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FISHES.—Vol. II.

BY

FRANCIS DAY, C.I.E., LL.D., ETC.,
DEPUTY SURGEON-GENERAL MADRAS ARMY (RETIRED).

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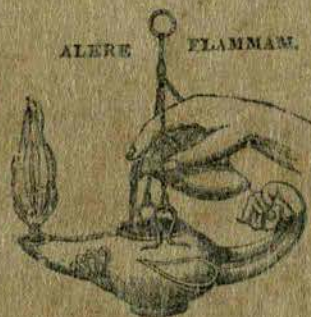
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PREFACE.

THAT part of the 'Fauna of British India,' which relates to Fishes is completed by the publication of the present volume. Unhappily the author of the work has not lived to see it appear; the illness that, in the Introduction to the first volume, was noticed as having prevented his correcting the proofs, terminated fatally almost on the day when that volume was issued.

Indian naturalists will not soon forget the great additions made by Dr. Francis Day to our knowledge of Indian fishes, and they will assuredly join the Editor of the present series in deploring the loss of one who, by the researches of a lifetime, by his numerous published works, and by admirable figures, has rendered such signal service to Indian Zoology.

The Editor has found it necessary in this second volume and in part of the first, for the sake of saving space, to make some slight excisions in the text, and to recast in many cases the synopses of genera and species. As the author was unable to revise the proofs, it is hoped that some allowance



will be made should any defects have crept in and passed unnoticed.

An explanation of the abbreviations used and of some of the technical terms has been given at the commencement of the first volume.

The remaining parts of the 'Fauna of British India,' dealing with other classes of Vertebrata, are well advanced towards completion, and it is hoped that a volume of Birds by Mr. E. W. Oates will be published before the close of the year.

July, 1889.



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7. <i>bataviensis</i> (<i>Bleeker</i>)	427	7. <i>zebra</i> (<i>Bloch</i>)	450
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Subclass **TELEOSTEI** (*continued*).Order **ACANTHOPTERYGII** (*continued*).Family II. **SQUAMIPINNES**.*Chaetodontidae*, pt., Richardson.

Pseudobranchiae well developed. Body elevated and compressed. Mouth generally small, and situated in front of snout. Teeth villiform or setiform, neither incisors nor canines; in most of the genera the palate is edentulous. Soft portion of the dorsal fin of greater extent than the spinous; anal with three or four spines; lower pectoral rays branched; ventrals thoracic, $1/5$. Scales cycloid or very finely ctenoid, extending to a greater or less extent over the vertical fins. Air-bladder present, generally simple. Intestines usually much convoluted; stomach caecal. Pyloric appendages in moderate numbers.

Geographical Distribution. These fishes are, as a rule, marine and tropical. Some are taken in rivers and estuaries, but very few are captured above tidal reach.

*Synopsis of Indian Genera.*First group. **CHAETODONTINA**.

No palatine or vomerine teeth.

- | | |
|--|-----------------|
| A. Dorsal spines not separated from rays by a hollow or notch. | |
| <i>a.</i> No preopercular spine. | |
| Snout moderate or short; no elongate dorsal spine | 1. CHAETODON. |
| Snout much prolonged | 2. CHELMON. |
| Snout moderate, 4th dorsal spine elongate | 3. HENIOCHUS. |
| Snout moderate, 3rd dorsal spine elongate | 4. ZANCLUS. |
| <i>b.</i> A strong preopercular spine | 5. HOLACANTHUS. |
| B. A notch or hollow between spines and rays of dorsal. | |
| <i>a.</i> Pectorals short. | |
| No dorsal spines with filiform extremities | 6. SCATOPHAGUS. |
| Several dorsal spines elongate and filiform | 7. EPHIPPUS. |
| <i>b.</i> Pectorals very long, nearly reaching caudal .. | 8. DREPANE. |

Second group. **TOXOTINA**.

Vomerine and palatine teeth.

- | | |
|---|-------------|
| Body oblong; dorsal in posterior half | 9. TOXOTES. |
|---|-------------|



First group. CHÆTODONTINA.

1. Genus CHÆTODON, Linn.

Syn. *Rabdophorus* and *Microcanthus*, Swains.; *Megaprotodon*, Guich.; *Sarothodius*, Gill.

Branchiostegals six. Body elevated and strongly compressed. Snout of moderate length, or short. Preopercle entire, or slightly serrated. Palate edentulous. Spinous and soft portions of the dorsal-fin not separated by a notch, the rays more numerous than the spines, none of the latter elongate; anal with three or four spines. Scales of large, moderate, or small size. Lateral line continuous, sometimes incomplete. Air-bladder may be constricted or with horns. Intestines much convoluted.*

Geographical Distribution. Tropical seas.

Synopsis of Indian Species.

- | | |
|---|-------------------------------------|
| A. Anal spines 4; a black eye-band and a caudal ocellus | 1. <i>C. plebeius</i> , p. 3. |
| B. Anal spines 3; more than 10 dorsal spines. | |
| a. No vertical band through eye | 2. <i>C. xanthocephalus</i> , p. 3. |
| b. A black or dark vertical eye-band. | |
| a'. Two large black spots on back; narrow vertical lines on sides ... | 3. <i>C. falcata</i> , p. 4. |
| b'. Black lines on sides, descending obliquely forwards in front, backwards behind, the two not crossing. | |
| No ocellus on soft dorsal, no dorsal ray produced | 4. <i>C. vagabundus</i> , p. 4. |

* Genus THOLICHTHYS, Günther.

Dr. Günther (A. M. N. H. ser. 4, i, 1868, p. 457) described and figured a very small fish, 11 millim. long, as a new *Cyttoid* genus, which he termed *Tholichthys*. I obtained several (I think thirteen) larger specimens at Madras 1½ inches long, which I described (P. Z. S. 1870, p. 687) as *T. osseus*. One was figured in the 'Fishes of India,' pl. xxvi, fig. 2. The following is the description; the fish appears to me to belong to the *Squamipennes*.

D. 12/25. P. 15. V. 1/5. A. 3/19-20. C. 17. L. 1. 41.

Length of head nearly 3, height of body 2 in the total length. *Eyes*—diameter from 2 to 2½ in the length of head. The angle of the preopercle is much enlarged, reaching to almost below the origin of the pectoral fin; the shoulder scale and those over the shoulder-girdle considerably dilated. *Fins*—third dorsal spine the longest and strongest, the fin notched; ventrals rounded; caudal almost square. *Scales*—ctenoid. *Lateral line*—ceases opposite the end of the soft dorsal.

In the very young, as figured by Dr. Günther, the developments mentioned above are greatly magnified, showing that atrophy occurs as age advances.



- An ocellus on soft dorsal; 5th dorsal ray produced 5. *C. auriga*, p. 5.
- c'. Black stripes on sides vertical above, bent back below 6. *C. chrysurus*, p. 6.
- d'. Sides uniform brown 7. *C. kleinii*, p. 6.
- e'. Each scale on side with a central brown spot 8. *C. miliaris*, p. 7.
- f'. Head with three dark bands, sides striped longitudinally 9. *C. trifasciatus*, p. 7.
- g'. A black blotch on side, just above l.l. 10. *C. unimaculatus*, p. 7.
- h'. A white collar behind the broad eye-band 11. *C. collaris*, p. 8.
- i'. Four dark vertical bands, the ocular being one 12. *C. fasciatus*, p. 8.
- j'. A black longitudinal line on each row of scales, and an interrupted band on root of tail 13. *C. melanotus*, p. 9.
- k'. Six dark vertical bands on sides .. 14. *C. octofasciatus*, p. 9.
- C. Anal spines 3; dorsal 6 or 7, vertical dark bands 15. *C. ocellatus*, p. 10.

725. (1.) *Chaetodon plebeius*.

Chaetodon plebeius, Brouss. MS.; Cuv. & Val. vii, p. 68; Day, Fish. India, p. 104, pl. xxvi, fig. 3 (see synonym.).

D. 14/13-17. P. 15. A. 3/15-16. C. 17. L. l. 50. L. tr. 7/15.

Length of head $4\frac{1}{2}$, height of body nearly 2 in the total length. Eyes—diameter $3\frac{1}{2}$ in length of head, 1 from end of snout. Preopercle finely serrated. Fins—dorsal spines strong, the fourth slightly the longest, the soft portions of the dorsal and anal rounded; second anal spine longest and strongest; caudal slightly rounded. Colour—yellow, with a black white-edged ocular band, a black white-edged ocellus at base of caudal fin.

Hab. Andaman Islands to the South Seas.

726. (2.) *Chaetodon xanthocephalus*.

Chaetodon xanthocephalus, Bennett, P. Z. S. 1832, p. 182; Day, Fish. India, p. 104, pl. xxvi, fig. 4.

D. 13-14/25-27. P. 15. A. 3/24. C. 17. L. r. 46/44. L. tr. 11/18.

Length of head $4\frac{1}{2}$, height of head $1\frac{3}{4}$ in the total length. Eyes—diameter 4 in length of head, $1\frac{1}{2}$ from end of snout and apart. Preopercle indistinctly serrated. Fins—soft portions of dorsal and anal rounded. Colour—a small dark blotch above orbit; no ocular band; body brownish yellow, with six indistinct dark vertical streaks; dorsal and anal fins dark violet, having white edges; caudal and ventrals yellowish.

Hab. Ceylon and Zanzibar.

727. (3.) *Chaetodon falcula*.

Chaetodon falcula, Bloch, *Ich.* ix, p. 102, t. 426, fig. 2; Day, *Fish. India*, p. 104, pl. xxvi, fig. 5 (from a drawing).

D. 12-13/(24) 26-27. A. 3/22-23. L. r. 28. L. tr. 6/12.

Length of head $3\frac{1}{2}$ to 4, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, nearly 2 from end of snout, and 1 apart. Snout produced, pointed. Preopercle serrated. *Fins*—last dorsal spine longest; soft portion of fin rounded; caudal almost square; ventral reaching as far as anal; pectoral equal to the length of the head behind the angle of the mouth; second anal spine strongest and rather the longest, equal to last dorsal. *Colour*—body and head of a rather reddish lilac-purple, becoming primrose posteriorly and on the fins. A dark white-edged ocular band, narrower than the orbit, commences before the dorsal fin, and is continued through the eye on to the interopercle. A black band, widest above, from the first 4 or 5 dorsal spines to below the lateral line; a second, angularly pointed in front, from last three spines to lateral line; a third over free portion of tail; these bands, which are triangular in the young, descend down on the body in adults. Twelve to fourteen vertical narrow black bands on each side. Soft dorsal with a narrow black margin; caudal with a black and white posterior edge; anal with a white outer margin, a black intramarginal band, and two more bands parallel to it.

Hab. Seas of India to the Malay Archipelago, and beyond. This species attains to at least 8 inches in length.

728. (4.) *Chaetodon vagabundus*. (Fig. 1.)

Chaetodon vagabundus, Linn. *Syst. Nat.* i, p. 465; Day, *Fish. India*, pp. 105, pl. xxvii, fig. 1, *Suppl.* p. 786 (see synon.).

Chaetodon pictus, Forsk. *Descr. Anim.* p. 65, no. 92; Day, *t. c.* p. 105, pl. xxvi, fig. 6 (see synon.).

Pah-noo-dah, Andam.; *Chénd*, Maráthi.

D. 12-13/23-25. A. 3/20-22. C. 17. L. r. 43/23. L. tr. 5-6/15.

Length of head about $3\frac{1}{2}$ to 4, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and also apart. Snout rather produced and pointed. Preopercle finely serrated, most strongly so at its angle. *Fins*—dorsal spines moderate; soft portions of dorsal and anal obtusely angular; second anal spine equals the length of the third; caudal rounded. *Colour*—a black white-edged ocular band descends to the angle of the interopercle. Numerous parallel dark bands pass obliquely downwards and forwards from the back, from the lowest of these other similar bands run obliquely backwards. A black band commences on the dorsal spines, and, growing broader, curves downwards over the soft dorsal, root of tail, and part of anal.



Dorsal and anal fins margined with black. Two black vertical bands on the caudal, the anterior of which is lunate.

The variety *C. pictus* has a black band on the snout, the dark ocular band descending to the chest, all the posterior third of the body with the soft dorsal and anal black; tail light with two black bands, the anterior lunate; fine dark oblique lines from the dorsal

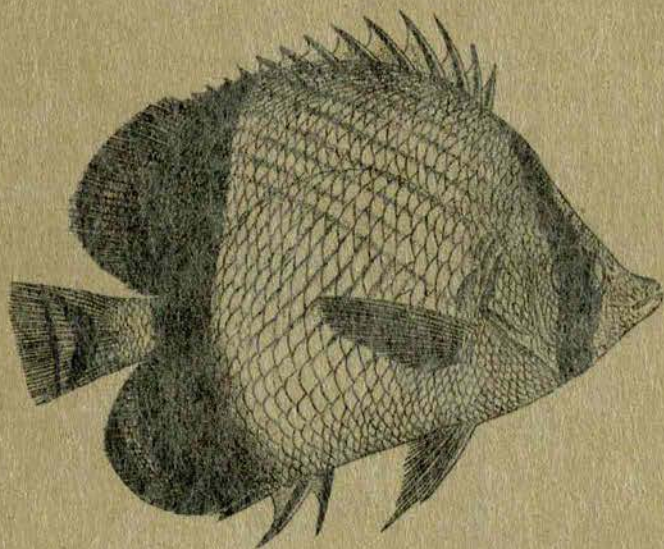


Fig. 1.—*Chaetodon vagabundus* var. *pictus*.

fin directed forwards and downwards and others on the lower and hinder half of each side directed backwards and downwards; the two not crossing.

ab. Red Sea, those of India to the Malay Archipelago and Polynesia; attaining at least 10 inches in length.

729. (5.) *Chaetodon auriga*.

Chaetodon auriga, *Forsk. Descr. Anim.* p. 60, no. 81; *Day, Fish. India*, p. 106, pl. xxvii, fig. 3 (var. *setifer*) (see synon.).

D. 11–13/23–24. P. 15. A. 3/20–21. L. r. 44–39. L. tr. $3\frac{1}{2}$ – $4\frac{1}{2}$ /13.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $1\frac{3}{4}$ to 2 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, nearly $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout pointed. Preopercle very finely serrated. *Fins*—5th dorsal ray produced into a short filament, soft portions of dorsal and anal angular; third anal spine the longest; caudal slightly emarginate. *Colour*—a brown band, with a white anterior edge, passes through the orbit and over the interopercle. Body with darkish lines, passing upwards and backwards in the anterior third of the body, and downwards and backwards posteriorly. A darkish band from base of soft dorsal across free portion of tail to lower half of anal. A dark band through middle of anal. Dorsal, anal, and caudal edged with white. In the variety *C. setifer* the ocular band, which has white



edges, is wider below the orbit. A dark ocellus on the centre of the middle dorsal rays. Anal with a fine black intramarginal band having a white outer edge, upper and hind margins of the anal edged with black; on the caudal fin two fine vertical lines enclose a semilunar space.

Hab. From the Red Sea, through the seas of India to Polynesia.

730. (6.) *Chaetodon chrysurus*.

Chaetodon chrysurus, Desjardins, P. Z. S. 1833, p. 117.

Chaetodon Mertensii, Day, *Fish. India*, pp. 105, 747, pl. xxvii, fig. 2 (scales too small) (see synonym.).

D. 13/22-23. P. 15. A. 3/16. C. 17. L. r. 34/27. L. tr. 5/14.

Length of head $4\frac{1}{3}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in the length of the head, $1\frac{1}{4}$ diam. from end of snout and also apart. Preopercle entire, its angle very oblique. *Fins*—dorsal spines increasing in length to the fifth, the soft portion of the fin as high as the spinous and rounded posteriorly; caudal cut nearly square; anal spines long, the third rather the longest, exceeding the highest of the dorsal by nearly one fourth. *Colour*—head and anterior two thirds of the body lavender, posterior third yellow; interorbital space yellow; a narrow dark white-edged band commences a little in front of the dorsal fin, then ceases, but reappears a little above the eye, through which it descends and passes down the preopercle to a little in front of the angle. Anterior two thirds of the body with narrow black vertical bands, which at the middle of the body form an angle directed forwards. A narrow dark intramarginal line with a white outer edge on both dorsal and anal fins; a narrow dark vertical band in the last third of the caudal, followed by a rather wider yellow one, externally the fin is grey.

Hab. Red Sea, Mauritius, the Malay Archipelago, and Pacific. I have this species from Ceylon.

731. (7.) *Chaetodon kleinii*.

Chaetodon kleinii, Bloch, *Ich.* t. 218, fig. 2; Day, *Fish. India*, p. 106.

D. 13/22-25. P. 15. A. 3/18-20. C. 17. L. 1. 33. L. tr. 5/11.

Length of head $4\frac{1}{3}$, height of body nearly 2 in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Preopercle entire. *Fins*—dorsal spines increasing in length to fifth, soft portion of fin rounded and rather higher than the spinous; caudal rounded; second and third anal spines of about equal strength, their length about equal to the fifth dorsal. *Colour*—uniform brownish, becoming darkest posteriorly; a rather broad ocular band from in front of the dorsal fin, through the eye over the pre- and interopercles to the base of the ventral fin; a black band over the snout. Ventrals black; edges of the soft dorsal, anal, and caudal black.

Hab. Seas of India to the Malay Archipelago.

732. (8.) *Chaetodon miliaris*.

Chaetodon miliaris, Quoy & Gaim. *Voy. Uranie et Phys.* p. 380, pl. lxii, fig. 6.

Chaetodon guttatissimus, Bennett, *P. Z. S.* 1832, p. 183; Day, *Fish. India*, pp. 106, 747, pl. xxvii, fig. 4, *Suppl.* p. 786 (see synonym.).

D. 13/22. P. 15. A. 3/17-18. C. 19. L. 1. 38. L. r. 42/35.

Length of head $4\frac{1}{4}$, height of body 2 in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Preopercle serrated. *Fins*—soft portions of dorsal and anal rounded posteriorly. *Colour*—a brown white-edged ocular band one third the width of the eye passes from nape to lower edge of interopercle. Body yellow, each scale having a brown spot; dorsal and anal fins with an outer narrow black edge and a broader white outer band, followed externally by a yellow margin; the rest of the fins covered with fine dark brown spots; caudal yellow, with a black vertical band.

Hab. Ceylon, Zanzibar, and Red Sea.

733. (9.) *Chaetodon trifasciatus*.

Chaetodon trifasciatus, Mungo Park, *Trans. Linn. Soc.* iii, p. 34.

Chaetodon vittatus, Bl. *Schn. Syst. Ich.* p. 227; Day, *Fish. India*, pp. 107, 747, pl. xxvii, fig. 5, *Suppl.* p. 786 (see synonym.).

D. 13/21-22. A. 3/(18) 20. C. 18. L. r. 45/38. L. tr. 5/13.

Length of head 4 to $4\frac{1}{4}$, height of body $1\frac{1}{2}$ to 2 in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Snout obtuse. Preopercle finely serrated. *Fins*—the soft portion of the dorsal and anal and the caudal rounded. *Colour*—a dark line passes over the snout, separated by a thin white band from the ocular one, which is half as wide as the orbit, and passes to the chest. Another dark parallel line behind, with an intermediate fine light one. Sides with about fifteen fine nearly horizontal dark lines. A dark band along the base of the soft dorsal fin, becoming wider over the free portion of the tail; another band along the centre of the soft dorsal. A light yellow band along the base of the anal with a dark one above it, and a white outer edge. Fins margined with dark and edged with orange. A dark vertical band on the posterior third of the caudal. Ventrals white.

Hab. From the Red Sea to Polynesia.

734. (10.) *Chaetodon unimaculatus*.

Chaetodon unimaculatus, Bloch, *Ich.* p. 1181, t. 201, fig. 1; Day, *Fish. India*, p. 107 (see synonym.).

D. 13/22-23. A. 3/19-20. L. 1. 46. L. tr. 8/19. Vert. 10/14.

Length of head 4, height of body about 2 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, rather above 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Lower jaw slightly the longer.



Preopercle entire. *Fins*—the dorsal spines strong, increasing in length to about the seventh from which they slightly decrease, the soft portion of the fin, that of the anal, and the caudal rounded. *Colour*—yellowish, with a narrow or moderately wide brownish-black ocular band from in front of the dorsal fin through the middle of the eye to the angle of the preopercle and on to the chest; a black blotch on the side above the lateral line below the last four spines and first two rays; posterior edge of soft dorsal with a narrow black band which is continued over the free portion of the tail on to the hind edge of the anal rays.

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

735. (11.) *Chætodon collaris*.

Chætodon collaris, Bloch, *Ich.* t. 216, fig. 1; Day, *Fish. India*, p. 107, pl. xxvii, fig. 6 (see synonym.).

D. 12/26–27. A. 3/20–22. L. r. 43–46/34–36. L. tr. 7/15.

Length of head $3\frac{1}{2}$, height of body $1\frac{2}{3}$ (in young) to $1\frac{1}{2}$ (in adult) in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and $\frac{5}{7}$ apart. A few fine serrations at angle of preopercle. *Fins*—fifth and sixth dorsal spines the longest; second anal spine the strongest and longer than the third; caudal cut nearly square. *Colour*—brownish olive, middle of each scale light citron. A bluish-white band from before dorsal fin over the opercles to the throat, where it expands; a second across the forehead, uniting the eyes; a third across the snout and over the cheek to the chin; opposite the orbit this gives off a hinder branch to angle of mouth and throat. Dorsal and anal tinged with reddish violet, upper fourth of soft dorsal margined with six coloured bands in the following order from without—white, black, scarlet, black, pearl-white, and black; anal with three bands—white, black, and scarlet. Posterior half of caudal pearly white, divided by a black band from a scarlet base. Ventrals black.

Hab. Seas of India to the Malay Archipelago.

736. (12.) *Chætodon fasciatus*.

Chætodon fasciatus, Forsk. *Descr. Anim.* p. 59, no. 80.

Chætodon lunula, Cuv. & Val. H. N. Poiss. vii, p. 59, pl. 173; Day, *Fish. India*, pp. 108, *Suppl.* p. 786 (see synonym.).

D. 12/23–26. P. 19. A. 3/18–20. C. 17. L. r. 54/40. L. tr. 7/14.

Length of head $2\frac{3}{4}$ to $3\frac{1}{2}$, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Preopercle serrated. *Fins*—soft dorsal and anal rounded, caudal slightly rounded. *Lateral line*—ceases below last third of soft dorsal. *Colour*—ocular band deep chestnut with white edges, rather wider than orbit; a second brown band from first 5 dorsal spines unites with occipital one; a third band from 5th and 6th dorsal spines gradually widens and goes as low as base of



pectoral fin; a band along base of soft dorsal passes over free portion of tail; caudal with a dark band in its posterior third; dorsal and anal with a dark edge and white margin. In the young the vertical bands are badly developed, and there is a large black white-edged ocellus in the centre of the soft dorsal.

Hab. Seas of India, Andaman Islands to the Malay Archipelago.

737. (13.) *Chaetodon melanotus*.

Chaetodon melanotus, *Bl. Schn. Syst. Ich.* p. 224.

Chaetodon melanotus, *Day, Fish. India*, p. 108, pl. xxviii, fig. 1

(see synonym.).

D. 12/19. P. 15. A. 3/18. C. 17. L. 1. 37-40. L. tr. 6/16.

Length of head 4, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, rather more apart. Preopercle very finely serrated. *Fins*—dorsal spines increasing in length to the 5th, behind which they again diminish in height; soft portion of dorsal and anal and the caudal rounded. *Colour*—yellowish, a narrow black ocular band from in front of dorsal through middle of eye to chest. Upper fourth of body stained black, and black lines along each row of scales; a black band over free portion of tail but interrupted in middle. Fins yellow, a narrow black intermarginal band on soft portions of dorsal and anal, outer edge white; a yellow band across the middle of the caudal, followed behind by a narrow black stripe; last third of fin gray. A short black band at base of first four anal rays.

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

738. (14.) *Chaetodon octofasciatus*.

Chaetodon octofasciatus, *Bloch, Ich.* t. 215, fig. 1; *Day, Fish. India*, p. 108 (see synonym.).

Munja-cooli-min, Tamil.

D. 11/19-22. P. 19. A. 3/17. C. 18. L. 1. 50. L. tr. 12/24.

Length of head 4, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Edge of preopercle a little rough, but not serrated. *Fins*—dorsal spines increasing in length to the fourth, soft portions of dorsal and of anal rounded; second anal spine the strongest, but not quite so long as third; caudal cut almost square. *Colour*—buff, vertically banded, with a central band along the snout to between the eyes; the ocular band commences in front of the dorsal fin and passes through the eye (which is about twice its width) to the cheeks and chest; the 2nd goes from 3rd and 4th dorsal spines to behind base of ventral, the 3rd from 7th dorsal spine to before commencement of anal, the 4th from last two spines to first anal rays, the 5th from first few dorsal rays to anterior third of soft anal, the 6th down last third of soft dorsal, across free portion of tail.



increasing in width to near posterior extremity of soft anal, the last over the base of the caudal; soft dorsal and anal with a dark outer edge and light margin.

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

739. (15.) *Chaetodon ocellatus*.

Platax ocellatus, Cuv. & Val. H. N. Poiss. vii, p. 229.

Chaetodon oligacanthus, Bleeker, *Batav. Genootsch. Verhand.* xxiii, *Chaetod.* p. 16; *Day, Fish. India*, pp. 109, *Suppl.* p. 786 (see synon.).

D. 6-7/29-30. P. 15. V. 1/5. A. 3/19-22. C. 17. L. 1. 46-48.

Length of head $3\frac{3}{4}$ to 4, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, 1 diam. from end of snout and also apart. Both margins of preopercle serrated, the inferior most coarsely so. *Fins*—anterior portions of soft dorsal and anal the highest. *Lateral line*—ceases opposite posterior fourth of dorsal. *Colour*—yellowish white, with five vertical brown bands, the anterior four of which have black edges; the ocular is brown and narrower than the orbit; three more similar bands pass from the back to the abdomen; at the upper part of the last is a dark ocellus at the base of the 8th to 12th dorsal rays inclusive; the fifth band is over the free portion of the tail. The posterior half of the ventrals is sometimes black.

Hab. Seas of India, the Malay Archipelago to the Philippine Islands.

2. Genus **CHELMON**, Cuv.

Syn. *Prognathodus*.

Branchiostegals six or seven; pseudobranchiæ. Body elevated and compressed. Snout produced as a long round tube by the horizontal elongation of the premaxillaries and mandibles, which are laterally connected by membrane; the gape of the mouth small. Preopercle without any spine; it and the preorbital sometimes serrated. Teeth on the jaws; none on the palate. One dorsal, with from 9 to 13 spines, none elongate; anal with 3. Scales of moderate or small size.

Geographical Distribution. Indian and Pacific Oceans.

Synopsis of Indian Species.

A black triangular patch from the dorsal to the

snout 1. *C. longirostris*, p. 10.

Five orange white-edged cross bands 2. *C. rostratus*, p. 11.

740. (1.) *Chelmon longirostris*.

Chaetodon longirostris, Brouss. *Ich.* pl. 7.

Chelmo longirostris, *Day, Fish. India*, p. 109 (see synon.).



D. 11-12/22-25. P. 15. A. 3/18-19. C. 18. L. 1. 73-75. L. tr. 11/30.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $7\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. in postorbital portion. Angle and lower edge of preopercle and lower edge of preorbital serrated. *Fins*—dorsal spines strong, the 4th somewhat the longest, exceeding the rays; soft portion of fin rounded; third anal spine longest. *Colour*—yellow, with a black triangular patch extending from base of first dorsal spine to snout, and its lower edge going through the eye to the opercle. Posterior edge of dorsal with a black margin; a small round black spot at posterior angle of anal; caudal grey, with a rather wide dark band over its base.

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

741. (2.) *Chelmon rostratus*. (Fig. 2.)

Chaetodon rostratus, Bloch, *Aust. Fisch.* iii. p. 87.

Chelmo rostratus, Day, *Fish. India*, p. 110, pl. xxviii, fig. 2 (see synon.).

D. 9/29-31. A. 3/20-21. L. 1. 47-50. L. r. 54/47. L. tr. 8/20. (Vert. 10/14.)

Length of head nearly or quite 3, height of body about 2 in the total length. *Eyes*—diameter 5 in length of head, $2\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. Preopercle finely serrated along both limbs; lower edge of preorbital and supraorbital margin likewise

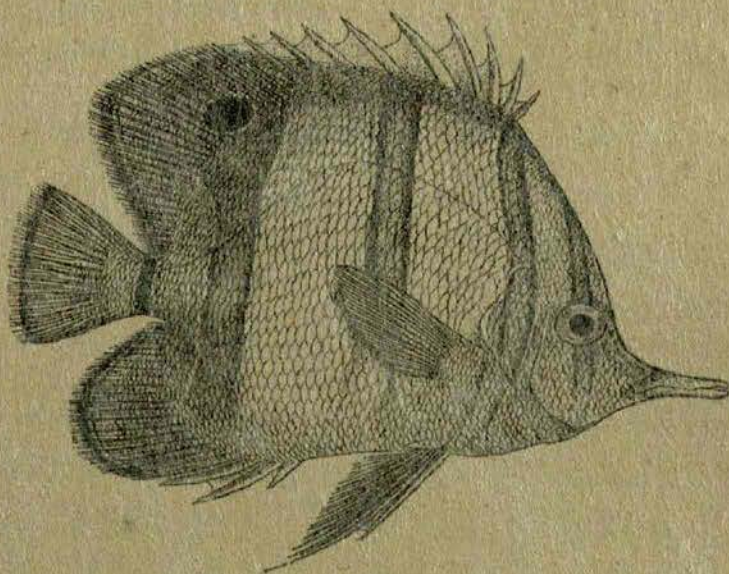


Fig. 2.—*Chelmon rostratus*.

serrated in the young. *Fins*—soft portions of dorsal and anal obtusely angular; caudal rounded. *Colour*—head and body with five orange cross bands edged with brown and with white outer margins, the hindmost round the root of the tail; a round black, white-edged spot in the middle of the soft dorsal and within the fourth cross band; soft dorsal, caudal, and anal with blue and white edges.



The earliest account of the habits of this species is in the 'Philosophical Transactions,' vol. liv, p. 89, and is contained in a letter from J. A. Schlosser. In it he tells us how Governor Hommell found that this fish frequented the shores and sides of the sea and rivers in search of food, and when it saw a fly sitting on the plants that grow in shallow water it swam on to within a distance of 4, 5, or 6 feet, and with surprising dexterity ejected out of its tubular mouth a single drop of water, which never failed to strike the fly into the sea, where it was seized by the fish. He kept some of these fishes in tubs of water, and saw them knock flies into the water even under these circumstances. He sent an example to the Amsterdam Museum, and Bleeker ascertained that this species was referred to J. Mitchell, Esq., in the 'Edinburgh New Philosophical Journal,' April to September, 1828, p. 162, also recounts how he similarly witnessed this fish thus exercising itself when kept in a pond near Batavia by a Japanese chief. See also a paper on the "Asiatic Blowpipe Fishes," Zoologist, ser. 3, vol. v. 1881, pp. 91-96.

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

Syn. *Taurichthys*, Cuv. & Val.; *Diphreutes*, Cantor.

Branchiostegals five; pseudobranchiæ. Body elevated and strongly compressed; mouth short, or of moderate length. Teeth villiform, none on the palate. A single dorsal fin, with from 11 to 13 spines, the 4th of which is elongated and filiform; anal with 3. Air-bladder present. Pyloric appendages few.

Geographical Distribution. Seas of India to Polynesia, &c.

742. (1.) **Heniochus macrolepidotus**. (Fig. 3.)

Chaetodon macrolepidotus, Linn. *Syst. Nat.* p. 464.

Heniochus macrolepidotus, Day, *Fish. India*, p. 110, pl. xxviii, fig. 3 (see synon.).

Purroamee, Mal.; *Chuddukun*, Tam.; *Pah-no-dah*, Andam.

D.11-12/24-25. A.3/17-18. L.1.52. L.tr.9/22. Cæc.pyl.6. Vert.10/14.

Length of head 4, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter from 3 to $3\frac{1}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. *Fins*—dorsal spines rather strong, the fourth having a filamentous prolongation reaching to the caudal fin or even beyond, the fifth is also somewhat elongated; 2nd and 3rd anal spines of about equal length and strength; caudal cut nearly square. *Colour*—pearly white, with a dark purplish band over snout, another over eyes, a broad one from 3 first dorsal spines across side, including ventral fin and extending to the anal; the hinder band commences on the dorsal, extending from 5th to 7th spine, curves downwards, and ends in the posterior third of the



anal fin. Pectoral, soft portions of dorsal, anal, and caudal fins bright yellow.

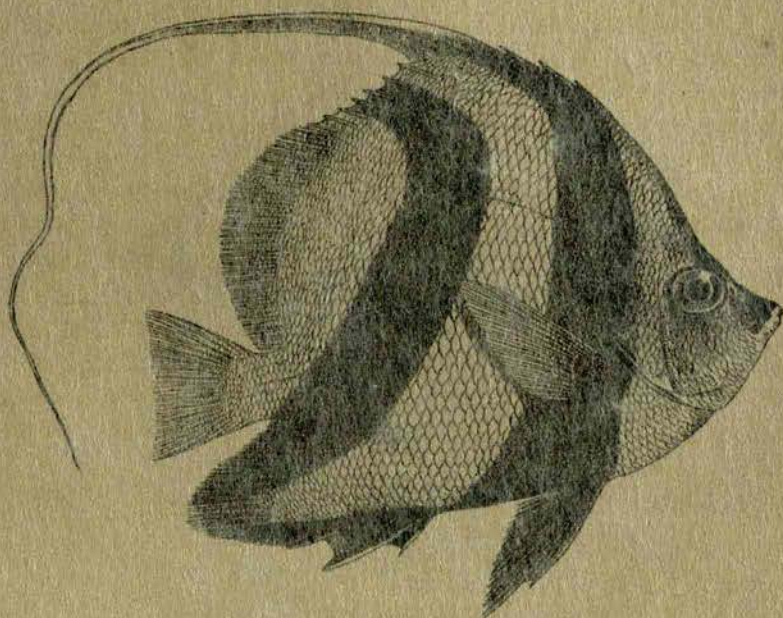


Fig. 3.—*Heniochus macrolepidotus*.

Hab. Throughout the Indian Ocean; said to attain 18 inches in length.

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

Syn. *Gnathocentrum*, Guich.; *Gonopterus* (Gronov.), Gray.

Branchiostegals four; pseudobranchiæ. Body elevated and compressed. Teeth in the jaws; none on the palate. One dorsal fin with spines, the third of which is very elongate; anal with three. Scales small. Air-bladder present. Pyloric appendages in moderate numbers.

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

743. (1.) *Zanclus cornutus*. (Fig. 4.)

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

Zanclus cornutus, Day, *Fish. India*, pp. 111, pl. xxviii, fig. 4, *Suppl.*®
p. 786 (see *synon.*)

D. 7/40-41. P. 19. A. 3/32-34. C. 16. Cæc. pyl. 14. Vert. 9/13.

Length of head rather more than 3, height of body $1\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. apart, and twice the length of postorbital portion of head. *Fins*—dorsal spines very elongated and filiform, the last rays very short; anal much the highest anteriorly; caudal emarginate. *Colour*—yellowish



white, with 2 broad, dark, vertical brown bands, the anterior from between the first dorsal spines and the forehead, descends over the

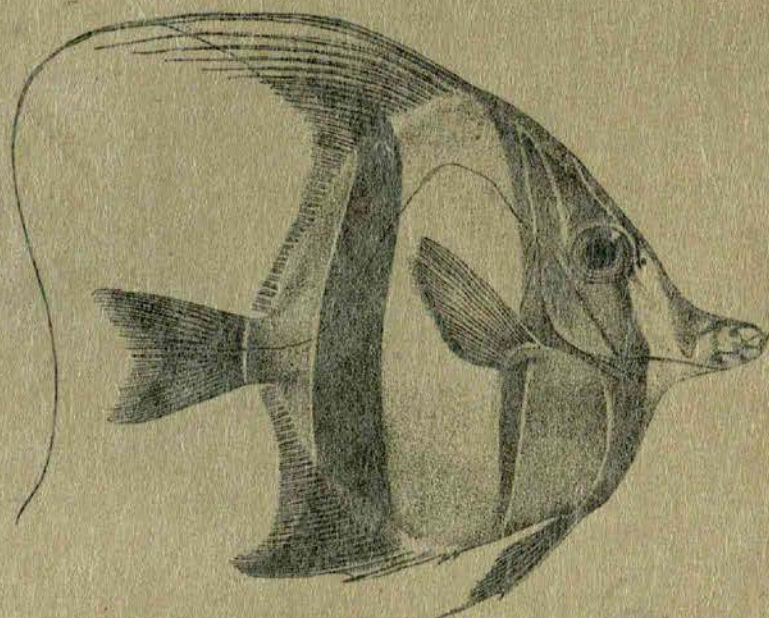


Fig. 4.—*Zaclus cornutus*.

orbits, opercle, and cheek to the ventral; the second band commencing between the base of the fourth spine and the first ray, passes downwards to the highest portion of the anal; this band has a white hinder edge; a third band crosses the caudal, and has a concave posterior margin and a white front edge. There is also a band over the snout. Pectoral yellow.

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

5. Genus **HOLACANTHUS**, Lacép.

Syn. *Genicanthus*, Swains.

Branchiostegals six; pseudobranchiæ. Body compressed, and as a rule much elevated. Preopercle serrated, with one or more strong spines at its angle. No palatine teeth. A single dorsal fin with from 12 to 15 spines; anal with 3 or sometimes 4. Scales of moderate or small size. Air-bladder with two horns posteriorly. Pyloric appendages many.

• *Geographical Distribution.* Tropical Seas.

Synopsis of Indian Species.

A. Scales small. L. l. much more than 50.

Bluish, with about nineteen narrow oblique canary-coloured bands on the body

1. *H. imperator*, p. 15.

Blue, with light vertical curved bands on the body

2. *H. nicobariensis*, p. 16.

Six or seven blue bands radiating from the head

3. *H. annularis*, p. 16.



B. Scales of moderate size. L. 1. about 50.

Eight to twelve vertical blue brown-edged

bands 4. *H. diacanthus*, p. 17.

Greyish on sides; a yellow shoulder-spot . . 5. *H. xanthurus*, p. 17.

Blue, with yellow black-edged spots on the
cheeks 6. *H. xanthometopon*,
[p. 18.]

744. (1.) *Holacanthus imperator*. (Fig. 5.)

Chaetodon imperator, Bloch, *Ich.* iii, p. 51, t. 194.

Holacanthus imperator, Day, *Fish. India*, p. 112, pl. xxviii, fig. 5 (see
synon.).

Kulloo-koli-meen, Tamil; *Nga-tyk-pyá*, Arracan; *Dood-ka-mal*, Chittagong.

D. 14/21-22. P. 21. V. 1/5. A. 3/20-21. C. 17.

Length of head 4 to $4\frac{1}{3}$, height of body $1\frac{1}{4}$ to 2 in the total
length. *Eyes*—diameter 3 to 4 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam.
from end of snout, and 1 apart. Angle of preopercle with

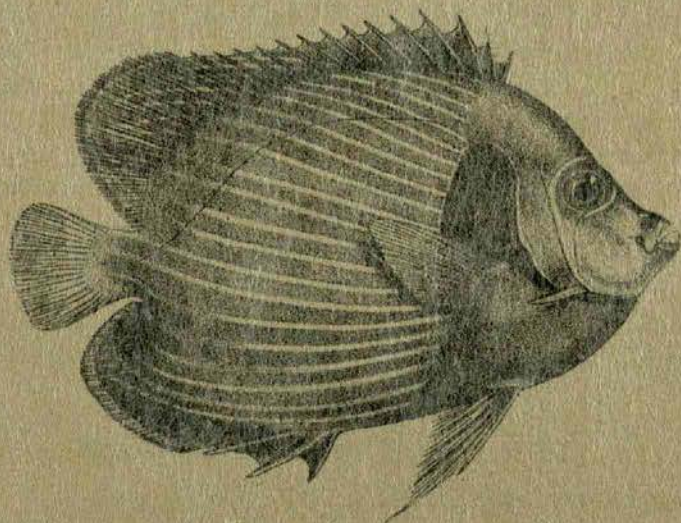


Fig. 5.—*Holacanthus imperator*.

a strong, smooth, curved spine, $1\frac{1}{4}$ diam. of orbit in length. *Fins*—
dorsal spines gradually increasing in length, soft portions of dorsal
and anal rounded; anal spines strong, third the longest and equal
to last dorsal; caudal rounded. *Scales*—small, covering the vertical
fins. *Colour*—body blue, with a greenish tinge along the back;
about nineteen canary-coloured lines pass upwards to the dorsal, or
horizontally to the caudal and anal. A large black descending
band with a blue anterior edge on the shoulder; chest chestnut.
A light blue stripe across the snout, round the cheeks, and to the
preopercular spine, which is nearly black. A brown band edged
above with blue crosses the eye and passes on to the preopercle.
Opercle yellow, edged with blue; branchiostegals black. A narrow



black edge to the caudal; ventral dark, with orange-coloured rays; pectoral blackish.

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

745. (2.) *Holacanthus nicobariensis*.

Chaetodon nicobarcensis, *Bl. Schn. Syst. Ich.* p. 219, t. 50.

Holacanthus nicobariensis, *Day, Fish. India*, p. 112, pl. xxviii, fig. 6 (var. *semicirculatus*) (see synon.).

D. 13-14/21. P. 19. V. 1/5. A. 3/20-21. C. 18. L. r. 85-90/75-80.

Length of head 4, height of body 2 to $2\frac{1}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ to 1 diam. apart. Preopercular spine smooth, and equal in length to $\frac{3}{4}$ or 1 diam. of orbit. *Fins*—dorsal spines shorter than the rays, the soft dorsal angularly rounded in adult; anal and caudal rounded. *Scales*—minute, about thirteen rows between lateral line and base of sixth dorsal spine. *Colour*—this fish shows different distributions of the same colours. In the young (*H. striatus*) the side is deep blue, with slightly curved vertical bands, alternately white and bluish white, the white being the broader. Caudal white, with or without a narrow black outer margin. In the adult (*H. semicirculatus*) the vertical bands have a more curved direction, the convexity being forwards. In typical *H. nicobariensis* this is still more apparent, a white spot or short transverse band being the centre around which the body-bands are curved. In both the last varieties the tail-fin is coloured. Several excellent ichthyologists consider these to be three distinct species, and not colour-varieties of one form.

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

746. (3.) *Holacanthus annularis*.

Chaetodon annularis, *Bl. Ich.* t. 215, fig. 2.

Holacanthus annularis, *Day, Fish. India*, p. 112, pl. xxix, fig. 1 (see synon.).

Jatipyna, Tel.; *Lolla terate*, Mal.; *Nya-lyk-pya*, Arrak.; *Dood-kamal*, Chittagong.

D. 13/20-21. P. 20. V. 1/5. A. 3/19-21. C. 17.

Length of head $4\frac{1}{2}$, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Preopercular spine smooth and as long as diameter of orbit. *Fins*—dorsal spines increase in length to the last; soft portion of fin angular, in adults often produced, that of anal rounded; third anal spine the longest. *Scales*—small. *Colour*—sienna, with a blue ring on the shoulder. Two narrow horizontal blue bands cross the head to the opercles, the upper through the eyes, the lower across the snout, and meet a third vertical band; six



or seven curved blue bands on the side radiate from the head and converge upon the soft dorsal fin; pectoral yellow, with a blue band at its base. Dorsal and anal fins dark, the first with a blue upper edge; anal with three blue lines on it and a light blue margin; caudal yellow, with a narrow orange tip.

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

747. (4.) *Holacanthus diacanthus*.

Chaetodon diacanthus (Boddaert), *Bl. Schn. Syst. Ich.* p. 220.

Holacanthus diacanthus, Day, *Fish. India*, p. 113 (see synon.).

D. 14/19. P. 19. V. 1/5. A. 3/19. C. 17. L. r. 52. L. tr. 7/25.

Length of head 5, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. Preopercle strongly serrated, its spine strong, equal in length to about 2 diameters of the orbit. *Fins*—soft dorsal and anal rounded; third anal spine longest and strongest; caudal rounded. *Colour*—yellowish, with from 8 to 12 vertical blue brown-edged bands, those on the body being continued on to the vertical fins. A short band along the snout, two from the summit of the head to the eye and to a little below it; one traverses the opercle, and about eight exist on the body; caudal yellow. Anal with bluish streaks parallel to its base.

Hab. Seas of India to the Malay Archipelago.

748. (5.) *Holacanthus xanthurus*.

Holacanthus xanthurus, Bennett, *P. Z. S.* 1832, p. 183; Day, *Fish India*, p. 113, pl. xxix, fig. 2 (see synon.).

Kul-kasu, Tamil.

D. 14/19. A. 3/18–19. C. 17. L. 1. 50. L. r. 50–55/45. L. tr. 7/22.

Length of head 4 to $4\frac{1}{4}$, height of body 2 in the total length excluding caudal filament. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. Dorsal and abdominal profiles about equally convex. Preopercle having a strong smooth spine, which is equal to or rather above 1 diameter of the orbit in length. *Fins*—fourth dorsal spine slightly the longest, last equal to third; soft portion of the fin slightly rounded; third anal spine longest, strongest, and one third longer than the longest dorsal, the soft portions of the two fins similar; caudal rather rounded, with its upper ray produced into a filament. *Scales*—strongly ctenoid and longitudinally fluted, much smaller above than below the lateral line. *Colour*—body greyish brown, darker along the back, and becoming black over the tail as well as on the vertical fins, head, and chest; a lightish opercular band and a small but brilliant yellow shoulder-spot; dorsal and anal fins



edged with yellowish white; caudal canary-colour. After death each scale seems to have a light semilunar band.

Hab. Ceylon and Madras; growing to 6 inches in length.

749. (6.) *Holacanthus xanthometopon*.

Holacanthus xanthometopon, Bleeker, *Batavia Nat. Tijdsch.* iv, p. 258, and *Atl. Ich.* ix, p. 64, *Chæt.* t. ix, fig. 2; Day, *Fish. India*, p. 114 (see synon.).

D. 14/17. P. 17. V. 1/5. A. 3/17. C. 17. L. r. 47. L. tr. 7/25.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. A strong spine at angle of preopercle, not quite half so long as the head. *Fins*—soft dorsal and anal fins angular; caudal rounded. *Colour*—blue, cheeks and opercles with numerous golden spots externally edged with black; some fine black lines on the lips and chin; a broad yellow interorbital band; body violet, each scale with a brilliant blue spot; a yellow shoulder-spot. Dorsal, caudal, and pectoral yellow, with a black spot at the base of the last seven dorsal rays, caudal with a black edge; ventral and anal white with a blue edge.

Hab. Andamans and Malay Archipelago. There is a specimen, $7\frac{1}{2}$ inches in length, in the Calcutta Museum.

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

Syn. *Cucodorus*, Cantor.

Branchiostegals six; pseudobranchia. Body much compressed and elevated, snout of moderate length. Preopercle spineless. Palate edentulous. Two dorsals, united at their bases, the first having ten or eleven spines, and a recumbent one in front directed forwards; the soft dorsal covered with scales; anal with four spines. Scales very small. Air-bladder simple. Pyloric appendages rather numerous.

Geographical Distribution. Indian Ocean.

750. (1.) *Scatophagus argus*. (Fig. 6.)

Chaetodon argus, Bloch, *Aust. Fisch.* iii, p. 86.

Scatophagus argus, Day, *Fish. India*, p. 114, pl. xxix, fig. 3 (see synon.).

Vádá, Maráthi; *Qu-ee*, Sind.; *Chitsillo* and *Eesputti*, Tel.; *Sipili*, Tam.; *Nutchar-char*, Mal.; *Nga-pa-thoong*, Arrac.; *Beeshatara*, Chittag.; *Po-ra-dah*, Andam.; *Dewi koralejah*, Cingalese.

D. 10 | 1/16-17. P. 20. A. 4/14-16. C. 16. Cæc. pyl. 18 (20).

Length of head 4, height of body 2 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. *Fins*—each dorsal spine thicker on alternate sides,



interspinous membrane deeply notched, fourth spine highest; anterior rays much the longest, but not quite equalling length of 4th spine; anal spines all about the same length, each alternate one being the stronger; caudal fan-shaped, its central rays rather the longest. Scales—minute; about 30 rows between 6th dorsal spine

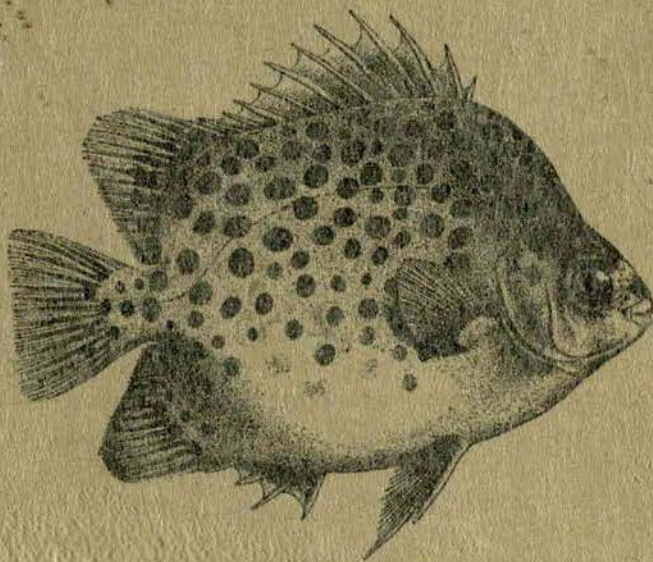


Fig. 6.—*Scatophagus argus*.

and lateral line. Colour—purplish, becoming white on abdomen; large round blackish or greenish spots on the body, most numerous along the back, and varying in size and tint. First dorsal brownish blue, having a few minute spots; second dorsal yellowish, with slight brown markings between the rays.

In the very young a bony ridge, ending in a spine, passes from the eye above the opercle on to the shoulder.

Hab. Indian Ocean, ranging to China and Australia, attaining a foot in length. This fish enters backwaters and rivers, but is a foul feeder, and, so far as I have observed, is not in request as food. Hamilton Buchanan remarks of it that "when newly caught it is a fish of great beauty, easy digestion, and excellent flavour; but after death it soon becomes soft and strong tasted."

7. Genus **EPHIPPUS**, Cuv.

Syn. *Selene*, Lacép.; *Ilarches*, Cantor.

Branchiostegals six; pseudobranchiæ. Body much compressed and elevated. Snout short, the upper profile parabolic. Preopercle without a spine. No teeth on the palate. Dorsal with eight or nine spines, several of which are flexible and elongate, all are receivable into a groove at their base; interspinous membrane deeply cleft, and a deep notch between the spinous and soft portions of the fin; three anal spines; pectoral short. Scales of



moderate or small size. Air-bladder bifurcated anteriorly, and with two long horns posteriorly. Pyloric appendages free.

Geographical Distribution. Indian and Atlantic Oceans.

751. (1.) *Ephippus orbis*. (Fig. 7.)

Chaetodon orbis, Bloch, *Ich.* p. 1187, t. 202, fig. 2.

Ephippus orbis, Day, *Fish. India*, p. 115, pl. xxix, fig. 4 (see synon.).

Kharvad, Marathi; *Nulla torriti*, Tam.; *Kol-lid-dah*, Andam.

D. 8-9/19-20. P. 19. A. 3/15. C. 19. L. 1. 42. L. tr. 7/15. Cæc. pyl. 2-4.

Length of head 4 to $4\frac{1}{2}$, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{3}$ in length of head, nearly 1 diam. from end of snout and also apart. *Fins*—dorsal spines moderately strong at the base, interspinous membrane deeply emarginate; the third, fourth, and fifth spines are elongate and filiform at their extremities, especially the third. Soft dorsal rounded. First ventral ray elongate. Second anal spine the strongest, equal to the seventh

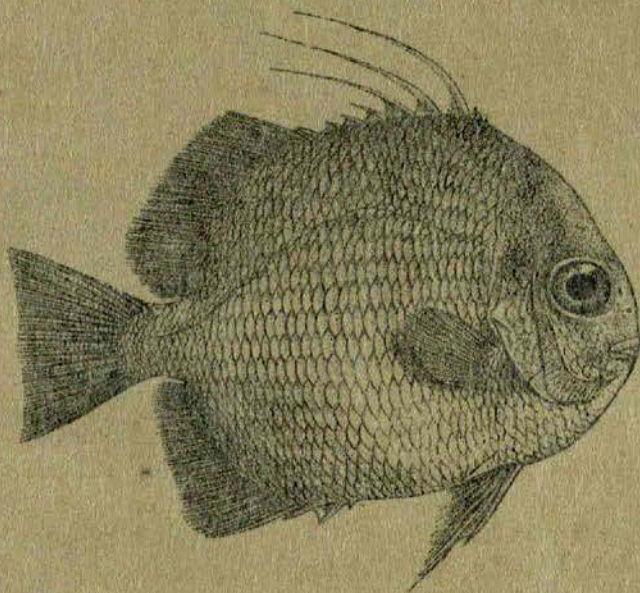


Fig. 7.—*Ephippus orbis*.

dorsal spine in length; anterior rays the longest. Caudal slightly produced in the centre, and somewhat emarginate above and below. *Colour*—back and head greyish green, sides and abdomen silvery shot with pink; fin-membranes diaphanous, finely dotted with black, more especially in their marginal halves; rays bluish white. The young have a dark-grey orbital band, another over the nape, and two over the body; the fins are edged with grey.

Hab. Seas of India to the Malay Archipelago; attaining at least 6 inches in length.

8. Genus **DREPANE**, Cuv. & Val.Syn. *Harpochirus*, Cantor; *Cryptosmilia*, Cope.

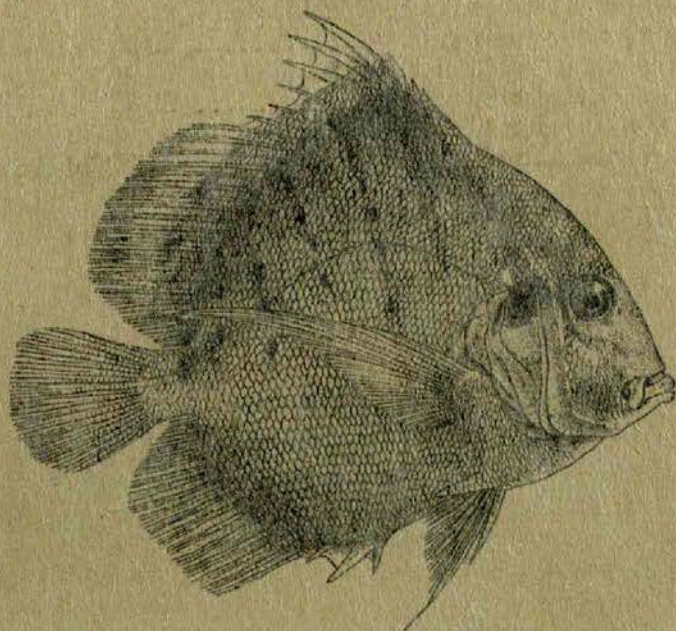
Branchiostegals six; pseudobranchiæ. Body elevated and much compressed. Snout short. Preopercle spineless. Palate edentulous. Dorsal having in front a concealed spine directed forwards, and eight or nine spinous rays, which, as well as those of the anal, are receivable into a groove at the base; interspinous membrane deeply notched; pectoral long and falciform. Scales of moderate size. Air-bladder posteriorly prolonged into two horns. Pyloric appendages few.

752. (1.) *Drepane punctata*. (Fig. 8.)*Chaetodon punctatus*, Gmel. *Syst. Nat.* p. 1243.*Drepane punctata*, Day, *Fish. India*, p. 116, pl. xxix, fig. 5 (see *synon.*).

Syn. *Chandava*, Maráthi; *Punnur*, Sind.; *Shuk*, Baluch.; *Pündthee*, Mal.; *Pulli torriti*, Tam.; *Thetti*, Tel.; *Roopi-chanda*, Chittag.; *Shengua-roët*, Arracan.; *Nga-shengua*, Burm.

D. 8-9/21-22. A. 3/18-19. L. 1. 50-55. L. tr. 14/33. Cæc. pyl. 2-3.

Length of head from $3\frac{1}{4}$ to 4, of pectoral 2, height of body $1\frac{1}{3}$ to $1\frac{1}{2}$ in the total length. *Eyes*—diameter from $2\frac{1}{3}$ to 3 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ to $\frac{3}{4}$ apart. *Fins*—dorsal spines strong, in a young individual ($1\frac{3}{10}$ inches long) the

Fig. 8.—*Drepane punctata*.

last six are of equal height. Should there be nine dorsal spines, the fourth is the longest in adults; if only eight then the third; the rays longer than the spines; pectoral sometimes reaching to the base of the caudal; second anal spine the strongest and generally the longest; caudal with its central rays slightly produced. *Colour*—silvery, having a gloss of gold and tinge of purple,



with or without vertical bands and black spots; edges of the fins stained with grey, and a grey band along the middle of the dorsal.

Hab. Red Sea, east coast of Africa, seas of India to Australia; attaining at least 15 inches in length, and in most places esteemed as food.

Second group. TOXOTINA.

9. Genus **TOXOTES**, Cuv.

Branchiostegals seven; pseudobranchiæ. Body oblong, compressed. Snout rather produced; lower jaw the longer. Villiform teeth on jaws, vomer, and palatine bones. A single dorsal fin, having 4 or 5 strong spines, situated in the posterior half of the back; anal with 3 spines. Scales cycloid, of moderate or rather small size. Air-bladder simple. Pyloric appendages in moderate numbers.

It is stated in some works that these wide-mouthed fishes shoot insects with a drop of water in Batavia. Bleeker observed that he never witnessed this, and the action is one which the mouths of these fishes appear incapable of effecting (see p. 12, *ante*).

Geographical Distribution. Seas and estuaries of India, the Malay Archipelago and Polynesia.

Synopsis of Indian Species.

- | | |
|--|----------------------------------|
| L. l. 42. Two to four rows of large black patches or irregular stripes along sides | 1. <i>T. microlepis</i> , p. 22. |
| L. l. 31. Five or six oblong black patches on upper half of head and side | 2. <i>T. chatareus</i> , p. 23. |
| L. l. 27. Four triangular blotches descend from the back to the lateral line | 3. <i>T. jaculator</i> , p. 23. |

753. (1.) *Toxotes microlepis*. (Fig. 9.)

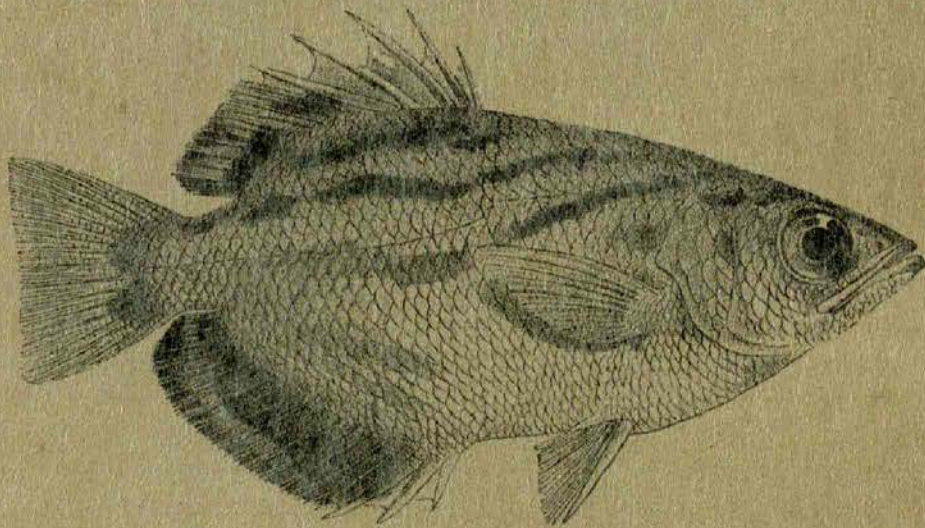


Fig. 9.—*Toxotes microlepis*.

Toxotes microlepis, *Blyth, J. A. S. B.* xxix, 1860, p. 142; *Day, Fish. India*, p. 117, pl. xxx, fig. 1 (see *synon.*).

Nya-ky-a-ma, Burmese.



D. 5/13. P. 12. A. 3/17. C. 19. L. 1. 42. L. tr. 6/14. Cae. pyl. 8.

Length of head $3\frac{1}{2}$ to $3\frac{1}{3}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—the dorsal commences slightly in advance of the anal, its last three spines the longest, as is the third of the anal. *Colour*—golden, with two to four large black oblong blotches or stripes along the sides, most being above the lateral line; dorsal blotched with black and having dark edges; anal dark; caudal yellow.

Hab. Burma and Siam to Sumatra and Borneo; growing to at least 6 inches in length.

754. (2.) *Toxotes chatareus*.

Coilus chatareus, Ham. *Buch. Fish. Ganges*, pp. 101, 370, pl. xiv, fig. 34.

Toxotes chatareus, Day, *Fish. India*, p. 117, pl. xxix, fig. 6 (see *synon.*).

Nga-prong-gryn, *Kodryn*, and *Paulng-gyn*, Arracan.

D. (4)–5/12. P. 13. A. 3/16–17. C. 17. L. 1. 31. L. tr. 4–5/11–10.

Length of head $3\frac{1}{4}$ to $3\frac{1}{3}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—dorsal spines strong, the fourth somewhat the longest; (in a specimen with only four dorsal spines the third equals the fourth). Anal commences slightly behind the dorsal, the third spine a little the longest. Caudal cut nearly square. *Colour*—silvery shot with gold; dorsal profile greenish brown, six or seven oblong spots between eye and end of base of dorsal fin; some black blotches on soft dorsal; anal with lower edge black. In the young the blotches are larger and darker, the ventral is black, and there is a black band along the base of the caudal.

Hab. Rivers and estuaries of India, Burma, the Malay Archipelago, and found by Steindachner to occur in South Australia. My largest specimen is 8 inches in length, but this species attains upwards of a foot.

755. (3.) *Toxotes jaculator*.

Sciæna jaculatrix, Pallas, *Phil. Trans.* lvi, 1766, p. 187.

Toxotes jaculator, Day, *Fish. India*, p. 117 (see *synon.*).

D. 4/11–12. P. 15. A. 3/15–17. C. 17. L. 1. 27. L. tr. 4–5/10–9.

Length of head 3, height of body 3 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and from $1\frac{1}{4}$ to $1\frac{1}{2}$ apart. *Fins*—dorsal spines strong, the third the longest. Anal commences below first dorsal spine, the third spine the longest. Caudal rather emarginate. *Colour*—brownish shot with golden; four triangular black blotches pass downwards from the back to the lateral line, most developed in the young. Fins dark.

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



Family III. MULLIDÆ.

Branchiostegals four; pseudobranchiæ. Body rather elongate. Profile of head convex. Two stiff barbels below the chin belonging to the hyoid apparatus. Teeth feeble and variously inserted. Two dorsal fins, situated at some distance asunder; the anal similar to the second dorsal; ventral with one spine and five rays. Scales large, feebly ctenoid, and rather deciduous. Air-bladder, when present, simple. Pyloric appendages few or in moderate numbers.

Geographical Distribution. Seas of temperate Europe and those of the tropics; many young and some adults have been captured in rivers.

Uses. This family, to which the Red Mullet belongs, furnishes usually excellent food.

Synopsis of Indian Genera.

Teeth in both jaws, on the vomer, and palatine bones . . 1. UPENEOIDES.
Teeth in several rows in both jaws, palate edentulous . . 2. MULLOIDES.
Teeth in a single row in both jaws, palate edentulous . . 3. UPENEUS.

1. Genus **UPENEOIDES**, Bleeker.

Syn. *Megalepis*, Bianc.; *Upeneus*, sp., Cuv.; *Upeneus* (C. V.), Bleeker, 1874.

Small teeth in the jaws, vomer, and palatine bones.

Geographical Distribution. Red Sea, Indian Ocean, and beyond.

Synopsis of Indian Species.

- A. Lobes of caudal without dark cross bars . . 2. *U. sulphureus*, p. 25.
B. Lobes of caudal barred.
a. First dorsal spine minute; 2nd, 3rd, and 4th nearly equal.
c. Body chestnut above, not spotted 1. *U. vittatus*, p. 25.
Body leaden above, not spotted 3. *U. cæruleus*, p. 26.
Head and body with brown spots, a brown lateral stripe 4. *U. tragula*, p. 26.
b. First dorsal spine the longest; fin pointed.
Sides with red spots 5. *U. bensasi*, p. 27.
Sides without spots 6. *U. taeniopterus*, p. 27.

756. (1) *Upeneoides vittatus*. (Fig. 10.)

Mullus vittatus, *Forsk. Descr. Anim.* p. 31.

Upeneoides vittatus, *Day, Fish. India*, p. 120, pl. xxx, fig. 2 (see synon.).

Cheerul, Mal.; *Chah-ti-ing-ud-dah*, Andam.; *Nga nang young*, Arracan.

D. 8 | 1/8. A. 1/7. L. l. 38-39. L. tr. $2\frac{1}{2}$ -3/7. C. pyl. 11. Vert. 7/17.

Length of head $4\frac{1}{4}$, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{3}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. *Teeth*—in several villiform rows in both jaws and palatines, and in a single row on vomer. *Fins*—spines of first dorsal weak, first minute, second and third nearly the same length, and one third higher than second dorsal; six rows of scales between the dorsal fins; origin of anal below 3rd or 4th dorsal ray, its spine minute. *Scales*—ctenoid, those along median line of abdomen with a blunt keel along their centres. *Lateral line*—tubes arborescent on each scale, especially anteriorly. *Air-bladder*—present. *Colour*—chestnut on the back; golden below. Two or three bright yellow longitudinal bands along each side; first dorsal

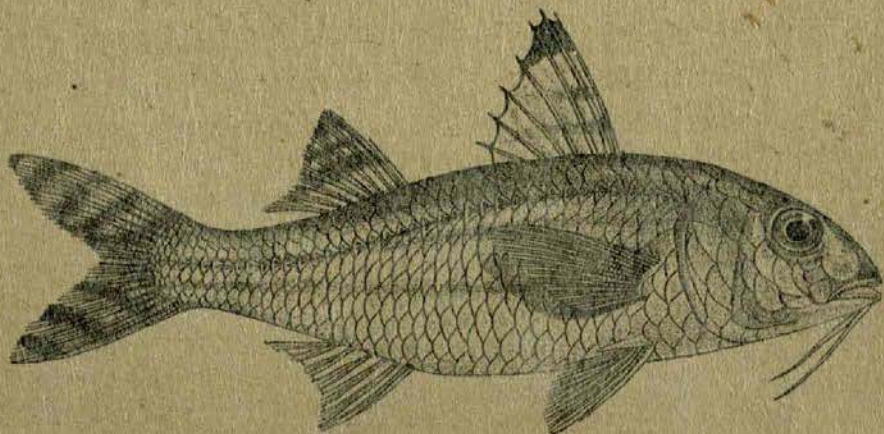


Fig. 10.—*Upeneoides vittatus*.

fin black-edged and with two blackish bands; pectoral pinkish, edged with white; upper caudal lobe crossed by six yellowish-brown bars, and having dark edges and a black tip; lower lobe with three oblique dark bars and a white tip.

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

757. (2.) *Upeneoides sulphureus*.

Upeneus sulphureus, *Cuv. & Val. H. N. Poiss.* iii, p. 450.

Upeneoides sulphureus, *Day, Fish. India*, p. 120, pl. xxx, fig. 3 (see synon.).

Navarei, Tanil; *Nga nangyoung*, Arracan.

D. 8 | 1/8. P. 15. A. 7. C. 15. L. l. 35-38. L. tr. $2\frac{1}{2}$ /7.

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



length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. *Teeth*—in an uninterrupted semilunar band on the vomer. *Fins*—first dorsal spine very small, the third a little longer than second or fourth; six rows of scales between dorsals; second dorsal two thirds as high as spinous; origin of anal below second or third dorsal ray. *Lateral line*—tubes in an arborescent form on each scale. *Air-bladder*—absent. *Colour*—reddish-chestnut on back, becoming silvery on abdomen, which in adults is shaded with yellow. A purplish blotch on the opercle and subopercle. A brilliant golden stripe, two thirds of a scale wide, from orbit to upper third of tail; generally two or three more below and parallel with it, in large specimens a light band along row of scales above lateral line. First dorsal milk-white edged with black, having two horizontal yellow lines finely dotted with black; second dorsal with only one band; caudal reddish, with a black white-edged margin.

Hab. Seas of India to the Malay Archipelago; attaining at least 5 inches in length.

758. (3.) *Upeneoides cæruleus*.

Upeneoides cæruleus, Day, P. Z. S. 1868, p. 194; *Fish. India*, p. 121.

D. 7-8/9. P. 15. A. 7. C. 15. L. 1. 32-34. L. tr. $2\frac{1}{2}$ /7.

Length of head $4\frac{1}{2}$ to 5, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and also apart. Opercle with two spines. *Teeth*—in a single row on the vomer and palate. *Fins*—first spine of dorsal minute or wanting; 7 or 8 rows of scales between the two dorsals. *Lateral line*—the tubes are rather long and bifurcate in the first portion of the lateral line, the branches subsequently are short, and mostly spring from the upper side. *Air-bladder*—present. *Colour*—leaden above, dirty white below. First dorsal with a black tip, a whitish band along its middle, and a badly marked one at its base; second dorsal dark, with a light band along the middle; extremities of caudal stained with black, and a band across the upper lobe; pectoral, ventral, and anal yellowish.

Considering the time of year at which the specimens have been captured and their small size, it is not improbable that they are the young of a larger species, as *U. vittatus*.

Hab. Madras; growing to 4 inches in length; most common during the months of June and July.

759. (4.) *Upeneoides tragula*.

Upeneus tragula, Richardson, *Ich. China*, p. 220.

Upeneoides tragula, Day, *Fish. India*, p. 121, pl. xxx, fig. 4 (see *synon.*).

Chiri, Maráthi.

D. 7-8 | $1\frac{1}{8}$. P. 13. A. $1\frac{1}{7}$. L. 1. 30-32. L. tr. $2\frac{1}{7}$. Cæc. pyl. 6.



Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter $3\frac{3}{4}$ to 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout rather obtuse anteriorly. A strong preopercular spine, a smaller one at the shoulder just below commencement of lateral line. *Fins*—first dorsal spine minute or absent, first dorsal fin very little higher than second; anal commences slightly behind origin of second dorsal. *Scales*—ctenoid, covering snout and preorbital bone; some over fore part of dorsal and anal fins; four rows between dorsal fins. *Colour*—silvery, head and body spotted with brown, a brown longitudinal band from eye through snout to base of caudal; dorsal fin with dark, almost black, bands; each caudal lobe with five or six oblique black bars.

Hab. East coast of Africa, coast of Sind, the Andamans, to the Malay Archipelago; attaining at least $4\frac{1}{2}$ inches in length.

760. (5.) *Upeneoides bensasi*.

Mullus bensasi, Temm. & Schleg. *Faun. Japon.*, Poiss. p. 30, pl. xi, fig. 2.

Upeneoides bensasi, Day, *Fish. India*, p. 121, pl. xxx, fig. 5 (see synon.).

Te nevere, Tamil.

D. 7/1/8. P. 15. A. 1/7. C. 15. L. 1. 32-34. L. tr. 2/7.

Length of head from $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter from $4\frac{1}{4}$ to $4\frac{1}{2}$ in length of head, nearly or quite 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Preopercular spine small. *Fins*—four rows of scales between dorsal fins, the first of which is higher than the second. *Scales*—the central row along median line of abdomen with a blunt keel; scales on preorbital. *Lateral line*—the tubules are very arborescent posteriorly, especially on their upper side. *Air-bladder*—absent. *Colour*—chestnut along the back, becoming golden on abdomen; head reddish; a silvery stripe from eye to centre of caudal, with a row of red spots above and another below it. Dorsals tipped with black, and having two reddish bands across them; caudal reddish, the upper lobe having four oblique chestnut bars; pectorals, ventrals, and anal yellow.

Hab. Madras to the Malay Archipelago. Abundant all the year round on the Coromandel coast; attaining to 5 inches in length.

761. (6.) *Upeneoides tæniopterus*.

Upeneus tæniopterus, Cuv. & Val. *H. N. Poiss.* iii, p. 451.

Upeneoides tæniopterus, Day, *Fish. India*, p. 122 (see synon.).

D. 7/1/7. P. 15. A. 7. L. 1. 38. L. tr. 3/7. Cæc. pyl. 2.

Length of head, of caudal fin, and height of body each $4\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{2}$ apart. A very slight rise from snout to base of first dorsal, a slight swelling over snout in front of eye.



Opercular spine weak. *Fins*—first dorsal spine highest, second very nearly as long; six rows of scales between two dorsal fins. *Lateral line*—the tubes very arborescent posteriorly. *Air-bladder*—large. *Colour*—back reddish, becoming white on abdomen. A large triangular reddish spot is said to have existed on the free portion of the tail, but is not now apparent. First dorsal fin with three brownish longitudinal bands, second dorsal likewise banded; caudal with six oblique streaks across either lobe.

Hab. Ceylon to Australia; attaining at least 12 inches in length.

2. Genus **MULLOIDES**, Bleeker.

Syn. *Upeneus*, sp., Cuv. & Val.

The teeth in the jaws are in several rows; palate edentulous.

Geographical Distribution. Red Sea, Indian Ocean, and beyond.

762. (1.) *Mulloidides flavolineatus*. (Fig. 11.)

Mullus flavolineatus, Lacép. *H. N. Poiss.* iii, p. 406.

Mulloidides flavolineatus, Day, *Fish. India*, p. 122, pl. xxx, fig. 6 (see synon.).

D. 7 | 1/8. P. 17-19. A. 2/6. L. 1. 35-38. L. tr. 2/6. Cæc. pyl. 18.

Length of head $4\frac{1}{3}$, height of body from 5 to $5\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{2}{3}$ diam. from end of snout, and 1 apart. *Fins*—first three dorsal spines of about the same length. Five rows of scales between the dorsal fins. Second dorsal anteriorly half to two thirds as high as the first. First anal spine minute; the fin commences slightly behind origin of second dorsal. *Lateral line*—tubes very arborescent, especially anteriorly. *Air-bladder*—large. *Colour*—upper surface of head

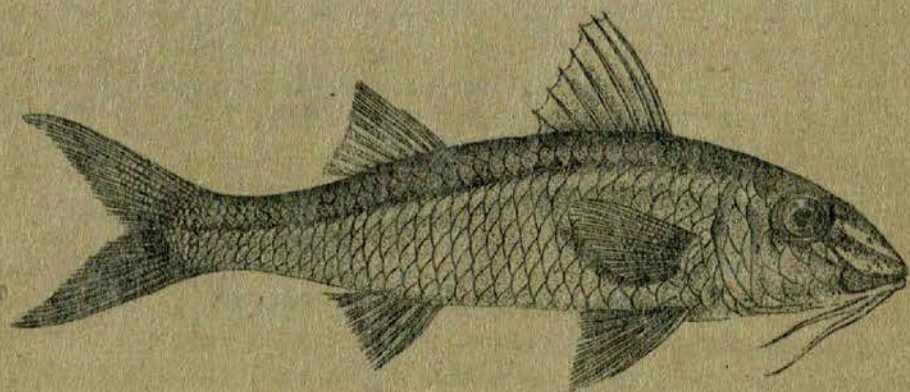


Fig. 11.—*Mulloidides flavolineatus*.

and back reddish chestnut, becoming whitish on sides, and tinged with yellow on abdomen. A narrow yellow band from upper edge of eye to snout, and a second from below eye joins it. A brilliant



golden band, rather above one scale in width, from hind edge of eye to middle of base of caudal. Fins flesh-coloured, a yellow band along base of second dorsal; lower lobe of caudal grey.

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

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

Syn. *Mullupeneus*, Poey; *Parupeneus*, Bleeker (1874).

Only a single row of teeth in either jaw, the palate is edentulous.

Geographical Distribution. Red Sea, Indian Ocean, and beyond.

Synopsis of Indian Species.

- A. Last dorsal and anal rays produced 1. *U. macronema*, p. 29.
- B. Last rays not produced.
 - a. A black lateral band 2. *U. barberinus*, p. 30.
 - b. One or more dark vertical bands from between dorsals 3. *U. multifasciatus*, p. 30.
 - c. Golden spots on many scales.
 - Eyes $6\frac{1}{2}$ in length of head 4. *U. luteus*, p. 31.
 - Eyes $4\frac{2}{3}$ in length of head 5. *U. displiurus*, p. 31.
 - d. Large black spot on side of tail and, in life, a golden blotch on side; no lateral band 6. *U. indicus*, p. 32.
 - e. Vermilion, barbels rosy 7. *U. cinnabarinus*, p. 33.

763. (1.) *Upeneus macronema*. (Fig. 12.)

Mullus macronema, Lacép. iii, pp. 383, 404, pl. 13, fig. 2.

Upeneus macronemus, Day, *Fish. India*, p. 123, pl. xxxi, fig. 1 (see synon.).

Khorfi, Arabi.

D. 8/9. P. 16. A. 7. C. 15. L. 1. 29-30. L. tr. $2\frac{1}{2}/7$.

Length of head $3\frac{2}{3}$ to 4, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $2\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Lips thick. Opercular spine rather strong. *Fins*—first spine of dorsal short, the third and fourth subequal, and nearly or quite twice as high as the anterior dorsal rays; last dorsal and anal rays elongate; ventral a little longer than pectoral. *Scales*—three rows between the dorsal fins. No enlarged pores on the snout. *Lateral line*—with several short bifurcations posteriorly. *Colour*—a black band from the snout through the eye, at first just below the lateral line, subsequently upon it, and ending below the end of the soft dorsal; a black blotch at the base of the caudal fin; these two marks are divided by a light oblique vertical band which passes over the free portion of the tail just behind the second dorsal fin; some golden spots on the scales along the sides of the body. A purplish stripe from eye to snout. First dorsal with its lower half purple, becoming blacker



above; second dorsal with a deep black band along its base, and three light lines higher up; pectoral with a dark base; ventral blackish externally; anal with five or six light longitudinal bands; caudal with a black edging. Each scale below the lateral line with a light blue spot.

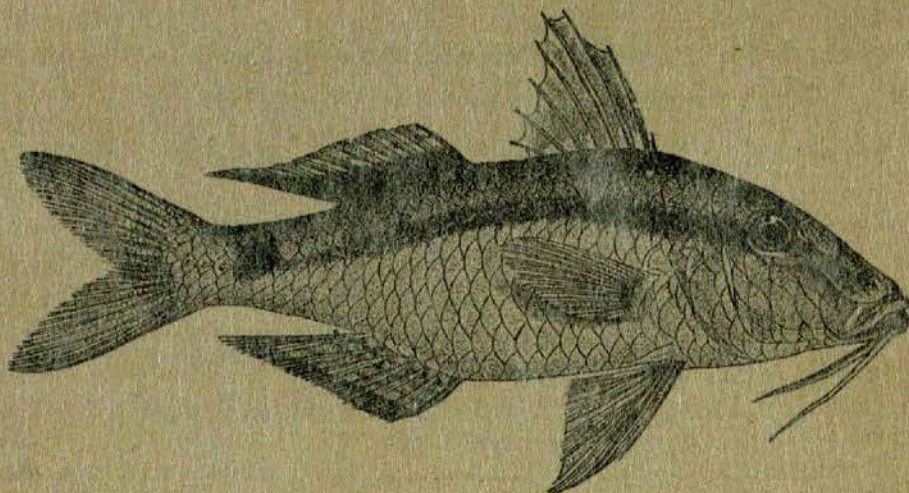


Fig. 12.—*Upeneus macronema*.

Hab. Red Sea, coasts of India, Malay Archipelago and beyond; attaining at least $8\frac{1}{2}$ inches in length.

764. (2.) *Upeneus barberinus*.

Mullus barberinus, Lacép. *H. N. Poiss.* iii, p. 406, pl. 13, fig. 3.

Upeneus barberinus, Day, *Fish. India*, p. 124 (see synon.).

D. 8/9. P. 18. A. 7. C. 15. L. 1. 29–31. L. tr. $2\frac{1}{2}/7$.

Length of head $3\frac{1}{2}$ to 4, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter $5\frac{1}{2}$ in length of head, 3 diam. from end of snout, and $1\frac{1}{4}$ apart. Opercular spine rather strong. *Fins*—first spine of dorsal fin very short, the third, sometimes also the fourth, highest, and about twice the height of anterior dorsal rays; last rays of second dorsal not prolonged. *Scales*—three rows between dorsal fins. *Lateral line*—tubules with several rather long bifurcations posteriorly. *Colour*—a black band from the eye along the lateral line, and from below middle of second dorsal above that line, terminating below end of second dorsal; a round black spot at root of caudal. In some specimens there is a darkish band along the dorsal fins.

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

765. (3.) *Upeneus multifasciatus*.

Mullus multifasciatus, Quoy & Gaim. *Voy. Uranie et Phys.* p. 330, *Atl.* t. lix, fig. 1.

Upeneus multifasciatus, Day, *Fish. India*, p. 124 (see synon.).



edge of third the longest, and twice as high as the anterior dorsal rays; three rows of scales between bases of dorsal fins. Anal commences on vertical below third or fourth dorsal ray. *Lateral line*—tubes arborescent posteriorly. *Colour*—purplish; a black horizontal band usually exists on the snout, and is continued through the eye sometimes to a good distance behind it. Two or three wide black bands descend from the dorsals or the interspace between them to the middle of the body; these bands are sometimes united into one, sometimes split up into several. There is usually a third band over the free portion of the tail or a spot on the side of its base. Second dorsal, anal, and sometimes the outer half of the ventral finely banded; occasionally a dark basal band exists on the second dorsal.

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

766. (4.) *Upeneus luteus*.

Upeneus luteus, Cuv. & Val. H. N. Poiss. vii, p. 521; Day, *Fish India*, p. 125, pl. xxxi, fig. 2 (see synon.).

D. 8/9. P. 15. A. 7. C. 15. L. 1. 30. L. tr. 2/7.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter $6\frac{1}{3}$ in length of head, $3\frac{1}{2}$ diam. from end of snout, and $1\frac{2}{3}$ apart. Barbels with roughened elevations along their whole length and extending to a little behind the posterior edge of the preopercle. *Fins*—first spine of dorsal minute, the third and fourth the longest, and nearly twice as high as the anterior dorsal rays; three rows of scales between bases of dorsal fins. *Lateral line*—the branches of the tubes very short but numerous. *Colour*—reddish, the edges of the scales somewhat the darkest. A broad purplish band, having a light yellow edge on either side, goes from the eye to the snout; three narrow yellow bands across the opercle. Outer edge of preopercle purplish. The centre of each scale on body, except first thirteen of lateral line, has a golden spot; abdomen yellowish. Second dorsal and anal with from three to five bluish longitudinal lines.

Hab. East coast of Africa and seas of India; attaining at least a foot in length.

767. (5.) *Upeneus dispilurus*.

Mullus dispilurus, Playfair, *Fish. Zanzibar*, p. 41, pl. v, fig. 4 (not 3), adult.

Upeneus dispilurus, Day, *Fish. India*, p. 125, pl. xxxi, fig. 3 (see synon.).



of the second dorsal. *Scales*—on snout and head including most of the preorbital bone; the uncovered portion has some rather large pores. *Colour*—reddish, the edges of the scales being slightly darker. A broad purplish band, with a light silvery edge, from the eye to the snout; two more narrow silvery lines, formed of short, oblong spots, from hind edge of orbit for a short distance; the two rows of scales above the lateral line, and generally the three below, have a golden-yellow spot in the centre of each scale; a light golden band over the free portion of the tail, behind which is often a dark mark. First dorsal marbled with brown, the second with four and the anal with three reddish bands; caudal reticulated with light grey markings.

Hab. Red Sea, Sind, where it attains at least $9\frac{1}{2}$ inches in length; probably also found in East Africa.

768. (6.) *Upeneus indicus*.

Mullus indicus, Shaw, *Gen. Zool.* iv, pt. ii, p. 614.

Upeneus indicus, Day, *Fish. India*, p. 126, pl. xxxi, fig. 4 (see synon.).

Rahtee goolivinda, Tel.; *Kul naveri*, *Mussara*, Tam.

D. 8/9. P. 16. V. 1/5. A. 0-1/7. C. 15. L. 1. 30. L. tr. $2\frac{1}{2}/7$.

Length of head from $3\frac{3}{4}$ to 4, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—from $5\frac{1}{2}$ to $6\frac{1}{2}$ (larger in the young) in the length of the head, $1\frac{1}{4}$ diameters apart. Barbels reach to beyond the angle of the preopercle. *Fins*—first spine of anterior dorsal minute, the third and fourth the longest, one half higher than the rays. Anal commences slightly behind the level of the second dorsal and is as high as it. *Lateral line*—tubes becoming very arborescent posteriorly. *Air-bladder*—present. *Colour*—purplish red, with a large oval shining golden blotch, which usually disappears after death, on the lateral line opposite the interspace between the two dorsal fins; a purplish-black mark, lightest in its centre, on either side of free portion of tail; yellow lines or spots on the abdomen. Some light violet lines on upper surface of head. A broad purple band with violet edges from eye to snout; cheeks pink, variegated with yellow and tortuous blue lines; a dark spot at corner of mouth. Dorsal purplish streaked with blue; a few yellow bands on anal; fins pinkish except the caudal, which has the rays purplish, but the membrane has a greenish tinge.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond; attaining at least 16 inches in length.

769. (7.) *Upeneus cinnabarinus*.

Upeneus cinnabarinus, *Cuv. & Val. H. N. Poiss.* iii, p. 475; *Day Fish. India*, p. 126.

D. 8/9. P. 15. V. 1/5. A. 7. C. 15. L. 1. 29. L. tr. 3/7.

Length of head 4, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, nearly 2 diam. from end of snout, and 1 apart. A rather strong opercular spine. *Fins*—first dorsal spine short, second not quite so long as third. *Scales*—three rows between the two dorsal fins. *Lateral line*—the tubes very arborescent posteriorly. *Air-bladder*—small. *Colour*—vermilion, darkest on the back; there appears to be a central silvery spot in the middle of each scale in the two rows above and the two below the lateral line. Dorsal and anal rays yellow, the membrane reddish; upper caudal lobe orange, the lower one red. A large purple spot covers the opercle and descends on the subopercle. Barbels rosy.

Hab. Ceylon, where it is said to be abundant.

Family IV. SPARIDÆ.

Squamipinnes, pt., *Cuv.*; *Chaetodontidæ*, pt., *Richards*.

Branchiostegals from 5 to 7; pseudobranchiæ well developed. Body oblong and compressed. Bones of the head with a rudimentary muciferous system. No teeth on the palate (except in *Pimelepterus*); more or less broad and cutting or conical teeth in front of the jaws, or a lateral series of molars, or both conjoined. A single dorsal fin; bases of spinous and soft portions nearly equal; anal with three spines; ventrals thoracic, 1/5. Lateral line continuous, not extending on to the caudal fin. Scales cycloid or minutely ctenoid.

Geographical Distribution. Seas of temperate and tropical regions, some entering fresh waters.

Synopsis of Indian Genera.

First group. CANTHARINA.

Broad cutting-teeth in front of the jaws; no molars; palate edentulous.
Lower pectoral rays branched.

Scales on cheeks and opercles, none on the vertical
fins 1. CRENIDENS.

Second group. SARGINA.

Cutting-teeth in front of jaws and molars at the side. Palate
edentulous. Lower pectoral rays simple.

Molar teeth in several rows along the sides of the
jaws 2. SARGUS.



Third group. PAGRINA.

Conical teeth in front of the jaws and molars along the sides.
Palate edentulous.

- | | |
|---|-----------------|
| No scales on the cheeks | 3. LETHRINUS. |
| Scales on cheeks. A single row of molars. | 4. SPILERODON. |
| Scales on cheeks. Two rows of molars in the upper jaw. | 5. PAGRUS. |
| Scales on cheeks. Three or more rows of molars in the upper jaw | 6. CHRYSOPHRYS. |

Fourth group. PIMELEPTERINA.

Cutting-teeth in front of the jaws, and teeth on the palate.
As defined above 7. PIMELEPTERUS.

First group. CANTHARINA.

1. Genus **CRENIDENS**, Cuv. & Val.

Branchiostegals five; pseudobranchiæ. One or two rows of broad teeth in both jaws, with their cutting-edges crenulated; a band of granular teeth posteriorly but no pointed lateral ones; neither molars nor vomerine teeth. A single dorsal with 11 spines which can be received into a groove; 3 anal spines; lower pectoral rays branched. Scales ctenoid, of moderate size, covering cheeks and opercles, but not the vertical fins. Air-bladder simple. Pyloric appendages in small numbers.

Geographical Distribution. Red Sea and Indian Ocean.

Synopsis of Indian Species.

- | | |
|--|---------------------------------|
| L. tr. 7/13. Greyish, fins black-edged | 1. <i>C. indicus</i> , p. 34. |
| L. tr. 5/15. Silvery, fins grey | 2. <i>C. forskælii</i> , p. 35. |

770. (1.) *Crenidens indicus*. (Fig. 13.)

Crenidens indicus, Day, *Report Sea-Fish and Fisheries India*, 1873, p. clxxxvi; *Fish. India*, p. 132, pl. xxxii, fig. 4 (see synonym.).

Keen-see, Baluch.; *Oolah*, Tam.

D. 10-12/11-10. A. 3/10-11. L. 1. 53-55. L. tr. 7/13. Cæc. pyl. 5.

Length of head 4 to $4\frac{1}{2}$; height of body $2\frac{1}{4}$ to 4 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Body oval, compressed; a slight swelling above the eyes. *Teeth*—8, compressed, in front of upper jaw, each lobed at the sides; behind this row are three more of the same character but with smaller and more numerous teeth; in the mandible there are ten in the front row smaller than those in the upper jaw, behind these are two or three rows as in the upper jaw. *Fins*—fourth dorsal spine longest; pectoral extending to above anal; second anal spine strong and nearly or quite as long as fourth



dorsal, the third about equal in length; caudal emarginate. *Colour*—greyish silvery, scales on head and anterior portion of body with black edges, dark lines along rows on body; dorsal and anal

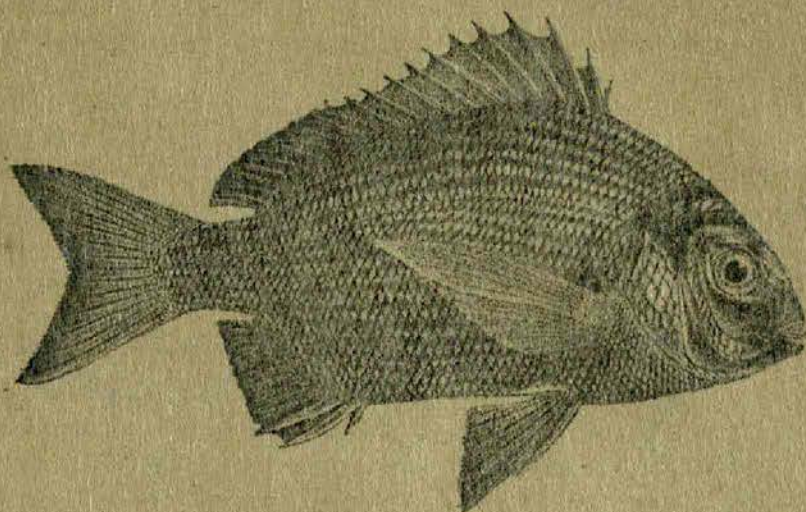


Fig. 13.—*Crenidens indicus*.

black, last anal ray white; pectoral yellow, with its base orange, and a black spot in axilla; outer two thirds of ventral black, the rest bluish white; caudal dark grey, with a black edge.

Hab. Very common along the Sind coast and not rare at Madras; attaining at least 12 inches in length. Also found at Suez.

771. (2.) *Crenidens forskaelii*.

Crenidens forskalii, Cuv. & Val. *H. N. Poiss.* vi, p. 377, pl. 162 quater; *Day, Fish. India*, p. 135 (see synon.).

D. 11/11. P. 15. A. 3/9–11. C. 17. L. 1. 52. L. tr. 5/15. C. pyl. 2.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and also apart. *Teeth*—as in *C. indicus*, but with ten in the anterior row in the upper and twelve in the lower jaw. *Fins*—dorsal spines rather weak, the fourth slightly the longest; pectoral not reaching to above anal spines, which are weak, the third being equal to $\frac{2}{3}$ of the length of fourth dorsal spine; caudal forked. *Air-bladder*—large, posteriorly two-horned. *Colour*—silvery, the vertical fins rather darker than the body.

Hab. Red Sea, seas of India, Sind, and the coast of Mozambique.

Second group. SARGINA.

2. Genus **SARGUS** (Klein), Cuv.

Branchiostegals five or six; pseudobranchiæ. Opercle either unarmed or with a blunt point. A single row of cutting-teeth in the front part of the jaws, and several lateral rows of rounded



molars. A single dorsal with from 10 to 13 spines receivable into a groove along its base; anal with three. Scales finely ctenoid, of moderate size, covering the cheeks. Air-bladder sometimes notched anteriorly and posteriorly. Pyloric appendages few.

Geographical Distribution. Mediterranean, Atlantic and Indian Oceans.

772. (1.) *Sargus noct.* (Fig. 14.)

Sargus noct (Ehrenb.), Cuv. & Val. H. N. Poiss. vi, p. 51; Day, *Fish. India*, p. 133, pl. xxxii, fig. 5 (see synonym.).

Keen-see, Baluch.

D. 12/13-14. A. 3/13. L. 1. 62-68. L. tr. 7-8/16. Vert. 10/13.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to 4 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout and also apart. Snout compressed, lips rather thick. *Teeth*—eight broad, compressed, rather forwardly directed incisors in each jaw, also three rows of rounded molars. *Fins*—dorsal spines increasing in length to fourth, rays much lower than spines. Second anal spine strongest and longest. *Scales*—five rows between the eye and the angle of the preopercle. *Colour*—greyish

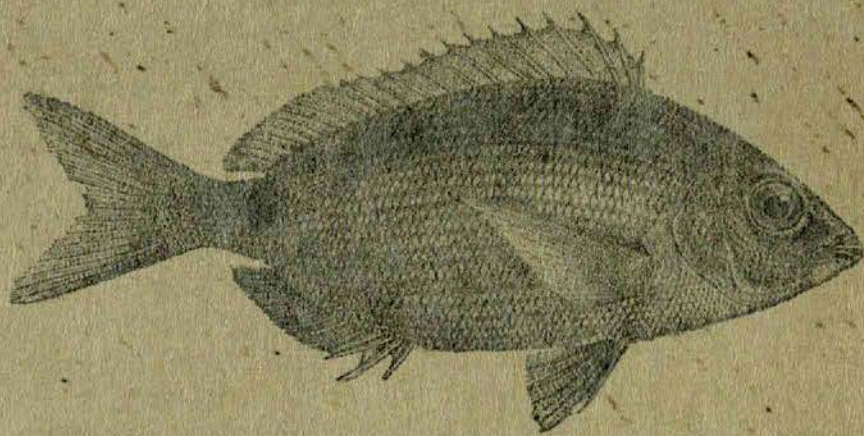


Fig. 14.—*Sargus noct.*

silvery; fine dots on the scales, forming lines along the middle of each row; a darkish spot at the base of the pectoral; a black blotch with a silvery lower border (lost in adult) on lateral line between end of dorsal fin and base of caudal. Fins blackish, except the pectoral, which is flesh-coloured, and the caudal, which has an orange tinge. Eyes golden. Young with narrow vertical brown lines on the body.

Hab. Red Sea (very common at Suez), to the coast of Sind; attaining at least 12 inches in length.



Third group. PAGRINA.

3. Genus **LETHRINUS**, Cuv.

Palu, Maráthi; *Kuradisa*, Arabi.

Branchiostegals six; pseudobranchiæ. Villiform teeth in anterior portion of jaws, with canines in front of them; lateral teeth in a single row and either conical or with rounded crowns; none on the palate or tongue. Dorsal fin single, receivable into a sheath at its base, and having 10 spines and 9 rays; anal with 3 spines. Scales of moderate size, none on the cheeks. Air-bladder generally notched posteriorly, and having short lateral processes. Pyloric appendages few.

Geographical Distribution. West coast of Africa; Indian and Pacific Oceans.

Synopsis of Indian Species.

- | | |
|---|---------------------------------|
| A. Lateral teeth conical | 1. <i>L. miniatus</i> , p. 37. |
| B. Some or all of the lateral teeth rounded and obtuse. | |
| <i>a.</i> A quadrangular dark blotch between l. l. and pectoral | 2. <i>L. cinereus</i> , p. 38. |
| <i>b.</i> Longitudinal lines of blue spots on scales, and sometimes yellow bands. | |
| Third dorsal spine longest | 3. <i>L. karwa</i> , p. 38. |
| Fourth dorsal spine longest | 4. <i>L. nebulosus</i> , p. 39. |
| <i>c.</i> Olive, with yellow longitudinal bands. | |
| Eyes $1\frac{1}{2}$ diameters from end of snout | 5. <i>L. ornatus</i> , p. 40. |
| Eyes 2 diameters from end of snout | 6. <i>L. ramak</i> , p. 40. |
| <i>d.</i> An oblong blotch below l. l. opposite middle of dorsal | 7. <i>L. harak</i> , p. 41. |

773. (1.) **Lethrinus miniatus**.

Sparus miniatus (Forster), *Bl. Schn. Syst. Ich.* p. 281.

Lethrinus rostratus, Cuv. & Val. *H. N. Poiss.* vi, p. 296; *Day, Fish. India*, pp. 134, pl. xxxiii, fig. 1, *Suppl.* p. 787 (see synonym.).

D. 10/9. P. 13. A. 3/8. C. 19. L. l. 48-50. L. tr. 16/16. C. pyl. 3.

Length of head $3\frac{2}{3}$, height of body 4 in the total length. *Eyes*—diameter 5 in length of head, $2\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Snout pointed and compressed. Length of head $\frac{1}{4}$ more than its height. *Teeth*—three rather small curved canines in front of upper jaw, and a small one on either side of symphysis of lower jaw; from 18 to 20 compressed, conical, and pointed teeth along either ramus of the lower jaw, and about 15 similar teeth in the upper. *Fins*—dorsal spines increasing in length to the fourth, which is not quite so long as the rays; ventral almost reaches the anal spines, the third of which is considerably longer than the second; caudal emarginate. *Colour*—olive-brown, lightest on abdomen. Head, especially above, having a tinge of purple; a dark



brown blotch behind posterior upper angle of eye; narrow oblique dark bands from the eye and opercle to the upper jaw; a large blotch on the opercle. Inside of mouth orange. The centre of each scale with a blue spot, darkest externally; about eight faint vertical bands descend from the back towards the middle of the body, and usually a dark blotch is apparent between pectoral fin and lateral line. A black spot at base of each dorsal ray, and the fin lightly banded; ventrals slate-coloured; some indistinct vertical bands on the caudal.

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

774. (2.) *Lethrinus cinereus*.

Lethrinus cinereus, Cuv. & Val. *H. N. Poiss.* vi, p. 293; *Day, Fish. India*, p. 135 (see synonym.).

D. 10/9. P. 13. A. 3/8. C. 17. L. 1. 47-48. L. tr. 6/17.

Length of head $3\frac{2}{3}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. *Teeth*—4 small curved canines in upper and 6 in lower jaw; the lateral teeth conical and somewhat irregular in size, especially in the lower jaw; the posterior lower teeth with rounded crowns. *Fins*—dorsal spines increasing in length to 4th and 5th; 2nd and 3rd anal spines about equal and as high as the 3rd dorsal; caudal forked, lobes pointed. *Colour*—olive-brown, a quadrangular black blotch between pectoral fin and lateral line; faint vertical bands more or less broken up on the body; numerous white or blue spots on scales in upper half of first two thirds of body; dorsal fin with brown spots and a red outer margin; pectoral pinkish; ventral slate-coloured; anal similar to second dorsal; caudal with 3 faint brown vertical bands, most distinct in the young.

Hab. Seas of India, to the Malay Archipelago and beyond; my longest specimen from Madras was 9 inches long.

775. (3.) *Lethrinus karwa*.

Lethrinus karwa (Russell), Cuv. & Val. *H. N. Poiss.* vi, p. 311; *Day, Fish. India*, p. 135, pl. xxxiii, fig. 2 (see synonym.).

Karwa, Tel.

D. 10/9. P. 13. V. 1/5. A. 3/8. C. 17. L. 1. 48. L. tr. 6/17.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter in the adult 4 to $4\frac{1}{4}$ in length of head, $2\frac{1}{2}$ diam. from end of snout, and 1 apart. Head rather higher than long. *Teeth*—four large and strong canines on each side in both jaws; in the adult all lateral teeth in upper jaw with rounded crowns; in the lower jaw the first five teeth are more or less conical and



rounded, those behind have rounded crowns. *Fins*—dorsal spines increasing in length to the third, which is scarcely so long as the longest ray; second anal spine not so long as third, which equals length of second dorsal, and is nearly as high as the rays; caudal emarginate. *Colour*—olivaceous brown, becoming lighter on abdomen; the centre of each scale with a cobalt-blue spot, so as to form longitudinal lines, in some specimens there are intermediate yellow bands; inside of mouth orange; pectoral flesh-coloured, base of its second ray bright blue; dorsal, caudal, and anal slate-coloured, margined with orange, and having a line of spots along the centre of the rays; ventral externally slate-coloured. In most adult specimens there is a faint quadrangular spot between lateral line and pectoral and also indistinct vertical bands. In some the edges of the opercle, subopercle, and branchiostegal rays are blood-red.

Hab. Red Sea, seas of India; a specimen captured in Madras in June, 1867, was 16 inches in length.

776. (4.) *Lethrinus nebulosus*. (Fig. 15.)

Sciaena nebulosa, *Forsk. Descr. Anim.* p. 52, no. 61.

Lethrinus nebulosus, *Day, Fish. India*, p. 136, pl. xxxiii, fig. 4 (see synon.).

D. 10/9. P. 13. V. 1/5. A. 3/8. C. 17. L. 1. 46–48. L. tr. 6/16.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 2 to $2\frac{1}{2}$ diam. from end of snout, and 1 apart. Numerous fine open pores on lower surface of mandibles, and even on cheeks in adult. *Teeth*—four rather small canines in front of either jaw, the first 3 lateral teeth in upper jaw and the first 6 or 7 in the lower rather conical,

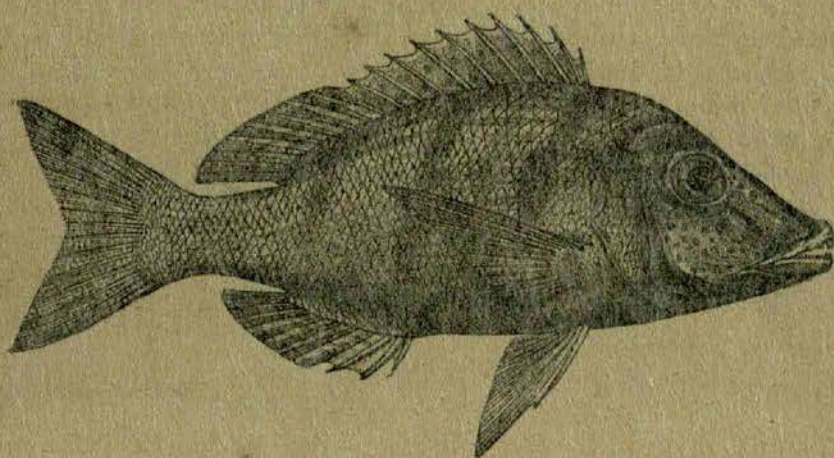


Fig. 15.—*Lethrinus nebulosus*.

the remainder with globular crowns. *Fins*—dorsal spines increasing in length to the 4th, which is about equal to longest ray; the 2nd anal spine nearly one fourth shorter than third, which is nearly as



long as third dorsal; caudal forked, lobes pointed. *Scales*—the row containing the lateral line rather smaller than those above and below. *Colour*—two blue, black-edged bands from eye to posterior nostril and mouth, another below the eye; preopercle spotted blue. Inside of mouth orange; opercular membrane yellow, sometimes blood-red. Body olivaceous, lighter on abdomen; scales orange along their centres, and every other row spotted with blue at its base: in some specimens faint vertical bands are perceptible, and a darkish blotch between pectoral and lateral line, whilst the rows of scales below the pectoral have a narrow dark line along their centres. A large specimen had parts of the head tinged with blue. Dorsal, caudal, and anal slate-coloured, the dorsal edged with reddish, and having two rows of blue spots; faint lines along the soft dorsal and anal; the caudal with narrow blue transverse bars; upper pectoral ray blue in its basal half.

Lethrinus opercularis is probably a variety of this species.

Hab. Red Sea and the seas of India; very common at Madras. Attains at least $16\frac{1}{2}$ inches in length.

777. (5.) *Lethrinus ornatus*.

Lethrinus ornatus, Cur. & Val. H. N. Poiss. vi, p. 310; Day, Fish. India, p. 137 (see synonym.).

D. 10/9. P. 13. V. $1\frac{1}{5}$. A. $\frac{3}{8}$. C. 17. L. 1. 48. L. tr. 6/15.

Length of head $3\frac{3}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. Dorsal profile somewhat elevated. *Teeth*—four conical canines in either jaw, the first five lateral teeth in each jaw conical and pointed, the remainder with rounded crowns. *Fins*—dorsal spines increasing in length to fourth, which is highest, as long as longest ray; second anal spine rather stronger but shorter than third, which equals third dorsal and is nearly as high as the rays. Caudal forked. *Scales*—the row containing the lateral line is much smaller than that above or that below it. *Colour*—greenish olive, with six or seven yellow horizontal bands; the opercular membrane red; caudal edged with red. A violet band across the base of the pectoral fin.

Young specimens have dorsal and anal edged reddish, and irregular blackish blotches about the body; the largest, which is somewhat quadrangular, being above middle of base of pectoral.

Hab. Andamans to the Malay Archipelago.

778. (6.) *Lethrinus ramak*.

Sciæna ramak, Forsk. Desc. Anim. p. 52, no. 64.

Lethrinus ramak, Day, Fish. India, p. 137 (see synonym.).

D. 10/9. P. 13. V. $1\frac{1}{5}$. A. $\frac{3}{8}$. C. 17. L. 1. 50. L. tr. 6/14.

Length of head $3\frac{2}{3}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{4}$ in length of head, 2 diam. from end of snout, and



1½ apart. Fine pores visible over most of the scaleless portion of the head. *Teeth*—canines rather small, lateral row in jaws near the front compressed and pointed, the posterior 6 or 8 rounded, the first few larger. *Fins*—dorsal spines increasing in length to 3rd and 4th, which are not quite so long as the last rays. Second anal spine strongest, but not so long as 3rd, which equals 2nd dorsal; caudal forked. *Colour*—olive, with yellow longitudinal bands; a small violet spot in axilla.

Hab. Red Sea and Ceylon.

779. (7.) *Lethrinus harak*.

Sciæna harak, *Forsk. Descr. Anim.* p. 52, no. 63.

Lethrinus harak, *Day, Fish. India*, p. 137, pl. xxxiii, fig. 3 (see synonym.).

Po-tang-dah, Andam.

D. 10/9. P. 12. A. 3/8. C. 17. L. 1. 46-47. L. tr. 5½/15. Cæc. pyl. 3.

Length of head 3½, height of body 3½ in the total length. *Eyes*—diameter 3¼ to 4 in length of head, rather above 2 diam. from end of snout, and 1 apart. Snout rather elongate and pointed, having a slight swelling above anterior upper edge of eye. *Teeth*—canines in both jaws moderate; the first four teeth in the lateral row conically obtuse, whilst the hind teeth are large and rounded. *Fins*—dorsal spines increasing in length to 4th, which is about equal to length of rays. Ventral just reaches anal spines, of which the third is slightly the longest; caudal forked. *Colour*—greenish olive, with an oblong blackish blotch below the lateral line opposite the middle of the dorsal fin.

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

4. Genus *SPHÆRODON*, Rüpp.

Syn. *Chrysoplarys*, sp., Cuv. & Val.; *Monotaxis*, Bennett.

Branchiostegals six; pseudobranchiæ. Jaws with conical canines in front and a single row of molars laterally. A single dorsal fin with 10 spines, receivable into a groove at their base; 3 anal spines. Scales of moderate size, extending on to the cheeks. Pyloric appendages few.

Geographical Distribution. Red Sea and Indian Ocean.

780. (1.) *Sphærodon grandoculis*.

Sciæna grandoculis, *Forsk. Descr. Anim.* p. 53, no. 65.

Sphærodon heterodon, *Günther, Cat. i.*, p. 465; *Day, Fish. India*, p. 138, *Suppl.* p. 787 (see synonym.).

D. 10/10. P. 15. A. 3/9. C. 17. L. 1. 44-48. L. tr. 5/14.

Length of head 4, height of body 3½ in the total length. *Eyes*—diameter 3 to 3½ in length of head, ⅔ to 1 diam. from end of



snout, and 1 apart. A swelling over the anterior upper edge of the orbit. *Teeth*—molars very broad. *Fins*—dorsal spines increasing in length to the third and fourth, behind which they continue about the same length; pectoral extends to above the anal; caudal deeply forked and elongate in the young. *Colour*—rosy, scales with darker edges; base of pectoral violet.

Considerable changes in the form of this fish occur with age, the head becoming much more obtuse in adults, the preorbital comparatively higher and the upper jaw longer, extending further posteriorly in old specimens. Markings on the body disappear with age, but black or deep blue spots, which are absent in the young, appear at the bases of the dorsal and anal fins.

Hab. Ceylon and Malay Archipelago.

5. Genus **PAGRUS**, Cuv.

Syn. Argyrops, Swains.

Branchiostegals six; pseudobranchiæ. Jaws with an anterior row of conical canines, and laterally two rows of rounded molars, with sometimes a rudimentary third. A single dorsal fin with from 11 to 12 spines, sometimes elongate, receivable into a groove at their base; anal with 3. Scales of moderate size, extending on to the cheeks. Air-bladder simple. Pyloric appendages, when present, in small numbers.

Geographical Distribution. Atlantic, Mediterranean, Red Sea, and Indian Ocean to New Zealand.

781. (1.) *Pagrus spinifer*. (Fig. 16.)

Sparus spinifer, *Forsk. Descr. Anim.* p. 32, no. 23.

Pagrus spinifer, *Day, Fish. India*, p. 138, pl. xxxiii, fig. 5, *Suppl.* p. 787 (see *synon.*).

Sokru, Baluch.; *Kooroota*, Tel.; *Pununtlai*, Tam.

D. 11-12/9-11. P. 15. A. 3/8-9. L. 1. 53. L. tr. 6-7/18. Cæc. pyl. 5.

Length of head $3\frac{2}{3}$ to $3\frac{3}{4}$, height of body $2\frac{1}{2}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ to 4 in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and nearly 1 apart. *Teeth*—four conical incisors in front of each jaw, with about three rows of rounded teeth immediately behind them; two rows of teeth with rounded crowns along the sides of either jaw, the hindermost small and in more than two rows, the first few in the outer row of the maxilla may be more or less conical. *Fins*—dorsal spines compressed, the young having filamentous prolongations, first two very short, just appearing above the scales, the third the longest in the fin; the 2nd anal spine a little stronger than the third and of about equal length; caudal emarginate. *Scales*—cycloid. *Colour*—whitish, with pinkish bands passing along the middle of every scale and becoming rather indistinct below the middle of the body. In



specimens up to 4 inches in length there are five vertical bands on the body.

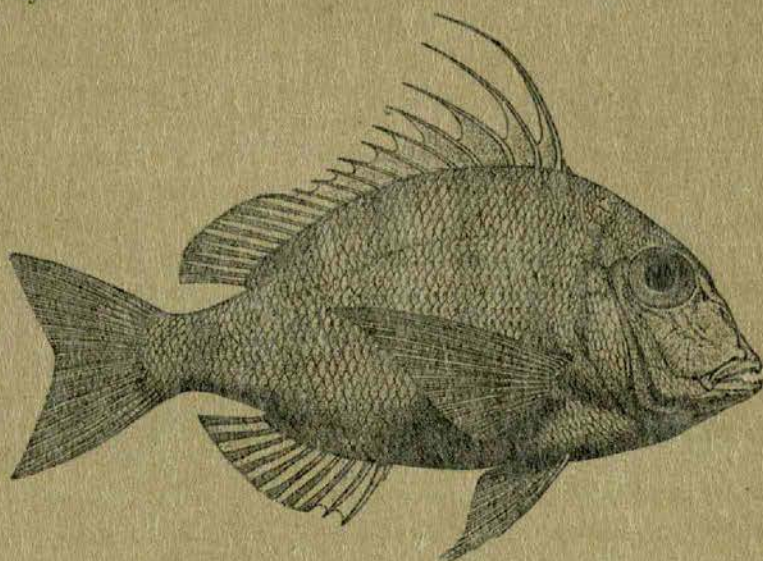


Fig. 16.—*Pagrus spinifer*.

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

6. Genus **CHRYSOPHRYS**, Cuv.

Syn. *Chrysoblephus*, Swainson.

Branchiostegals six; pseudobranchiæ. Body oblong, compressed. Four to 3 conical or compressed teeth in front, and 3 or 4 rows of rounded molars laterally in both jaws. A single dorsal fin, with from 11 to 13 spines, receivable into a groove at their base; anal with 3 spines. Scales of moderate size, extending over the cheeks. Air-bladder sometimes notched or with very short appendages. Pyloric appendages few.

Geographical Distribution. Tropical and warmer temperate seas.

Synopsis of Indian Species.

- A. Six incisors in front of each jaw.
- a. Second anal spine very large, exceeding any dorsal spine.
- L. tr. 4-5/11 1. *C. datnia*, p. 44.
- L. tr. 6/13 2. *C. berda*, p. 44.
- b. Second anal spine not longer than dorsal spines.
- Height of body $3-3\frac{1}{2}$ in total (sometimes 4 incisors only) 3. *C. cuvieri*, p. 45.
- Height of body $2\frac{3}{4}$ in total 4. *C. aries*, p. 46.
- B. Six incisors in upper, 4 in lower jaw 5. *C. bifasciata*, p. 46.
- C. 4-6 incisors in upper, 6-8 in lower jaw 6. *C. sarba*, p. 47.

782. (1.) *Chrysophrys datnia*. (Fig. 17.)

Coius datnia, Ham. *Buch. Fish. Ganges*, pp. 88, 369, pl. 9, fig. 29.
Chrysophrys datnia, Day, *Fish. India*, pp. 140, pl. xxxiv, fig. 1,
Suppl. p. 788 (see *synon.*).

Karkutla, Maráthi; *Maramus*, Arabic.

D. 11-13/11-10. A. 3/8-9. L. 1. 46-48. L. tr. 4-5/11. C. pyl. 4.

Length of head 4 to 4½, height of body 2¾ in the total length. *Eyes*—diameter 4 to 5 in length of head, 1 to 1½ diam. from end of snout and also apart. A slight protuberance above the anterior upper angle of the orbit. Dorsal profile considerably elevated. Vertical limb of preopercle very finely serrated; opercle with a well-developed spine. *Teeth*—six incisors in front of either jaw, with rounded teeth behind them; an outer row of only 4 or 5 compressed teeth at the side in either jaw, within this are 3 or 4 rows of rounded molars in the lower and 4 or 5 in the upper jaw; the inner teeth of the hind rows are the largest. *Fins*—dorsal spines alternately broader on each side, the fourth the longest. *Colour*—silvery grey, the bases of the scales darkest and their edges silvery;

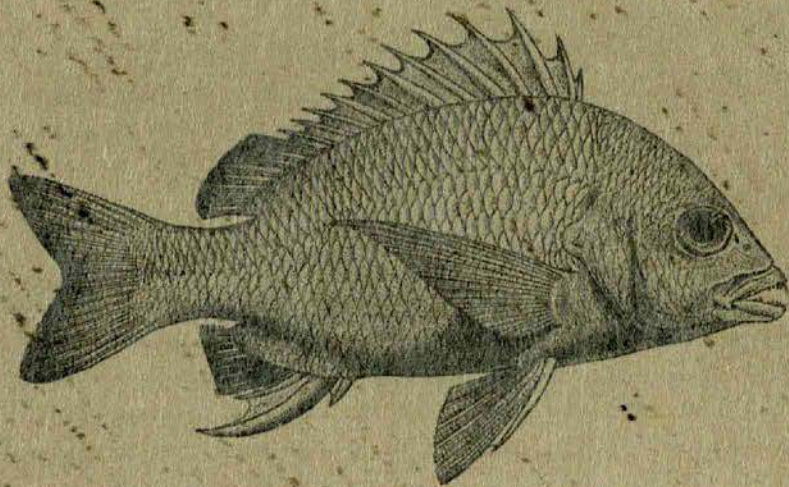


Fig. 17.—*Chrysophrys datnia*.

this is most distinct above the lateral line; a dark interorbital band; dorsal and caudal with black edges, a dark band along soft dorsal and first few anal rays.

Hab. Seas and estuaries of India and the Malay Archipelago; growing to 18 inches in length.

783. (2.) *Chrysophrys berda*.

Sparus berda, Forsk. *Descr. Anim.* p. 32, no. 24.

Chrysophrys berda, Day, *Fish. India*, pp. 140, pl. xxxiv, fig. 2,
 pl. xxxv, fig. 2 (var. *calamara*), *Suppl.* p. 788 (see *synon.*).

Kharva, Maráthi; *Dun-de-a* and *Jarras*, Sind.; *Calamara*, Tel.; *Aree*,
 Mal.; *Coorria* and *Currapu-mattawa*, Tam.; *Kala mudwan*, Hind.; *Nya-*
wah, Mugh; *Moo-roo-kee-dah*, Andam.



D. 11-12/11-12. A. 3/8-10. L. l. 44-46. L. tr. 6/13. C. pyl. 3.

Length of head 4, height of body $2\frac{1}{2}$ to $2\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head (in a young specimen $4\frac{3}{10}$ inches long 3), $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout and also apart. Dorsal profile much more convex than abdominal. Vertical margin of preopercle a little roughened or even minutely serrated; opercle with a distinct spine. *Teeth*—six incisors in front of either jaw, the remainder of the teeth with rounded crowns, except occasionally a few in outer row of upper jaw; three or four rows in lower jaw, four or five in upper, the largest being the last of the inner series. *Fins*—each alternate dorsal spine strongest on one side, the fourth or fifth slightly the longest. Second anal spine much the longest and strongest, being from $\frac{1}{2}$ or a little more (in typical *berda*) to $\frac{3}{4}$ (in var. *calamara*) the length of the head; caudal emarginate. *Air-bladder*—notched posteriorly. *Colour*—in *berda* silvery grey. Scales darkest at their bases. Usually a black spot behind opercle. A black edge to dorsal interspinous membrane; soft dorsal, caudal, and anal with black edges; a dark band along anal fin. In specimens from Sind brownish bands usually radiate from the eye. In the variety *calamara* the fish is dark greyish, the scales with dark edges, the fins black or edged with black. Some specimens are much darker than others.

Hab. Red Sea, and seas of India to the Malay Archipelago and beyond. I have taken specimens of *C. berda* in Sind 30 inches in length. The var. *calamara* is known as "black rock cod" in the Madras Presidency, and is excellent eating; it is common in Malabar until July.

784. (3.) *Chrysophrys cuvieri*.

Chrysophrys cuvieri, Day, *Fish. India*, p. 141, pl. xxxiv, fig. 3, *Suppl.* p. 788 (see synonym.).

D. 11/11-12. P. 15. A. 3/8-9. L. l. 48. L. tr. 4-5/13.

Length of head $3\frac{1}{2}$ to 4, height of body from 3 to $3\frac{1}{2}$ (in the young) in the total length. *Eyes*—diameter 6 (to 4 in the young) in length of head, $1\frac{1}{4}$ to 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Dorsal profile but little elevated in the adult. Opercle with a distinct spine. *Teeth*—four to six sharp, pointed and rather conical incisors in front of either jaw, with villiform teeth behind them; a pointed and compressed row along outer side of each jaw, the last few teeth of which are small and with rounded crowns; inside these are two rounded rows of small molars in the lower and three in the upper jaw. *Fins*—dorsal spines alternately strongest on each side, the 4th or 5th the highest; first anal spine short, the second strong and longest; caudal slightly lobed. *Scales*—seven rows between the eye and angle of the preopercle; the caudal with fine scales almost to its end. *Colour*—silvery grey, about eight lines radiate from eye and posterior edge of pre-orbital; each row of scales has a darkish band along its centre; dorsal and caudal fins black-tipped, a grey band along the middle