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FISH

PART IV.

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FISH (*PART IV*).

By B. L. CHAUDHURI.

This paper contains a systematic treatment of the division Perciformes of the sub-order Acanthopterygii. The total number of specimens examined and recorded is 281. They belong to seventeen known species, to thirteen genera and seven families.

Sub-Order *ACANTHOPTERYGII.*

Division PERCIFORMES.

Family LOBOTIDAE.

Genus **COIUS**[1] Hamilton Buchanan.

Coius quadrifasciatus (Sevastianof).

1809. *Chaetodon quadrifasciatus*, Sevastianof, *Mém. Acad. Imp. Sci. St. Pétersbourg* I, p. 448, tab. xviii, fig. 2.
1822. *Coius polota*, Hamilton Buchanan, *Fish. Ganges*, pp. 95 and 370, pl. xxxviii, fig. 2.
1842. *Anoplus polota*, Temminck and Schlegel, *Faun. Japon.*, p. 17.
1844. *Anoplus polota*, Richardson, *Zool. Voy.* '*Sulpher*,' p. 83.
1849. *Datina polota*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 998.
1851. *Lobotes hexazona*, Bleeker, *Nat. Tijdschr. Ned. Ind.* I, p. 9.
1853. *Datnioides polota*, *id.*, *ibid.*, V, p. 441.
1859. *Datnioides polota*, Günther, *Cat. Fish. Brit. Mus.* I, p. 339.
1876. *Datnioides quadrifasciatus*, Bleeker, *Arch. Néerl. Sc. Nat.* XI, i, p. 272.
1877. *Datnioides quadrifasciatus*, *id.*, *Atl. Ichthyol. Ind. Orient. Néerl.* VIII, p. 32, pl. cccy. fig. 1.
1878. *Datnioides poluta*, Day, *Fish. Ind.* p. 96, pl. xxiv, fig. 6.
1889. *Datnioides quadrifasciatus*, Day, *Faun. Brit. Ind. Fish.* I, p. 535, fig. 162.
1890. *Datnioides polota*, Vinciguerra, *Ann. Civ. Stor. Nat. Genova* (2) IX, p. 162.
1905. *Coius quadrifasciatus*, Fowler, *Proc. Acad. Nat. Sci. Philadelphia* LVII, p. 504.
1907. *Datnioides polota*, Lloyd, *Rec. Ind. Mus.* I, p. 227.

The original specimen of Sevastianof (not Sebastian as given by Day in the Fauna volume) must have been a young one as his figure shows all the three radiating brown bands from the orbit which are conspicuous in the young specimens only. The figure of Sevastianof is apparently life size, measuring 55 mm. in length. In colouration and marking it resembles most of the young specimens in the collection.

[1] ***Coius*** is one of Hamilton Buchanan's composite genera (*Fish. Ganges*, p. 85). As Bleeker's *Datnioides* is the last name proposed, it gives precedence to *Coius*, of which *Coius polota* of Hamilton Buchanan is the type.

Hamilton Buchanan's figure does not show the round marking on the post-opercle. Day's figures—both for *D. polota* in *Fish. Ind.* and for *D. quadrifasciatus* in the Fauna—show these markings, though no mention is made of them in the text. This round marking on the post-opercle is very conspicuous in all the young ones but is not traceable in the larger specimens in the collection. The ventral fin, the base of which is almost directly below the root of the pectoral fin, has one spine and five branching rays; the spine is outermost and of the rays the two next the spine have filiform endings, the inner one having a much more elongated ending than the one next to the spine. The fish is a permanent inhabitant in the main area of the lake, where it breeds at the end of the rainy season.

There are altogether eleven specimens in the collection of which eight are young.

The following list gives the different parts of the lake from which the specimens were collected, together with their number and size :—

			mm.
4 specimens	Mouth of Barkul Bay	18th September, 1914	21—37.
3 ,,	Off Mottapur	14th March, 1918	50—60.
1 specimen	Off Nalbano ...	18th September, 1914	22.
2 specimens	Rambha ...	21—31st July, 1913	125—175.
1 specimen	,, ...	1st January, 1915	142.

Distribution.—The estuaries of the Ganges and the rivers of Burma, Siam, the Malay Peninsula and the Malay Archipelago.

Family SERRANIDAE.

Sub-family *CENTROPOMINAE.*

Genus **LATES** Cuvier and Valenciennes.

Lates calcarifer (Bloch).

1790. *Holocentrus calcarifer*, Bloch, *Ausl. Fisch.* IV, p. 100, pl. ccxliv.
1801. *Perca calcar*, Bloch and Schneider, *Syst. Ichthyol.* I, p. 89.
1802. *Holocentrus heptadactylus*, Lacépède, *Hist. Nat. Poiss.* IV, p. 344.
1803. *Perca* sp. (*pandoomenoo*), Russell, *Fish. Vizagapatam* II, p. 23, pl. cxxxii.
1822. *Coius vacti*, Hamilton Buchanan, *Fish. Ganges*, pp. 86 and 369, pl. xvi, fig. 28.
1828. *Lates nobilis*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* II, p. 96, pl. xiii.
1828. *Lates calcarifer*, *id*, *ibid.*, II, p. 100.
1845. *Lates nobilis*, Bleeker, *Nat. Geneesk. Arch. Ned. Ind.* II, p. 524.
1846. *Lates nobilis*, Richards, *Rep. Brit. Assoc. Adv. Sc.* 1845, p. 222.
1846. *Lates calcarifer*, *id.*, *ibid.*
1849. *Lates nobilis*, Bleeker, *Verh. Batav. Gen.* XXII, p. 27.
1849. *Lates heptadactylus*, Bleeker, *Journ. Asiat. Soc. Bengal*, p. 983.
1853. *Lates nobilis*, Jerdon, *Madras Jour. Lit. Sci.* XVII, p. 128.
1859. *Lates calcarifer*, Günther, *Cat. Fish. Brit. Mus.* I, p. 68.
1865. *Lates calcarifer*, Day, *Fish. Malabar*, p. 2.
1870. *Lates calcarifer*, Günther, *Proc. Zool. Soc. London*, p. 824.

1876. *Lates calcarifer*, Day, *Fish. Ind.*, p. 7, pl. i, fig. 1.
1876. *Plectropoma calcarifer*, Bleeker, *Atl. Ichthyol. Ind. Orient. Néerl.* VII, p. 109, pl. cccxxii, fig. 3.
1877. *Pseudolates cavifrons*, Alleyne and Macleay, *Proc. Linn. Soc. N. S. W.* I, p. 262, pl. iii.
1878. *Lates darwiniensis*, Macleay, *ibid.*, II, p. 345.
1889. *Lates calcarifer*, Day, *Faun. Brit. Ind. Fish.* I, p. 440, fig. 139.
1890. *Lates calcarifer*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova*, (2) IX, p. 162.
1895. *Lates calcarifer*, Boulenger, *Cat. Perc. Fish. Brit. Mus.* I, p. 363.
1906. *Plectropomus calcarifer*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 255.
1907. *Lates calcarifer*, Lloyd, *Rec. Ind. Mus.* I, p. 225.
1907. *Plectropoma calcariferum*, Evermann and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 78.
1910. *Lates calcarifer*, Jenkins, *Rec. Ind. Mus.* V, p. 131.
1911. *Lates calcarifer*, Willey, *Spol. Zeylanica* VII, p. 100.
1912. *Lates calcarifer*, Jenkins, *Rec. Ind. Mus.* VII, p. 54.
1913. *Lates calcarifer*, Weber, *Siboga-Exped.* LVII, *Fische*, p. 215.
1916. *Lates calcarifer*, Sundara Raj, *Rec. Ind. Mus.* XII, p. 278.

There are two specimens in the collection, both from Satpara ; one measuring 262 mm. in length was secured in March 1914, and the other, measuring 137 mm. in length, was captured on the 10th October. The fish is thus reported only from the outer channel.[1]

Distribution.—Coasts and mouths of rivers of South Eastern Asia from India to Southern China, Malay Archipelago, the Philippine Islands, Australia and New Guinea.

Sub-family *CHANDINAE.*

Genus **CHANDA**[2] Hamilton Buchanan.

Chanda ambassis (Lacépède).

1775. ? *Sciaena safgha*, Forskal, *Descrip. Animal*, p. 53.
1801. ? *Perca safgha*, Bloch and Schneider, *Syst. Ichthyol.*

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[1] It is, however, common in Rambha Bay in the main area. *N. A.*

[2] The generic name *Chanda* of Hamilton Buchanan [*Fish. Ganges*, 1822, pp. 103 and 370] has priority over *Ambassis* of Cuvier and Valenciennes [*Hist. Nat. Poiss.*, II (1828), p. 175]. This was pointed out by M'Clelland and Cantor as well as by Waite, although Fowler (*loc. cit.*), the first reviser of *Chanda*, had regarded its type identical with the type of Bleeker's genus *Pseudoambassis*. *Chanda* of Hamilton Buchanan, which is the same as *Bogoda* of Bleeker, is characterized by the uninterrupted lateral line, small or minute scales and strong curved canines and is distinguished from the related genera by the serrated pre-orbital, small teeth, comparatively larger scales, complete lateral line and the presence of about ten rays in the dorsal fin. A procumbent dorsal spine is always present but in some cases it is small and concealed in the flesh [*The Fishes of Samoa* by Drs. Jordan and A. Seal, *Bull Bur. Fish.* (*U.S.*) xxv, p. 175]. Fowler, and long before him Cuvier and Valenciennes, observed that the two first species under *Chanda* as described by Hamilton Buchanan belonged to a different genus altogether and for this reason Cuvier and Valenciennes suppressed the name *Chanda*, but they often showed themselves zealous in cancelling valid names without any justification. It should be remembered that Hamilton Buchanan clearly expressed his doubts as to the propriety of placing these two species in his genus *Chanda*. The fact that he placed these two admittedly doubtful species under the generic name cannot therefore vitiate it. As to the first doubtful species, Hamilton Buchanan himself proposed to place it in another genus : " This species is ill defined, and might, perhaps, be placed as a *Coius*." (*Fish. Ganges*, p. 105). He further pointed out, " As in the genera already described there are, as it were, certain intermediate species, so in this the two first, which I have described, together with the *Zeus insidiator*, have but little of the transparency, which forms part of the generic character." He further stated that his excuse for including these two

1802. *Centropomus ambassis*, Lacépède, *Hist. Nat. Poiss.* IV, p. 273.
1828. *Ambassis commersonii*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* II, p. 176, pl. xxv.
1837. *Ambassis commersonii*, Rüppell, *Neu. wirbel. Fisch.*, p. 89.
1849. *Ambassis commersonii*, Bleeker, *Verh. Batav. Gen.* XXII, p. 30.
1849. *Ambassis macracanthus*, *id.*, *ibid.*, p. 30.
1859. *Ambasssis commersonii*, Günther, *Cat. Fish. Brit. Mus.* I, p. 223.
1859. *Ambassis macracanthus*, *id.*, *ibid.*, p. 227.
1865. *Ambassis commersonii*, Day, *Fish. Malabar*, p. 15.
1866. *Ambassis productus*, Guichenot, *Mém. Soc. Sci. Cherbourg* XII, p. 130.
1868. *Ambassis commersonii*, Peters, *Reis. Mossamb.* IV, p. 10.
1870. *Ambassis macracanthus*, Day, *Proc. Zool. Soc. London*, p. 681.
1875. *Ambassis commersonii*, *id.*, *Fish. Ind.*, p. 52, pl. xv, fig. 3.
1877. *Ambassis commersonii*, Bleeker, *Atl. Ichthyol. Ind. Orient. Néerl.* VIII, pp. 133 and 136.
1889. *Ambassis commersonii*, Day, *Faun. Brit. Ind. Fish.* I, 488.
1905. *Ambassis ambassis*, Fowler, *Proc. Acad. Nat. Sci. Philadelphia* LVII, p. 500.
1915. *Ambassis commersonii*, Boulenger, *Brit. Mus. Cat. Freshw. Fish. Africa* III, p. 112, fig. 85.
1916. *Ambassis ambassis*, Sundara Raj, *Rec. Ind. Mus.*, XII, p. 279.
1916. *Ambassis commersonii*, Boulenger, *Brit. Mus. Cat. Freshw. Fish. Africa*, IV, p. 326.

There are only two specimens in the collection, both secured from a fisherman at Kalupara Ghat on 7th April 1914; these are 54·6 and 64·5 mm. in length.

Distribution.—East coast of Africa, shores of India and the Malay Archipelago, North coast of Australia. The species ascends rivers and estuaries.

Genus **PRIOPIS**[1] Kuhl and van Hasselt.

Priopis gymnocephalus (Lacépède).

1802. *Lutjanus gymnocephalus*, Lacépède, *Hist. Nat. Poiss.* III, p. 479, pl. xxiii, fig. 3 and IV, p. 216.
1828. *Ambassis dussumieri*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* II, p. 181.
1831. *Lutjanus gymnocephalus*, Lacépède and Desmarest, *Hist. Nat. Poiss.* V, p. 108.
1834. *Ambassis dussumieri*, Quoy and Gaimard, *Voy. "Astrolabe" Poiss.* III, p. 645, pl. i, fig. 3.
1845. *Ambassis dussumieri*, Bleeker, *Nat. Geneesk. Arch. Ned. Ind.*, II, p. 520.
1849. *Chanda dussumieri*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 988.
1849. *Chanda gymnocephala*, *id.*, *ibid.*, p. 989.
1859. *Ambassis dussumieri*, Günther, *Cat. Fish. Brit. Mus.* I, p. 225.
1865. *Ambassis dussumieri*, Day, *Fish. Malabar*, p. 16.

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doubtful species (*viz.*, *C. setifer* and *C. ruconius.*) in his genus *Chanda* was that the name was a common local appellation for all the species he included. A very curious mistake may be noted here. In Agassiz's *Nomenclator Zoologicus* Pisces, p. 15) Hamilton Buchanan's generic name *Chanda* is stated to have been derived from "the Greek word καυδος =hians!" It is in reality a vernacular name. The word is not derived from the Hindi word *Chandi* (=silver), as wrongly supposed by Cantor and Day, but from the Bengali word *Chand*=moon, from the moon-like rounded shape and the moon-like semitranslucent lustre exhibited by these fishes in their sudden sallies to the surface of the water and quick retreat.

[1] The genus *Priopis*, Kuhl and van Hasselt (Cuvier and Valenciennes, *Hist. Nat. Poiss.* VI, *p.* 503) is defined as *Chanda* with the lateral line interrupted (Jordan and Seale, *Proc. U. S. Nat. Mus.* XXVIII, p. 780).

1865. ***Ambassis dussumieri***, Kner, *Reis. Novara' Fisch.*, p. 41.
1869. ***Ambassis vachelli***, Peters, *Monatsb. Königl. Preuss. Akad. Wiss., Berlin* (1868), p. 255.
1870. ***Ambassis dussumieri***, Day, *Proc. Zool. Soc. London*, p. 681.
1874. ***Ambassis gymnocephalus***, Bleeker, *Nat. Verh. Holl. Maatsch. Wetensch.* II, p. 15.
1877. ***Ambassis gymnocephalus***, Bleeker, *Atl. Ichthyol. Ind. Orient. Néerl.* VIII, pp. 133 and 138, pl. ccclii, fig. 3.
1878. ***Ambassis gymnocephalus***, Day, *Fish. Ind.* p. 54, pl. ccclii, fig. 3.
1879. ***Ambassis gymnocephalus***, Bleeker, *Verh. Akad. Amsterdam*, XVIII, p. 13.
1889. ***Ambassis gymnocephalus***, Day, *Faun. Brit. Ind. Fish.* I, p. 489.
1905. ***Priopis gymnocephalus***, Jordan and Seale, *Proc. U. S. Nat. Mus* XXVIII, p. 780.
1905. ***Ambassis gymnocephalus***, Fowler, *Proc. Acad. Nat. Sci. Philadelphia* LVII, p. 501.
1913. ***Ambassis gymnocephalus***, Weber, *Fisch. Siboga'-Exped.*, p. 217.

Lacépède's figure is defective as it does not show that the lateral line is not continuous.

In many specimens there is no external appearance of the horizontal spine in front of the first dorsal fin.

In some specimens the tips of the pelvic fins reach the vent, covering the anal opening. The caudal fin is not tipped with black in some, and in some the skin between the first dorsal fin and the body is black.

There are altogether forty-seven specimens in the collection; the following list gives the distribution of the species in the lake :—

			mm.
9 specimens	Off Barkul	18-21st September, 1914 ...	39—48
16 ,,	Off mouth of Barkul Bay	18th September, 1914 ...	35·5—48
1 specimen	Off Barkul	13th November, 1914 ...	35
1 ,,	Chirriya Island (shore collecting) ...	13th February, 1914 ...	16·5
3 specimens	Chirriya Island (Towards Samal Point) ...	17th February, 1914 ...	42·5—47·5
1 specimen	Between Chirriya Island and Barkuda Island ...	17th November, 1914 ...	47
3 specimens	Rambha Bay ...	February, 1914 ...	46—51
1 specimen	,, ,, ...	March, 1914 ...	44
1 specimen	Satpara (shore collecting)	13th March, 1914 ...	17·5
2 specimens	West of Satpara (tow netting)	20th March, 1914 ...	10—12
1 specimen	Satpara	March, 1914 ...	43
5 specimens	,, ...	12-13th September, 1914 ...	38—50
3 ,,	,, ...	October, 1914 ...	40—43
1 specimen	,, ...	... ...	40·5

The species occurs in the main area of the lake as well as in the outer channel, where it breeds. It is a permanent inhabitant in the lake.

Distribution.—Coasts of Orissa and Malabar, entering rivers and estuaries in India, Seychelles, Penang, Javanese and Chinese seas, Celebes and Isle de France.

Sub-family *LUTJANINAE.*

Genus **LUTJANUS** Bloch.

Lutjanus johnii (Bloch).

1795. *Anthias johnii*, Bloch, *Ichthyol.* IX, p. 97, pl. cccxviii.
1801. *Anthias johnii*, Bloch and Schneider, *Syst. Ichthyol.*, p. 303.
1802. *Lutjanus johnii*, Lacépède, *Hist. Poiss.* IV, p. 235.
1803. *Sparus* sp. (*doondiawah*), Russell, *Fish. Vizagapatam*, I, p. 76, pl. xcvii.
1803. *Sparus* sp. (*mungimupudee*), *id.*, *ibid.*, II, p. 8, pl. cx.
1803. *Sparus tranquebaricus*, Shaw, *Gen. Zool.*, *Pisc.* IV, p. 471.
1822. *Coius catus*, Hamilton Buchanan, *Fish. Ganges*, pp. 90 & 369, pl. 38, fig. 30.
1824. *Mesoprion unimaculatus*, Quoy and Gaimard, *Zool. Freycin.*, pp. 304-441.
1828. *Mesoprion johnii*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* II, p. 443.
1831. *Mesoprion flavipinnis*, *id.*, *ibid.*, VII, p. 475.
1831. *Serranus pavoninus*, *id.*, *ibid.*, VII, p. 443.
1831. *Lutjanus johnii*, Desmarest, *Oeuvres Lacép.*, IX, p. 127.
1834. *Mesoprion unimaculatus*, Quoy and Gaimard, *Voy. de l'Astrolabe.*, *Poiss.* III, p. 665, pl. V, fig. 3.
1836. *Mesoprion unimaculatus*, Cuvier, *Règ. Anim.*, *Poiss.* p. 35.
1846. *Mesoprion unimaculatus*, Richardson, *Rep. Brit. Assoc. Adv. Sc.* (1845), p. 229.
1849. *Mesoprion johnii*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 995.
1849. *Mesoprion unimaculatus*, Bleeker, *Verh. Batav. Gen.* XXII, pp. 4, 20 and 42.
1853. *Mesoprion unimaculatus*, Jerdon, *Madras Journ. Lit. Sci.* XVII, p. 130.
1859. *Serranus pavoninus*, Günther, *Cat. Fish. Brit. Mus.* I, p. 126.
1859. *Mesoprion johnii*, *id.*, *ibid.*, p. 200.
1865. *Mesoprion johnii*, Day, *Fish. Malabar*, p. 11.
1865. *Mesoprion johnii*, Kner, *Reis. 'Novara' Fisch.*, p. 35.
1876. *Lutianis johnii*, Day, *Fish. Ind.*, p. 42, pl. xiii, fig. 1.
1877. *Lutjanus johni*, Bleeker, *Atl. Ichthyol. Ind. Orient. Neérl.* VIII, p. 49, pl. cccxxxviii, fig. 1.
1889. *Lutjanus johnii*, Day, *Faun. Brit. Ind. Fish.* I, p. 476.
1904. *Lutianus johnii*, Fowler, *Journ. Acad. Nat. Sci. Philadelphia* (2) XII, p. 325.
1906. *Lutianus johni*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 264.
1907. *Lutianus johnii*, Lloyd, *Rec. Ind. Mus.*, I, p. 226.
1907. *Lutianus johnii*, Evermann and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 79.
1908. *Lutianus johnii*, Gilchrist and Thomson, *Ann. South African Mus.* VI, p. 213.
1913. *Lutianus johnii*, Weber, *'Siboga'-Exped.* LVII, *Fisch*, p. 247.

There is only one specimen (young) measuring 50 mm. in length, captured on 17th November 1914, when proceeding across the mouth of Rambha Bay between Chirriya Island and Barkuda Island. There are three broad but faint transverse bands; the black ocellus commences at the thirty-fourth scale from the snout and on the twentieth scale of the lateral line; the ocellus measures 10 mm. × 8 mm.

The species is only an occasional visitor in the main area of the lake.

Distribution.—Coasts of Africa, Red Sea, seas of India, ascending some distance up tidal rivers, Malay Archipelago, coasts of China and Australia.

Genus **THERAPON**[1] Cuvier.

Therapon jarbua (Forskal).

1775. *Sciaena jarbua*, Forskal, *Descr. Anim.*, p. 50.
1788. *Sciaena jarbua*, Linnaeus, *Syst. Natur.*, *Gmelin*, Ed. XIII, p. 1303.
1790. *Holocentrus servus*, Bloch, *Ausl. Fisch.* IV, p. 80, pl. ccxxxviii, fig. 1.
1797. *Holocentrus servus*, *id.*, *Ichthyol.*, taf. ccxxxviii, fig. 1.
1801. *Grammistes servus*, Bloch and Schneider, *Syst. Ichthyol.*, I, p. 185.
1802. *Holocentrus jarbua*, Lacépède, *Hist. Nat. Poiss.* IV, pp. 348 and 355.
1817. *Terapon servus*, Cuvier, *Reg. Anim.*, Ed. I, II, p. 295.
1824. *Therapon timoriensis*, Quoy and Gaimard, *Voy. "Uranie" et " Physicienne, "* p. 341.
1829. *Therapon servus*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* III, p. 125.
1831. *Therapon servus*, *id.*, *ibid.*, VII, p. 479.
1836. *Therapon servus*, Cuvier, *Règ. Anim., Poiss.* p. 43.
1846. *Therapon servus*, Richardson, *Rept. Brit. Assoc. Adv. Sc.* (1845), p. 238.
1848. *Therapon servus* Bleeker, *Journ. Ind. Arch.* II, No. IX, p. 632.
1859. *Therapon servus*, Günther, *Cat. Fish. Brit. Mus.* I, p. 278.
1865. *Therapon servus*, Kner, *Reis. 'Novara,' Fisch.* p. 45.
1865. *Therapon servus*, Day, *Fish. Malabar*, p. 17.
1867. *Therapon servus*, Jouan, *Mém. Soc. Imp. Sci. Nat. Cherbourg* XIII, p. 251.
1868. *Therapon servus*, Peters, *Reis. Mossambique*, IV, p. 10.
1870. *Therapon jarbua*, Klunzinger, *Verh. Zool.-bot. Ges. Wien* XX, p. 729.
1873. *Therapon servus*, Günther, *Fisch. Sudsee* I, p. 26.
1873. *Therapon* (*Batnia*) *jarbua*, Bleeker, *Ned. Tijdschr. Dierk.* IV, p. 377.
1875. *Therapon servus*, Bleeker, *Atl. Ichthyol. Ind. Orient. Neérl.* VII, p. 112, pl. xxxiv, fig. 2.
1876. *Therapon jarbua*, Day, *Fish. Ind.* p. 69, pl. xviii, fig. 4.
1876. *Therapon* (*Datnia*) *jarbua*, Bleeker, *Arch. Néerl. Sc. Nat.* XI, I, p. 267.
1878. *Therapon* (*Datnia*) *jarbua*, Bleeker, *Arch. Néerl. Sc. Nat.* XIII, p. 42.
1884. *Therapon jarbua*, Klunzinger, *Fisch. Roth. Meer*, p. 729.
1889. *Therapon jarbua*, Day, *Faun. Brit. Ind. Fish.* I, p. 505, fig. 153.
1903. *Therapon jarbua*, Jordan and Evermann, *Proc. U. S. Nat. Mus.* XXV, p. 348.
1904. *Therapon jarbua*, Fowler, *Journ. Acad. Nat. Sci. Philadelphia* (2) XII, p. 527.
1905. *Terapon servus*, Jordan, *Guide Study Fish.* II, p. 342.
1906. *Terapon jarbua*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 266.
1907. *Terapon jarbua*, Smith and Pope, *Proc. U. S. Nat. Mus.* XXXI, p. 476.
1907. *Terapon jarbua*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 23.
1907. *Therapon jarbua*, Lloyd, *Rec. Ind. Mus.* I, p. 226.
1907. *Terapon jarbua*, Evermann and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 83.
1908. *Therapon jarbua*, Gilchrist and Thomson, *Ann. South Afric. Mus.* VI, p. 150.
1910. *Therapon servus*, Franz, *Abhandl. Akad. Wiss.* IV, p. 46.

[1] ***Terapon***, Cuvier, *Reg. Anim.* Ed. I (1817), p. 295, was a misprint for *Therapon* and was subsequently corrected in a later edition. ***Djabub***, Forskål, *Desc. Anim.* (1775), p. 44, though an earlier generic name, is held not eligible.

1911. *Terapon jarbua*, Jordan and Richardson, *Mem. Carnegie Mus.* IV, p. 187.
1912. *Therapon jarbua*, Bean and Weed, *Proc. U. S. Nat. Mus.* XIII, p. 605.
1913. *Therapon jarbua*, Weber, *'Siboga'-Exped.* LVII, *Fisch.*, p. 254.
1913. *Therapon jarbua*, Sewell, *Journ. Proc. Asiat. Soc. Bengal*, (n. s.) IX, pp. 334 and 344.
1913. *Therapon servus*, Jordan, Tanaka and Snyder, *Journ. Coll. Sci. Imp. Univ. Tokyo*, XXXIII, p. 168.
1915. *Therapon jarbua*, Boulenger, *Cat. Freshw. Fish. Afric. Brit. Mus.* III, p. 113, fig. 114.
1917. *Therapon jarbua*, Hornell, *Madras Fish. Bull.* XI, p. 91.

Hamilton Buchanan has left an excellent figure of this fish in the plate No. 67 of the volume of his manuscript drawings ;[1] the name *"Holocentrus (?) katkaya"* is on the back of the plate in his own handwriting. This drawing is evidently the original of the badly copied figure in Hardwicke's *Illustrations.*[2] The figure was named *Pterapon trivittatus* and was published without any acknowledgment of the source, the name also evidently was borrowed without acknowledgment from Hamilton's *Fishes of the Ganges* (p. 92) on a mistaken identity of the published species with the unpublished manuscript figures.

There are altogether five specimens in the collection, four of which are from Satpara, but no special locality is known for the fifth which measures 88 mm. and was collected at the end of July 1913. Of the Satpara specimens the biggest measures 115 mm. in length and was collected on 12th September 1914 and the remaining three on March, 1914, measuring 83 mm., 85 mm. and 95 mm. The biggest specimen has eleven spines in the first dorsal, the one measuring 95 mm. in length has ten prominent spines and a rudimentary one anteriorly. Of the rest one has a trace of a spine but the other two specimens have only ten prominent spines in the first dorsal fin. These facts satisfactorily explain the differences in the observations of Günther and Klunzinger on the number of spines.

Distribution.—Red Sea, east coast of Africa, seas and estuaries of India, the Malay Archipelago, north coast of Australia, Formosa, Japan, Samoa, Fiji, New Britain, New Guinea and the Solomon Islands.

Therapon puta, Cuvier.

1803. *Perca sp. (keelputa)*, Russell, *Fish. Vizag.* II, p. 19, pl. cxvi.
1817. *Terapon puta*, Cuvier, *Règ. Anim.* Ed. I, II, p. 295.
1822. *Coius trivittatus*, Hamilton Buchanan, *Fish. Ganges*, pp. 92 and 370.
1829. *Therapon puta*, Cuvier and Valenciennes, *Nat. Hist. Poiss.* III, p. 131.
1829. *Therapon ghebul, id., ibid.* III, p. 133.
1836. *Therapon puta*, Cuvier, *Règ. Anim., Poiss.*, p. 43, pl. xii, fig. 2.
1849. *Therapon trivittatus*, M'Clelland, *Journ. Asiat. Soc. Bengal*, p. 1001.
1853. *Therapon puta*, Jerdon, *Madras Journ. Lit. Sci.* XVII, p. 130.
1859. *Therapon trivittatus*, Günther, *Cat. Fish. Brit. Mus.* I, p. 281.
1859. *Therapon ghebul, id., ibid.*, I, p. 281.
1865. *Therapon trivittatus*, Kner, *Reis. 'Novara,' Fisch.*, p. 45.
1865. *Therapon trivittatus*, Day, *Fish. Malabar*, p. 17.
1873. *Therapon (Datina) trivittatus*, Bleeker, *Ned. Tijdschr. Dierk.* IV, p. 375.

[1] Chaudhuri, *Mem. Ind. Mus.* V, p. 444 and foot-note.
[2] Gray, *Illustrations of Indian Zoology from the collection of Major-General Hardwicke*, II, pl. lxxxviii, fig. 1.

1875. *Therapon puta*, *id.*, *Fish. Ind.*, p. 68, pl. xviii, fig. 3.
1884. *Therapon trivittatus*, De Vis, *Proc. Linn. Soc. N. S. W.* VIII, p. 457.
1889. *Therapon puta*, Day, *Faun. Brit. Ind. Fish.* I. p. 505.
1906. *Terapon puta*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 266.
1907. *Terapon puta*, Jordan and Seale, *ibid.* XXVI, p. 24.
1907. *Terapon puta*, Evermann and Seale, *ibid.* XXVI, p. 83.
1912. *Therapon puta*, Bean and Weed, *Proc. U. S. Nat. Mus.* XLII, p. 605.
1913. *Therapon puta*, Weber, *'Siboga'-Exped.* LVII, *Fisch.*, p. 91.
1913. *Therapon puta*, Sewell, *Journ. Proc. Asiat. Soc. Bengal* (n. s.) IX, p. 352.
1917. *Therapon puta*, Hornell, *Madras Fish. Bull.* XI, p. 91.

There are altogether thirty-six specimens in the collection, more than twenty of which are young. The list given below will show the time and place of their occurrence in the lake.

			mm.
2 specimens	Off Barnikuda	6th September, 1914,	54—62
1 specimen	Cherriakuda towards Samal Point	17th February, 1914	58
8 specimens	Mahosa (Barhampur Island)	18th March, 1914	26—20
1 specimen	Rambha Bay	February, 1914	74
1 specimen	Between Samal Island and mainland	September, 1913	32
1 specimen	Satpara	...	77
7 specimens	,,	March, 1914	68—87
7 specimens	Satpara Bay	13th March, 1914	15—25
3 specimens	,,	17th March, 1914	17, 18 & 21
1 specimen	South side of Satpara Island	13th March, 1914	14
2 specimens	West of Satpara	20th March, 1914	15 & 17
1 specimen	Seruanaddi	8th September, 1914	60
1 specimen	From Seruanaddi going towards Barnikuda	4th September, 1914	67

The young ones were mostly obtained in shore-collecting in the neighbourhood of Satpara Island. Numerous round light spots are found in these specimens between the horizontal bands. The caudal fin is immaculate in most of the young specimens. In some of the young specimens there is a black spot at the root of the caudal fin.

This fish appears to be a permanent inhabitant in the main area as well as in the outer channel, breeding in the latter area in winter.

Distribution.—Red sea, seas of India, Malay Archipelago, the Philippine Islands, coast of Australia, sea of Timur and South Pacific Ocean (the island of Samoa).

Family SILLAGINIDÆ.

Genus **SILLAGO,** Cuvier.

Sillago sihama (Forskål).

1775. *Atherina sihama*, Forskål, *Descrip. Anim.*, pp. xiii and 70.
1801. *Platycephalus sihamus*, Bloch and Schneider, *Syst. Ichthyol.*, p. 60.

1801. *Sciaena malabarica*, *id.*, *ibid.*, p. 18, pl. xix.
1803. *Sparus sp.* (*soring*), Russell, *Fish. Vizag.* II, p. 9, pl. cxiii.
1817. *Sillago acuta*, Cuvier, *Règ. Anim.* (Ed. I) II, p. 258.
1827. *Sillago sihama*, Rüppell, *Atl. Reis. Nord. Afrik. Fisch. Meer.* p. 9, pl. ii, fig. 1.
1829. *Sillago acuta*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* III, p. 400.
1829. *Sillago erythroea*, *id.*, *ibid.*, p. 409.
1835. *Sillago sihama*, Rüppell, *Neu. Wirbel. Faun. Abyssin. Fisch.*, p. 100.
1836. *Sillago sihama*, Cuvier, *Règ. Anim., Poiss.*, p. 45.
1845. *Sillago acuta*, Bleeker, *Nat. Geneesk. Arch. Ned. Ind.* II, pp. 524 and 527.
1849. *Sillago malabarica*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 1003.
1853. *Sillago acuta*, Jerdon, *Madras Journ. Lit. Sci.* XVII, p. 131.
1860. *Sillago sihama*, Günther, *Cat. Fish. Brit. Mus.* II, p. 243.
1861. *Sillago sihama*, Gill, *Proc. Ac. Nat. Sci. Philadelphia*, p. 504.
1861. *Sillago malabarica*, *id.*, *ibid.*
1865. *Sillago sihama*, Day, *Fish. Malabar*, p. 47.
1866. *Sillago sihama*, Playfair, *Fish. Zanzibar*, p. 69.
1867. *Sillago sihama*, Jouan, *Mém. Soc. Imper. Sci. Nat. Cherbourg* XIII, p. 252.
1868. *Sillago sihama*, Kner, *Reis. Oster. Novar. Fisch.*, p. 128.
1870. *Sillago sihama*, Klunzinger, *Verhandl. Zool.-Bot. Ges. Wien.* XX, p. 818.
1874. *Sillago sihama*, Bleeker, *Verh. Akad. Amsterdam* XIV, p. 67.
1876. *Sillago sihama*, Day, *Fish. Ind.*, p. 265, pl. lvii, fig. 3.
1880. *Sillago sihama*, Günther, *Rep. Voy. H. M. S.* "*Challenger*," *Zool.* I, p. 56.
1885. *Sillago sihama*, Macleay, *Proc. Linn. Soc. N. S. W.* IX, p. 28.
1885. *Sillago sihama*, Steindachner and Doderlein, *Denk. Akad. Wiss. Wien.* XLIX, p. 19.
1889. *Sillago sihama*, Day, *Faun. Brit. Ind. Fish.* II, p. 224.
1902. *Sillago sihama*, Jordan and Snyder, *Proc. U. S. Nat. Mus.* XXIV, p. 486.
1904. *Sillago sihama*, Fowler, *Journ. Acad. Nat. Sci. Philadelphia* XII, p. 549.
1905. *Sillago sihama*, Jordan, *Stud. Fish.* II, p. 358.
1905. *Sillago sihama*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 277.
1907. *Sillago sihama*, *id.*, *ibid.*, XXVI, p. 25.
1907. *Sillago sihama*, Smith and Pope, *Proc. U. S. Nat. Mus.* XXII, p. 478.
1908. *Sillago sihama*, Gilchrist and Thomson, *Ann. S. Afric. Mus.* VI, p. 192.
1910. *Sillago sihama*, Jenkins, *Rec. Ind. Mus.* V, pp. 132 and 136.
1910. *Sillago sihama*, Franz, *Abhandl. Bayer. Akad. Wiss.* IV, *suppl.* I, p. 83.
1911. *Sillago sihama*, Jordan and Richardson, *Mem. Carnegie Mus.* IV, p. 192.
1912. *Sillago sihama*, Bean and Weed, *Proc. U. S. Nat. Mus.* XLII, p. 607.
1912. *Sillago sihama*, Jenkins, *Rec. Ind. Mus.* VII, p. 60.
1913. *Sillago sihama*, Tanaka, *Fig. Descrip. Fish. Japan* XIV, p. 241, pl. lxviii.
1913. *Sillago sihama*, Jordan, Tanaka and Snyder, *Journ. Coll. Sci. Imp. Univ. Tokyo* XXXIII, p. 187.
1913. *Sillago sihama*, Jordan and Metz, *Mem. Carnegie Mus.* VI, p. 41.
1913. *Sillago sihama*, Sewell, *Journ. Asiat. Soc. Bengal* (n. s.) IX, pp. 338 and 344.
1913. *Sillago sihama*, Weber, '*Siboga*'-*Exped.. Fisch.*, p. 267.
1914. *Sillago sihama*, Jordan and Thomson, *Mem. Carnegie Mus.* VI, p. 259.
1917. *Sillago sihama*, Hornell, *Madras Fish. Bull.* XI, p. 91.

Dr. Gill separates *S. malabarica* as a distinct species having the soft dorsal spotted.[1] Besides colouration specimens of this species show great variation in the depth of the body, attenuation of the head and snout and height of the spinous dorsal. That M. Leschenault saw "single individuals upwards of three feet in length" was first given currency by Cuvier.[2] Most subsequent writers, including Day, quoted this statement without any corroboration or acknowledgment. The species is, comparatively speaking, a small sized one.[3] As the species is of wide distribution and as no one else has observed it to reach anywhere near the size recorded by Leschenault, it is probable that his observation is erroneous. It is not unlikely that Leschenault mistook some species of *Sphyraena* for *Sillago sihama* as both the genera have two dorsal fins, a long pointed snout as well as a similar nature and arrangement of scales. Cuvier and Valenciennes partly confounded *S. panijus* (Hamilton Buchanan) with *S. sihama* (Forskål), for they remark that the vernacular name for the species in Calcutta is *Panji mas.*[4]

There are altogether seventeen specimens in the collection, seven of which are quite young and were obtained only a mile south-west of the mouth of the lake on the outer bar. The rest are all adult and were found distributed over the main area and collected throughout the year. The caudal fin is in most cases square-cut and in some emarginate but never deeply indented as represented in Russell's figure, which in all probability is defective. Most of the specimens have a broad longitudinal silvery band about the middle of the body not conspicuous in the young specimens. In some there are black blotches on the opercle. There is a horse-shoe shaped black marking on the occiput with white border in front.

The following statement shows the number and size of the specimens in the collection together with the localities in the lake from which they were obtained:—

			mm.
4 specimens	Balugaon	21-31st July, 1913	112—144
2 specimens	Parikud	28th November, 1914	115 & 160
1 specimen	Rambha Bay	February, 1914	135
3 specimens	(purchased)	19th November, 1914	107—152
7 specimens	Outer Bar, one mile south-west of the mouth of the lake.	19th March, 1914	25—44

The species is a permanent inhabitant of the main area of the lake going out to the sea or near the mouth of the lake to breed. In all probability the breeding time is about the month of February.

Distribution.[5]—Coasts of Abyssinia, Zanzibar, North and East Africa, Red Sea, seas of India, Bay of Bengal and estuaries of the Ganges, Malay Archipelago, seas of the

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[1] *Proc. U. S. Nat. Mus.* XXIV, p. 487.

[2] *Hist. Nat. Poiss.* III, p. 407.

[3] "Erreicht fast 30 cm. lange" Weber, *'Siboga'-Exped. Fisch.*, p. 267.

[4] *Hist. Nat. Poiss.* III, p. 401.

[5] Günther in his catalogue enters "one skin (bad state)" of this fish as belonging to Nepal, presented by B. H. Hodgson; this is undoubtedly a mistake. The locality of the donor who was for a long time a resident in Nepal must have been mistaken for that of the fish. Günther has similarly referred a few more marine fish to Nepal which led T. C. Jerdon to contribute his paper "On the extension of certain marine fishes to the freshwater Rivers of India." *Ann. Mag. Nat. Hist.* (3) XVII, p. 153.

Philippines, China. Formosa, Japan and Korea, coast of Queensland and also that of Samoa.

Family SCIAENIDAE.

Genus **SCIAENA** Linnaeus.

The genus *Johnius* (including *Bola*) was restricted to *J. carutta* by Gill.[1] Bleeker proposed to separate those species which had enlarged teeth in the lower jaw from *Sciaena* and wanted to group them under a new genus *Pseudosciaena*,[2] for which he made *S. aquila* (Lacépède) the type. If Bleeker's arrangement be adopted the generic name of the group should for reasons of priority become *Argyrosomus*[3] of De La Pylaie, who founded the latter genus in 1832 on the same species. *Sciaena* is undoubtedly a large genus comprising a great variety of forms which, though differing widely among themselves, form an almost continuous series from one extremity to the other. The inter-relations of these forms have been fully discussed by Jordan and Eigenmann[4] and no useful purpose would be served by upholding the number of these artificial genera. The genus *Sciaena* is now therefore definitely restricted to *Cheilodipterus aquila* of Lacépède.[5] This species thus becomes the type of *Sciaena* which replaces the genera *Argyrosomus* of De La Pylaie and *Pseudosciaena* of Bleeker.[6]

Sciaena coibor (Hamilton Buchanan).

1822. *Bola coibor*, Hamilton Buchanan, *Fish. Ganges*, pp. 78 and 368.
1830. *Corvina albida*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* V, p. 93.
1830. *Corvina anei, id, ibid.*, p. 131.
1834. *Corvina albida*, Belanger, *Voy. Indes-orientales*, p. 355.
1860. *Johnius anei*, Blyth (not Bloch), *Proc. Asiat. Soc. Bengal*, p. 141.
1863. *Pseudosciaena albida*, Bleeker, *Ned. Tijdschr. Dierk.* I, p. 145.
1865. *Corvina albida*, Day, *Fish. Malabar, p.* 54.
1865. *Corvina neilli, id., ibid., p.* 55.
1876. *Sciaena albida, id., Fish. Ind.*, p. 188, pl. xliv, figs. 4 and 6.
1889. *Sciaena albida, id., Faun. Brit. Ind. Fish.* II, p. 117.
1910. *Sciaena albida*, Jenkins, *Rec. Ind. Mus.* V, p. 136.

There is only one specimen in the collection, 462 mm. in length without the caudal fin. It was caught off Barkul Point at the end of November, 1914. Another specimen was reported from Gopkuda in August, 1907. In the Barkul specimen the muciferous pore below the symphysis of the lower jaw (the centrally situated one behind the bluntish knob) is semilunar in shape with a short hanging fold in front, the two lateral pores are deep and elongated and the outer pores are almost slit-like. The barbel between the right corner of the semilunar pore and the right lateral elongated pore is very slender and thin and is only 5 mm. in length

[1] *Proc. Acad. Nat. Sci. Philadelphia*, 1862 (published 1863), pp. 16-18.
[2] *Ned. Tijdschr. Dierk.* I (1863), p. 145., and *Arch. Néerl. Sc. Nat.* XI (1876), p. 329.
[3] *Compt. Rend. Congr. Sci. France* for 1834 (published 1835), p. 534.
[4] *Bull. U. S. Fish Comm.* for 1886 (published 1889), p. 395.
[5] Lacépède, *Hist. Nat. Poiss.*, Nou. Ed., IV, p. 373.
[6] Jordan, *The Genera of Fishes*, 1917, p. 94.

and is contained three times in the short vertical diameter of the eye. There is a minute (but thick) barbel-like growth near the left lateral pore. The eye is oval, the short vertical diameter is contained in the horizontal diameter one and one-third times. The longer diameter of the eye is contained twice in the interorbital distance.

The fish is an occasional visitor to the lake, appearing in the main area during the flood and also soon after the freshets are over. It grows to four feet and more in length.[1]

Distribution.—Seas of India, coast of Malabar, larger estuaries of the Ganges, and the estuary of the Sittang river; seas of China and the Philippine Islands.

Genus **UMBRINA** Cuvier.

Umbrina indica (Kuhl and Hasselt).

1803. *Labrus sp.* (*qualar katchelee*), Russell, *Fish. Vizag.* II, p. 13, pl. cxviii.
1824. *Sciaena indica*, Kuhl and Hasselt, *Bull. Sci. Nat.* (Ferussac), II, pp. 374 and 377.
1830. *Umbrina russelii*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* V, p. 178.
1830. *Sciaena indica*, *id.*, *ibid.*, p. 179.
1830. *Umbrina kuhlii*, *id.*, *ibid.*
1836. *Umbrina russelii*, Cuvier, *Règ. Anim.*, *Poiss.* p. 82.
1846. *Umbrina russelii*, Richardson, *Rep. Brit. Assoc. Adv. Sc.* (1845), p. 226.
1849. *Umbrina russelli*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 1053.
1850. *Umbrina kuhlii*, Bleeker, *Verh. Batavia Gen.* XXIII (5), pp. 4, 5, 11 and 19.
1852. *Umbrina russelli*, Bleeker, *Nat. Tijdschr. Ned. Ind.* III, p. 56.
1853. *Umbrina russelli*, Jerdon, *Madras Journ. Lit. Sci.* XVII, p. 132.
1860. *Umbrina russellii*, Günther, *Cat. Fish. Brit. Mus.* II, p. 278.
1868. *Umbrina russellii*, Kner, *Reis. Novara,' Fisch.* p. 131.
1873. *Umbrina russellii*, Day, *Rep. Sea Fish and Fisher*, p. ccl.
1874. *Sciaena russelli*, Bleeker, *Verh. Akad. Amsterdam* XIV, p. 58.
1876. *Umbrina russelli*, Day, *Fish. Ind.*, p. 183, pl. xliii, fig. 4.
1889. *Umbrina russellii*, *id.*, *Faun. Brit. Ind. Fish.* II, p. 110.
1907. *Umbrina russelli*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 25.
1907. *Umbrina russelli*, Evermann and Seale, *ibid.*, p. 87.
1910. *Umbrina russellii*, Jenkins, *Rec. Ind. Mus.* V, p. 136.

Russell described and figured this fish from Vizagapatam under its local name as a "Labrus with a pentagonal tail." Twenty-one years later Kuhl and van Hasselt redescribed it from a specimen obtained at Java and supplied a name under approved methods and called it *Sciaena indica*. Cuvier and Valenciennes, though acknowledging the name given by them, rechristened the species after the senior author and called it *U. kuhlii* and, thinking it a different species, invented the name *U. russellii* for Russell's species from Vizagapatam. Later writers, finding out the identity of *U. kuhlii* with Russell's species, dropped the name *U. kuhlii*, but did not restore the earlier name. Moreover they copied the inadmissible name with its incorrect spelling. The law of priority demands that the name given by Kuhl and van Hasselt should be restored.

[1] "This is a very beautiful fish, found in the larger estuaries of the Ganges. I saw only one specimen, which was four feet in length; but it is said to grow considerably larger." *Fish. Ganges*, p. 79.

There are altogether eight specimens in the collection. In all the specimens the second ray of the ventral fin ends in a prolonged filamentous extension, similar to that shown in Russell's figure though not mentioned by later authors. The upper ridges over the eyes are black in all the specimens ; the upper two-thirds of the anterior dorsal fin is black or ashy brown in many and in some the membrane joining the spines is covered with minute dark brown spots, the other fins having yellow spots ; a faint black blotch is noticed on the opercle of almost all the specimens.

The following list shows the different localities in the lake from which the specimens were obtained and their number and size :—

			mm.
1 specimen	Barkul	13th November, 1912	135
1 ,,	Barkul Bay	1st March, 1914	86
2 specimens	Chiriya Island	18th February, 1914	78
1 specimen	Between Maludaikuda and Kalidai	21st September, 1914	53
1 ,,	Samal Island	22nd September, 1913	63
2 specimens	Channel between Satpara and Barnikuda	4th September, 1914	55 & 58

The fish appears to be common in the main area and in the outer channel from September to March, the young ones being found in the outer channel after the floods are over. In all probability the fish is a permanent inhabitant of the lake, breeding in the outer channel. Some of the specimens grunted loudly on being removed from the water.

Distribution.—Seas of India, Bay of Bengal, coasts of Ceylon, Penang, Malay Archipelago, seas of China (Canton) and coasts of the Philippine Islands.

Family GERRIDAE.

Genus **GERRES,**[1] Quoy and Gaimard.

Gerres öyena (Forskål).

1775. *Labrus öyena*, Forskål, *Descr. Anim.*, p. 35.
1788. *Labrus öyena*, Linnaeus and Gmelin, *Syst. Natur.*, (Ed. 13th), I, p. 1287.
1802. *Labrus öyena*, Lacépède, *Hist. Nat. Poiss.* III, p. 463.
1802. *Labrus longirostris, id., ibid.*, p. 468, pl. xix, fig. 1.
1802. *Sparus britannus, id., ibid.*, IV, pp. 132 and 134.
1827. *Smaris öyena*, Rüppell, *Atl. Reis. Nord. Afrika*, p. 11, pl. iii, fig. 2.
1829. *Gerres öyena*, Cuvier, *Règ. Anim., Poiss.* (2nd Edit.), p. 104.

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[1] In 1824 the authors (*viz.*, Quoy and Gaimard) published the "*Voyage autour du Monde*" shortly before the second edition of the *Règne Animal.* In this publication (p. 293) they adopted the genus *Gerres* from Cuvier's manuscript. In 1829 in the second edition of *Règ. Anim.* Cuvier established the genus based on seven species, including *G. öyena.* In 1850, thinking *Gerres* pre-occupied by *Gerris* Fabricius—a genus of Hemiptera (1794), Cantor proposed *Catochaenum* in its place. *Gerres*, being spelled differently from *Gerris*, is not pre-occupied (See *Proc. California Acad. Sci.* (2) V, p. 470.) It should be noted here that the new name *Xystaema* created by Jordan for some species of *Gerres* has been withdrawn by the author (*The Genera of Fishes*, p. 118). Jordan further points out that *Gerres* and *Gerris* are words from different roots. *Podager* proposed as a substitute for *Gerres* [*Natur. Thier. Schul.*, p. ix] is pre-occupied in birds and thus could not replace *Gerres.* [*Proc. Acad. Nat. Sci. Philadelphia*, LXX p. 338 (1918)].

1830. *Gerres ōyena*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* VI, p. 355.
1836. *Gerres ōyena*, Cuvier, *Règ. Anim., Poiss.* p. 104.
1845. *Gerres ōyena*, Bleeker, *Nat. Geneesk. Arch. Ned. Ind.* II, p. 521.
1850. *Gerres ōyena*, *id.*, *Verh. Batav. Gen.* XXIII, p. 12.
1859. *Gerres ōyena*, Günther, *Cat. Brit. Mus. Fish.* IV, p. 261.
1863. *Diapterus ōyena*, Bleeker, *Ned. Tijdschr. Dierk.* 1, p. 232.
1866. *Gerres ōyena*, Günther, *Fish. Zanzibar*, p. 111.
1875. *Gerres ōyena*, Day, *Fish. India*, p. 99, pl. xxv, fig. 4.
1877. *Diapterus ōyena*, Bleeker, *Atl. Ichthyol.* VIII, p. 129.
1884. *Gerres ōyena*, Klunzinger, *Synops. Fisch. Roth.-Meer*, p. 49.
1889. *Gerres ōyena*, Day, *Faun. Brit. Ind. Fish.* I, p. 538.
1890. *Gerres ōyena*, Thurston, *Notes Pearl Fish. and Marine Faun. Manaar*, p. 91.
1907. *Xystaema ōyena*, Smith and Pope, *Proc. U. S. Nat. Mus.* XXXI, p. 478.
1908. *Xystaema ōyena*, Seale and Bean, *ibid.*, XXXIII, p. 244.
1913. *Gerres ōeyena*, Weber, *'Siboga'-Exped. Fisch.*, p. 273.
1913. *Gerres ōeyena*, Sewell, *Journ. Asiat. Soc. Bengal* (n. s.) IX, p. 344.

Most of the later authors from Cuvier down to Day and Smith have included under the synonymy of this fish, *Gerres equula* of Temminck and Schlegel,[1] which is a distinct Japanese species.[2] *G. equula* is, however, identical with *G. erythroarum* (Bloch).[3] It was first described from Japanese specimens. Both these names therefore have been excluded from the list of synonymy though they are found included in many of the previous lists.

There are altogether three specimens, more or less damaged, measuring in length 76 mm., 77 mm. and 85 mm. without the caudal fin. They were all obtained at Satpara on the 10th October, 1914.

In all probability the fish is not a permanent inhabitant of the lake, but is a casual visitor to the outer channel after floods.

Distribution.—East coast of Africa, Red Sea, seas of India, Malay Archipelago. the Philippines; the Fiji Islands and Japan.

Gerres setifer (Hamilton Buchanan).

1822. *Chanda (?) setifer*, Hamilton Buchanan, *Fish. Ganges*, pp. 105 and 370.
1830. *Gerres lucidus*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* VI, p. 477.
1849. *Catochaenum lucidum*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 1038.
1853. *Gerres lucidus*, Bleeker, *Verh. Batav. Genoot.*, XXV, p. 40.
1862. *Gerres altipinis* Günther, *Cat. Fish. Brit. Mus.* IV, p. 258.
1867. *Gerres lucidus*, Jouan, *Mém. Soc. Imp. Sci. Nat. Cherbourg* XIII, p. 263.
1875. *Gerres setifer*, Day, *Fish. Ind.* p. 97, pl. xxv, fig. 1.
1875. *Gerres lucidus*, *id.*, *ibid.*, p. 99, pl. xxv, fig. 5.
1889. *Gerres setifer*, *id.*, *Faun. Brit. Ind. Fish.* I, p. 536.
1889. *Gerres setifer*, *id.*, *ibid.*, p. 539.
1910. *Gerres lucidus*, Jenkins, *Rec. Ind. Mus.* V, pp. 131 and 135.
1913. *Gerres lucidus*, Sewell, *Journ. Asiat. Soc. Bengal* (n. s.) IX, p. 344.

[1] Temminck and Schlegel, *Faun. Japon. Poiss.*, p. 76, pl. xl, fig. 1.
[2] Jordan, Tanaka and Snyder, *Journ. Coll. Sci. Imp. Univ. Tokyo* XXXIII, p. 177, fig. 129.
[3] Bloch, *Ichthyologie* VIII, p. 23, pl. cclxi.

Hamilton Buchanan found this fish in the estuaries of the Ganges and had a drawing made of it which is still preserved in the volume of manuscript drawings (Plate lxvi) in the library of the Asiatic Society of Bengal.[1] The name *Katchanda* is written on the page both in Bengali and Roman characters. This is the local name for the fish. In the absence of the type specimen this manuscript plate becomes the protograph. Hamilton Buchanan doubted the propriety of including it under the genus *Chanda* and suggested its removal to the genus *Coius*. In the drawing also, the number of spines in the dorsal fin is ten and that of rays only nine. *Gerres lucidus* of Cuvier and Valenciennes is described from specimens received from Pondicherry having nine spines and ten divided rays. Günther considers *G. lucidus* as a doubtful species and does not recognise *G. setifer* at all. He, however, described this fish as a new species under the name of *G. altipinnis*, from a specimen from the Ganges, which perhaps was Hamilton Buchanan's type as it was out of a collection presented by G. R. Waterhouse which is suspected to contain some of Hamilton Buchanan's types. Day has admitted both the names *G. setifer* and *G. lucidus* though he was strongly of opinion that they referred to the same species. Jordan[2] on the other hand proposed a new genus, which he styled *Gerreomorpha*, for specimens with ten instead of nine dorsal spines (*viz.*, *G. japonica* and *G. setifer*). Though in other respects quite similar, some of the specimens in the present collection have ten and others nine spines. This is, therefore, a variable character in the species.

There are altogether one hundred and twenty-two specimens in the collection, all obtained during the months of February and March. The species is found during this restricted period throughout the main area as well as in the outer channel of the lake. The following statement shows the different localities whence the specimens were obtained and their number and size :—

			mm.
1 specimen	Off Barkuda Island	17th February, 1914	56
2 specimens	Off Barkul ...	1st March, 1914	39 and 44
17 „	Barkul Bay ...	1st March, 1914	32—54
10 „	Chilka lake ...	...	49—98
60 „	Chirriya Island towards Samal Island	17-18th February, 1914	28—56
7 „	Off Kalidai ...	1st March, 1914	31—43
1 specimen	Between Kalidai and Samal Island	20th February, 1914	36
6 specimens	Off Patsahanipur	3-9th March, 1914	18—55
8 „	From Sankuda towards Samal Island	17th February, 1914	26—43
7 „	Rambha Bay	February, 1914	45—74
1 specimen	„ „	March, 1914	45
2 specimens	Satpara ...	7th March, 1914	33—60

The species appears to be a dry-weather visitor to the lake and does not breed in it. It is said to be the most common Indian species, visiting the coasts in enormous numbers and going up the estuaries.

[1] Chaudhuri, *Mem. Ind. Mus.* V, p. 444.

[2] Jordan, The Gerrid fishes of Japan. *Proc. U. S. Nat. Mus.* XXXIII, p. 247 (1908).

Distribution.—Seas and coasts of India including estuaries, the Malay Archipelago and China.

Gerres punctatus, Cuvier and Valenciennes.

1803. *Zeus* sp. (*wodawahah*), Russell, *Fish. Vizag.* I. p. 52. pl. lxvii.
1803. *Zeus* sp. (*woodan*), *id., ibid.*, p. 53, pl. lxviii.
1830. *Gerres punctatus*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* VI. p. 480.
1830. *Gerres filamentosus, id., ibid.*, p. 482.
1849. *Catochaenum filamentosum*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 1038.
1850. *Gerres filamentosus*, Bleeker, *Verh. Batav. Gen.* XXIII, p. 10.
1853. *Gerres filamentosus, id., ibid.*, XXV p. 40.
1853. *Gerres punctatus, id., ibid.*
1859. *Gerres filamentosus*, Günther, *Cat. Fish. Brit. Mus.* I, p. 345.
1859. *Gerres punctatus, id., ibid.*, p. 346.
1862. *Gerres punctatus, id., ibid.*, IV, p. 260.
1862. *Gerres filamentosus, id., ibid.*, p. 261.
1863. *Diapterus filamentosus*, Bleeker, *Ned. Tijd. Dierk.* I, p. 231.
1867. *Gerres filamentosus*, Jouan, *Mém. Soc. Imp. Sci. Nat. Cherbourg* XIII (Ser. 20), p. 263.
1873. *Diapterus punctatus*, Bleeker, *Ned. Tijds., Dierk.* IV, p. 140.
1875. *Gerres filamentosus*, Day, *Fish. Ind.*, p. 98, pl. xxv, fig. 3.
1877. *Diapterus filamentosus*, Bleeker, *Atl. Ichthyol.* VIII, p. 124, pl. ccclxii, fig. 31.
1889. *Gerres filamentosus*, Day, *Faun. Brit. Ind.* I, p. 98, fig. 163.
1903. *Xystaema filamentosus*, Jordan and Evermann, *Proc. U. S. Nat. Mus.* XXV, p. 352.
1904. *Gerres filamentosus*, Fowler, *Journ. Acad. Nat. Sci., Philadelphia* (2) XII, p. 530.
1905. *Xystaema filamentosum*, Jordan, *Stud. Fish.* II, p. 348.
1905. *Xystaema punctatum*, Jordan and Seale, *Proc. U. S. Nat. Mus.* XXVIII, p. 782.
1906. *Xystaema punctatum, id., Bull. U. S. Bur. Fish.* XXV, p. 272.
1907. *Xystaema punctatum*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 24.
1908. *Xystaema punctatum*, Seale and Bean, *Proc. U. S. Nat. Mus.* XXXIII, p. 244.
1911. *Xystaema punctatum*, Jordan and Richardson, *Mem. Carnegie Mus.* IV, p. 190.
1912. *Gerres filamentosus*, Snyder, *Proc. U. S. Nat. Mus.* XLII, p. 501.
1913. *Gerres filamentosus*, Weber, *'Siboga'-Exped. Fisch.*, p. 271.
1913. *Gerres filamentosus*, Gilchrist and Thompson, *Ann. S. Afric. Mus.* XI, p. 33.
1917. *Gerres filamentosus*, Hornell, *Madras Fish. Bull.* XI, p. 93.

G. punctatus is evidently the same as *G. filamentosus* (the depth, $3\frac{1}{2}$ in the total length with caudal, in *G. punctatus* is true of the very young stage only till $2\frac{1}{2}$ inches long—in the adult it is 3 or a little less). The name *punctatus* appears in the same work as *filamentosus*, but, being on an earlier page, has priority.[1]

There is only one specimen in the collection, 76 mm. in length, caught near Satpara in October, 1914. The dorsum is brown and the fins are dull yellow (in spirit) and the snout is not black. The specimen possesses an adipose eye-lid.

The species is only a casual visitor to the lake, and does not proceed further inwards than the outer channel.

[1] Jordan and Seale, *Bull. U. S. Bur. Fisher.* XXV, p. 272.

Distribution.—Red Sea, seas of India, Malay Archipelago, Indo-Australian Archipelago, China, Philippines and Formosa.

Genus **LEIOGNATHUS,** Lacépède.

Leiognathus equulus (Forskål).

1758. *Scomber flavescens latitudine ad longitudinem dimidea denticulis piliformibus*, Artedi, ***Descrip.*** *Exac. Princ. Curios. Natur. Cab. Seba*, III, p. 75, pl. xxvii, fig. 4.
1775. *Scomber equula*, Forskål, *Descrip. Anim. Pisc.* p. 58.
1785. *Scomber edentulus*, Bloch, *Allgem. Natur. Fisch.*, pl. ccccxxviii.
1788. *Centrogaster equula*, Linnaeus and Gmelin, *Syst. Natur.* (Ed. xiii), I, p. 1337.
1801. *Scomber edentulus*, Bloch and Schneider, *Syst. Ichthyol.* p. 36.
1802. *Caeses equulus*, Lacépède, *Hist. Natur. Poiss.* III, pp. 85, 90.
1803. *Leiognathus argenteus*, *id.*, *ibid.*, IV, pp. 448 and 449.
1803. *Zeus* sp. (*tottal karah*), Russell, *Fish. Vizagapatam*, I, p. 49. pl. lxii.
1804. *Scomber equula*, Shaw, *Gener. Zool.* IV, p. 596.
1835. *Equula ensifera*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* X, p. 66.
1835. *Equula caballa*, *id.*, *ibid.*, p. 73.
1836. *Equula ensifera*, Cuvier, *Règ. Anim., Poiss.*, p. 139.
1836. *Equula totta*, *id.*, *ibid.*
1838. *Equula caballa*, Rüppell, *Neu. Wirbel. Faun. Abyssinien Gehör. Fisch.* (*Roth.-Meer*), pp. 51 and 52.
1848. *Equula serrulifera*, Richardson, *Zool. Voy. 'Erebus' and 'Terror'* II, *Ichthyol.* p. 137, pl. lix, figs. 12 to 14.
1849. *Equula caballa*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 1128.
1851. *Equula caballa*, Jerdon, *Madras Journ. Lit. Sci.*, p. 138.
1852. *Equula ensifera*, Bleeker, *Verh. Bat. Gen.* XXIV, p. 8.
1860. *Equula edentula*, Günther, *Cat. Fish. Brit. Mus.* II, p. 498.
1860. *Equula caballa*, *id.*, *ibid.*, p. 499.
1863. *Leiognathus edentulus*, Bleeker, *Ned. Tijdsch. Dierk.* I, p. 235.
1865. *Leiognathus edentulus*, *id.*, *ibid.*, II, p. 148.
1865. *Equula ensifera*, Kner, *Reis. Novara,' Fisch.*, p. 166.
1865. *Equula edentula*, Day, *Fish. Malabar*, p. 103.
1866. *Equula edentula*, Playfair, *Fish. Zanzibar*, p. 65.
1869. *Equula ruconius*, Day (not Hamilton Buchanan), *Proc. Zool. Soc. London*, p. 302.
1871. *Equula caballa*, Klunzinger, *Verh. Zool.-Bot. Ges. Wien*, p. 467.
1871. *Equula edentula*, *id.*, *ibid.*
1873. *Leiognathus edentulus*, Bleeker, *Versl. Akad. Amsterdam* (2) VII, p. 37.
1875. *Leiognathus edentulus*, *id.*, *Poiss. Madagascar et Réunion*, p. 98.
1876. *Equula edentula*, Day, *Fish. Ind.*, p. 238, pl. lii, fig. 1.
1879. *Leiognathus edentulus*, *Verh. Akad. Amsterdam* XVIII, p. 18.
1885. *Equula edentula*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) II, XXII, p. 88.
1889. *Equula edentula*, Day, *Faun. Brit. India, Fish.* II, p. 186, fig. 65.
1890. *Equula edentula*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 171.
1903. *Leiognathus edentulum*, Jordan and Evermann, *Proc. U. S. Nat. Mus.* XXV, p. 338.
1905. *Leiognathus edentulus*, Fowler, *Proc. Acad. Nat. Sci. Philadelphia* LVII, p. 510.

1906. *Leiognathus edentulus*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 273.
1906. *Leiognathus equula*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 273.
1907. *Leiognathus edentula*, Evermann and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 69.
1907. *Equula edentula* Lloyd, *Rec. Ind. Mus.*, I, p. 228.
1908. *Leiognathus edentulus*, Seale and Bean, *Proc. U. S. Nat. Mus.* XXXIII, p. 242.
1908. *Equula edentula*, Gilchrist and Thompson, *Ann. S. Afric. Mus.* VI, p. 188.
1911. *Leiognathus edentulum*, Jordan and Richardson, *Mem. Carnegie Mus.* IV, p. 180.
1912. *Leiognathus argentium*, Snyder, *Proc. U. S. Nat. Mus.*, XLII, p. 412.
1912. *Leiognathus edentulus*, Bean and Weed, *Proc. U. S. Nat. Mus.* XLII, p. 604.

Artedi's specific name, although the earliest, being polynomial in form is inadmissible. Cuvier created the genus *Equula*[1], taking *Centrogaster equula* of Linnaeus and Gmelin[2] (which is *Scomber equula* of Forskål) as its type and named his newly created genus, as was his wont, after the specific name of the type, at the same time supplying a new name for the already named species by dropping the old and earliest specific name. Therefore the name of the species should have been *Equula equula*, even if there were any justification for the newly created Cuvierian generic name. Cuvier's objection to "*Leiognathus*" of Lacépède was its etymological meaning, *i. e.*, "toothless." Lacépède in separating the new genus *Leiognathus* from the old genus "*Scomber*" meant to take out all those species which did not possess any conspicuous teeth.[3] Cuvier and Valenciennes contended that as the group thus taken out actually possessed teeth, though minute, the name *Leiognathus* was not only inappropriate but also ineligible and therefore must go.[4] Thus Lacépède's generic name was discarded and Cuvier, after raising the specific name of the first author (*i.e.*, Forskål) to that of a genus, substituted the specific name *caballa* for *equula* of Forskål and *ensifera* for *edentulus* of Bloch, considering these two to be two distinct species and paying no regard to the law of priority. Günther, though he remarked that he had no hesitation [5] in considering the two species as identical, recorded them under different names as distinct species. He, however, restored Bloch's name *edentulus* in place of *ensifera*, but left the Cuvierian name *caballa* for *equula* of Forskål. The argument against the earlier name *Leiognathus* is no longer considered valid, hence the generic name *Equula* is ineligible. It is regrettable that the familiar name of a well-known species must be altered.[6]

There are altogether thirteen specimens in the collection. The fish is found all over the lake, including the outer channel, throughout the year. It is a permanent inhabitant, probably breeding in the lake during the flood-season.

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[1] Cuvier, *Règ. Anim.* (Ed. I), II, p. 323 (1817).

[2] Linnaeus and Gmelin, *Sys. Nat.* III, p. 1337 (1788).

[3] Lacépède, *Hist. Nat. Poiss.* IV, 449.

[4] Cuvier and Valenciennes, *Hist. Nat. Poiss.* X, pp. 60, 61, and 67.

[5] Günther, *Cat. Fish. Brit. Mus.* II, p. 499.

[6] Houttuyn in 1782 reported "*Centrogaster argentatus*" from Nagasaki. (*Verh. Hollandsche Maatsch. Weelen. Haarlem* XX, pp. 311—346). As Houttuyn's descriptions represent the earliest record of Japanese fishes his names must have precedence over all others when his descriptions can be identified. Jordan and Snyder in their "List of Japanese Fishes" point out that it is identical with *Equula nuchale* of Temminck and Schlegel (*Faun. Japonica, Poiss.*, p. 126, pl. lxvii, fig. i), which is one of the commonest of Japanese fishes; but the name should be *Leiognathus argentatum* (*Proc. U. S. Nat. Mus.* XXIII (1901), p. 747) and the name should be restricted to Japanese species. Forskål's name is applicable to the species from the Rea Sea and the Seas of India.

The following statement shows the different localities in the lake whence the specimens were obtained, and their number and size :—

				mm.
2 specimens	Off Barkul ...	9-13th November, 1912	...	25 and 41
2 ,,	Barkul Bay ...	1st March, 1914	...	37 and 38
1 specimen	East of Barkul bungalow ...	3rd March, 1914	...	28
2 specimens	Chirriya Island	18th February, 1914	...	30 and 32
2 ,,	Rambha Bay	February, 1914	...	50 and 54
2 ,,	,, ,,	March, 1914	...	47 and 52
2 ,,	Satpara ...	10th October, 1914	...	51 and 54

Distribution.—Red Sea, seas of India, Malay Archipelago, Australian coasts, New Guinea, Formosa and Japan.

Leiognathus blochii (Cuvier and Valenciennes).

1835. *Equula blochii*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* X, p. 84.
1835. *Zeus notatus, id., ibid.*, (from ms. of Bloch).
1853. *Equula blochii* Bleeker, *Verh. Bat. Gen.* XXV, p. 46.
1865. *Equula blochii*, Day, *Fish. Malabar*, p. 105.
1876. *Equula blochii, id., Fish. India*, p. 241, pl. lii, fig. 3.
1889. *Equula blochii, id., Faun. Brit. India Fish.* II, p. 189.

Bloch named this fish *Zeus notatus* from specimens sent to him from Tranquebar. This name, however, remained in manuscript until it was noticed by Cuvier and Valenciennes [1] who identified Bloch's species with specimens from Malabar. But Cuvier and Valenciennes renamed it, as was usual with them, out of respect for the author who first named the species. Cuvier and Valenciennes were the first to publish Bloch's name along with the new name they substituted for it. Bloch only named the species but did not describe it ; moreover, Bloch's name in its first publication is printed after the name given by Cuvier and Valenciennes. Günther recorded it as a doubtful species,[2] but it is generally regarded to be a valid one and is believed to be restricted to Indian waters. The name given to it by Cuvier and Valenciennes must stand though it is regrettable that Bloch's original name was not adopted.

There are altogether seven specimens in the collection. This fish appears to be a permanent resident in the lake and is found throughout the main area as well as in the outer channel during the dry months.

The following statement shows the different localities where the specimens were obtained and their number and size :—

				mm.
3 specimens	Barkul Bay ...	1st March, 1914	...	35, 40 & 41
1 specimen	Between Kalidai and Samal Island ...	20th February, 1914	...	32
1 ,,	South of Kalidai	21st February, 1914	...	26
1 ,,	Kaluparaghat ...	...	...	49
1 ,,	Satpara ...	March, 1914	...	57

Distribution.—Seas of India.

[1] Cuvier and Valenciennes, *Hist. Nat. Poiss.* X, p. 84.
[2] Günther, *Cat. Fish. Brit. Mus.* II, p. 498.

Genus **GAZZA,** Rüppell.

Gazza minuta (Bloch).

1788. ***Zeus argentarius***, Forster, *Descrip. Animal. Mar. Australis* (ms.)
1795. ***Scomber minutus***, Bloch, *Natur. Ausl. Fische*, pl. cccexxix, fig. 2.
1801. ***Zeus argentarius***, Bloch and Schneider, *Syst. Ichthyol.* I, p. 95.
1803. ***Zeus*** sp. (***komah karah***), Russell, *Fish Vizagapatam* I, p. 60. pl. lxiii.
1835. ***Equula coma***, Cuvier and Valenciennes, *Hist. Nat. Poiss.* X, p. 76.
1835. ***Equula minuta***, *id.*, *ibid.*, p. 88.
1835. ***Equula dentex***, *id.*, *ibid.*, p. 91.
1835. ***Gazza equulaeformis***, Rüppell, *Neu.-Wirbelth. Fische*, p. 4, pl. i, fig. 3.
1844. ***Zeus argentarius***, Forster and Lichtenstein, *Descr. Anim.*, p. 288.
1845. ***Gazza equulaeformis***, Bleeker, *Nat. Geneesk. Arch. Ned. India* II, p. 518.
1849. ***Gazza equulaeformis***, Cantor, *Journ. Asiat. Soc. Bengal*, p. 1135.
1851. ***Gazza minuta***, Bleeker, *Nat. Tijdsch. Ned. India* II, p. 213.
1851. ***Equula coma***, Jerdon, *Madras Journ. Lit. Sci.*, p. 138.
1851. ***Equula minuta***, *id.*, *ibid.*
1853. ***Gazza tapeinosoma***, Bleeker, *Nat. Tijdschr. Ned. India* IV, p. 260.
1860. ***Gazza minuta***, Günther, *Cat. Fish. Brit. Mus.* II, p. 506.
1860. ***Gazza equulaeformis***, *id.*, *ibid.*
1860. ***Gazza argentaria***, *id.*, *ibid.*
1863. ***Gazza argentarius***, Bleeker, *Ned. Tijdschr. Dierk.* I, p. 242.
1865. ***Equula dentex***, Kner, *Reis. 'Novara,' Fisch.*, p. 170.
1866. ***Gazza equulaeformis***, Playfair, *Fish. Zanzibar*, p. 65.
1871. ***Gazza argentaria***, Klunzinger, *Verh. Zool.-Bot. Ges. Wien* XXI, p. 467.
1871. ***Gazza equulaeformis***, *id.*, *ibid.*, p. 468.
1876. ***Gazza minuta***, Day, *Fish. India*, p. 244, pl. liii, fig. 1.
1876. ***Gazza aequulaeformis***, *id.*, *ibid.*
1881. ***Gazza equulaeformis***, Günther, *Journ. Mus. Godeff.* IV, p. 144.
1881. ***Gazza argentaria***, *id.*, *ibid.*, p. 144. pl. xci, fig. B.
1888. ***Gazza argentaria***, Day, *Fish. Ind. Suppl.*, p. 790.
1889. ***Gazza minuta***, *id.*, *Faun. Brit. India, Fish.*, p. 194, fig. 66.
1889. ***Gazza equulaeformis***, *id.*, *ibid.*
1889. ***Gazza argentaria***, *id.*, *ibid.*, p. 195.
1903. ***Gazza equulaeformis***, Jordan and Evermann, *Proc. U. S. Nat. Mus.* XXV, p. 338.
1905. ***Gazza minuta***, Jordan and Seale, *Proc. U. S. Nat. Mus.* XXVIII, p. 777.
1905. ***Gazza minuta***, *id.*, *Bull. U. S. Bur. Fisher.* XXV, p. 273.
1905. ***Gazza argentaria***, *id.*, *ibid.*
1905. ***Gazza equulaeformis***, *id.*, *ibid.*
1905. ***Gazza minuta***, Jordan, *Guid. Stud. Fish.* II, 287.
1907. ***Gazza minuta***, Smith and Seale, *Proc. Biol. Soc. Washington*, XIX, p. 77.
1911. ***Gazza equulaeformis***, Jordan and Richardson, *Mem. Carnegie Mus.* IV, p. 181.
1912. ***Gazza minuta***, Bean and Weed, *Proc. U. S. Nat. Mus.* XLII, p. 604.
1913. ***Gazza argentaria***, Weber, *'Siboga'-Exped. Fisch.*, p. 270.
1917. ***Gazza minuta***, Jordan and Starks, *Ann. Carnegie Mus.* XI, p. 444.
1917. ***Gazza equulaeformis***, Hornell, *Madras Fish. Bull.* XI, p. 92.

Weber sinks *G. minuta*, *G. equulaeformis* and *G. tapeinosoma*, in the synonymy of *G. argentaria*, J. R. Forster (1729–1798), described by him in his *Descriptiones Animalium*. But this work remained in manuscript till 1844 in which year it was published by Lichtenstein. In 1801, Schneider published Bloch's *Ichthyology*, in which Forster's name, *Zeus argentarius*, was first published with his description. Thus the name "*Scomber minuta*" was the earliest, being published in 1795, and has therefore priority.

There is only one specimen in the collection 69 mm. in length. It was secured near Nalbano on 25th November, 1914. Probably the fish is only a casual visitor to the lake.

Distribution.—Zanzibar, Red Sea, East Indian seas, Malay Archipelago, Indo-Australian Archipelago, Polynesia (Samoa), New Hebrides and the Philippines.

Family SCORPIDIDAE.

Genus **MONODACTYLUS** Lacépède.

Monodactylus argenteus (Linnaeus).

1754. *Chaetodon argenteus*, Linnaeus, *Chinens. Lagerstorm. Amoen. Acad.* IV, p. 249, No. 26.
1758. *Chaetodon argenteus*, *id.*, *Syst. Natur. Ed.* X, p. 272.
1775. *Scomber rhombeus*, Forskål, *Descrip. Animal. Pisc.*, p. 58.
1788. *Chaetodon argenteus*, Linnaeus, *Syst. Natur.* (*Gmelin*), I, p. 1242.
1788. *Centrogaster rhombeus*, *id.*, *ibid.*, p. 1338.
1800. *Monodactylus falciformis*, Lacépède, *Hist. Nat. Poiss.* II, pl. V, fig. 4.
1801. *Chaetodon argenteus*, Bloch and Schneider, *Syst. Ichthyol.*, p. 230.
1802. *Monodactylus falciformis*, Lacépède, *Hist. Natur. Poiss.* III, pp. 131 and 132.
1802. *Centropodus rhombeus*, *id.*, *ibid.*, pp. 303 and 304.
1802. *Acanthopodus argenteus*, *id.*, *ibid.*, pp. 558 and 559.
1803. *Zeus* sp. (*kanki sandwa*), Russell, *Fish. Vizagapatam* I, p. 47, pl. lix.
1803. *Scomber rhombeus*, Shaw, *Gen. Zool.* IV, p. 595.
1830. *Centropodus rhombeus*, Desmarest, *Oeuv. Lacép.* VIII, p. 132.
1831. *Psettus rhombeus*, Cuvier and Valenciennes, *Hist. Natur. Poiss.* VII, p. 245.
1831. *Psettus commersonii*, *id.*, *ibid.*, p. 250.
1834. *Psettus rhombeus*, Cuvier, *Règ. Anim., Poiss.*, p. 111, pl. xlii, fig. 2.
1834. *Monodactylus rhombeus*, Griffith, *Cuv. Anim. K ngdom* X, pl. lv, fig. 2.
1839. *Monodactylus rhombeus*, Swainson, *Nat. Hist. Fish. Amphib. Rep.* II, p. 212.
1846. *Psettus argenteus*, Richardson, *Rep. Brit. Assoc· Adv. Sci.* (1845), p. 246.
1848. *Psettus argenteus*, *id.*, *Zool. Voy. 'Erebus' and 'Terror,' Fish.*, p. 57, pl. xxxv, figs. 1-3.
1849. *Monodactylus rhombeus*, Cantor, *Journ. Asiat. Soc. Bengal*, p. 1154.
1853. *Psettus rhombeus*, Bleeker, *Verh. Batav. Genoot.* XXV, p. 40.
1855. *Psettus argenteus*, *id.*, *Verh. Akad. Amsterdam* II, p. 10.
1855. *Psettus argenteus*, Peters, *Arch. Naturgesch.* p. 247.
1860. *Psettus argenteus*, Günther, *Cat. Fish. Brit. Mus.* II, p. 487.
1860. *Psettus falciformis*, *id.*, *ibid.*, p. 488.
1863. *Monodactylus argenteus*, Bleeker, *Ned. Tijdschr. Dierk.* I, p. 242.
1865. *Psettus argenteus*, Kner, *Reis. 'Novara,' Fisch.*, p. 164.
1865. *Psettus argenteus*, Day, *Fish. Malabar*, p. 99.
1865. *Psettus falciformis*, *id.*, *ibid.*, p. 100.

1866. *Psettus argenteus*, Playfair, *Fish. Zanzibar*, p. 64.
1871. *Psettus argenteus*, Klunzinger, *Verh. Zool.-Bot. Ges. Wien* XX, p. 794.
1875. *Monodactylus argenteus*, Bleeker, *Poiss. Madagascar*, p. 65.
1876. *Psettus falciformis*, Day, *Fish India*, p. 234, pl. li A, fig. 6.
1876. *Psettus argenteus*, *id.*, *ibid.*, p. 235, pl. li B, fig. 5.
1876. *Psettus argenteus*, Günther, *Journ. Mus. Godeffroy, Fisch.*, p. 140.
1879. *Psettus argenteus*, Bleeker, *Verh. Akad. Amsterdam*, p. 18.
1880. *Psettus argenteus*, Günther, *Introd. Study Fish.*, p. 448, fig. 199.
1889. *Psettus falciformis*, Day, *Faun. Brit. India, Fish.* II, p. 180.
1889. *Psettus argenteus*, *id.*, *ibid.*, fig. 62.
1905. *Monodactylus argenteus*, Jordan, *Guide Study Fish.* II, p. 398.
1906. *Monodactylus argenteus*, Stead, *Fish. Australia*, p. 133, fig. 49.
1906. *Monodactylus argenteus*, Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, pp. 178 and 237, fig. 30.
1907. *Psettus argenteus*, Lloyd, *Rec. Ind. Mus.* I, p. 227.
1907. *Monodactylus argenteus*, Evermann and Seale, *Bull. U. S. Bur. Fish.* XXVI, p. 32.
1907. *Monodactylus argenteus*, *id.*, *ibid.*, p. 71.
1909. *Psettus argenteus*, Goodrich, *Treat. Zool. Cyclost. Fish.*, p. 432, fig. 440.
1917. *Psettus argenteus*, Hornell, *Madras Fish. Bull.* XI, p. 91.

Jordan and Fowler proposed a new family Platicidae to include the genera *Monodactylus*, *Platax* and *Psettias* (a new genus created by Jordan). This is a small group of fishes of the Asiatic seas related to the Chaetodontidae, but showing differences in the skeleton.[1] In *Monodactylus* and *Psettias* the ventral fins are rudimentary and the body is still deeper in both than in *Platax*. In *Monodactylus* it is less deep than in *Psettias* and is not deeper than long, whereas in *Psettias* it is deeper than long.[2] Commerson proposed to unite three genera of Lacépède, *viz.*, *Monodactylus*,[3] *Centropodus*[4] and *Acanthopodas*,[5] erroneously thinking that these had "no teeth in the palate," under the name of *Psettus*. The mistake is repeated by Günther[6] and Day. Commerson's description of the genus was in manuscript until it was published by Cuvier and Valenciennes in 1831.[7] Moreover, *Monodactylus* has priority, having been created by Lacépède as early as 1802.

There are three specimens in the collection, all caught off the coast of Parikud. The dates of their capture are, however, not recorded. Three specimens measure respectively 85 mm., 89 mm. and 97 mm. in length and all are evidently young as the full grown adults of this bat fish are said to reach a length from 180 mm. to 250 mm. and over. All the three specimens show the orbicular and the opercular dark-brown or black bands characteristic of the young. The disappearance of these in more mature forms and the alteration of proportion of parts consequent on growth have led to the creation of a very large number of species and even a few genera out of this one single fish, as the long list of its synonymy

[1] Jordan and Fowler, *Proc. U. S. Nat. Mus.* XXV. p. 525.
[2] Jordan and Seale, *Bull. U. S. Bur. Fish.* XXV, p. 236.
[3] Lacépède, *Hist. Nat. Poiss.* III, p. 131.
[4] *Id.*, *op. cit.*, III, p. 303.
[5] *Id.*, *op. cit.*, IV, 558.
[6] Günther, *Introd. Study Fish.*, p. 447 and *Cat. Fish. Brit. Mus.*, II, p. 486.
[7] Cuvier and Valenciennes, *Hist. Nat. Poiss.* VII, p. 240.

proves. The colour of the curved portions of the free anterior ends of the dorsal and the anal fins is dark brown in all the three specimens and that of the pectoral and the caudal fins is dull yellow. The fish is an occasional visitor to the main area of the lake and does not appear to breed in it.

Distribution.—The geographical range of this fish is very extensive; from the Red Sea through the east coast of Africa, Zanzibar and Aden to Indian seas, the Malay Peninsula, the Malay Archipelago, Polynesia (Samoa), seas of Australia and China and the Philippines. It is reported to be most common in Malabar and Coromandel during monsoon months and rather abundant in the harbour of Apia, Port Jackson and Singapore.

FAUNA OF THE CHILKA LAKE.

FISH

PART V.

By SUNDER LAL HORA, *D.Sc.*

(With 14 text-figures.)

CONTENTS.

FISH (*PART V*).

By SUNDER LAL HORA.

This part contains a systematic treatment of the divisions Gobiiformes, Zeorhombi, Scombriformes, Jugulares and Scleroparei of the suborder Acanthopterygii and of the sub-order Opisthomi. I have also added a summary of the whole report on the fish of the Chilka Lake.

To the division Gobiiformes are referred 22 species, of which 16 belong to the sub-family Gobiinae, 4 to Eleotrinae, and one each to Periophthalminae and Gobioidinae. I have erected a new genus, closely allied to *Apocryptes*, to accommodate the minute transparent Gobies of the lake and in other genera have found as many as six species hitherto undescribed. I have refrained from naming a species of the genus *Eleotris*, represented by a single, probably immature, specimen. Most of the new species belong to the genus *Ctenogobius ;* others are distributed among the genera *Glossogobius*, *Micrapocryptes* (gen. nov.), and *Tænioides*. The only general feature of the Chilka fish of this family is their small size. Most of the new species hardly exceed a couple of inches in length, while forms like *Ctenogobius minima* and *Micrapocryptes fragilis* are among the smallest known vertebrates.

Belonging to the division Zeorhombi, there are three species representing three families —Bothidae, Cynoglossidae and Soleidae. Of the three species *Cynoglossus brevis* Günther is widely distributed in the lake area and is represented by a large number of specimens. Of the other two, *Pseudorhombus arsius* (Ham. Buch.) and *Synaptura orientalis* (Bl. and Schn.), a few specimens were found in the outer channel or in its immediate neighbourhood, and the species thus appear to be occasional visitors to the lake.

The Scombriformes are represented by two species, *Caranx carangus* (Bloch) and *Equula edentata* (Bloch). The former was found all over the lake, the latter in the main area only. Both are probably permanent residents in the lake.

A single species of Blenny (Jugulares) was found abundantly in different parts of the lake, in which it apparently is endemic. It has already been described by Dr. Chaudhuri [1] under the name *Petroscirtes bhattacharyae*, while Mr. D. R. Bhattacharya[2] has described post-larval stages in its development.

The Scleroparei are represented only by *Platycephalus insidiator*, a common species in Indian seas. A few specimens were taken in the outer channel, to which this species is evidently an occasional visitor.

Mastacembelus armatus was the only species of Opisthomi. It is an occasional immigrant from fresh water in the rainy season.

In preparing my report on these fishes I am greatly indebted to Dr. B. L. Chaudhuri, who had made a preliminary investigation of the specimens before I examined them and had

[1] Chaudhuri, *Rec. Ind. Mus.* XII, p. 107 (1916).

[2] Bhattacharya, *Mem. Ind. Mus.* V, p. 385 (1916).

separated them into their genera and in some cases into their species. I have to thank Dr. Annandale for suggesting new names and for revising my manuscript.

Family GOBIIDAE.

Sub-family *GOBIINAE.*

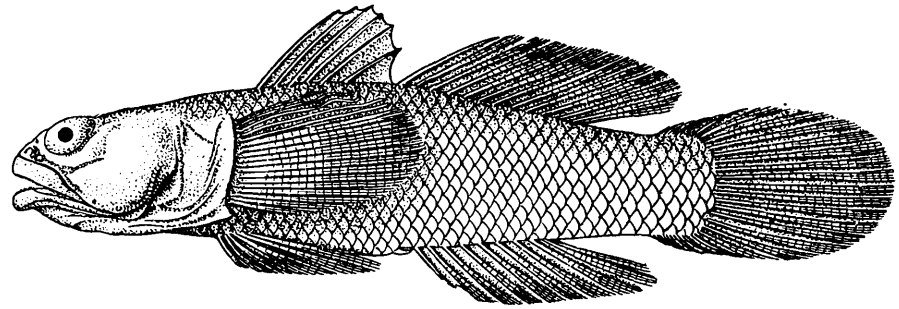
Genus **GOBIUS** Linnæus.

Gobius ostreicola Chaudhuri.

1916. *Gobius ostreicola*, Chaudhuri, *Rec. Ind. Mus.*, XII, p. 105.

1916. *Gobius ostreicola*, Bhattacharya, *Mem. Ind. Mus.*, V, p. 383 (larval stages).

There are altogether six specimens in the collection. They were collected in the months of September and December, 1914, near Manikpatna in the oyster-beds.



Text-fig. 22.—*Gobius ostreicola* Chaudhuri: ×2.

Gobius albopunctatus Cuv. and Val.

1876. *Gobius albopunctatus*, Day, *Fish. India* I, p. 294, pl. lxiii, fig. 7.

Fifteen specimens of this species were collected on the oyster-beds near Manikpatna in December, 1914. The species differs from the others included in the genus in the possession of a distinct emargination at the anterior extremity of the tongue. The emargination is not so deep as it is in the species of *Glossogobius*, from which genus the species can be readily distinguished by the presence of free rays to the pectoral fin.

The emargination of the tongue has been considered to be a character of generic importance but I refrain at present from erecting a new genus for *G. albopunctatus*, because the Indian species that have hitherto been referred to the genus *Gobius* are in need of revision.

Distribution.—The seas of India to the Fiji Islands and Port Essington, Australia.

Genus **GLOSSOGOBIUS** Gill.

Gill[1] defined this genus as follows: "*Glossogobius* has a depressed head, protruding lower jaw, an anteriorly free and deeply emarginate tongue, and several rows of stout teeth in each jaw, the outer of which are hooked backwards." Quite recently the definition has been amplified by Jordon and Snyder,[2] and also by McCulloch and Ogilby.[3] The ampli-

[1] Gill, *Ann. Lyc. Nat. Hist. N. York*, p. 46 (1859).

[2] Jordan and Snyder, *Proc. U. S. Nat. Mus.* XXIV, p. 74 (1902).

[3] McCulloch and Ogilby, *Rec. Austr. Mus.* XII, p. 235 (1919).

fication has been made to include the peculiar structure of the mouth, which is very wide and of the gill-openings, which extend further forwards than in *Gobius*, rendering the isthmus narrow. All these characters are well-marked in the four old species, *G. platycephalus* (Richardson), *G. giuris* (Ham. Buch.), *G. biocellatus* (Cuv. and Val.) and *G. brunneus* (Schlegel), that have been included in this genus. Of the species that have been recently described, the tongue of *G. campbellianus* (Jordan and Snyder)[1] is stated to be " notched " and the " lower jaw slightly projecting." This species has been referred to *Glossogobius* because it possesses " the large mouth, notched tongue and narrow isthmus." It is open to question whether a species which does not possess " protruding lower jaw, an anteriorly free and deeply emarginate tongue " can be included in *Glossogobius*. The remaining species, *G. aglestes* (Jordan and Seale),[2] *G. abacopus* (Jordan and Richardson)[3] and *G. mas.* sp. nov. show typical *Glossogobius* characters.

Glossogobius giuris (Ham. Buch.).

1919. *Glossogobius giuris*, McCulloch & Ogilby, *Rec. Austr. Mus.*, XII, p. 236.

This is one of the most widely distributed species of the genus and is represented by a large number of individuals from different localities in the Chilka Lake. The outline of the tongue is liable to considerable variation. In some individuals a large parasitic Isopod was found inside the mouth cavity and in such examples the tongue was found to be abnormal in that it was swollen and the emargination was feebly indicated.

The following statement shows the different localities whence the specimens were collected and their number :—

5 specimens	... ...	Satpara ...	... 10 November 1914.
3 „	... ...	Chilka Lake, Orissa	... 31 July 1913.
2 „	... ...	Barkul ...	... 10 September 1914.
4 „	... ...	Satpara ...	... March 1914.
4 „	... ...	Rambha Bay ...	... February 1914.
1 specimen	... ...	Main channel W. of Satpara Island ...	... 16 March 1914.
2 specimens	... ...	W. of Satpara ...	... 20 March 1914.
1 specimen	... ...	Channel between Satpara and Barnikuda. ...	... 4 September 1914.
1 „	... ...	About 1 mile off N.E. of Nalbano Island	... 25 November 1914.

Distribution.—The range of this species extends from the East Coast of Africa, through the seas and fresh waters of India to Malay Archipelago, Australia and beyond.

Glossogobius biocellatus (Cuv. and Val.).

1919. *Glossogobius biocellatus*, McCulloch & Ogilby, *Rec. Austr. Mus.*, XII, p. 237.

There are three specimens in the collection. All of these were collected in the neighbourhood of Barnikuda in early September, 1914. This species occurs near the coasts of India and the range extends to the Malay Archipelago and Australia.

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[1] Jordan and Snyder, *Proc. U. S. Nat. Mus.* XXXIII, p. 542, fig. 2 (1908).

[2] Jordan and Seale, *Proc. U. S. Nat. Mus.* XXVIII, p. 799, fig. 16 (1903).

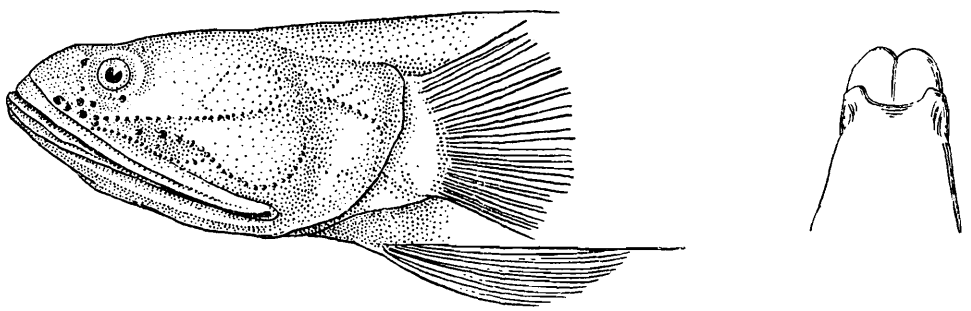
[3] Jordan and Richardson, *Mem. Carnegie Mus.* IV, p. 200, pl. lxxiv (1909).

Glossogobius mas, sp. nov.

D. VI/1/7. A. 7.

To this species I assign six specimens, 4 females and 2 males. There are some differences between the two sexes and I, therefore, propose to describe them separately. The species does not grow more than an inch and a half long.

Male.—The male is thin and slender, with a greatly flattened head. The profiles are slightly arched and the body tapers towards both ends. The head is flat and broad posteriorly, while anteriorly it is constricted and rounded. The snout is bluntly pointed and is slightly longer than the horizontal diameter of the eye. The head is contained 2·7 times



Text-fig. 23.—*Glossogobius mas*, sp. nov.
a. Lateral view of head of a male specimen: ×6.
b. Tongue of same : ×8.

in the length of the fish without the caudal fin ; its depth at the occiput is contained 1·8 times and its breadth 1·6 times in its length. The eyes are small and are situated on the dorsal surface ; they are invisible from below ; their diameter is contained 5·2 times in the length of the head, 1·1 times in length of the snout and 0·9 times in the inter-orbital distance. The depth of the body near the anterior origin of the first dorsal fin is almost half the length of the head.

The mouth is oblique and very wide ; the maxilla reaches as far back as the lower margin of the operculum. The tongue is deeply notched.

The scales are deciduous and as a rule only their basal membranes are present in specimens. There are 24 to 26 scales in a longitudinal series between the angle of the operculum and the base of the caudal fin. The scale is rectangular in outline and is markedly ctenoid. There are a large number of radii proceeding from an eccentric nucleus to the apex. The circular striae are not well-developed and are greatly interrupted in their course.

The second dorsal and the anal fins are small and contain about seven rays each. The pectorals are almost as long as the ventrals and are shorter than the length of the head. The caudal fin is pointed in the middle.

Female.—All the 4 female specimens are full of eggs and consequently the body is deeper and stouter. The chief point of difference from the male is that the mouth is not so wide and the maxillae extend to just behind the posterior margin of the orbit. In all other respects the female agrees with the male.

The colour is rather characteristic. It is reddish brown all over ; the centre of the scales is whitish, while their edges are dotted with black. The under surface of head and body is whitish. The fins have no markings.

Gobius melanosticta Day, a small Goby from the backwaters of Madras, shows great similarity to the female of the new species. The two can, however, be readily distinguished by the number of their fin-rays, their proportions and colouration.

The dissection of a male specimen has not revealed the ripe testes. Possibly the two sexes will ultimately have to be regarded as separate species but I have refrained from describing them as such because the number of specimens at present available is very small.

The following statement gives the number of individuals, their localities and sex:—

4 specimens	... Off Samal Island	... 22 September 1913	3 ♀ & 1 ♂.
1 specimen	... Rambha Bay	... 4 September 1919	♂
1 „	... Off Barkul ...	... 2 November 1914	♀

Measurements in hundredths of total length without caudal.

	♂	♀
Total length without caudal	21 mm.	25 mm.
Length of head	37·1	33·2
Depth of head at occiput	20·0	20·4
Breadth of head	25·7	23·6
Length of snout	8·1	8·0
Diameter of eye	7·1	7·2
Interorbital width	6·1	6·4
Depth of body near origin of first dorsal	19·5	32·0
Length of caudal peduncle	28·5	31·2
Height of caudal peduncle	12·3	14·4
Length of caudal fin	26·6	14·0
Length of pectoral fin	29·5	24·0
Length of ventral fin	28·5	16·0
Longest ray of dorsal fin.	22·3	18·0
Longest ray of anal fin	27·6	20·0

Genus **CTENOGOBIUS** Gill.

The genus *Ctenogobius* is well represented in the fauna of the Chilka Lake, for there are as many as seven species in the collection. Four are described here for the first time. With the exception of two species, all are very small and may, therefore, have been overlooked elsewhere by collectors. Some of the species which I now assign to this genus have previously been referred to the genus *Gobius*, from which *Ctenogobius* can be distinguished by the absence of " silk-like free tips to the upper rays of the pectorals "[1] and by their smaller size and totally " different physiognomy."

Ctenogobius acutipinnis (Cuv. & Val.).

1876. *Gobius acutipinnis*, Day, *Fish. India* I, p. 291, pl. lxi, fig. 2.

There are four specimens in the collection, one from Rambha Bay, one from Barkul and the other two from Serua Naddi (September, 1914). The largest specimen is from Rambha Bay and is 41 mm. in length without the caudal.

Distribution.—The seas of India.

[1] Jordan and Snyder, *Proc. U.S. Nat. Mus.*, XXIV, p. 54 (1902).

Ctenogobius chilkensis (Jenkins).

1910. *Gobius chilkensis*, Jenkins, *Rec. Ind. Mus.* V, p. 137, pl. vi, fig. 2.

There are eighty specimens of this species in the Chilka Survey Collection. Most of them were obtained from the neighbourhood of Nalbano Island. The largest is 35 mm. in length.

This species is only known from the Chilka Lake. Jenkins obtained his specimens from near Gopkuda Island.

Ctenogobius alcocki (Annandale).

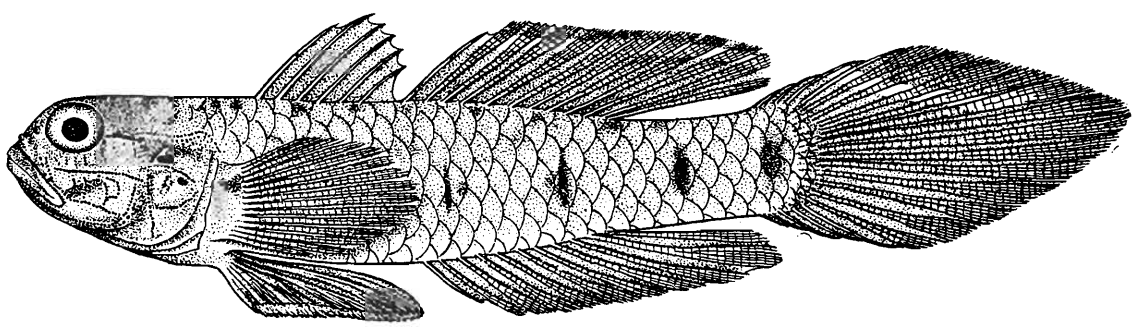
1906. *Gobius alcockii*, Annandale, *Journ. As. Soc. Bengal*, (n.s.) II, p. 201, fig. 1.

This small Gobiid fish was first described from Port Canning and Calcutta by Annandale. It is very common all over the Chilka Lake and is represented by a large number of specimens. There are six spines in the first dorsal fin instead of five, the number given in Annandale's description and figure. A large number of individuals was netted near Barku and specimens were also collected at various other localities in the Lake.

Ctenogobius globiceps, sp. nov.

D. VI|I/11. A. 1/10.

In this new species the body is somewhat compressed from side to side, and the head is almost globular. The dorsal profile is straight and horizontal ; the ventral rises towards both ends from below the middle of the base of the pectoral fin. The head is almost as high as the greatest depth of the body and its length is contained 4 times in the length without the caudal fin. The eyes are big and are situated near the dorsal surface ; they are hardly visible from below. The diameter of the eye is contained 3·3 times in the length of the head. The snout is short and rounded. The anterior pair of nostrils are tubular and are separated from the posterior pair by a short distance. The mouth is small and oblique ; the maxilla reaches to below the anterior $\frac{1}{4}$ of the orbit. The sides of the head are covered by a large number of mucous glands, which are arranged in definite rows.



Text-fig. 24.—*Ctenogobius globiceps*, sp. nov. : ×4.

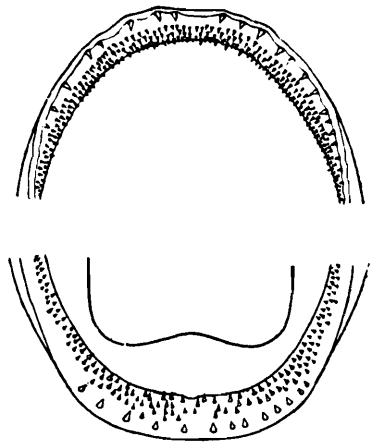
The anterior dorsal commences immediately above the origin of the pectoral fin and contains six spines ; its commencement is almost equidistant from the anterior origin of the second dorsal and the posterior margin of the orbit. The second dorsal is composed of one spine and eleven rays ; its anterior origin is midway between the base of the caudal and the tip of the snout. The ninth branched ray is the longest and its length is greater than the greatest depth of the body. The pectoral fin is as long as the ventral and is slightly shorter than the head. The anal fin is long and originates behind the commencement of

the second dorsal. The penultimate ray is the longest and is longer than the longest ray of the second dorsal. The caudal fin is sharp and pointed in the middle; its length is contained 2·5 times in the length of the fish with the caudal.

The teeth are small and conical and there are several rows of them both in the upper and the lower jaw; those of the outer rows are slightly the longer. The tongue is slightly emarginated.

There are 26 to 27 scales along the lateral line and $5\frac{1}{2}$ series of longitudinal scales between the anterior origin of the second dorsal and the anal fins. The scales are feebly ctenoid.

In spirit the colour is yellowish with 4 or 5 short vertical black bands on the sides of the body. There are a few small black spots on the body above the lateral line. The pelvic fins are blackish, while the others are slightly dusky. There is a white band marking off the tip of the second dorsal fin and obliquely continued on the upper half of the caudal fin. The colour pattern is, on the whole, very characteristic of the species.



TEXT-FIG. 25.—Tooth-bands and tongue of *Ctenogobius globiceps*, sp. nov.: ×20.

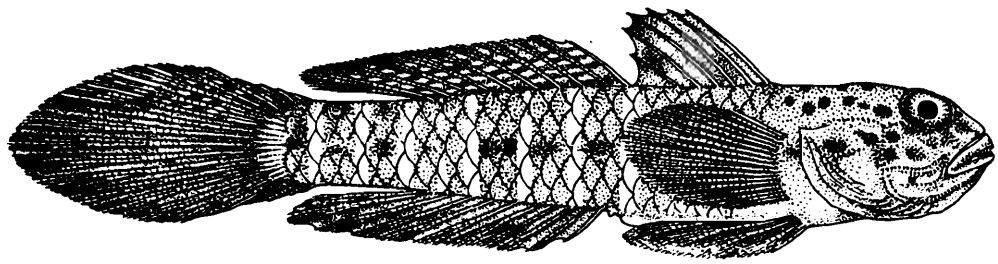
This species is widely distributed in the Chilka Lake and a large number of specimens were obtained from the following localities:—

Off Samal I.; Rambha Bay; Satpara; between Cherriakuda and the mainland; Serua Nadi; Mahosa, Barhampur Island; off Balugaon; off Nalbano; off Barkul bungalow; South of Kalidai.

Ctenogobius cylindriceps, sp. nov.

D. VI|1/9. A. 1/9.

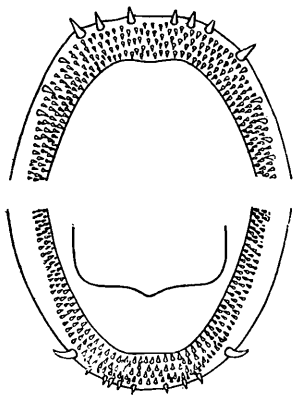
The new species is very common in the Chilka Lake and is represented by a large number of specimens in the collection. It does not grow to more than an inch and a half in length. The dorsal profile is almost straight or slopes gradually down to the base of the caudal fin from the anterior origin of the first dorsal. The head is sub-cylindrical and the body somewhat flattened from side to side. The length of the head is contained 3·7 times in the total



TEXT-FIG. 26.—*Ctenogobius cylindriceps*, sp. nov.: ×4.

length without the caudal and its height at the occiput is almost equal to the greatest height of the body. The eyes are situated near the dorsal surface and are not visible from below; their diameter is slightly greater than the length of the snout and is contained about 3·3 times in the length of the head.

The commencement of the first dorsal fin is almost equidistant from the posterior limit of the orbit and the anterior origin of the second dorsal. The length of the base of the second dorsal is almost equal to the length of the head and it commences immediately behind the membranous base of the first dorsal. The last divided ray is the longest and is as high as the greatest depth of the body. The anal fin originates slightly behind the anterior commencement of the second dorsal and its base is shorter than the length of the head. The last ray of the anal is the longest and is slightly greater than the greatest height of the body The pectoral fin is short and rounded and is considerably shorter than the length of the head. The pelvic fins are as long as the pectoral and are separated from the anal by a short distance. The caudal fin is contained 2·4 times in the total length without the caudal ; it is bluntly pointed behind.

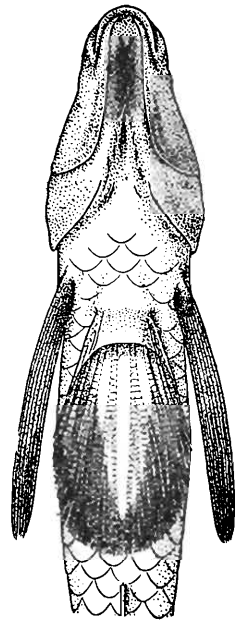


Text-fig. 27.—Tooth-bands and tongue of *Ctenogobius cylindriceps*, sp. nov. : ×20.

The mouth is small, with a somewhat oblique opening ; the maxilla just reaches to below the anterior margin of the orbit. There are several rows of minute teeth in both jaws ; those of the outer row in the upper jaw and two teeth, one on each side, of the lower jaw are enlarged. The latter have the appearance of canines. The tongue is pointed in the middle.

The scales are comparatively large and firmly set on the body. There are about 25 between the angle of the operculum and the base of the caudal fin. Between the anterior origin of the second dorsal and the anal there are five rows of longitudinal scales. The scales are feebly pectinated. The cheeks and the opercula are naked.

The colouration is very characteristic. In alcohol the sides are dusky with 7 to 11 vertical, narrow, yellowish bands. The upper surface of the head is also dusky, but its lower surface and the under surface of the body are yellowish. The anterior dorsal is covered with minute black spots and there is also a deep black marking on the membrane between the 4th and the 5th spine. The second dorsal is variegated with black and white and the anal is dusky. The pectoral is almost colourless and the pelvic is dark. The upper rim of the caudal is variegated with black and white, while the remaining portion is light grey. There are usually a number of black spots along the lateral line and the last component of the series near the base of the caudal fin is somewhat deeper in colour. There are several rounded black spots on the top and sides of the head. The colour fades in some specimens and the fish assumes a uniform yellow tinge.



Text-fig. 28.—Under surface of head and body of *Ctenogobius cylindriceps*, sp. nov. ×5⅓.

The new species can be readily distinguished by its characteristic colouration, especially deep black pelvic fins and by its small size. The dentition and the tongue are quite different from those of the preceding species.

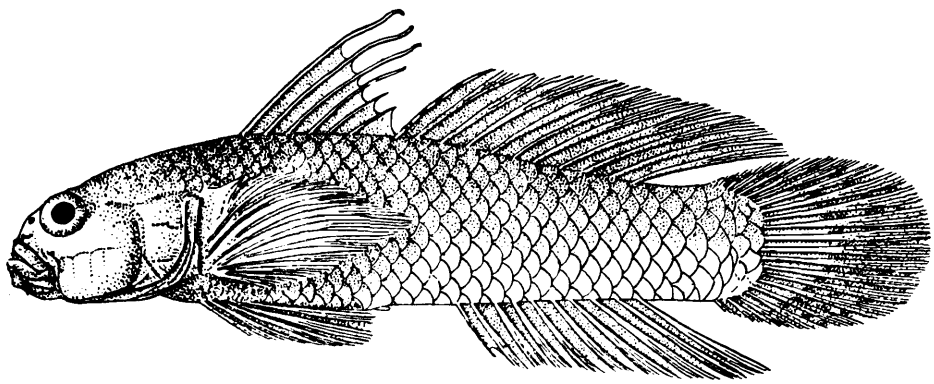
The following statement gives the localities whence the specimens were obtained, and their number :—

9 specimens ...	... Cherria Island	12 February 1914.
26 ,, ...	... Rambha Bay	14 February 1914.
3 ,, ...	... Off Rambha Bay	14 February 1914.
6 ,, ...	... East side of Rambha Bay ...	15 February 1914.
2 ,, ...	... Off Domkuda towards Samal I.	17 February 1914.
4 ,, ...	... Off North side of Samal I. ...	24 February 1914.
1 specimen ...	... East of Barkul	2 March 1914.
1 ,, ...	... Off Barkul Bungalow ...	4 March 1914.
20 specimens ...	... Main Channel, W. of Satpara Island	16 March 1914.
7 ,, ...	... Main Channel between Satpara and Barnikuda. ...	17 March 1914.
2 ,, ...	... Between Mahosa and Satpara	18 March 1914.
12 ,, ...	... Channel between Satpara and Barhampur Islands. ...	22 March 1914.
10 ,, ...	... Between Cherria and Mainland	20 July 1914.
15 ,, ...	... Serua Nadi	4 September 1914.
18 ,, ...	... Channel off Barhampur Island	9 September 1914.
3 ,, ...	... Kalidai W. part of Samalkuda	22 November 1914.
3 ,, ...	... Near Nalbano Island ...	25 November 1914.
1 specimen ...	... East of Barkul	29 November 1914.
21 specimens ...	... About half mile from Parikudh Island	29 November 1914.

Ctenogobius dentifer, sp. nov.

D. VI|1/10. A. 9—10.

There are eight specimens of this species in the collection. Of these six were obtained in Rambha Bay in February 1914, while the remaining two were collected near Satpara and Barnikuda. The fish does not grow to more than two and a half inches in length.



TEXT-FIG. 29.—*Ctenogobius dentifer*, sp. nov. : ×2⅛.

The dorsal profile is slightly arched and the ventral is almost straight and horizontal throughout. The head is flat and somewhat depressed ; the body is compressed from side to side. The length of the head is contained 3·6 times in the total length without the caudal fin. The width of the head is contained 1·2 times and its height 1·5 times in its length. The greatest depth of the body is one-fifth of the total length without the caudal. The

eyes are in the anterior half of the head and are situated near the dorsal surface ; they are not visible from below. The mouth is small and has a slightly oblique opening ; the maxilla just reaches to below the anterior third of the orbit. The snout is small and rounded and the margins of the eyes almost meet on the dorsal surface.

The commencement of the first dorsal is in the anterior third of the distance between the tip of the snout and the base of the caudal fin. All the spines are greatly produced ; the third is the longest and reaches to the base of the fifth ray of the second dorsal fin when adpressed. The base of the second dorsal is as long as the length of the head ; the rays increase in length as they proceed backwards. The anal fin commences slightly behind the anterior origin of the second dorsal and ends slightly in front of the end of the second dorsal fin. The rays in the middle of the pectoral fins are greatly elongated and are provided with silky terminations. The pelvic fins are shorter than the length of the head. The caudal fin is slightly longer than the pelvic fins and is rounded posteriorly.

The teeth are arranged in several rows both in the upper and the lower jaws ; those of the outer rows in each are longer and stronger than the others and are somewhat curved inwards near their extremities. In the lower jaw the outer teeth are well-marked and form a formidable series resembling canines.

The scales are large and well-developed. There are 28 to 31 between the angle of the operculum and the base of the caudal fin. Between the anterior origin of the second dorsal and the anal there are 9 series of the longitudinal rows. Scales are absent on the cheeks and the opercula, but on the dorsal surface of the head they are continued up to the margins of the orbits.

On the head there are a number of open pores ; they are arranged along the margins of the opercular bones and on the surface just behind the eyes.

In spirit the colour of the body is yellowish red. The pelvic and the anal fins are dark, while the remaining fins are white near their bases and dusky near their free margins. The snout, sides and under surface of the head are lighter in colour. The most characteristic feature of the colouration is the presence of a deep black spot on the bases of some of the upper pectoral rays.

The new species is readily recognised by its elongate dorsal spines and by the presence of well-developed canine-like teeth.

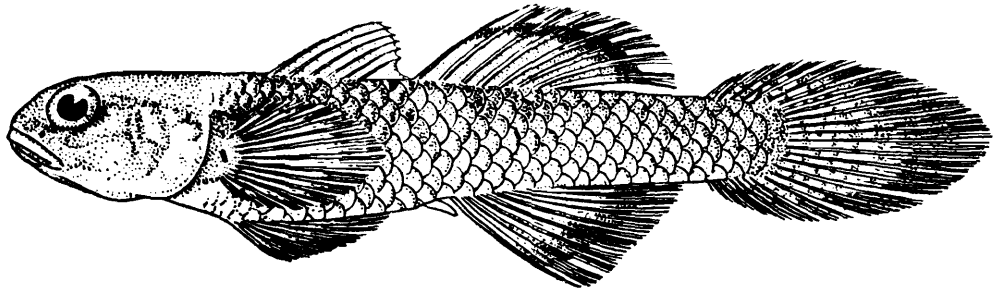
Measurements in hundredths of the total length.

Total length without caudal	40 mm.
Length of head	27·5
Width of head	22·5
Height of head near occiput	18·2
Greatest depth of body	20·0
Diameter of eye	7·5
Length of snout	5·7
Length of caudal peduncle	25·0
Height of caudal peduncle	14·5
Length of caudal fin	25·0
Length of pelvic fin	23·7
Longest ray of second dorsal fin	22·0
Longest ray of anal fin	21·2

Ctenogobius minima, sp. nov.

D. VI|1/7. A. 1/7-8.

This species, the smallest of the Chilka Gobies, is represented by a large number of specimens in the collection. It does not exceed 20 mm. in total length without the caudal fin.



TEXT-FIG. 30.—*Ctenogobius minima* sp. nov. : ×6.

The form is very characteristic ; the dorsal profile is straight and horizontal throughout and the ventral profile bulges most near the base of the pelvic fin. The body is deepest between the bases of the first dorsal and the pelvic ; the chest bulges outwards. The head is broad posteriorly and narrows anteriorly from side to side. The snout is shorter than the diameter of the eye and is rounded at the tip. The length of the head is contained 3·7 times in the length of the body without the caudal fin. The eyes are placed dorso-laterally and are hardly visible from below ; the horizontal diameter of the eye is contained 3·5 times in the length of the head. The mouth is small, with a slightly oblique opening ; the lower jaw is somewhat shorter than the upper. The teeth are minute and the tongue is grooved anteriorly and pointed in the middle. The gill-openings are restricted to the sides and do not extend beyond the base of the pectoral fin. There are four well-marked branchiostegal rays.

The commencement of the first dorsal fin is equidistant from the tip of the snout and the posterior limit of the base of the caudal fin. The anterior origin of the second dorsal is nearer the base of the caudal than the tip of the snout. It contains one spine and seven branched rays ; the fourth or fifth branched ray is the longest, and is almost as high as the greatest depth of the body. The anal fin begins posterior to the commencement of the second dorsal and contains one spine and seven to eight branched rays. The pectoral fin is rounded and is as long as the longest ray of the second dorsal. The pelvic is slightly longer than the pectoral. The caudal is rounded, with a sharp point in the middle.

The body is covered with ctenoid scales, which are firmly set. There are about 25 or 26 between the angle of the operculum and the base of the caudal fin, and six series of longitudinal rows between the bases of the second dorsal and the anal near their anterior origin. The scales are markedly ctenoid, with a large number of radii to the base.

The colour of the body in spirit is light olivaceous ; the margins of the scales in the upper half of the trunk are speckled with minute black dots. The head is also marked with clusters of black dots. In the female the caudal and the dorsal fins are marked with minute dots. The colouration of the male is somewhat different. The edges of the scales and of

the head are comparatively darker but the most characteristic feature is the presence of a couple of black bands, one near the margin of the second dorsal and the other near the margin of the anal. The caudal fin is somewhat dusky.

The following statement gives the localities whence the specimens were obtained, their number and sex.

9 specimens ...	Nalbano Island	6 January 1915.♂
2 „ ...	Rambha Bay	September, 1914.♂
1 specimen ...	Off Balugaon	6 March 1914.♂
27 specimens ...	Between Cherria I. and mainland.	20 July 1914.♂
1 specimen ...	Off Kalidai	5 March 1914.♀
1 „ ...	N.E. of Nalbano	9 March 1914.♂
2 specimens ...	Near Manikpatna	7 September 1914.♂
1 specimen ...	Serua Nadi	8 September 1914.♂
10 specimens ...	Domkuda and Samal Islands ...	18 June 1914.♀
5 „ ...	Near Nalbano	11 September 1914.♀
7 „ ...	Off Balugaon	6 March 1914.♀
1 specimen ...	W. of Satpara	20 March 1914.♀
1 „ ...	Mahosa, Barhampur Island ...	20 March 1914.♀
3 specimens ...	Serua Nadi	8 September 1914.♀
1 specimen ...	Barkul point	2 March 1914.♀

Genus **OXYURICHTHYS** Bleeker.

Oxyurichthys tentacularis (Cuv. and Val.)

1876. *Gobius tentacularis*, Day, *Fish. India* I, p. 291, pl. lxiv, fig. 4.

This species is represented by a large number of specimens in the Chilka Survey collection. The following statement gives the different localities whence the specimens were collected, and their number.

8 specimens ...	Channel off Barhampur I. ...	2 September 1914.
4 „ ...	Manikpatna Island ...	21 March 1914.
6 „ ...	Main channel between Satpara and Barnikuda ...	17 March 1914.
10 „ ...	Main Channel W. of Satpara Island	16 March 1914.
1 specimen ...	Between Cherria I. and mainland	20 July 1914.
27 specimens ...	Channel between Satpara and Barhampur Islands ...	2 September 1914.
3 „ ...	Channel S. of Satpara Island ...	5 September 1914.
6 „ ...	Serua Nadi	8 September 1914.

The largest specimen is 65 mm. in length without the caudal.

Distribution.—This species is found in the seas of India and its range extends to the Malay Archipelago.

Genus **APOCRYPTES** Cuv. and Val.

Apocryptes rictuosus (Cuv. & Val.).

1876. *Apocryptes rictuosus*, Day, *Fish. India*, I, p. 300.

There are four specimens in the collection, the largest of which is 69 mm. in length. The species is readily distinguished by the presence of a well-marked black ocellus on the last few dorsal rays. The caudal fin is marked with a number of faint brownish bands.

The following statement gives the different localities whence the specimens were collected and their number and size :—

1 specimen ...	Main channel west of Satpara Island ...	16 March 1914 ...	62 mm.
2 specimens ...	Channel between Satpara and Barhampur Islands.	...	69 & 56 mm.
1 specimen ...	Barkul	18 September 1914	45 mm.

Distribution.—The seas and estuaries of India.

Apocryptes lanceolatus (Bl. & Schn.).

1876. *Apocryptes lanceolatus*, Day, *Fish. India*, I, p. 301, pl. lxiv, fig. 5.

This species is represented by a single specimen in the collection. The specimen was obtained in the South Bay of the lake and is 168 mm. in length.

Distribution.—The seas of India, extending to the Malay Archipelago.

Genus **MICRAPOCRYPTES,** nov.

The new genus resembles *Apocryptes* Cuv. and Val. in the structure of the teeth, at any rate in the adult male, but exhibits sexual dimorphism in this respect. It is chiefly distinguished by the small size and hyaline tissues of the fish and by the moderately compressed and elongate form. The tongue is notched in the middle and the scales are feebly ctenoid.

The type-species is *Micrapocryptes fragilis*, sp. nov. from the Chilka Lake and the Gangetic delta.

To this genus I refer *Apocryptes brachypterus* Bleeker[1] from Java. It is said to occur in the lake Grati (Province of Pasuruan). Günther[2] was of opinion that this species had more affinity to his genus *Latrunculus* than to the typical species of *Apocryptes*. *Micrapocryptes* differs from *Latrunculus* in the possession of feebly ctenoid scales, which are firmly set on the body, in its small size and the small mouth-opening. The dentition is also different in the two genera.

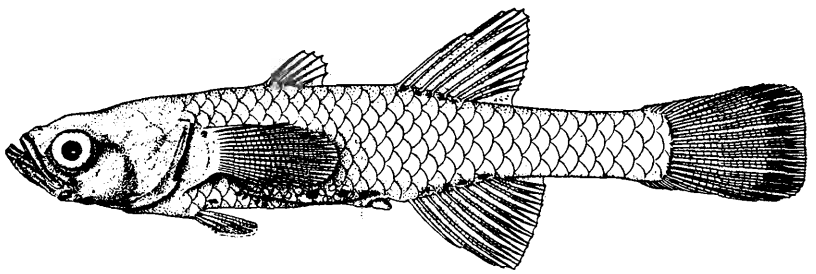
Micrapocryptes fragilis, sp. nov.

The species consists of small transparent Gobies, in which the body is but moderately elongated and the form is compressed from side to side. The dorsal profile is slightly arched and the ventral rises to the base of the caudal fin from just below the beginning of the dorsal. The head is elongated and bluntly pointed. The caudal peduncle is somewhat constricted and in this region both the dorsal and the ventral profiles are almost straight and parallel.

[1] Bleeker, *Nat. Tijdschr. Ned. Ind.* IX, p. 401 (1885).

[2] Günther, *Cat. Brit. Mus. Fish.* III, p. 80 (1861).

The measurements in hundredths of the length without the caudal fin are as follows : the length of head 25·3—27·6%, the depth of the body 19·6—22·2%, the length of the



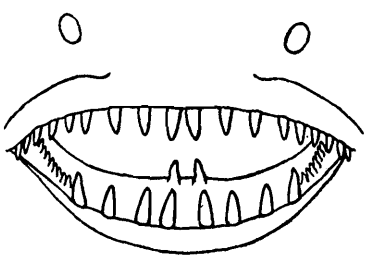
Text-fig. 31.—*Micrapocryptes fragilis*, gen. et sp. nov. : ×4.

snout 4·4—5·5%, the horizontal diameter of the eye 5·5—6·8%, the length of the pectoral fin 19·5—21·6%, the length of the pelvic fin 9·5—11·1%, the length of the caudal fin 17·6—20·4%, the least height of the caudal peduncle 10·4—13·8%, the length of the caudal peduncle 24—27·6%, the width of head 17·6—18·1% and the depth of head at occiput 17·6—18·1%.

The distance between the anterior origin of the first dorsal fin and the tip of the snout is equal to the distance between the anterior origin of the second dorsal and the base of the caudal. The distance between the anterior origin of the first dorsal and the anterior origin of the second dorsal is almost equal to twice the depth of the caudal peduncle. The anterior origin of the anal, which is situated slightly behind the origin of the second dorsal, is almost midway between the tip of the snout and the posterior margin of the caudal. The distance between the origin of the pelvic and the tip of the snout is equal to the distance between the last ray of the second dorsal and the base of the caudal. The base of the anal is longer than the base of the second dorsal and is almost equal to twice the diameter of the eye. The least height of the caudal peduncle is equal to the length of the pelvic and is half the depth of the body below the anterior origin of the first dorsal fin.

The eyes are prominent and are situated on the sides ; they bulge outwards and are visible from above as well as from below. The postorbital region of the head is almost equal in length to the remaining portion, and is twice the horizontal diameter of the eye. The snout is shorter than the diameter of the eye. The mouth is oblique and is turned upwards ; the lower jaw is longer than the upper. The gape of the mouth reaches to below the anterior margin of the orbit.

The teeth show considerable variation with the sex and the age of the individuals. The structure of teeth is exactly alike in the young of both sexes. In both jaws there are a number of small conical teeth. They are minute and closely fitted together and their number is rather difficult to determine. They project very little beyond the jaws and, indeed, to the naked eye the jaws appear edentulous. The teeth are developed in very young specimens but it is only with great difficulty that the two canines on the mandibular symphysis can be made out. As the sexes mature, the teeth of the female do not undergo any appreciable change and continue to be just as in the young condition. In a ripe male, however, the dentition is absolutely different. Instead of

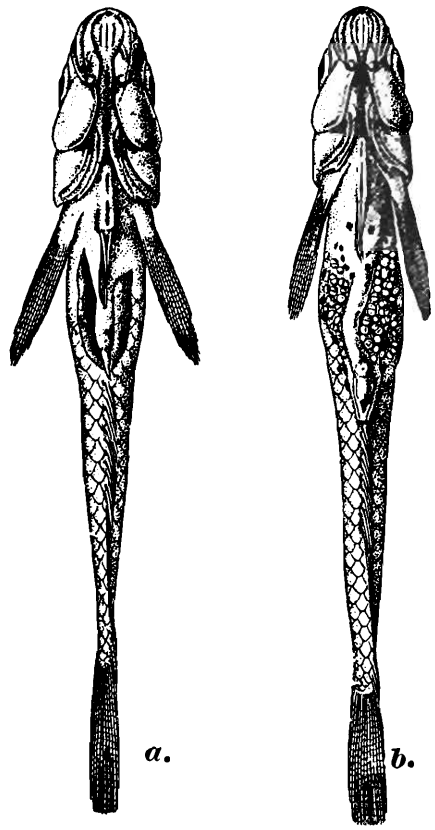


Text-fig. 32.—Tooth-bands of *Micrapocryptes fragilis*, gen. et. sp. nov.: ×18.

the minute set of teeth, there are developed in both jaws a number of comparatively large conical teeth, which are distinctly visible to the naked eye. In the upper jaw there are about nine teeth on each side and they diminish in size as they recede from the middle of the jaw towards the angle of the mouth. In the ower jaw the big teeth are developed only in the middle and there are usually four of these of almost equal length on each side. The big teeth in both the jaws are separated from each other. Near the angles of the mouth on each side in the lower jaw are a number of minute, closely set teeth. These probably represent the dentition of the young individual. The canines become very conspicuous and are curved near their extremities.

In the development and structure of the teeth the Indian transparent Goby runs almost the same course as has been described by Collett[1] for the two European transparent Gobies (*Aphia pellucidus* and *Crystallogobius nilssoni*). I have not, however, been able to determine in this new form all those points which have been so ably discussed by Collett for the European genera.

The first dorsal fin consists of five weak spines none of which is longer than the diameter of the eye. The second dorsal consists of a spine and from seven to eight branched rays. The second branched ray is the longest and its height is greater than the depth of the body. The spine is as high as the length of the base of the second dorsal. The anal consists of one spine and from ten to eleven branched rays ; the second branched ray is the longest and is equal in length to the depth of the body immediately below the first branched ray of the second dorsal. The pectoral is as long as the longest ray in the second dorsal ; it usually contains thirteen to fourteen rays and its posterior extremity is rounded. The pelvic is situated on a raised area and begins immediately below the base of the pectoral. The fins are united for a considerable length and form a regular funnel-shaped tube. The caudal is truncate and consists of thirteen rays besides a number of smaller rays on the sides.



TEXT-FIG. 33.—Under surface of male and female of *Micrapocryptes fragilis*, gen. et sp. nov.
a. Male : ×5½. *b*. Female : ×4.

The scales are of moderate size ; but they are extremely thin and are hardly distinguishable with the naked eye. There are 27 between the angle of the operculum and the base of the caudal fin. There are seven in an oblique line between the anterior origin of the anal fin and the base of the second dorsal. The scales are firmly set together. Under the microscope a series of small spines is seen along the posterior border of every scale, but I have not been able to make out any definite striae in the central portion. In a microscopic prepara-

[1] Collett, *Proc. Zool. Soc. London*, pp. 318—339 (1878).

tion the muscle fibres are seen running longitudinally underneath the scales. Except for these and certain other irregular interrupted markings I have not been able to make out any special structure.

The gill-openings extend for only a short distance on the under surface and the isthmus is of moderate width.

The anus is situated a short distance in front of the anal fin and this distance is almost equal to the diameter of the eye. In both sexes a prominent anal papilla is present and the gonads can be seen through the tissues of the body-wall. These facts are apt to give a wrong impression that the male carries eggs in its brood-pouch.

In the living condition the fish is transparent with a yellowish tinge. In the region of the heart and the main blood vessels the colour appears to be reddish owing to the transparent skin and body muscles. There are a series of black spots along the back and on the under surface from the origin of the anal to the base of the caudal. There are a few black spots irregularly scattered on the sides of the body as well. In alcohol the fish becomes opaque and takes on a light olivaceous tinge; the black spots are distributed as before. In the ripe females the skin in the region of the ovaries becomes deeply pigmented with a black colour. The tip of the lower jaw on the under surface is dark brown.

The new species closely resembles *Apocryptes brachypterus* Bleeker[1] from the Grati Lake in the province of Pasuruan, Java. I have not been able to consult the original description of this species and, therefore, I refer for relationships to Günther's[2] description of *A. brachypterus*. The Indian form differs from the Java species in the following characters :—

(*i*) The number of anal fin rays in the Indian form never exceeds 12, while in *M. brachypterus* it is stated to be 13.

(*ii*) In the new species the number of scales along the lateral line is 27, while in *M. brachypterus* it is 25.

(*iii*) The eyes in *M. fragilis* are more than one-fourth of the length of the head, whereas in the Javanese species the diameter of the eye is contained four times in the length of the head.

(*iv*) In *M. brachypterus* there are only sixteen teeth in the upper jaw whereas in the new species they are eighteen.

(*v*) The structure and arrangement of teeth on the lower jaw is totally different in the two species.

The following statement gives the different localities whence the specimens were collected and their number :—

Numerous specimens ...	... Baliaghata Canal, outskirts of Calcutta ...	... 17 July 1916.
1 specimen ...	... 1·9 miles N.E. of Kalidai ...	... 8 March 1914.
1 „ ...	... Off Balugaon ...	... 6 March 1914.
4 specimens ...	... East of Barkul ...	... 29 November 1914.

[1] Bleeker, *Nat. Tijdschr. Ned. Ind.* IX, p. 401 (1855).

[2] Günther, *Cat. Brit. Mus. Fish.* III, p. 84 (1861).

Measurements in hundredths of total length without caudal fin.

	♂	♀
Total length (without caudal fin)	18 mm.	22·1 mm.
Length of head	27·6	25·3
Depth of body	22·2	19·6
Length of snout	4·4	5·5
Depth of head at occiput	17·6	18·1
Width of head	17·6	18·1
From tip of snout to anterior limit of second dorsal fin ...	51·1	59·5
Length of pectoral fin	21·6	19·5
Length of pelvic fin	11·1	9·5
Length of caudal fin	17·6	20·4
Diameter of eye	5·5	6·8
Length of caudal peduncle	27·6	24·0
Height of caudal peduncle	13·8	10·4

Sub-family *ELEOTRINAE.*

Genus **ELEOTRIS** Gronovius.

Eleotris cavifrons Blyth.

1860. *Eleotris cavifrons*, Blyth, *Journ. As. Soc. Bengal* XXIX, p. 145.

1876. *Elotris cavifrons*, Day, *Fish. India* I, p. 313, pl. lxv, fig. 6.

This species is represented in the Chilka Survey Collection by a single specimen, which was collected near Satpara. The species has so far been known from the Andamans, where it is said to grow to 4 inches in length. The Chilka Lake specimen is 37 mm. in total length without the caudal.

Eleotris fusca (Bl. & Schn.).

1876. *Eleotris fusca*, Day, *Fish. India* I, p. 313, pl. lxv, fig. 7.

Of this species there are four specimens in the collection. The largest example is about 7 cm. in total length including the caudal. Two of these were obtained near Satpara, one near Barkul and the other one from near Mahosa.

Eleotris fusca is found all along the Indian Coast and its range extends to the Malay Archipelago. It is also met with along the African coast and is stated to ascend rivers for a considerable distance.

Eleotris sp.

There is a small specimen of the genus *Eleotris*, from Mahosa near Barhampur Island, which I have not been able to refer to any known species of the genus. I have refrained from naming it on account of the immaturity of the specimen. A short description of it is given below to facilitate reference in future.

The specimen is 23·5 mm. in total length without the caudal. The head is broad posteriorly but tapers towards the anterior end and the snout is almost sharp and pointed. The length of the head is contained about 3 times in the total length without the caudal. The

horizontal diameter of the eye is shorter than the length of the snout and is contained 4·3 times in the length of the head. The eyes are situated in the anterior half of the head and are not visible from below. The mouth is small and the maxilla just reaches to below the anterior margin of the orbit. The lower jaw is slightly the longer and is turned upwards. The gill-openings extend on the under surface for a short distance. The preopercular spine is curved and is turned downwards and forwards. There are 9 weak rays in the second dorsal and 10 in the anal.

In spirit the colour is reddish yellow with a large number of minute black dots scattered all over the body. These dots are aggregated near the upper margin of the base of the pectoral fin and on the whole of the caudal fin, rendering them dusky. The under surface of the head and belly is somewhat whitish.

Measurements in hundredths of the total length without the caudal fin.

Total length excluding length of caudal	23·5 mm.
Length of head	33·1
Height of head near occiput	18·2
Width of head	22·1
Length of snout	8·5
Diameter of eye	7·6
Interorbital width	5·5
Length of caudal peduncle	30·6
Height of caudal peduncle	13·6
Longest ray of dorsal fin	14·8
Longest ray of anal fin	15·3
Length of pectoral fin	26·4
Length of pelvic fin	17·1
Length of caudal fin	22·1

Genus **BUTIS** Bleeker.

Butis butis (Ham. Buch.).

1876. *Eleotris butis*, Day, *Fish. India* I, p. 315, pl. lxvii, fig. 3.

This species is represented by a single specimen in the Chilka Survey Collection. It is 52 mm. in length without the caudal. It is known to occur in the seas and estuaries of India and its range extends to the Malay Archipelago.

Sub-family *PERIOPHTHALMINAE.*

Genus **PERIOPHTHALMUS** Bloch & Schneider.

Periophthalmus koelreuteri (Pallas).

There is only one specimen of this species, obtained near Manikpatna Island in March, 1914. It is 43 mm. in length without the caudal. The species is common on the coasts of India and in estuaries and is said to ascend tidal rivers.

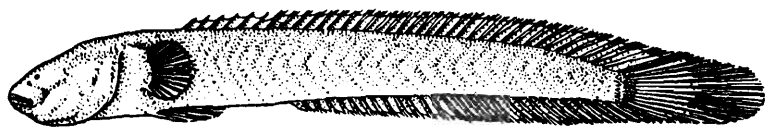
Sub-family *GOBIOIDINAE.*

Genus **TAENIOIDES** Lacépède.

Taenioides chilkensis, sp. no

This new species is represented by a large number of individuals from various localities in the Chilka Lake. It does not grow to a very large size, hardly exceeding 2½ inches in length without the caudal fin.

The body is compressed from side to side and both the dorsal and the ventral profiles slope gradually down to the base of the caudal fin. In most cases the head is deeper than the body. The eyes are minute but distinguishable and are situated in the anterior third of the length of the head. The mouth is small and is turned upwards. The lower jaw is longer than the upper.



TEXT-FIG. 34.—*Taenioides chilkensis*, sp. nov.: ×1½.

The length of the head is contained 5·4 times in the total length of the fish without the caudal and the height of body from 6·6 to 7·5 times. The head is 1·2 times as long as broad and 1·3 times as long as high. The snout is a little over one fourth of the length of the head.

The vertical fins are continuous; the dorsal fin commences immediately behind the pectoral and contains 6 spines and 31 or 32 rays. The anal fin is also very long and contains 27 to 29 rays. The pectoral fins are short and are provided with strong muscular bases. The pelvic fins are much longer than the pectorals. The caudal fin is longer than the head and contains about 15 rays; it is greatly produced in the middle.

There are several rows of sharp minute teeth both in the upper and the lower jaws. No scales are seen on the body even with the help of a lens.

The colour in spirit is dull olivaceous gray all over with the exception of the fins, which are whitish. There are no special markings on the body.

The following statement gives the localities whence the specimens were obtained and their number:—

5 specimens ...	... Satpara	September 1913.
1 specimen ...	... Channel off Barhampur Island	2 September 1914.
4 specimens ...	... Main channel between Satpara and Barnikuda ...	17 March 1914.
5 ,, ...	... Main Channel west of Satpara.	16 ,, 1914.
11 ,, ...	... Channel between Satpara and Barhampur Islands ...	22 ,, 1914.
14 ,, ...	... Serua Nadi	4 September 1914.

Measurements in millimetres.

Total length excluding length of caudal	52	49
Length of head	9·5	9
Height of head near occiput	7	7
Width of head	8	8·2
Length of snout	2·5	2·7
Length of caudal fin	10·5	9
Length of pectoral fin	3·8	3·8
Length of pelvic fin	5	5
Greatest height of body	7·8	6·5

The new species differs from all the other known Indian species of the genus in its small size, in the fewer number of rays in the vertical fins and in having different proportions.

Family BOTHIDAE.

Genus **PSEUDORHOMBUS** Bleeker.

Pseudorhombus arsius (Ham. Buch.).

1878. *Pseudorhombus arsius*, Day, *Fish. India* II, p. 423, pl. xci, fig. 5.

The four specimens of this species were collected from three localities, one from Parikudh, two in Serua Nadi and the remaining one in the channel between Barnikuda and Satpara. The largest specimen is 24 cm. in length including the length of the caudal fin.

There has always been a certain amount of confusion between this species and *Pseudorhombus russelli* (Gray), which was figured as *Platessa russellii* in the *Illustrations of Indian Zoology* on plate 94 without any description. Subsequently Günther[1] described it from the type and several other specimens from China, the East Indian Archipelago, Bengal and other places. Day,[2] who had previously regarded *P. russelli* as distinct from *P. arsius*, in his later work (*op. cit.*) considered the former to be synonymous with the latter. Several ichthyologists such as Castelnau,[3] Macleay,[4] Klunzinger,[5] Boulenger[6] and Sauvage,[7] who came after Day, recorded *P. russelli* from widely different localities without comment and without any reference to *P. arsius*. I have carefully compared Günther's description of *P. russelli* with an original manuscript drawing of Buchanan's *P. arsius*. I am of opinion that the two are identical, the latter representing an immature specimen, while the former is based on an adult. Day has already shown the variation which the members of this species exhibit as regards the number of fin-rays and scales along the lateral line.

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[1] Günther, *Cat. Brit. Mus. Fish.* IV, p. 424 (1862).

[2] Day, *Proc. Zool. Soc. London*, p. 287 (1865); *ibid.*, p. 523 (1869); *ibid.*, p. 698 (1870).

[3] Castelnau, *Proc. Linn. Soc. N. S. Wales* III, p. 391 (1878).

[4] Macleay, *ibid.* II, p. 362 (1878).

[5] Klunzinger, *Sitzungsb. K. Acad. Wiss. Wien* LXXX, p. 406 (1880).

[6] Boulenger, *Proc. Zool. Soc. London*, p. 665 (1887).

[7] Sauvage, in Grandidier's *Hist. Nat. Madagascar* XVI, p. 473 (1891).

The following are the measurements and the number of fin-rays in the manuscript drawing of Hamilton Buchanan's *P. arsius*, now preserved in the library of the Asiatic Society of Bengal :—

Total length, including length of caudal fin	68·5 mm.
Length of caudal fin	13·0 ,,
Length of head	17·0 ,,
Greatest depth of body	27·7 ,,
Length of pectoral fin of left side	8·6 ,,
Length of pectoral fin of right side	5·9 ,,
Length of ventral fin	5·8 ,,
Longest diameter of upper eye	3·3 ,,
Longest ray of dorsal	8·8 ,,
Longest ray of anal	6·5 ,,
No. of rays in dorsal	86
No. of rays in anal	55
No. of rays in caudal	15
No. of rays in ventral	5

Pseudorhombus arsius extends from the east coast of Africa, through the seas and estuaries of India, to Australia and China.

Family SOLEIDAE.

Genus **SYNAPTURA** Cantor.

Synaptura orientalis (Bl. & Schn.).

1878. *Synaptura orientalis*, Day, *Fish. India* II, p. 429, pl. xciii, fig. 4 ; pl. xciv, fig. 2.

In the collection from the lake there is only one specimen about 17·6 cm. in length including the caudal fin. It was collected near Parikudh.

There are 67 rays in the dorsal fin and 51 in the anal. The number of scales along the lateral line is 91. The depth of the body is contained about two and a half times and the length of the head five and a half times in the total length includingthe length of the caudal fin. The scales in the anterior part of the head on the blind side and also those along the gill-openings on both sides have their ctenoid processes greatly produced and the body surface in that region appears as if covered with soft cutaneous filaments. The scales of this type have already been figured by Gilchrist[1] for his species, *Synaptura ciliata*. In *S. orientalis* the processes are much longer than those figured for *S. ciliata*. In addition to these there are tufts of black hair-like filaments coming out from between the scales on the coloured side.

S. orientalis is found in the seas of India and China.

The following are the measurements of the Chilka Lake specimen in millimetres.

Total length, including length of caudal	176·0
Length of caudal	23·5
Length of head	31·2

[1] Gilchrist, *Mar. Invest. South Africa* III, p. 14, pl. xxxiv (1905).

Diameter of lower eye	4·5
Length of pectoral fin of right side	12·0
Length of pectoral fin of left side	9·0
Longest ray of dorsal	14·0
Longest ray of anal	13·5
Greatest depth of body	71·0
Length of pelvic fin	8·5

Family CYNOGLOSSIDAE.

Genus **CYNOGLOSSUS** Hamilton Buchanan.

Cynoglossus brevis Günther.

1862. *Cynoglossus brevis*, Günther, *Cat. Brit. Mus. Fish.* IV, p. 500.

1878. *Cynoglossus brevis*, Day, *Fish. India* II, p. 437, pl. xcvii, fig. 2.

There are sixty specimens of this species in the collection. It has so far been known from the river Hughli at Calcutta and is mainly a brackish water form. There is, however, one specimen in the old collection of the Indian Museum obtained by the Marine Survey from along the Orissa Coast (off Chilka Lake).

The colour varies greatly with age. In the young there are several short black bands on the body, which with the growth of the fish become thinner and more numerous and ultimately produce a reticulum in the adult. There is one very characteristic feature of the species, that several rays of the vertical fins at intervals are dark in colour.

The longest specimen is about 14·5 cm. in length including the caudal fin.

The list given below shows the place and time of occurrence of the species in the lake :—

1 specimen	Gopkuda Bay	14 February 1914.
1 ,, ...	Off Barkuda I.	17 February 1914.
1 ,, ...	South of Kalidai ...	21 February 1914.
1 ,, ...	Chirria I. Bay	23 February 1914.
1 ,, ...	¼ mile off Kalidai ...	1 March 1914.
3 specimens ...	1 mile South of Kalidai ...	1 March 1914.
3 ,, ...	Off Barkul Bay	1 March 1914.
4 ,, ...	Salari to Gantasila ...	3 March 1914.
4 young	West of Satpara I. ...	20 March 1914.
3 ,, ...	Shore of Mahosa	20 March 1914.
13 specimens ...	Channel between Satpara and Barhampur I.	2 September 1914.
5 ,, ...	Channel off Satpara ...	2 September 1914.
14 ,, ...	Channel off Barhampur I. ...	2 September 1914.
24 ,, ...	Channel between Satpara and Barnikuda	4 September 1914.
1 young	Island near Manikpatna ...	7 September 1914.
1 specimen	Serua Nadi	8 September 1914.
1 ,, ...	About 8 miles South-East of Kalupara	16 September 1914.
1 ,, ...	Mouth of Rambha Bay ...	17 November 1914.

Family CARANGIDAE.

Genus **CARANX** Lacépède.

Caranx carangus (Bloch).

1876. *Caranx carangus*, Day, *Fish. India* I, p. 215, pl. l, fig. 4.

The species is fairly common in the lake and is found both in the main area and the outer channel. It appears to be a permanent inhabitant of the lake.

The largest specimen is 12·6 cm. in length and was obtained in Rambha Bay in February, 1914.

Distribution.—The seas of India, the Malay Archipelago and the Atlantic coasts of tropical America.

Genus **EQUULA** Cuv. and Val.

Equula edentula (Bloch).

1876. *Equula edentula*, Day, *Fish. India* I, p. 238, pl. lii, fig. 1.

The species is represented by 14 specimens, of which 12 were collected in the main area, while the remaining two were obtained near Satpara. The species appears to be a permanent inhabitant of the lake.

Distribution.—The Red Sea, the seas of India, the Malay Archipelago and beyond.

Family BLENNIIDAE.

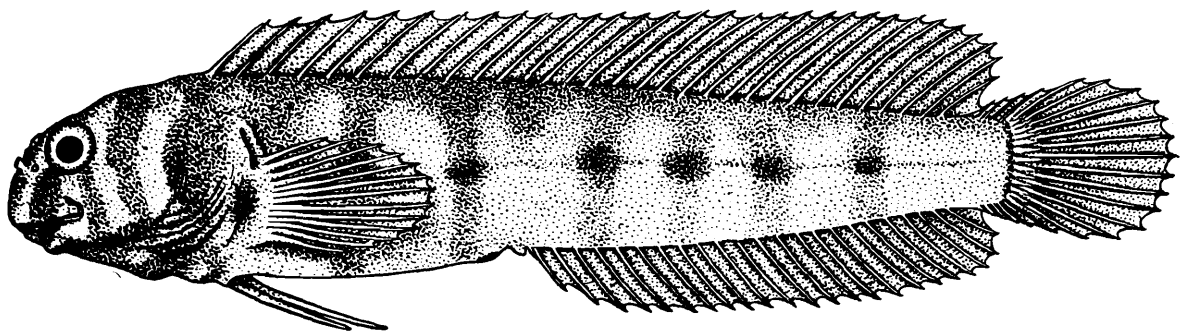
Genus **PETROSCIRTES** Rüppell.

Petroscirtes bhattacharyae Chaudhuri.

1916. *Petroscirtes bhattacharyae*, Chaudhuri, *Rec. Ind. Mus.* XII, p. 107.

1916. *Petroscirtes bhattacharyae*, Bhattacharya, *Mem. Ind. Mus.* V, p. 385, pl. xvii, figs. 8-11 (young stages).

The species occurs in the lake throughout the year and breeds in it. The specimens were collected both in the main area and the outer channel.



TEXT-FIG. 35.—*Petroscirtes bhattacharyae* Chaudhuri: × 3.

The fish has so far been found only in the Chilka Lake.

Family PLATYCEPHALIDAE.

Genus **PLATYCEPHALUS** Bl. & Schn.

Platycephalus insidiator (Forskål).

1876. *Platycephalus insidiator*, Day, *Fish. India*, I, p. 276.

A few specimens of this species were taken in the outer channel, to which it is evidently an occasional visitor.

Disribution.—The Red Sea, east coast of Africa, the seas of India, the Malay Archipelago and beyond.

Sub-order OPISTHOMI.

Family MASTACEMBELIDAE.

Genus **MASTACEMBELUS** Cuv. and Val.

Mastacembelus armatus (Lacépède).

1878. *Mastacembelus armatus*, Day, *Fish. India*, II, p. 340, pl. lxxiii, fig. 2.

The species is represented by two specimens captured near Patsahanipur. The largest is about a foot and half in length.

The fish is probably an occasional immigrant from fresh waters in the rainy season.

Distribution.—The fish occurs in the fresh and brackish waters of India, Ceylon and Burma. Its range extends as far as China.

SUMMARY OF THE REPORT ON THE FISH OF THE CHILKA LAKE.

The fish-fauna of the Chilka Lake comprises in all 118 species, of which 13 have been found to be new. Most of the new species, as many as seven, belong to the family Gobiidae, while the remaining six are distributed among the families Clupeidae, Siluridae, Ophichthyidae and Sphyraenidae. A new genus, *Micrapocryptes*, has been erected in the family Gobiidæ to accommodate the small transparent Gobies of the lake and the Gangetic Delta. In the genus *Eleotris* a specimen is recorded without any specific name. It probably represents a species hithereto undescribed but I have refrained from naming it on account of the immaturity of the single specimen.

Of the 118 species, 49 were taken in the main area only, 24 in the outer channel only and 39 from all over the lake. The distribution of the remaining six species in the lake is not known because they appear to have been purchased from local fishermen from time to time.

The most noteworthy feature in the physical environment of the fauna of the lake is the great periodic change in salinity. This has been fully discussed in the introduction to this volume by Annandale and Kemp (pp. 6—10) and also by Sewell in his paper on Rambha Bay (pp. 680-690). Most of the fishes inhabiting the lake are known from the estuarine waters of India and the Malay Archipelago, but certain forms such as *Pseudorhombus arsius*, *Gerres punctatus*, *G. öyena* and *Gobius albopunctatus*, which have hitherto

been known from sea water, were only captured in the outer channel when the water was quite fresh. Other sea fishes such as *Eleotris fusca*, *Therapon puta*, *Priopis gymnocephalus*, *Tetrodon reticularis*, *Mugil cunnesius*, *Dorosoma nasus* and *Trygon uarnak*, have been found to live in salinities varying from fresh water to water as saline as that of the Bay of Bengal. Several species immigrate into the lake at a certain period. Purely freshwater fishes such as *Mastacembelus armatus* and *Ophiocephalus punctatus* visit the main area during the rains, while forms like *Periophthalmus koelreuteri* and *Rhabdura macrura* are found in the outer channel during a period of drought when the water is as salt as that of the sea outside.

I hope to have an opportunity shortly of comparing the fish-fauna of the Chilka Lake with that of the Talé Sap, a somewhat similar lagoon connected with the Gulf of Siam, and to publish a paper in vol. VI of the *Memoirs of the Asiatic Society of Bengal.*

In the following table the species are arranged in the order in which they have been treated in the report, with a statement as to the specific gravity of the water in which they were taken, their distribution in the lake and their geographical range.

Species.	Specific gravity of water in which specimens were taken.	Distribution in lake.		Further distribution.
		Main area.	Outer channel.	
PLAGIOSTOMI.				
SELACHII				
Carcharinidae.				
Physodon mulleri Müller and Henle .	1·01075	X	...	Bengal and China.
Carcharinus gangeticus (Müller and Henle).	1·01075—1·02375	X	...	Seas and estuaries of India, Japan and Fiji.
,, *melanopterus* (Quoy and Gaimard).	1·00325	...	X	Seas of India and Malay Archipelago.
BATOIDEI				
Pristidae.				
Pristis pectinatus Latham	1·0010	X	...	Tropical and temperate seas.
Trygonidae.				
Trygon uarnak (Forskål)	1·000—1·0260	...	X	Red Sea, Indian Ocean, Gulf of Siam and East Indies.
,, *pareh* Bleeker	1·000—1·0020	X	...	River Hughli, Bay of Bengal and Malay Archipelago.
,, *imbricata* (Schneider)	1·00750—1·02375	X	X	East Indies.
Hypolophus sephen (Forskål)	1·00750—1·02375	X	X	Red Sea, Indian Ocean and East Indies.
Myliobatidae.				
Aetobatis flagellum (Schneider)	?	X	X	Tropical and semi-tropical waters of the world.
,, *guttata* (Bloch and Schneider)	?	X	...	Tropical parts of Indian Ocean.
Aetomylaeus nichofii (Schneider)	1·0110	X	...	Seas of India, East Indies and Japan.
TELEOSTEI.				
MALACOPTERYGII.				
Elopsidae.				
Elops indicus Swainson	1·00750—1·01050	X	...	Arabian Sea and Bay of Bengal, entering estuaries.
Megalops cyprinoides (Broussonet)	1·00725	X	...	Indian and Pacific Oceans and their estuaries.

Species.	Specific gravity of water in which specimens were taken.	Distribution in lake.		Further distribution.
		Main area.	Outer channel.	
TELEOSTEI—*contd.*				
MALACOPTERYGII—*contd.*				
CHANIDAE.				
Chanos chanos (Forskål)	1·000—1·0075	X	...	Red Sea, East Coast of Africa, Indian and Pacific Oceans and their estuaries.
CLUPEIDAE.				
DOROSOMATINAE.				
Dorosoma nasus (Bloch)	1·000—1·02650	X	X	South Arabia and Socotra, seas of India to Malay Archipelago, Philippines, Formosa and China.
,, *indicus* (Russel)	1·000—1·0030	?	?	Seas and estuaries of India, Siam, Malay Archipelago and Philippines.
ENGRAULINAE.				
Engraulis annandalei, sp. nov.	1·000	X	...	
,, *kempi*, sp. nov.	1·00750—1·00775	X	...	
,, *rambhae*, sp. nov.	1·00750—1·00800	X	...	
,, *purava* (Hamilton Buchanan).	1·00750—1·02650	X	X	Seas and estuaries of India, Malay Peninsula and Archipelago.
,, *mystax* (Bloch and Schneider).	1·00750	X	...	Seas and estuaries of India, Malaysia and China.
Stolephorus indicus (v. Hasselt)	1·000—1·00750	X	...	Seas of India and Malay Archipelago, Philippines, Formosa, Japan, Samoa and Tahiti.
,, *commersonii* Lacépède	1·00750	X	...	Madagascar, seas of India, Malay Archipelago and Philippines.
,, *tri* Bleeker	1·00750	?	?	Seas and estuaries of India, Malay Archipelago and Philippines.
CLUPEINAE.				
Clupeoides lile (Cuvier and Valenciennes).	1·00750	X	...	West coast of India, Ceylon, Burma, Siam and Malay Archipelago.
,, *ilisha* (Hamilton Buchanan.)	1·000—1·02650	X	X	Persian Gulf, coasts and estuaries of India and Siam.
OSTARIOPHYSI				
SILURIDAE.				
CLARIINAE.				
Platosus canius Hamilton Buchanan	1·000—1·02650	X	X	Seas, estuaries and rivers of India and the Malay Archipelago.
SILURINAE.				
Wallago attu (Bloch and Schneider)	1·0020	X	...	Rivers and estuaries of India and the Malay Archipelago.
Callichrous bimaculatus (Bloch)	1·0020	X	...	Ditto.
Pangasius pangasius (Cuvier and Valenciennes).	1·000	X	...	Ditto.
Osteogeneiosus militaris (Linnaeus)	1·000—1·0020	X	...	Ditto.
BAGARINAE.				
Arius satparanus, sp. nov.	1·000	...	X	
,, *arius* (Hamilton Buchanan)	1·000	...	X	Estuaries of Orissa, Bengal and Burma.

Species.	Specific gravity of water in which specimens were taken.	Distribution in lake.		Further distribution.
		Main area.	Outer channel.	
TELEOSTEI—*contd.*				
OSTARIOPHYSI—*contd.*				
BAGARINAE—*contd.*				
Arius caelatus (Cuvier and Valenciennes).	1·0020—1·0070	X	...	Seas, brackish waters and rivers of India, Siam and the Malay Archipelago.
,, *falcarius* Richardson	1·0060	X	...	Seas of East Africa, India and China.
Macrones cavasius (Hamilton Buchanan).	1·0020	X	...	Fresh waters of India and Burma.
,, *gulio* (Hamilton Buchanan).	1·0020—1·0260	X	X	Seas and estuaries of India and the Malay Archipelago.
,, *vittatus* (Bloch)	1·000—1·0020	X	...	Fresh water of Tranquebar, India and Siam.
CYPRINIDAE.				
CYPRININAE.				
Cirrhina latia (Hamilton Buchanan)	1·0080	X	...	Fresh waters of India.
Barbus sophore (Hamilton Buchanan)	1·000—1·0110	X	...	Fresh waters of India, also found within tidal influence.
,, *ticto* (Hamilton Buchanan)	1·000—1·0110	X	...	Fresh waters of India and Ceylon, also occurring in brackish waters.
vittatus Day	1·0260	...	X	Cutch, Madras and Ceylon.
APODES				
ANGUILLIDAE.				
Muraenesox cinereus (Forskål)	?	?	?	Coasts of Africa and Arabia; seas and estuaries of India, Malay Archipelago, Australia, Japan and China.
MURAENIDAE.				
Rhabdura macrura (Bleeker)	1·0260	...	X	Natal, seas of India, Malay Archipelago, Australia and Formosa.
OPHICHTHYIDAE.				
Ophichthis chilkensis, sp. nov. .	1·0060—1·0110	X	...	
,, *hijala* (Hamilton Buchanan).	1·000	X	...	Estuaries of Bengal and the sea of Penang.
,, *boro* (Hamilton Buchanan)	1·000—1·0020	X	...	Seas and estuaries of India and the Malay Archipelago.
HAPLOMI				
CYPRINODONTIDAE.				
APLOCHEILINAE.				
Panchax panchax (Hamilton Buchanan).	1·0020—1·0110	X	...	Fresh waters and estuaries of India, Andamans, Siam, Malay Peninsula and Archipelago.
Aplocheilus melastigma McClelland	1·000—1·0080	X	X	India, Formosa, Korea, Japan and Kiangsú in China.
CATOSTEOMI				
SYNGNATHIDAE.				
Ichthyocampus carce (Hamilton Buchanan).	1·0080	X	X	Seas, estuaries and fresh waters of India and the Malay Archipelago.
Hippocampus brachyrhynchus, Dunker	1·000—1·0110	X	X	Mekran Coast (Arabian Sea).

Species.	Specific gravity of water in which specimens were taken.	Distribution in lake.		Further distribution.
		Main area.	Outer channel.	
TELEOSTEI—*contd.*				
PERCESOCES				
SCOMBRESOCIDAE.				
Belone strongylura v. Hasselt	1·0030—1·00750	X	...	Coasts and estuaries from Bengal to China.
Hemirhamphus limbatus Cuvier and Valenciennes.	1·000—1·0110	X	...	Indian Ocean and the Sea of Penang.
MUGILIDAE.				
Mugil cephalus Linnaeus	1·000—1·0060	X	...	Mediterranean Sea, West Coast of Africa, Red Sea, Indian Ocean, seas of China and Japan including estuaries, Pacific and Atlantic coasts of America.
,, *gymnocephalus* Swainson	?	?	?	Seas of India and the Malay Archipelago.
,, *cunnesius* Cuvier and Valenciennes.	1·000—1·0260	X	X	Abyssinia, Red Sea, seas of India to the Malay Archipelago and beyond.
,, *subviridis* Cuvier and Valenciennes.	1·0020—1·0260	X	X	Seas of India entering fresh waters.
,, *caeruleo-maculatus* Lacépède	1·000	...	X	Coasts of Mauritius, through seas of India to the Malay Archipelago.
,, *jerdoni* Day .	1·0110	X	...	Seas of India.
,, *speigleri* Bleeker	1·000—1·0080	X	X	Seas of India, Malay Archipelago and Shanghai.
Liza borneensis (Bleeker)	?	...	X	Seas of India, Malay Archipelago and East Indies.
,, *corsula* (Hamilton Buchanan)	1·000	X	...	Fresh waters and estuaries of India.
,, *troschelii* (Bleeker)	?	...	X	Seas of India and Indo-Australian Archipelago.
POLYNEMIDAE.				
Eleutheronema tetradactylum (Shaw)	1·000—1·0060	X	...	Seas of India, Indo-Australian Archipelago, North Australia and China.
SPHYRAENIDAE.				
Sphyraena raghava, sp. nov.	?	...	X	
OPHIOCEPHALIDAE.				
Ophiocephalus punctatus Bloch	1·000	X	...	Fresh waters of India, Ceylon and Yunnan.
PLECTOGNATHI				
SCLERODERMI.				
TRIACANTHIDAE.				
Triacanthus brevirostris Temm. and Schl.	1·000—1·0070	X	X	Seas of India, Malay Archipelago, Australia, China and Japan.
GYMNODONTES.				
TETRODONTIDAE.				
Tetrodon fluviatilis (Hamilton Buchanan).	1·000—1·0110	X	...	Seas and estuaries of India and Malay Archipelago.
,, *oblongus* (Bloch)	?	...	X	Seas of India, Malay Archipelago, China and Japan.
,, *patoca* Hamilton Buchanan	1·0260	...	X	Seas of India to China.
,, *reticularis* (Bloch and Schneider).	1·000—1·0260	...	X	Seas of India, Malay Archipelago and New Guinea.

Species.	Specific gravity of water in which specimens were taken.	Distribution in lake.		Further distribution.
		Main area.	Outer channel.	
TELEOSTEI—*contd.*				
ACANTHOPTERYGII				
Perciformes.				
Lobotidae.				
Coius quadrifasciatus (Sevastianof)	1·000—1·00750	X	...	Estuaries of the Ganges, rivers of Burma, Siam, the Malay Archipelago and Peninsula.
Serranidae.				
Centropominae.				
Lates calcarifer (Bloch)	About 1·0000—1·0260	X	X	Coasts and mouths of rivers of South Eastern Asia from India to Southern China, the Philippines and Australia.
Chandinae.				
Chanda ambassis (Lacépède)	About 1·0150	X	...	East coast of Africa, shores of India, Malay Archipelago and North coast of Australia.
Priopis gymnocephalus (Lacépède)	1·000—1·0260	X	X	Coasts of Orissa and Malabar, Seychelles and Sea of Penang.
Lutjaninae.				
Lutjanus johnii (Bloch)	1·0060	X	...	Coasts of Africa, Red Sea, seas of India, Malay Archipelago, coasts of China and Australia.
Therapon jarbua (Forskål)	1·000—1·0260	...	X	East coast of Africa, Red Sea, seas and estuaries of India, Malay Archipelago, North coast of Australia and Japan.
„ *puta* Cuvier	1·000—1·0260	X	X	Red Sea, seas of India, Malay Archipelago, coasts of Australia, the Philippines and South Pacific Ocean.
Sillaginidae.				
Sillago sihama (Forskål)	1·000—1·260	X	X	North and East Africa, Red Sea, seas of India, Malay Archipelago, coasts of Queensland, the Philippines, Japan and China.
Sciaena coitor (Hamilton Buchanan)	1·0030	X	...	Seas of India, China and the Philippines.
Limbrina indica (Kuhl and Hasselt)	1·000—1·0110	X	X	Seas of India, Malay Archipelago, the Philippines, Sea of Penang and China.
Gerridae.				
Gerres oyena (Forskål)	1·000	...	X	East coast of Africa, Red Sea, seas of India, Malay Archipelago, Fiji, Japan and the Philippines.
„ *setifer* (Hamilton Buchanan)	1·0070—1·0260	X	X	Seas and coasts of India, Malay Archipelago and China.
„ *punctatus* Cuvier and Valenciennes.	1·000	...	X	Red Sea, seas of India, Malay Archipelago, China and the Philippines.
Leiognathus equulus (Forskål) .	1·000—1·0110	X	X	Ditto
„ *blochii* (Cuvier and Valenciennes).	1·00750—1·0260	X	X	Seas of India.

Species.	Specific gravity of water in which specimens were taken.	Distribution in lake.		Further distribution.
		Main area.	Outer channel.	
TESEOSTEI—*contd.*				
ACANTHOPTERYGII—*contd.*				
GERRIDAE—*contd.*				
Gazza minuta (Bloch)	1·0020	X	...	Zanzibar, Red Sea, East Indian Seas, Malay Archipelago, New Hebrides and the Philippines.
SCORPIDIDAE.				
Monodactylus argenteus (Linneaus)	?	X	...	East coast of Africa, Red Sea, seas of India, Malay Archipelago and of Australia, Philippines and China.
GOBIIFORMES				
GOBIIDAE.				
GOBIINAE.				
Gobius ostreicola Chaudhuri .	1·000	...	X	
,, *albopunctatus* Cuvier and Valenciennes.	1·000	...	X	Seas of India, Australia and Fiji.
Glossogobius giuris (Hamilton Buchanan).	1·000—1·0260	X	X	East coast of Africa, seas and fresh waters of India, the Malay Archipelago, Australia and beyond.
,, *biocellatus* (Cuvier and Valenciennes).	?	...	X	Seas and coasts of India, the Malay Archipelago and China.
,, *mas*, sp. nov. .	1·0010—1·0060	X	...	
Ctenogobius acutipinnis (Cuvier and Valenciennes).	1·000—1·0080	X	X	Seas of India.
,, *chilkensis* (Jenkins)	1·000—1·0080	X	X	
,, *alcocki* (Annandale)	1·0075—1·028250	X	X	Brackish water near Calcutta.
,, *globiceps*, sp. nov.	1·000—1·028250	X	X	
,, *cylindriceps*, sp. nov.	1·000—1·028250	X	X	
,, *dentifer*, sp. nov.	1·000—1·0110	X	X	
,, *minima*, sp. nov. . .	1·000—1·0260	X	X	
Oxyurichthys tentacularis (Cuvier and Valenciennes).	1·000—1·0260	X	X	Seas of India and the Malay Archipelago.
Apocryptes rictuosus (Cuvier and Valenciennes).	1·0020—1·0260	X	X	Seas and estuaries of India.
,, *lanceolatus* (Bloch and Schneider).	?	X	...	Seas of India and the Malay Archipelago.
Micrapocryptes fragilis, gen. et sp. nov.	1·0020—1·0080	X	...	
ELEOTRINAE.				
Eleotris cavifrons Blyth . .	?	...	X	Andamans.
,, *fusca* (Bloch and Schneider)	1·000—1·0260	X	X	East coast of Africa, coasts of India and the Malay Archipelago.
,, sp. . .	1·0280	...	X	
Butis butis (Hamilton Buchanan)	?	?	?	Seas and estuaries of India and the Malay Archipelago.
PERIOPHTHALMINAE.				
Periophthalmus koelreuteri (Pallas)	1·0280	...	X	Seas and estuaries of India.
GOBIOIDINAE.				
Taenioides chilkensis, sp. nov.	1·000—1·0280	...	X	
ZEORHOMBI				
BOTHIDAE.				
Pseudorhombus arsius (Hamilton Buchanan).	1·000	X	X	East coast of Africa, seas of India to Australia and China.

Species.	Specific gravity of water in which specimens were taken.	Distribution in lake.		Further distribution.
		Main area.	Outer channel.	
TELEOSTEI—*concld.*				
ACANTHOPTERYGII—*concld.*				
SOLEIDAE.				
Synaptura orientalis (Bloch and Schneider).	?	X	...	Seas of India and China.
CYNOGLOSSIDAE.				
Cynoglossus brevis Günther	1·000—1·0280	X	X	R. Hughli at Calcutta and along Orissa Coast.
SCOMBRIFORMES.				
CARANGIDAE.				
Caranx carangus (Bloch)	1·000—1·0110	X	X	Seas of India and the Malay Archipelago to Atlantic Coast of Tropical America.
Equula edentula (Bloch)	1·007750—1·0110	X	X	Red Sea, seas of India to the Malay Archipelago and beyond.
JUGULARES.				
BLENNIIDAE.				
Petroscirtes bhattacharyae Chaudhuri	1·000—1·0110	X	X	
SCLEROPAREI.				
PLATYCEPHALIDAE.				
Platycephalus insidiator (Forskål)	1·02825	...	X	East Coast of Africa, Red Sea, seas of India to the Malay Archipelago and beyond.
OPISTHOMI				
MASTACEMBELIDAE.				
Mastacembelus armatus (Lacépède)	1·000	X	...	Fresh and brackish waters of India, Ceylon and China.

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