. 4 (see synon.).

Cul-planchee, Tamil.

D. 9. P. 10. A. 9. C. 10.

Carapace 3-ridged, the upper or dorsal ridge elevated and compressed into a sharp triangular spine. Each lateral or ventral ridge well developed, and armed with 4 triangular, flattened, strong



spines directed backwards. Body about as wide as high. A compressed supraorbital spine. Fins—caudal rounded or truncated. Scutes—9 to 11 from gill-opening to tail, 9 or 10 transversely; about 11 across ventral surface. Colour—olive-brown, with 3 badly marked

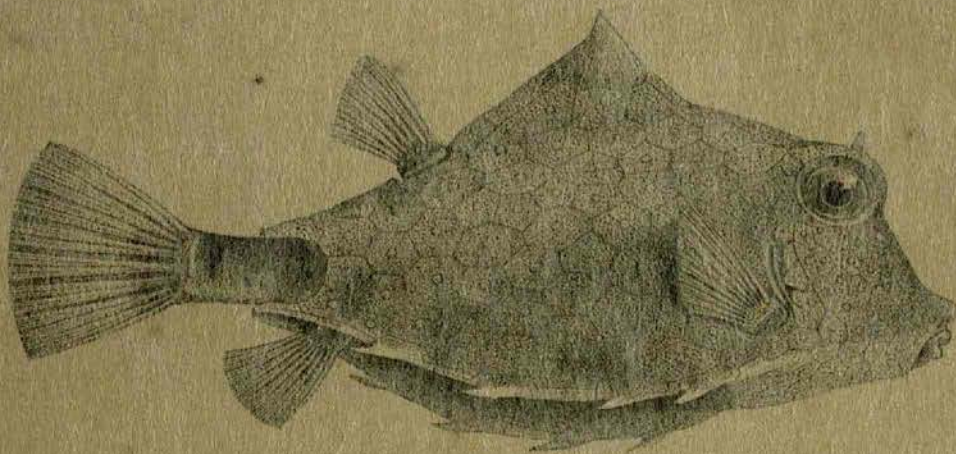


Fig. 174.—*Ostracion turritus*.

dark bands in lower $\frac{1}{3}$ of body, and a fourth just behind base of dorsal fin. A light blue spot in centre of each scute. Fins straw-coloured, the caudal with two dark vertical bands, one at the base, the other at the end. The young have several dark blotches and bands on various parts of the body, and a ridge extends from orbit to upper part of bridge over tail.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and reported from New York. This fish attains at least 9 inches in length.

1394. (2.) *Ostracion cubicus*.

Ostracion cubicus, Linn. *Syst. Nat.* i, p. 410; Day, *Fish. India*, p. 696, pl. clxxxi, fig. 3 (see synonym.).

D. 10. P. 10. A. 10. C. 10.

Carapace 4-ridged and spineless; ridges blunt. Body about as wide as high; back convex. Interorbital space concave. Fins—caudal truncated and about $\frac{1}{3}$ of total length. Scutes—about 10 between gill-opening and tail, 5 or 6 transversely; and 5 or 6 across ventral surface. Colour—brownish, a single blue black-edged ocellus in the centre of most of the scutes; sometimes the spots are absent from parts of the body; on the head they are frequently black, and have more than one spot on each scute. On the abdomen the spots may be white, with or without black marks, or black. Fins yellowish, and covered with black spots or immaculate.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; attaining at least 18 inches in length.

1395. (3.) *Ostracion punctatus*.

Ostracion punctatus, *Bl. Schn. Syst. Ich.* p. 501; *Day, Fish. India*, p. 696, pl. clxxxi, fig. 2 (see synonym.).

D. 9. P. 10. A. 10. C. 10.

Carapace 4-ridged and spineless; ridges blunt. Body not quite so high as wide; back rather convex. Interorbital space concave, sometimes flat. *Fins*—caudal truncated and nearly $\frac{1}{2}$ of total length. *Scutes*—about 10 across ventral surface. *Colour*—reddish brown, covered with numerous white dots, sometimes confluent into lines.

Hab. East coast of Africa, seas of India, Malay Archipelago, and beyond.

1396. (4.) *Ostracion nasus*.

Ostracion nasus, *Bloch, Austral. Fische*, i, p. 118, t. 138; *Day, Fish. India*, p. 696 (see synonym.).

D. 9. P. 10. A. 9. C. 10.

Carapace 5-ridged and spineless; ridges rather sharp. Body wider inferiorly than high; a distinct ridge along median line of back. Interorbital space concave, more especially in adults, in which a hump exists above mouth. *Fins*—caudal rounded, about $\frac{1}{2}$ of total length. *Scutes*—11 or 12 between branchial opening and base of caudal fin; 6 or 7 transversely; 7 or 8 across ventral surface. *Colour*—greenish yellow, with small irregularly-scattered round black spots, or one in the centre or at the side of each scute; abdomen whitish; black spots on tail and caudal fin. The young are bright orange-yellow, with numerous black spots along sides, not situated in centre of scutes, some black spots also exist over the caudal fin and on base of pectorals; fins yellowish, abdominal surface whitish yellow. Pupil golden.

Hab. Seas of India to Malay Archipelago and Pacific. I procured two young ones at Cochin, but have not obtained the adult. This species attains to at least $8\frac{1}{2}$ inches in length.

1397. (5.) *Ostracion cornutus*.

Ostracion cornutus, *Linn. Syst. Nat.* i, p. 409; *Day, Fish. India*, p. 697, pl. clxxvi, fig. 4 (see synonym.).

Murtoo-plachee, Tamil; *Nga nod*, "ox-fish," Burmese.

D. 9. P. 11. A. 9. C. 10.

Carapace 4-ridged. Two long anteriorly directed and conical supraorbital spines; each ventral ridge terminates posteriorly in another somewhat similar one. Dorsal ridge rather elevated about the middle. Interorbital space very concave. *Fins*—caudal truncated, about $\frac{1}{2}$ total length. *Scutes*—about 10 between gill-opening and tail, 5 or 6 transversely; and 7 across ventral surface.



Colour—carapace light brown, with round blue spots all over it in moderate numbers, about one to each scute; some scutes, however, without spots. Caudal blue-spotted.

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

Family II. GYMNODONTES.

Body more or less short. Bones of the upper and lower jaw in the form of a beak, having a cutting-edge, and covered with a layer of ivory-like substance; a median suture present in some. A spineless dorsal, anal, and caudal; pectorals present; ventrals absent. Dermal covering modified into small or large spines or laminae. Pelvic bones and air-bladder present or absent.

Some *Gymnodontes* possess the means of dilating an elastic portion of the oesophagus, or an abdominal sac, with air. Most of the Indian fishes of this family are highly indigestible or even virulently poisonous.

Synopsis of Indian Genera.

First group. TRIODONTINA.

Tail well developed. Abdomen dilatible into a large compressed sac supported by an elongate pelvic bone.

Upper jaw divided by a median suture, lower
entire 1. TRIODON.

Second group. TETRODONTINA.

Tail well developed. A portion of the oesophagus dilatible.

- A. Both jaws with a median suture.
Dorsal and anal fins with many rays (23-28) ... 2. XENOPTERUS.
Dorsal and anal fins with few rays (8-16) ... 3. TETRODON.
B. Both jaws entire 4. DIODON.

Third group. MOLINA.

Tail very short, truncated. Vertical fins confluent. Body short and compressed.

Jaws without median suture 5. ORTHAGORISCUS.

First group. TRIODONTINA.

1. Genus TRIODON (Reinw.), Cuvier.

The upper jaw with, the lower without, a median suture. Two



separate nasal orifices on either side. Tail elongate, terminating in a bilobed fin; dorsal and anal with few rays. Abdomen possessing a large sac, the upper portion of which can be dilated with air, and kept distended by elongate pelvic bones. The dermal covering consisting of spiny osseous laminae, which are not imbricate. Air-bladder present.

1398. (1.) *Triodon bursarius*.

Triodon bursarius (Reinw.), *Cuv. Règn. Anim.* 2^e éd. 1829, ii, p. 370; *Day, Fish. India*, p. 698 (see synonym.).

B. vi. D. 10-11. P. 15-16. A. 9-10. C. 18.

Length of head 4 to 4½, of caudal fin 7 in the total length. *Eyes*—situated in posterior half of head. Interorbital space rather concave. *Fins*—dorsal slightly in advance of anal; caudal emarginate. *Colour*—dull brown, a large, irregularly shaped, black yellow- or blue-edged spot present on upper portion of sac. Fins yellow.

Hab. Seas of India to the Malay Archipelago; attaining at least 21 inches in length.

Second group. TETRODONTINA.

2. Genus *XENOPTERUS* (Bibron), Dumeril.

Syn. *Chomerhinus*, Bleeker.

Back rounded; both jaws divided by a median suture. Nostrils funnel-shaped with fringed margins. Dorsal and anal fins with many rays (23 to 38). Part of the body covered with fine dermal spines, having double or treble roots.

These fishes and the *Tetrodons* are able to inflate their bodies with air and float on the water, abdomen uppermost. They ascend large rivers, far above tidal influence.

1399. (1.) *Xenopterus naritus*. (Fig. 175.)

Tetraodon naritus, Richardson, *Voy. 'Samarang.'* *Fish.* p. 18, pl. viii.
Xenopterus naritus, *Day, Fish. India*, p. 699, pl. clxxxii, fig. 1 (see synonym.).

Nga booden, Burmese.

B. v. D. 32-38. P. 19. A. 28-32. C. 12.

Eyes—rather small; interorbital space broad and flat. Lips thick and fringed. *Fins*—caudal slightly emarginate. *Spines*—rather widely separated, situated between eye and base of pectoral fin, above which they are continued a short distance; also for a short distance behind that fin and along the abdominal surface



nearly as far as the vent. *Colour*—pale yellow, darkest along the back and in the lower two thirds of the dorsal fin.

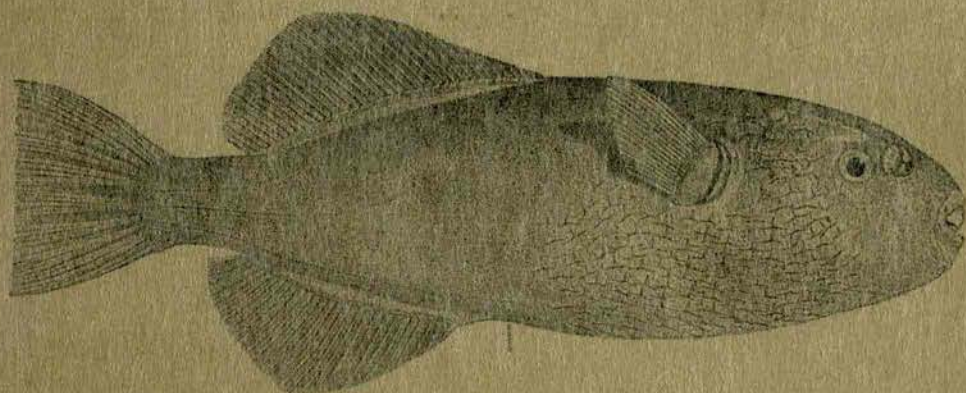


Fig. 175.—*Xenopterus narilus*.

Hab. Through the rivers, estuaries, and coasts of Burma to the Malay Archipelago.

3. Genus **TETRODON**, Linnaeus.

Syn. *Leisomus*, *Lagocephalus*, *Cirrhisomus*, and *Psilonotus*, Swainson; *Holacanthus*, Gray; *Prilonotus* and *Anchisomus*, Kaup; *Tropidichthys*, Bleeker; *Rhynchotus*, *Apsicephalus*, *Brachycephalus*, Hollar.

Kappa, Tel.; *Plachee*, Tam.; *Kuddul mah-cutchee*, or "Sea-frogs," Mal. Globe or puff fishes.

Back broad, or compressed into a ridge. Both jaws with a median suture. Dorsal and anal fins with few rays. Body wholly or partially covered with fine dermal spines, or spines may be absent. A portion of the oesophagus dilatable and capable of being distended with air. Air-bladder present and horseshoe-shaped.

Some species of *Tetrodon* are poisonous, but there is much variation in this respect and some Burmese and Andamanese eat particular kinds.

Geographical Distribution. Tropical and subtropical seas, entering estuaries. A few are found in fresh waters.

Synopsis of Indian Species.

- A. Back broad, not compressed; nasal organs conspicuous.
 - a. Two nasal openings on each side of snout, each pair in a prominent papilla.
 - a'. No spines on back 1. *T. inermis*, p. 490.
 - b'. Spines on back.
 - a". Greenish olive above, unspotted. 2. *T. lunaris*, p. 491.
 - b". Olive-green above with brown spots 3. *T. sceleratus*, p. 491.



- c". Yellowish brown above, with light spots.
 Eye nearer to gill-opening than to snout 4. *T. hypselogenion*, p. 492.
 Eye equidistant from gill-opening and snout 5. *T. oblongus*, p. 492.
- b. A single imperforate nasal cavity on each side with a fringed edge; body spiny 6. *T. patoca*, p. 492.
- c. A simple circular nasal cavity; body spineless 7. *T. cutcutia*, p. 493.
- d. On each side two solid nasal tentacles and an impervious nasal fossa.
- a'. Body spiny throughout.
 No spots on body, sides sometimes banded 8. *T. immaculatus*, p. 493.
 Usually scattered black spots.
 Caudal fin unspotted 9. *T. nigropunctatus*, p. 494.
 Brownish above with close dark spots. Caudal spotted 10. *T. stellatus*, p. 494.
 Dark with white spots above, banded below. Caudal spotted. 11. *T. reticularis*, p. 494.
 Dark with a few pale spots above. Caudal unspotted. 12. *T. hispidus*, p. 495.
- b'. Back and abdomen spiny, sides spineless.
 D. 11, A. 8-9. Back with white spots 13. *T. leopardus*, p. 495.
 D. 12, A. 11. Back with green spots and bars 14. *T. viridipunctatus*, p. 496.
 D. 14-16, A. 12-13. Back and sides with large black blotches. 15. *T. fluviatilis*, p. 496.
- B. Back compressed into a keel, nasal organs inconspicuous 16. *T. margaritatus*, p. 497.

1400. (1.) *Tetrodon inermis*.

Tetrodon inermis, Temm. & Schleg. *Faun. Japon.*, Poiss. p. 278, t. cxxii, fig. 2; Day, *Fish. India*, p. 701, pl. clxxx, fig 1.

B. v. D. 12-13. P. 19. A. 11. C. 10.

Two nasal openings on each side. *Eyes*—rather large, situated nearer to gill-opening than to end of snout, and $1\frac{1}{2}$ diameters apart. *Fins*—dorsal with its anterior rays the longest, its height rather above twice the length of its base; anal similar. Caudal emarginate. *Spines*—soft and widely separated, only existing along the abdominal surface, not extending so far as the vent. A moderately well-marked fold of skin along side of tail. Skin on summit of head with short longitudinal rugæ. *Colour*—upper surface of head and back plumbaceous; a broad dull brown band from the eye nearly to the tail, beneath silvery white. Gill-opening black internally; dorsal fin dark in its upper two thirds; caudal dark in its last half, margined with white.

Hab. Seas of India to Japan.

1401. (2.) *Tetrodon lunaris*. (Fig. 176.)

Tetrodon lunaris, *Bl. Schn. Syst. Ich.* p. 505; *Day, Fish. India*, p. 701, pl. clxxxii, fig. 2 (see synonym.).

Kappa koorawah, Tel.; *Cha-mo-dah*, Andamanese.

B. v. D. 12-14. P. 16-19. A. 11-12. C. 10.

Two nostrils on each side of snout. *Eyes*—rather large, situated much nearer to gill-opening than to end of snout and $1\frac{1}{2}$ diam. apart; interorbital space flat. *Fins*—dorsal with its anterior rays the longest; anal similar to dorsal. Caudal emarginate. *Spines*—

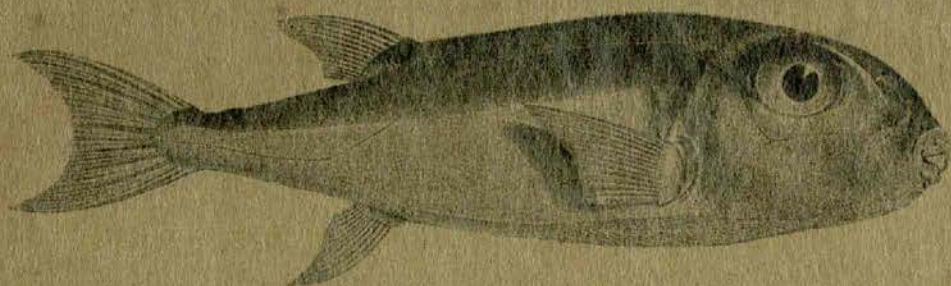


Fig. 176.—*Tetrodon lunaris*.

small, either entirely covering back, or only anteriorly from opposite front margin of eyes; abdomen similarly protected. *Colour*—Greenish olive above, sides and abdomen satin-white, a yellowish line from eye to middle of caudal fin; end of caudal dark with a light outer edge.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond; attaining at least a foot in length. The fry are common in the Hooghly.

1402. (3.) *Tetrodon sceleratus*.

Tetrodon sceleratus (Forster), *Gmel. Syst. Nat.* i, p. 1444; *Day, Fish. India*, p. 701 (see synonym.).

B. v. D. 10-12. P. 16-17. A. 9-11. C. 11.

Length of head equals about $\frac{2}{3}$ of its distance from base of dorsal fin; two nostrils on each side. *Eyes*—nearly two diameters from end of snout. Tail depressed. *Fins*—caudal fin emarginate, $\frac{1}{5}$ to $\frac{1}{4}$ of total length. *Spines*—head and back with fine spines, none on sides, but some with three roots along abdominal surface to behind base of anal. *Colour*—olive-green above, with some brown spots; whitish laterally and below, with a silvery longitudinal band; a triangular white spot in front of eye; a brown band round mandibles, sometimes continued along side below silvery lateral band; gill-openings black.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; attaining at least $2\frac{1}{2}$ feet in length.

1403. (4.) *Tetrodon hypselogenion*.

Tetrodon hypselogenion, Bleeker, *Batavia Nat. Tijdsch.* iii, p. 300;
Day, Fish. India, p. 702, pl. clxxxiii, fig. 5 (see synonym.).

B. v. D. 8-9. P. 16. A. 8. C. 10.

Two nostrils on each side. *Eyes*—situated rather behind middle of length of head. Osseous interorbital space very much narrower than shortest diameter of eye. *Fins*—base of dorsal only $\frac{2}{3}$ of its height, the anterior rays highest; anal similar. Caudal slightly emarginate, length $4\frac{1}{2}$ in total. *Spines*—of moderate size and rather widely separated, they commence on the dorsal profile a slight distance behind eyes and are continued half the distance to base of dorsal fin or more; also along abdominal surface almost to vent; some are present on sides behind pectoral fin. *Colour*—yellowish brown, white stained with yellow beneath; colour of back often sharply defined from white of sides; whole upper surface covered with light dots, which have usually dark edges; from three to five vertical bars under eye. Caudal with about seven vertical bands, most distinct in the upper lobe.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and Australia; attaining about six inches in length.

1404. (5.) *Tetrodon oblongus*.

Tetrodon oblongus, Bloch, *Aust. Fische*, ii, p. 6, t. 146, fig. 1; *Day, Fish. India*, p. 702, pl. clxxxii, fig. 3 (see synonym.).

D. 12. P. 17. A. 10. C. 10.

Two nostrils on each side. *Eyes*—small in adults; interorbital space nearly flat and very broad in adults, in which it exceeds length of snout. *Teeth*—lower a little larger than upper pair. *Fins*—middle dorsal ray somewhat the highest, twice as long as base of fin; anal similar to dorsal. Caudal truncated. *Spines*—with two roots, present on back from nostrils to dorsal fin; a few on lower part of cheeks and many along abdominal surface almost as far as vent. *Colour*—light brownish along back, white tinged with yellow on sides and beneath. Bands of dark brown from back down sides to middle of body enclosing light spaces of irregular size and shape or round spots. From snout to dorsal fin round or oval light spots predominate. Fins yellow stained with orange, sometimes a black shoulder-spot.

Hab. Seas of India, Malay Archipelago, China, Japan, and the South Sea.

1405. (6.) *Tetrodon patoca*.

Tetrodon patoca, Ham. Buch. *Fish. Ganges*, pp. 7, 362, pl. xviii, fig. 2;
Day, Fish. India, p. 703, pl. clxxxii, fig. 4 (see synonym.).

Bheng pulli, Ooriah; *Boga*, Chittagong; *Nga booden*, Burmese.

D. 10-11. P. 18. A. 8-10. C. 10-11.



A single fringed imperforate nasal cavity on each side of snout; interorbital space broad. *Fins*—dorsal and anal rounded, the caudal fin (which is contained from $4\frac{1}{2}$ to $5\frac{1}{2}$ times in the total length) truncated. *Spines*—small, with three or four roots, extending from a short distance behind nostrils to base of dorsal fin; beneath they cover the chest nearly as high as base of pectoral and extend to vent. *Colour*—upper half brown or black, with numerous round or oval white spots; sides and abdomen silvery, a yellowish tinge dividing dark back from white side. Caudal in young stained dark in outer half. In some, especially marine forms and immature specimens, two or three distinct dark bands descend from back to middle of sides, and a fourth passes across head.

Hab. From Sind through the seas of India to China, attaining at least 13 inches in length. Very common along the Coromandel coast.

1406. (7.) *Tetrodon cutcutia*.

Tetrodon cutcutia, *Ham. Buch. Fish. Ganges*, pp. 8, 362, pl. xviii, fig. 3; *Day, Fish. India*, p. 703, pl. clxxxii, fig. 5 (see synonym.).

Teepah bengti, Oorah.

B. v. D. 10-11. P. 21. A. 10. C. 7.

Caudal fin 6 in total length; interorbital space flat and broad. Nostril a single orifice, situated in a very short simple tube. *Fins*—all rounded. *Spines*—entirely absent. *Colour*—greenish yellow above, white on abdomen. A light band from eye to eye. A large black ocellus, surrounded by a light edge, on side. The whole back marked with dark greenish reticulations enclosing lighter spaces; fins greyish; caudal tipped with carmine; a red spot on throat.

Hab. Fresh waters of Orissa, Bengal, and Assam; attaining about $3\frac{1}{2}$ inches in length.

1407. (8.) *Tetrodon immaculatus*.

Tetrodon immaculatus, *Bl. Schn. Syst. Ich.* p. 507; *Day, Fish. India*, p. 703, pl. clxxxiii, fig. 4 (see synonym.).

D. 9-10. P. 17-18. A. 8-10. C. 9-10.

Two nasal tentacles on each side, an impervious nasal fossa between each two. Interorbital space broad and flat. *Fins*—rounded, height of dorsal equals about $\frac{1}{2}$ length of head. Caudal rather elongate, $\frac{1}{4}$ total length. *Spines*—small, covering body except snout and posterior half of tail. *Colour*—greenish above, brownish along middle of side, and dirty white below; upper and lower edges as well as end of caudal black. In some there is a white spot over eye; occasionally there are several parallel greyish longitudinal bands on sides. In some examples all spines are white.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond; attaining at least 12 inches in length.

1408. (9.) *Tetrodon nigropunctatus*.

Tetrodon nigropunctatus, *Bl. Schn. Syst. Ich.* p. 507; *Day, Fish. India*, p. 740, pl. clxxx, fig. 4 (see synonym.).

B. v. D. 10. P. 18. A. 9. C. 9.

Two nasal tentacles on each side. *Eyes*—rather small, about 2 diameters from end of snout and about 3 apart; interorbital space nearly flat, osseous portion less than two diameters of eye wide. *Fins*—dorsal situated in the last fourth of the body excluding caudal fin; it and anal rounded. Caudal rounded and about $\frac{1}{2}$ of total length. *Spines*—small, and usually covering the entire body; the extent over which they extend varies, and they appear to be absent in some examples. *Colour*—brown above, becoming lighter on sides and beneath; some scattered black dots over the body, and the vent in a black spot; snout and round mouth black or very dark brown; the spots sometimes wanting. In one variety termed *citrinella* the entire body is of a beautiful lemon-colour with black spots.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; attaining at least to 9 inches in length.

1409. (10.) *Tetrodon stellatus*.

Tetrodon stellatus, *Bl. Schn. Syst. Ich.* p. 503; *Day, Fish. India*, p. 705, pl. clxxxiii, fig. 3 (see synonym.).

B. v. D. 11. P. 18-21. A. 11-12. C. 11.

Two nasal tentacles on each side. *Eyes*—rather above two diameters from end of snout, and $2\frac{1}{2}$ apart; interorbital space nearly flat, and osseous portion extending the whole distance. *Fins*—dorsal situated in last $\frac{1}{4}$ of length excluding caudal fin, which is rounded and about $\frac{1}{6}$ of total length. *Spines*—small, extended all over body. *Colour*—generally brownish yellow along back; the whole back and sides to below pectoral covered with brown spots divided by yellowish-white lines above, but further apart lower down. Caudal spotted; dorsal and anal dark; pectoral yellowish, often with a black base beneath; anus in a black ring; lower lip black, yellow at the angle.

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

1410. (11.) *Tetrodon reticularis*.

Tetrodon reticularis, *Bl. Schn. Syst. Ich.* p. 506; *Day, Fish. India*, p. 705, pl. clxxx, fig. 5 (see synonym.).

Paatha, Mal.; *Ko-pud-dah*, Andamanese.

D. 10-11. P. 19. A. 10-11. C. 10-11. Vert. 8/10.



Two nasal tentacles on each side. Interorbital space broad and flat. *Fins*—rounded, dorsal situated in last fourth of length excluding caudal fin; height of dorsal somewhat exceeds half length of head. Caudal fin $4\frac{1}{2}$ in total length. *Spines*—small, covering entire body except fore part of snout. *Colour*—deep grey or brown above, white below; 8 to 10 longitudinal black stripes, which are curved under the eye, as well as round the mouth and pectoral fin; on the back are round whitish spots; caudal reticulated with black on a white ground. In the young bands on cheek are wanting.

Hab. Seas of India, Malay Archipelago, and New Guinea; attaining at least 17 inches in length.

1411. (12.) *Tetrodon hispidus*.

Tetrodon hispidus, Bloch, *Aust. Fische*, i, p. 130, t. 142; Day, *Fish. India*, p. 706, pl. clxxxiii, fig. 2 (see synonym.).

B. v. D. 10. P. 17-18. A. 10-11. C. 11.

Two nasal tentacles on each side. *Eyes*—of moderate or rather small size, from $2\frac{1}{2}$ to 3 diameters from end of snout, and 3 apart; orbit prominent and interorbital space concave. *Fins*—rounded; caudal about $\frac{1}{2}$ of total length. *Spines*—small, those on abdomen with two or three roots, they cover the body from snout to a short distance behind base of dorsal fin (in some examples they appear not to extend so far). *Colour*—brown above, with a moderate number of bluish-white spots; one or two bluish-white bands sometimes round orbit, another well-marked one round gill-opening and pectoral fin; sometimes lines or spots of black on abdomen, not ascending to cheeks; some specimens have several black blotches along either side of abdomen, or bands descending on to it.

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

1412. (13.) *Tetrodon leopardus*.

Tetrodon leopardus, Day, *Fish. India*, p. 706, pl. clxxx, fig. 2 (see synonym.).

Bondaroo kappa, Tel.

B. v. D. 11. P. 18. A. 8-9. C. 11.

Two nasal tentacles on each side. *Eyes*—of moderate size, $1\frac{1}{2}$ diam. apart and the same from end of snout; interorbital space flat. *Fins*—dorsal highest in front, anal similar to dorsal. Caudal rounded, $4\frac{2}{3}$ in total length. *Spines*—two-rooted, widely separated along back, extending from front edge of eyes to dorsal fin; below they are closer together and reach to the vent. *Colour*—olive above, extending two thirds down sides, with an interrupted black network surrounding white spots; three black cross bands, one over head, with a V-shaped light interorbital band, posterior to it the second above pectoral, the third from base of dorsal. Reti-



culated narrow black lines enclosing large white spots on caudal and dorsal fins, the latter having likewise a narrow black basal band.

Hab. Seas of India.

1413. (14.) *Tetrodon viridipunctatus*.

Leiodon viridipunctatus, Day, *P. Z. S.* 1865, p. 315.

Tetrodon viridipunctatus, Day, *Fish. India*, p. 707, pl. clxxvi, fig. 5 (see synonym.).

B. v. D. 12. P. 18. A. 11. C. 11.

Two nasal tentacles on each side; caudal fin 5 in total length. *Eyes*—diameter 5 in length of head, rather nearer to gill-opening than to end of snout. *Fins*—all rounded. *Spines*—two-rooted, short, some distance asunder, they commence at occiput, and extend along back two thirds of way to commencement of dorsal fin; none on sides. Inferiorly they begin below orbit, surround lower and posterior margin of pectoral fin, and are continued backwards as far as anus. *Colour*—back light green; abdomen silvery white; back and sides covered with emerald-green spots; a bar of the same colour between the eyes, from it a longitudinal band goes backwards in the median line towards a second irregular transverse band further back. Eye brown, with a golden rim surrounding the iris. Caudal and anal tipped with black; dorsal yellowish; four black spots under throat.

Hab. Cochin on the Malabar coast.

1414. (15.) *Tetrodon fluviatilis*.

Tetrodon fluviatilis, Ham. Buch. *Fish. Ganges*, pp. 6, 362, pl. xxx, fig. 1; Day, *Fish. India*, p. 707, pl. clxxxiii, fig. 1.

B. v. D. 14-16. P. 22. A. 12-13. C. 11.

Two nasal tentacles on each side. *Eyes*—rather large, $1\frac{1}{2}$ to 2 diam. from end of snout; interorbital space broad and slightly convex. *Fins*—caudal fin truncated, its length $\frac{1}{2}$ of total. *Spines*—with two roots, widely separated, concealed in the skin, and extending from eyes to base of dorsal fin, also over cheeks and abdomen as far as vent. *Colour*—greenish olive above, white on sides and below; back and sides with large black blotches, one or more irregular light cross bands on back, one between eyes; abdomen covered with round or angular black spots and blotches much wider than the ground-colour, sometimes it is quite black beneath; fins yellowish, end of caudal stained dark and sometimes with black spots.

Hab. Seas and estuaries of India to the Malay Archipelago and beyond. This species ascends tidal rivers and in the Amherst District of Burma is said to be found in hill-streams. It attains at least $6\frac{1}{2}$ inches in length.

1415. (16.) *Tetrodon margaritatus*.

Tetrodon margaritatus, Rüpp. *Atl. Fische*, p. 66; Day, *Fish. India*, p. 707 (see synon.).

Karoom palasi, Tamil.

B. v. D. 9-10. P. 14-16. A. 9. C. 11.

Back compressed into a keel; nasal organs inconspicuous. *Eyes*—rather high up and in posterior half of length of head. Upper profile of snout rather concave. *Fins*—dorsal situated in almost last fourth of length excluding caudal fin, which is rather convex and contained from $4\frac{1}{2}$ to 5 times in total length. *Spines*—minute, generally covering the entire body, but occasionally wanting in caudal portion. *Colour*—dull reddish, becoming light beneath; fins yellow. The body is variously marked: in typical *T. margaritatus* there is a black blue-edged ocellus on either side of the dorsal fin; horizontal blue lines round eye and on posterior portion of body, elsewhere there are small yellow dark-edged ocelli. In the variety *T. papua* the black dorsal spot is present; the oblique bands on snout become nearly horizontal and a blue band passes to vent; also angular bands on tail; body and cheeks covered with small blue, black-edged spots. In variety *T. bennetti* a black dorsal spot also exists. Bluish vertical bands on snout, and one along middle of throat; angular bands on tail. Bluish spots on body, smallest on sides of head.

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

4. Genus **DIODON**, Linnæus.

Syn. *Paradiodon*, Bleeker.

Body nearly globular. Jaws without median suture. Nasal tentacle simple, with a pair of lateral openings. Body covered with stiff and erectile dermal spines, each having a pair of lateral roots. A portion of the œsophagus dilatable, and capable of being distended with air. No pelvic bones. Air-bladder present.

Geographical Distribution. Tropical seas to the Cape of Good Hope.

In the Museum at Calcutta are two examples, without labels, of *D. spinosissimus*; and as the British Museum contains a specimen from Siam, it is not unlikely that the species is found in the seas of India. *D. novemmaculatus*, Bleeker, is also probably a visitor to India.

Synopsis of Indian Species.

Body and fins with small round spots 1. *D. hystrix*, p. 498.
Body with large black yellow-edged blotches. 2. *D. maculatus*, p. 498.

1416. (1.) *Diodon hystrix*. (Fig. 177.)

Diodon hystrix, Linn. *Syst. Nat.* i, p. 413; Day, *Fish. India*, p. 708, pl. clxxix, fig. 4 (see synon.).

Moolu plachay, Tamil.

Spines longest on sides of body behind pectoral fin, where they become about $\frac{3}{4}$ the length of that fin; they are dilated at their bases and usually with a pair of basal grooves. Two or three pairs

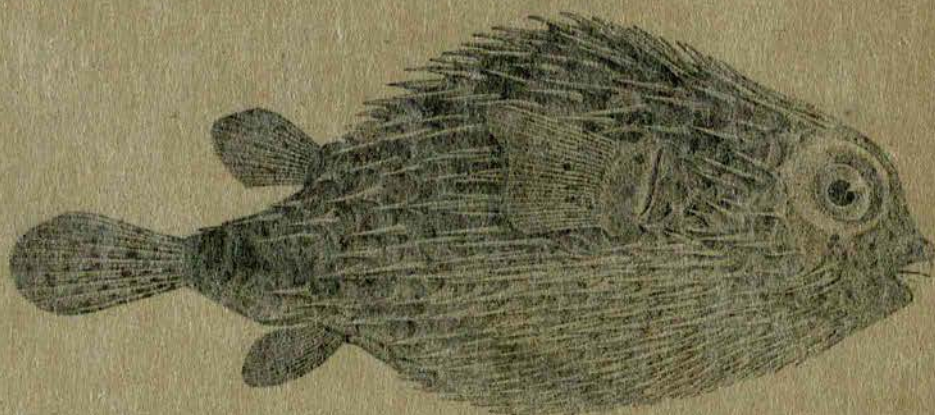


Fig. 177.—*Diodon hystrix*.

of immovable spines at upper and lower sides of the tail. Colour—the whole fish (except the ventral surface) light brown, covered with round blue or brown spots, rarely above one to the base of a single spine. The fins similarly spotted.

Hab. All tropical seas. This fish attains $2\frac{1}{2}$ feet in length.

1417. (2.) *Diodon maculatus*.

Diodon maculatus, Günther, *Catal.* viii, p. 307; Day, *Fish. India*, *Suppl.* 1888, p. 809 (see synon.).

B. vi. D. 2/13. P. 23. A. 2/12. C. 7.

Length of head $2\frac{2}{3}$ to $3\frac{1}{2}$ in length of body. Eyes—diameter $3\frac{1}{2}$ to 4 in length of head. Sometimes tentacles above orbit on lower side of head, and on back. Spines of varying lengths, 16 to 19 between snout and dorsal fin; generally only two or three behind dorsal. The roots of these spines are long and strong, and have a distinct ridge along their basal portions. Colour—large black yellow-edged blotches on the body of various shapes, and often small black spots. The large black spots are in some cases badly defined.

Hab. Tropical seas. Found in the Gulf of Manar by Sir W. Elliot, and in Ceylon by Haly.



Third group. MOLINA.

5. Genus **ORTHAGORISCUS**, Bl. Schn.

Syn. *Cephalus*, Shaw; *Tympanomium*, *Diplanchias*, *Trematopsis*, and *Ozodura*, Ranzani; *Ranzania*, Nardo; *Pendalion*, Guilding.

Body short and compressed, covered with a rough or else with a smooth tessellated skin, which cannot be distended with air; tail-portion of body very short and truncated. Jaws without median suture. Vertical fins confluent. Ventrals absent. No pelvic bones. No air-bladder. An accessory opercular gill.

Geographical Distribution. Cosmopolitan and pelagic.

1418. (1.) *Orthagoriscus* — ?

A small sun-fish, *Orthagoriscus*, has been observed in Ceylon (Haly, *Taprobanian*, vol. ii, 1888, p. 165; Day, *Fish. India*, Suppl. 1888, p. 809). This may have been the widely ranging *O. mola*, or the form found at Amboina which was described and figured by Bleeker in 1873 as *O. oayuropterus*, or possibly a nondescript species.



Subclass **LEPTOCARDII.**

Skeleton semicartilaginous and notochordal : destitute of jaws or ribs. Brain absent. Blood colourless and distributed by pulsating sinuses. Respiratory and abdominal cavities confluent : numerous branchial clefts, and the water discharged by an opening in front of the vent.

Family I. **CIRROSTOMI.**

An elongate compressed body, having a low and rayless dorsal fin, continued round the tail past the vent to the respiratory opening. Mouth a longitudinal slit on the interior surface, and with cirri. Eyes rudimentary. Vent near the end of the tail.

1. Genus **BRANCHIOSTOMA**, Costa.

Syn. *Amphioxus*, Yarrell.

Definition as in the family.

One or more varieties of this fish are common in the seas around India, Burma, Ceylon, and the Andaman Islands.



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