



this mark is very indistinct in Madras specimens, but exceedingly dark in those from Burma.

The only objection to uniting the Madras with the Assam and Burmese form is that the former has P. 1/12-13, the latter P. 1/15. The shoulder-spot is not so well marked, and the dorsal fin not so developed in the Madras variety. This fish is closely allied to *C. bimaculatus*, but has a larger eye, a narrow band of palatine teeth, much longer pectoral fins and maxillary barbels. The Burmese form (*C. notatus*) is more elongated.

*Hab.* Madras, Assam, and Burma.

#### 141. (6.) *Callichrous malabaricus*.

*Silurus malabaricus*, *Cuv. & Val. H. N. Poiss.* xiv, p. 353.

*Callichrous malabaricus*, *Day, Fish. India*, p. 478, pl. cxi, fig. 1 (see *synon.*).

*Kala gugh*, Maráthi; *Mungee Wahlah*, Mal.

B. xv. D. 4. P. 1/13-14. V. 8. A. 61-69 (3/58-66). C. 17.

Length of head 5 to  $5\frac{1}{2}$ , of caudal fin 7, height of body 6 in the total length. *Eyes*—opposite the angle of the mouth, diameter  $5\frac{1}{2}$  in the length of head,  $1\frac{1}{2}$  diameters from the end of snout, and 3 apart. The greatest width of the head equals its length excluding the snout. Lower jaw strongly prominent. *Barbels*—the maxillary reach to above the commencement of the anal fin, the mandibular are short. *Teeth*—in an interrupted band across the vomer. *Fins*—dorsal narrow. Pectoral rounded, as long as the head excluding the snout; the spine strong, nearly one half as long as the head, and rather strongly serrated internally. A notch between the end of the anal and the base of the caudal, the last being deeply forked with the upper lobe the longer. *Colour*—of a deep greyish brown shot with purple, fin-membranes densely spotted with black.

Specimens captured to the south of Canara or in the Cochin district show the most anal rays, a more elongated body, and longer mandibular barbels.

*Hab.* Malabar coast of India as high as Canara. These fish reach 20 inches in length.

#### 142. (7.) *Callichrous pabda*.

*Silurus pabda*, *Ham. Buch. Fish. Ganges*, pp. 150, 374, t. xxv, fig. 47.

*Callichrous pabda*, *Day, Fish. India*, p. 479, pl. cxi, figs. 2 & 3 (see *synon.*).

*Palu*, Punj.; *Pabda*, Beng.

B. xii-xiv. D. 4-5. P. 1/11-13. V. 8. A. 54-60 (2/52-58). C. 18.

Length of head 5 to  $5\frac{1}{2}$ , of caudal fin 8, height of body 5 to  $5\frac{1}{2}$  in the total length. *Eyes*—diameter 5 in the length of head,  $1\frac{1}{2}$  to  $1\frac{1}{2}$  diameters from end of snout, and  $2\frac{1}{2}$  to 3 apart. The greatest





width of the head equals its length excluding the snout. The width of the gape of the mouth equals half the length of the head. Lower jaw very prominent. *Barbels*—the maxillary reach the middle or end of the pectoral fin, the mandibular the hind edge of the orbit. *Teeth*—vomerine in two small oval patches, not confluent together. *Fins*—pectoral spine as long as the head behind the middle of the eyes, serrated internally, sometimes rather strongly, at other times feebly, or entirely smooth. Anal not confluent with the caudal. *Colour*—this varies considerably, usually silvery glossed with gold, having a dark shoulder-spot above the middle of the pectoral fin, and usually another close to the base of the tail. In some specimens the body is covered with brownish blotches. At Jubbulpore I took specimens having a dark band along the upper portion of the back, and a second along the lateral line, leaving a light line from the gill-opening to the upper portion of the caudal fin.

*Hab.* Punjab in the affluents of the Indus and along that river to its termination; at Hardwar where the Ganges emerges from the Himalayas and along its waters in the Gangetic provinces; also Orissa, Darjeeling, and the Brahmaputra in Assam.

#### 14. Genus *Ailia*, Gray.

Branchiostegals eight. Gill-openings wide, the gill-membranes not confluent with the skin of the isthmus. Body elongated and strongly compressed. Head covered with thin skin. Eyes nearly or quite behind the angle of the mouth, and with adipose lids. Upper jaw slightly the longer. Nostrils patent, those on either side approximating, the anterior in front of the snout. Eight barbels. Villiform teeth in the jaws and in two minute patches on the vomer. No anterior dorsal, but a small adipose fin posteriorly. Pectoral with a spine. Ventral with six rays. Anal long (59-75 rays). Caudal forked. Air-bladder tubiform, lying across the body of an anterior vertebra, and externally protected by bone. No axillary pore.

*Geographical Distribution.* Sind, the larger rivers of the Punjab, N.W. Provinces, Bengal, Assam, and Orissa.

#### 143. (1.) *Ailia coila*. (Fig. 58.)

*Malapterurus coila*, *Ham. Buch. Fish. Ganges*, pp. 158, 375.

*Ailia coila*, *Day, Fish. India*, p. 488, pl. cxiv, fig. 4 (see synon.).

*Puttuli* and *Bounse puttli*, "Bamboo leaf," Oorjah; *Mangleachnee*, Sind.; *Vella kalada*, Telugu; "*Kajoli*, Rangpur, *Basanguti*, Gorakhpur, *Bātausi*, Bhagulpur," H. Buch.

B. viii. P. 1/14. V. 6. A. 59-75. C. 19.

Length of head 6 to 7, of caudal fin  $5\frac{1}{2}$  to 8, height of body  $5\frac{1}{4}$  to 6 in the total length. *Eyes*—diameter  $3\frac{1}{2}$  to  $3\frac{3}{4}$  in the length of the head,  $1\frac{1}{4}$  diameters from the end of snout, and 1 apart. The greatest width of the head equals its length excluding the snout;





the width of the gape of the mouth equals one third of the length of the head. Upper jaw the longer, and rather overhung by the snout. Cleft of the mouth reaching halfway to the orbit opposite the centre of the eye. *Barbels*—extend to the first one third or middle of the length of the fish excluding its caudal fin. *Teeth*—generic. *Fins*—pectoral spine slender and about as long as the

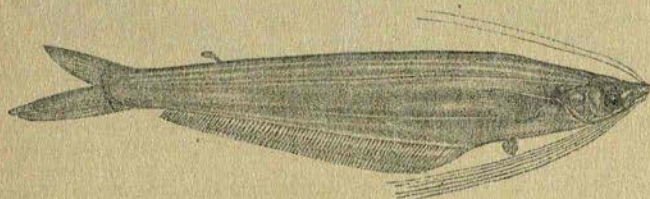


Fig. 58.—*Ailia coila*.

head. Ventral short. Anal with from 59 to 75 rays in my specimens, and most of the intermediate numbers may be found. Caudal forked. In many specimens the neural spines appear just above the skin along the back. *Colour*—silvery, some of the fins often stained grey at their margins. The caudal, especially in Orissa specimens, is commonly orange edged with black.

The fish is excellent eating and much esteemed as food.

*Hab.* From the Kistna and Orissa; throughout the Indus Junna, and Ganges, from the hills to their terminations; also Assam. Attains at least 7 inches in length.

#### 15. Genus **AILIICHTHYS**, Day.

Similar to *Ailia* except that the ventral fins are absent.

##### 144. (1.) **Aillichthys punctatus**. (Fig. 59.)

*Aillichthys punctata*, Day, *P. Z. S.* 1871, p. 713; and *Fish. India*, p. 489, pl. cxiv, fig. 5.

*Put-tas-si* and *Put-tu-ah*, Punj.

P. 1/12. A. 76-90. C. 17.

Length of head 6 to 7, of caudal fin 6, height of body  $5\frac{1}{2}$  in the total length. *Eyes*—situated more than half below the angle of the mouth, being partly on the lower side of the head, diameter four elevenths to one third of length of head, one half to two thirds of a diameter from end of snout, 1 diameter apart. Body compressed, upper profile of the head slightly concave. Width of the head equals its postorbital length. Width of the gape of the mouth equals one third of the length of the head. Upper jaw somewhat the longer, the cleft of the mouth only extends about halfway to the anterior margin of the eye, and to opposite its



centre. *Barbels*—subequal in length and extend to the middle of the length of the fish. *Teeth*—villiform in the jaws. *Fins*—adipose dorsal minute. Pectoral spine nearly as long as the head;



Fig. 59.—*Aillichthys punctatus*.

ventrals absent. Caudal forked, lower lobe the longer. *Colour*—silvery, upper surface of head nearly black, a large black spot before the base of the caudal fin.

*Hab.* Jumna below Delhi, also from the Indus in Sind, where I obtained numerous specimens up to 4 inches in length.

#### 16. Genus **PSEUDEUTROPIUS**, Bleeker.

Syn. *Clupisoma*, Swainson; *Schilbeichthys*, Bleeker.

Branchiostegals from six to ten. Gill-openings wide, the membranes not confluent with the skin of the isthmus and rather deeply notched. Body elongated and compressed. Head covered with soft skin. Eyes large, with or without broad adipose lids, and situated behind as well as a little below the angle of the mouth, being usually partly on the inferior surface of the head. Upper jaw, as a rule, the longer. Nostrils patent, the posterior ones transverse and as near together as they are to the anterior pair. Barbels eight—one nasal pair, one maxillary and two mandibular pairs, these last commencing in a transverse line close to the hind margin of the lower lip. Teeth villiform on the jaws and palate. Dorsal fin short, with one spine and six to eight rays; a very small adipose dorsal which may be absorbed in the adult (*Schilbeichthys*); pectoral with a serrated spine; anal long, terminating at some distance from a forked caudal. Ventral with from 6 to 8 rays. Air-bladder rather small, somewhat heart-shaped, with a notch at its anterior edge, and closely attached to the front surfaces of the vertebrae. An axillary pore generally present.

*Geographical Distribution.* Fresh waters of Sind, India, Ceylon, and Burma to the Malay Archipelago, where according to Bleeker it appears to have a single representative.

*Uses.* These fishes are all excellent as food, but in some localities are to be avoided as they consume offal.



*Synopsis of Indian Species.*

- A. 54. Nasal barbels reach the dorsal, maxillary barbels the anal fin; the mandibular are about as long as the head. Left of mouth to below first third of eye ..... 1. *P. goongwaree*, p. 137.
- A. 43-52. Maxillary barbels reach middle of pectoral fin, the mandibular shorter than the head ..... 2. *P. tuakree*, p. 138.
- A. 42-46. Snout projecting, and covered beneath with teeth which are entirely in advance of those of the lower jaw. The maxillary barbels reach the anal fin, the mandibular are as long as the head .... 3. *P. acutirostris*, p. 139.
- A. 38-43. Maxillary barbels as long as head, the others shorter ..... 4. *P. murius*, p. 139.
- A. 35-37. Maxillary barbels reach the ventral fin, mandibular as long as the head. Teeth on the palate in two distinct patches .... 5. *P. sykesii*, p. 140.
- A. 33-41. Maxillary barbels reach the anal fin, mandibular longer than the head. Dark bands along the body, and a spot at the base of the caudal ..... 6. *P. atherinoides*, p. 141.
- A. 29-36. Maxillary barbels reach the ventral fin, mandibular about as long as the head. Adipose dorsal absent in adults ..... 7. *P. garua*, p. 141.

145. (1.) *Pseudotropius goongwaree*. (Fig. 60.)

*Hypophthalmus goongwaree*, *Sykes*, *Tr. Z. S. ii*, p. 369, pl. 64, fig. 3.  
*Pseudotropius goongwaree*, *Day*, *Fish. India*, p. 471, pl. cix, fig. 3.  
(see *synon.*).

*Nga nyeen yeng*, Burmese.

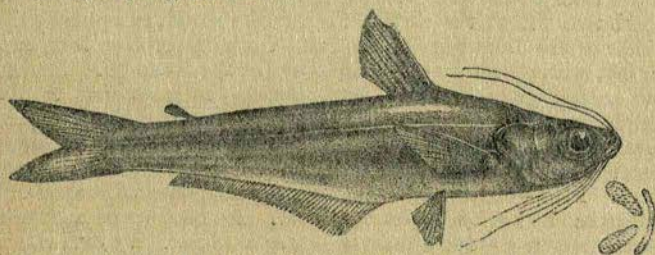


Fig. 60.—*Pseudotropius goongwaree* and upper dentition.

B. vi. D. 1/7 | 0. P. 1/13. V. 6. A. 54 (3/51). C. 17.

Length of head 5, of caudal fin 5, height of body 5 in the total length. *Eyes*—with a very broad circular adipose lid, situated partially on the lower surface of the head, diameter  $2\frac{3}{4}$  in the length of head,  $\frac{3}{4}$  to 1 diameter from the end of snout, and 1 apart. The median longitudinal groove on the head reaches the base of the occipital process, which latter is narrow, especially at its base. Width of head rather above half its length. Upper





jaw the longer; width of gape of mouth equals the diameter of the eye; cleft extends to below first third of the eye. *Barbels*—the nasal pair reach the base of the dorsal fin, the maxillary the anal fin, and the mandibular are about as long as the head. *Teeth*—in a wide pyriform band, wider than those in the jaws; the vomerine and palatine groups touching, but the two vomerine patches having a short interspace between them. *Fins*—dorsal spine somewhat slender, nearly as long as the head and very finely serrated posteriorly. Pectoral spine slightly longer, stronger, and rather strongly denticulated internally. Ventral fin not quite half as long as the head, and under the centre of the dorsal fin. Caudal forked. Free portion of the tail rather higher at its base than it is long. *Colour*—silvery, darkest superiorly.

*Hab.* Rivers of the Deccan, Bengal, and Burma; attaining about a foot in length.

146. (2.) *Pseudentropius taakree*.

*Hypophthalmus taakree*, *Sykes*, *Tr. Z. S.* ii, p. 369, pl. 64, fig. 4.

*Pseudentropius taakree*, *Day*, *Fish. India*, p. 471, pl. cix, fig. 4 (see synonym.).

*Waidi* and *Váyadi*, Maráthi; *Salava jella*, Telugu; *Nga than gyik*, Burmese.

B. vi. D.  $\frac{1}{6-7}$  | O. P. 1/10-II. V. 6. A. 43-52 ( $\frac{3-4}{40-50}$ ). C. 17.

Length of head 6 to  $6\frac{1}{2}$ , of caudal fin 6, height of body 5 to 6 in the total length. *Eyes*—situated behind the angle of the mouth and partly on the under surface of the head, having broad circular adipose lids; diameter  $2\frac{3}{4}$  to 3 in the length of the head,  $\frac{2}{3}$  to 1 diameter from end of snout and 1 apart. The greatest width of the head equals half its length, the width of the gape of the mouth two fifths; the cleft of the mouth extends to opposite the middle of the front edge of the eye. Occipital process long and slender, scarcely reaching the basal bone of the dorsal fin. Median longitudinal groove on the head shallow and reaching to the occipital process. *Barbels*—the nasal half as long as the head, the maxillaries reach the anal, whilst the mandibular are a little longer than the head. *Teeth*—the vomerine and palatine in a distinct patch. *Fins*—dorsal spine smooth anteriorly, serrated posteriorly, as long as the head without the snout. Pectoral spine stronger, serrated internally and almost as long as the head. Ventral rather above half as long as the head and reaching the anal. Free portion of the tail about as high at its base as it is long. *Colour*—silvery, with a gloss of green along the back; caudal stained with grey at its edges.

I have obtained in Burma, as high as Mandalay, specimens which I am unable to separate from this species, except that in some the pectoral spine is slightly shorter, in others the adipose fin is almost or quite absent.

*Hab.* Poona, the Deccan, the rivers Kistna and Jumna. Attains upwards of a foot and a half in length, and is good eating.



147. (3.) *Pseudentropius acutirostris*.

*Pseudentropius acutirostris*, Day, P. Z. S. 1869, p. 618; and *Fish. India*, p. 472, pl. cix, fig. 1 (see synon.)

B. vi. D.  $1\frac{1}{6}$  | O. P.  $1\frac{1}{7}$ . V. 6. A. 42-46 (2/40-44). C. 17.

Length of head  $4\frac{2}{3}$  to 5, of caudal fin 5, height of body 5 in the total length. *Eyes*—without adipose lids, situated behind the cleft of the mouth, diameter one third of the length of the head, one diameter from the end of snout, and also apart. The greatest width of the head equals half its length. Upper surface of the head flat and rugose. Upper jaw elongated, and projecting considerably beyond the lower. The median longitudinal groove on the head reaches the base of the occipital process, which is narrow and two sevenths as wide at its base as it is long. *Barbels*—the nasal rather longer than the head, the maxillary reach the base of the anal fin, the mandibular as long as the head. *Teeth*—the whole under surface of the snout toothed, the premaxillaries being entirely in advance of the lower jaw, in two minute patches on the vomer, and of the same character on the palatines, the latter not continuous with those on the vomer. *Fins*—dorsal spine as long as the head behind the angle of the mouth, finely serrated posteriorly. Pectoral spine strong, rough externally, and with about ten strong teeth internally; it is as long as the head excluding the snout. Ventral arising somewhat behind the base of the dorsal fin; caudal deeply forked. *Colour*—silvery, a black spot on the occiput, and a black blotch at the base of the dorsal fin.

*Hab.* The Irrawaddy and other large Burmese rivers. It does not appear to attain a large size.

148. (4.) *Pseudentropius murius*.

*Pimelodus murius*, Ham. *Buch. Fish. Ganges*, pp. 195, 378.

*Pseudentropius murius*, Day, P. Z. S. 1869, p. 306; and *Fish. India*, p. 472, pl. cviii, fig. 3 (see synon.).

*Muri-sacha*, Ooriah and Bengali; *Motusi*, Beng.; *Butchna*, Hind.; *Ke-raud*, Punj.; *Chhotkô vâchoyâ*, of the Kusi (H. B.).

B. v. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{10}$ . V. 6. A. 38-43 (3/35-40). C. 17.

Length of head  $5\frac{1}{2}$  to 6, of caudal fin  $5\frac{1}{2}$  to 6, height of body  $5\frac{1}{2}$  to 6 in the total length. *Eyes*—lateral and very slightly on the lower surface of the head; each with a broad, circular, adipose lid, diameter 3 to  $3\frac{3}{4}$  in the length of head,  $\frac{2}{3}$  of a diameter from end of snout, and 1 apart. The greatest width of the head is rather above two thirds of its length. Jaws compressed, the upper slightly the longer, the cleft reaches nearly or quite to below the front edge of the eye; the width of the gape equals one third of the length of the head. The median longitudinal groove on the head extends to the end of the occipital process,





which is narrow, short, half as wide at its base as it is long, and with a long interspace between it and the basal bone of the dorsal fin. *Barbels*—the nasal reach to a short distance behind the posterior edge of the orbit; the maxillary to the base of the pectoral fin, whilst the two mandibular pairs are a little longer than the head. *Teeth*—on the vomer and palate form an almost uninterrupted semilunar band. *Fins*—dorsal spine nearly as long as the first ray, or as the head excluding the snout, weak, very finely serrated in front, more coarsely behind. Pectoral spine weak, nearly or quite as long as the head, rough externally, serrated internally. Ventral small, one third as long as the head. Caudal deeply forked. Caudal peduncle as long as deep at its base. *Colour*—silvery, lightest along the sides and below; dorsal, pectoral, and caudal fins darkest at their margins.

In the form called *P. megalops* the maxillary barbels extend to beyond the origin of the anal fin, but I do not see any other difference.

*Hab.* Rivers of Sind, Orissa, the Jumna, and rivers of Bengal and Assam. Attaining about 6 or 8 inches in length.

149. (5.) *Pseudeutropius sykesii*.

*Schilbe sykesii*, Jerdon, *Mad. Jour. L. Sc.* xv, 1849, p. 335.

*Pseudeutropius sykesii*, Day, *Fish. India*, p. 473, pl. cix, fig. 5 (see synon.).

*Nah-kelletee*, Tam.

B. viii-ix. D. 1/7 | 0. P. 1/9. V. 6. A. 35-37 (3/32-34). C. 17.

Length of head 6, of caudal fin 6, height of body 6 in the total length. *Eyes*—diameter 3 to  $3\frac{1}{4}$  in length of head, 1 diameter from end of snout, and  $1\frac{1}{4}$  apart. Head rather higher than wide, its greatest width equals its length excluding the snout. The angle of the mouth is on a level with the lower edge of the orbit. Upper jaw slightly the longer; posteriorly it reaches two thirds of the distance between the snout and front edge of the orbit. The median longitudinal groove on the upper surface of the head reaches to the base of the occipital process, which is narrow. *Barbels*—the nasal pair reach to the front edge of the orbit, the maxillary pair to the end of the pectoral or middle of the ventral; the mandibular are as long as, or a little longer than the head. *Teeth*—those on the palate in two distinct patches. *Fins*—dorsal spine slender, as long as the head excluding the snout, and finely serrated posteriorly; adipose fin small. Pectoral spine stronger and slightly longer than that of the dorsal, smooth externally, denticulated internally with about twenty-two teeth. Ventral commences just behind the vertical from the last dorsal ray; caudal forked, lower lobe slightly the longer. *Colour*—bluish silvery along the back, becoming silvery white on the sides and below. Dorsal and caudal grey, the other fins white.

*Hab.* Western coast of India in fresh water; attaining about 6 inches in length.



150. (6.) *Pseudotropius atherinoides*.

*Silarus atherinoides*, Bloch, *Ich.* t. 371, fig. 1.

*Pseudotropius atherinoides*, Day, *Fish. India*, p. 473, pl. cix, fig. 2 (see synon.).

*Put-tul*, and *Chel-lee*, Punj.; *Ah-hee*, Sind.; *Put-tah-re*, N.W. Prov.; *Akku-jella*, Tel.; *Battuli* and *Bi-potassi*, Oorlah; *Boh-du-ah* (*Pātāsi*, and *Doyā*, H. B.), Assam.

B. vi. D. 1/5-6 | 0. P. 1/7. V. 6. A. 33-41 (3/30-38). C. 17.

Length of head 5 to  $5\frac{1}{2}$ , of caudal fin 5, height of body  $4\frac{1}{2}$  to  $5\frac{1}{2}$  in the total length. *Eyes*—with free orbital margins, no adipose lids, situated partially on the lower surface of the head; diameter  $2\frac{1}{2}$  to 3 in the length of head, and about half a diameter from end of snout. The greatest width of the head equals two thirds of its length. Upper jaw a little the longer. The median longitudinal groove on the head broad, shallow, and reaching to the base of the occipital process, which is four times as long as broad at its base and extends to the basal bone of the dorsal fin. *Barbels*—the nasal slightly longer than the head, the maxillary reach the base of the anal (in some Madras specimens only to the ventral) fin, the mandibular pair are rather longer than the head. *Teeth*—in the premaxillaries usually anterior to those in the mandibles; in a narrow, uninterrupted, crescentic band across the palate. *Fins*—dorsal spine two thirds as long as the head, anteriorly rugose, finely serrated posteriorly. Pectoral spine rather longer and stronger than that of the dorsal, with about ten denticulations internally. Ventral half as long as the head. Caudal deeply forked. *Colour*—silvery, greenish along the back, and with three or four bands along the sides formed by black spots. Occiput and anterior portion of dorsal fin dark-coloured.

*Hab.* Throughout Sind, India (excluding the western coast), and Assam; rarely attaining to above 4 or 5 inches in length. The form called *P. urua* is said to come from rivers and ponds in the northern parts of Bengal.

151. (7.) *Pseudotropius garua*.

*Silarus garua*, Ham. Buch. *Fish. Ganges*, pp. 156, 375, pl. 21, fig. 50.

*Pseudotropius garua*, Day, *Fish. India*, p. 474, pl. cix, fig. 6 (see synon.).

*Pania buchua*, Oorlah; *Puttosi*, Beng.; *Buchua*, Hind.; *Dhon-ga-mu*, Sind.; (*Kocha*, H. B.).

D. vi. D. 1/7. P. 1/11. V. 6. A. 29-36 (3/26-33). C. 17.

Length of head  $5\frac{1}{2}$  to  $6\frac{1}{2}$ , of caudal fin  $4\frac{1}{2}$ , height of body  $5\frac{1}{2}$  to 7 in the total length. *Eyes*—situated partly on the lower surface of the head, having a broad, circular, adipose lid; diameter  $3\frac{1}{2}$  to 4 in the length of the head,  $1\frac{1}{4}$  diameters from the end of snout, and  $2\frac{1}{2}$  apart. The greatest width of the head equals its length excluding





the snout. Upper jaw the longer, the width of the gape of the mouth is two fifths the length of the head. Occipital process about four times as long as it is wide at its base, and not quite reaching the basal bone. *Barbels*—nasal from one third to one half as long as the head; the maxillary extend to the middle or end of the ventral fin, the two mandibular pairs are about as long as the head. *Teeth*—in a semilunar band across the palate, those of the vomer contiguous to those of the palatines, and each patch being semicircular internally: sometimes the two vomerine patches have an interspace between them. *Fins*—dorsal spine rather slender, rugose anteriorly and feebly serrated posteriorly, as long as the head behind the nostrils, while the pectoral is of equal length or a little longer, stronger, and denticulated internally. The adipose dorsal generally only exists in the immature, and becomes almost imperceptible in the adult: as its non-existence forms the chief distinction of the genus *Schilbeichthys* from that of *Pseudeutropius*, whilst its absence is merely the result of age, I have not adopted the former designation. Lower caudal lobe the longer. *Air-bladder*—small, somewhat heart-shaped, and closely attached to the anterior surface of the front vertebrae. *Colour*—silvery, fins stained with grey.

*Hab.* Found generally throughout the larger rivers of Sind, India, Assam, and Burma. Attains upwards of two feet in length.

#### 17. Genus **PANGASIUS**, Cuvier and Valenciennes.

*Syn.* *Pseudopangasius* and *Helicophagus*, Bleeker.

Branchiostegals from about seven to twelve. Gill-openings wide, the membranes not confluent with the skin of the isthmus and rather deeply notched. Upper jaw the longer. Eye with a free orbital margin. Nostrils at some distance apart, both patent, the anterior situated in front, or on the upper edge, of the snout. Four slender barbels, one pair maxillary and a pair behind the chin. Teeth villiform, intermixed with conical ones in the jaws; those in the vomer, if present, distinct from those on the palatines. Dorsal fin inserted in front of ventral and with one spine and seven rays; adipose fin short. Ventral with six rays. Pectoral with a spine. Anal rather elongate (29 to 39 rays), not confluent with the caudal. Air-bladder in the abdominal cavity, and not enclosed in bone. One or more axillary pores.

*Geographical Distribution.* Large rivers and estuaries of India and Burma to the Malay Archipelago.

#### 152. (1.) *Pangasius buchanani*. (Fig. 61.)

*Pimelodus pangasius*, Ham. Buch. *Fish. Ganges*, pp. 163, 376, pl. 33, fig. 52.

*Pangasius buchanani*, Cuv. & Val. *H. N. Poiss.* xv, p. 45, pl. 426; Day, *Fish. India*, p. 470, pl. cviii, fig. 5 (see synon.).

*Jellum*, Ooriah; *Coola Kellette*, Tamil; *Nga dan*, Burmese.



B. ix-x. D. 1/7 | 0. P. 1/12. V. 6. A. 31-34 (4-5/27-29). C. 19.

Length of head  $5\frac{1}{2}$  to 6, of caudal fin 5 to  $5\frac{1}{2}$ , height of body 4 to 5 in the total length. *Eyes*—partly on the lower surface of the head, and rather nearer the snout than the occiput, the width of the interorbital space equalling the length of the head excluding the snout. The greatest width of the head equals its length behind the angle of the mouth. Upper jaw the longer; width of the gape of the mouth equals three sevenths of the length of the head, its cleft reaches to below the hind nostril, and is opposite the centre of the front edge of the eye. Upper surface of the head smooth in small specimens, rather lined in large ones, especially along the occipital process, which is from  $2\frac{1}{2}$  to 3

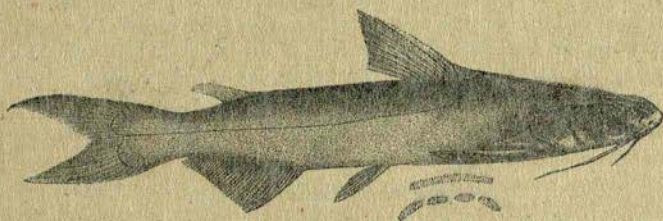


Fig. 61.—*Pangasius buchanani* and upper dentition.

times as long as wide at its base. *Barbels*—the maxillary reach the base of the pectoral fin; the mandibular are half as long as the head. *Teeth*—on the palate in a crescentic row, the vomerine patches being either distinct from or just confluent with those on the palate. *Fins*—dorsal spine of moderate strength, as long as the head behind the angle of the mouth, slightly serrated anteriorly, in its entire length posteriorly. Pectoral spine rather stronger than that of the dorsal, in some specimens of the same length; in others as long as the head, denticulated internally. Caudal deeply forked. *Colour*—silvery, darkest along the back and glossed with purple on the sides; cheeks and under surface of the head shot with gold. *Air-bladder*—large, its anterior portion occupies about half the length of the abdominal cavity, and is then divided by a constriction from the second portion, which is narrowed and divides into two small continuations, one of which extends on either side amongst the muscles covering the hæmal spines, as far as to above the middle of the anal fin. The anterior portion of the air-bladder has a large pyramidal and cellular cavity, the base of which is anterior; on either side of this cellular cavity is a pyriform smooth chamber, the two communicating anteriorly. The remainder of the air-bladder is cellular or, rather, furnished with valvular-formed folds.

*Hab.* Large rivers and estuaries of India, Assam, Burma, and perhaps the Malay Archipelago. This species attains upwards of four feet in length, and is a foul feeder.



18. Genus **SILUNDIA**, Cuvier and Valenciennes.

Branchiostegals eleven to twelve. Gill-openings wide, the gill-membranes overlapping, but not confluent with the skin of the isthmus. Body elongated and compressed. Head covered with soft skin. Eyes lateral, with narrow adipose lids. Mouth rather wide, not cleft to so far as the eyes; lower jaw the longer. Nostrils, those on either side approximating, the anterior pair in front of the snout and a little external to the posterior pair. A pair of maxillary and sometimes also a pair of mandibular barbels. Villiform teeth in the jaws, and in an uninterrupted band on the palate. First dorsal fin with one spine and seven rays; the adipose short. Anal long (40–50 rays). Ventral with six rays, placed below or just behind the adipose dorsal. Air-bladder kidney-shaped, convex anteriorly, lying across the body of an anterior vertebra, from which it is separated by the aorta, having its lateral margins protected by bone. An axillary pore.

*Geographical Distribution.* Throughout the larger rivers of India and Burma.

*Synopsis of Indian Species.*

- A. 44–50. Maxillary and mandibular barbels . . . 1. *S. sykesii*, p. 144.  
A. 40–46. A pair of short maxillary barbels only. 2. *S. gangetica*, p. 145.

153. (1.) **Silundia sykesii**.

*Silundia sykesii*, Day, Jour. L. S. Zool. xii, p. 569; and Fish. India, p. 487, pl. cxiv, fig. 2 (see synonym.).

*Wal-la-ke kel-le-tee* (slippery siluroid) and *Poo-nat-tee*, Tam.; *Wan-jou*, Tel.

B. xii. D. 1/7 | O. P. 1/12. V. 6. A. 44–50 (2–3/42–47). C. 19.

Length of head  $5\frac{1}{4}$ , of caudal fin  $4\frac{2}{3}$ , height of body  $5\frac{3}{4}$  in the total length. *Eyes*—with a narrow, free, adipose lid; diameter  $3\frac{1}{2}$  in the length of the head, 1 diameter from the end of snout, and  $1\frac{1}{3}$  apart. The greatest width of the head equals its length behind the middle of the eyes; lower jaw the longer, curved upwards in the middle; snout rather broad; the width of the gape of the mouth equals four elevenths of the length of the head. *Barbels*—the maxillary pair reach the opercle or even the base of the pectoral fin; the mandibular pair equal one diameter of the eye in length. *Teeth*—villiform in the jaws, in a crescentic band across the palate. *Fins*—dorsal spine weak, roughened anteriorly, finely serrated posteriorly and as long as the head excluding the snout; pectoral spine stronger, as long as the head behind the angle of the mouth, and reaching to above the ventral. Ventral arising behind the vertical from the last dorsal ray, and reaching to the anal. Caudal forked, the lower lobe rather the longer. Free portion of the tail nearly as high as long. *Colour*—bluish superiorly,





becoming white on the sides and beneath, the fins stained externally with grey.

Sykes says his *Ageneiosus childreni* is termed *Purree*, Mahr., and *Sillun* in the Deccan, that it is *without cirri*, and also that the first bony ray is "serrated on the anterior edge," this being also shown in the figure. The long maxillary barbels of this species serve to distinguish it from *S. gangetica*.

*Hab.* Rivers of the Deccan and the Kistna and Godavery to their terminations.

154 (2.) *Silundia gangetica*. (Fig. 62.)

*Pimelodus silondia*, Ham. Buch. *Fish. Ganges*, pp. 160, 375, pl. 7, fig. 50.

*Silundia gangetica*, Cuv. & Val. *H. N. Poiss.* xv, p. 49, pl. 426; *Day, Fish. India*, p. 488, pl. cxiv, fig. 3 (see synon.).

*Silond*, Punj.; *Ji-lung* and *Silond*, Oorah and Bengali; *Wanjou*, Telugu; *Poonatté* or *Wallaké kelletti* ("slippery siluroid"), Tamil; *Nga mrang*, Arracan; *Basa* or *Bacha*, Chittagong; *Nga mee nyeeng*, Burm.

B. xi-xii. D. 1/7 | O. P. 1/11-13. V. 6. A. 40-46 (4/36-44). C. 17.

Length of head  $5\frac{1}{2}$ , of caudal fin  $5\frac{1}{2}$  to 6, height of body 5 to  $5\frac{1}{2}$  in the total length. *Eyes*—with narrow anterior and posterior adipose lids; diameter  $\frac{1}{4}$  to  $4\frac{1}{2}$  in the length of head,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  diameters from the end of snout, and 2 apart. The width of the head equals its length excluding the snout, whilst its height is rather less. Lower jaw the longer, snout rather broad, the width of the gape of the mouth exceeding half the length of the head. *Barbels*—a pair of minute maxillary, but no mandibular ones. *Teeth*—in the jaws villiform, and in a crescentic band across the

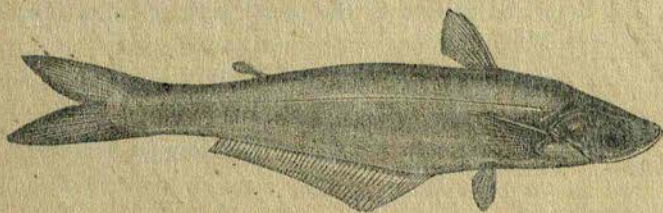


Fig. 62.—*Silundia gangetica*.

palate. *Fins*—dorsal spine rather weak, as long as the head behind the middle of the eye, anteriorly smooth or rugose, posteriorly finely serrated in its upper portion. Pectoral spine stronger, as long as head without the snout, and serrated internally. Ventral fin arising under the posterior dorsal rays, and nearly reaching the anal. *Air-bladder*—small, with its lateral edges protected by a short osseous process from either side of the vertebra, but it cannot be said to be enclosed in bone. The air-bladder itself, when opened, is found to consist of two oval chambers,





having a communicating canal, and in the young is almost surrounded by high osseous sides. *Colour*—bluish along the back, becoming silvery on the sides, fins stained with grey.

*Hab.* Estuaries of India and Burma, ascending the larger rivers nearly to their sources. *S. gangetica* attains 6 feet or more in length, and is called “a shark” by the natives. It is very voracious.

### 19. Genus **MACRONES**, Duméril.

*Syn.* *Bagrus*, pt., Cuv. & Val.; *Hypselobagrus*, *Hemibagrus*, *Pseudobagrus*, and *Aspidobagrus*, Bleeker.

Branchiostegals from six to twelve. Mouth terminal, transverse. Upper jaw generally the longer. Gill-openings wide, the gill-membranes overlapping the isthmus and being separate to the chin. Eyes with free circular lids. Barbels eight—one nasal, one maxillary, and two mandibular pairs. A distinct and separate interneural shield on the nape, closely connected to the basal bone of the dorsal fin; or no such shield. Villiform teeth in the jaws, and in a more or less uninterrupted curved band across the palate. Rayed dorsal fin with one spine and seven rays; adipose dorsal of varying length; pectoral with a strong serrated spine; anal short or of moderate length; ventral with six rays; caudal forked. Air-bladder of moderate or large size, attached to the under surface of the bodies of the anterior vertebrae. An axillary pore generally present.

The ova of these fishes are small, consequently very different to those of their marine relatives, *Arius* and its allied genera.

*Geographical Distribution.* These fishes extend through most parts of Asia, and are numerous in the fresh waters of India and Ceylon, one species (*M. gulosus*) often being captured in the sea.

*Uses.* Employed as food by the poorer natives, but of inferior quality and rather insipid.

#### *Synopsis of Indian Species.*

- |  |                                  |
|--|----------------------------------|
| A. 26-28. Golden, with a large black shoulder-spot .....   | 1. <i>M. chryseus</i> , p. 148.  |
| A. 12-13. Maxillary barbels reach caudal fin. A black spot on adipose dorsal fin .....   | 2. <i>M. aor</i> , p. 149.       |
| A. 11-12. Maxillary barbels reach hind edge of first dorsal fin .....  | 3. <i>M. seenghala</i> , p. 150. |
| A. 12. Maxillary barbels reach front edge of eye. A dark shoulder-spot, another on the adipose dorsal; body with indistinct cross bands .....  | 4. <i>M. blythii</i> , p. 151.   |
| A. 12-15. Occipital process half longer than wide at its base, a long interspace between it and basal bone of dorsal fin. Length of base of adipose dorsal equal to half that of the interspace between the two dorsal fins .. | 5. <i>M. gulosus</i> , p. 151.   |





- A. 11-13. Upper surface of the head almost smooth. Occipital process very narrow, a long interspace between it and basal bone. Brown, with some black spots along the sides ..... 6. *M. punctatus*, p. 153.
- A. 11-13. Upper surface of the head roughened. Occipital process short, with a long interspace between it and the basal bone. Brown with some black spots along the sides .. 7. *M. corsula*, p. 153.
- A. 12. Occipital process short, with a long interspace between it and the basal bone. Dorsal spine smooth, weak, articulated in its upper three fourths ..... 8. *M. microphthalmus*, p. 154.
- A. 11-13. Occipital process reaches basal bone. Maxillary barbels reach caudal fin. Adipose dorsal long, commencing just behind the rayed fin. Dorsal spine entire. Silvery, often with a black spot at base of dorsal spine, and fins stained with dark ..... 9. *M. cavasius*, p. 155.
- A. 11-13. Median groove on head reaches base of occipital process, which latter reaches the basal bone. Golden, with a black shoulder-spot and about five longitudinal dark bands ..... 10. *M. tengara*, p. 156.
- A. 11-13. Eye 3 to  $3\frac{1}{2}$  in length of head; occipital process reaches basal bone. Maxillary barbels reach middle of anal fin. Base of adipose dorsal as long as that of the rayed fin. Dark spot anteriorly at base of dorsal fin ..... 11. *M. oculatus*, p. 156.
- A. 9-12. Median groove on head does not reach the base of the occipital process, which latter reaches the basal bone. .... 12. *M. vittatus*, p. 157.
- A. 11-12. Maxillary barbels reach anal fin. Purplish black, with some white spots ..... 13. *M. leucophasis*, p. 158.
- A. 12. Head 5 in the total length. Median groove on head does not reach occipital process, which last extends to the basal bone. Maxillary barbels reach anal fin. A dark shoulder-mark, a light band along the body, and dark spot at base of caudal ..... 14. *M. montanus*, p. 159.
- A. 9-10. Head  $4\frac{1}{2}$  in the total length. Median groove on head does not reach occipital process, which last does not quite reach the basal bone.



- Maxillary barbels reach middle of anal fin. A large pre-anal papilla. A dark shoulder-mark. .... 15. *M. kelotius*, p. 160.
- A. 10-11. Head  $4\frac{3}{4}$  to  $5\frac{1}{4}$  in the total length. Median groove on the head does not reach base of occipital process, which last has a long interspace between it and the basal bone. Maxillary barbels reach middle or end of ventral fin. A dark shoulder-spot, another at base of caudal fin. .... 16. *M. malabaricus*, p. 160.
- A. 11. Head  $5\frac{1}{2}$  in the total length. Median groove on the head almost reaches the base of the occipital process, which last reaches the basal bone. Maxillary barbels reach end of ventral fin. A dark blotch at base of caudal fin. .... 17. *M. armatus*, p. 161.
- A. 9-10. Head  $5\frac{1}{4}$  to  $5\frac{1}{2}$  in the total length. Median groove on the head reaches the base of the occipital process, which last reaches the basal bone. Maxillary barbels reach the anal fin. Two light longitudinal bands, and sometimes a dark shoulder-spot. .... 18. *M. bleekeri*, p. 162.

155. (1.) *Macrones chryseus*. (Fig. 63.)

*Pseudobagrus chryseus*, Day, *Fish. Malabar*, p. 185, pl. xiii, fig. 2.

*Macrones chryseus*, Day, *Fish. India*, p. 443, pl. xcix, fig. 3.

*Mungil yata*, Mal.; *Neela katurnee*, Hind.

B. x. D.  $1/7$  | 0. P.  $1/6$ . V. 6. A. 26-28. C. 17-19.

Length of head  $4\frac{3}{4}$  to  $4\frac{3}{8}$ , of caudal fin 5, height of body 5 in the

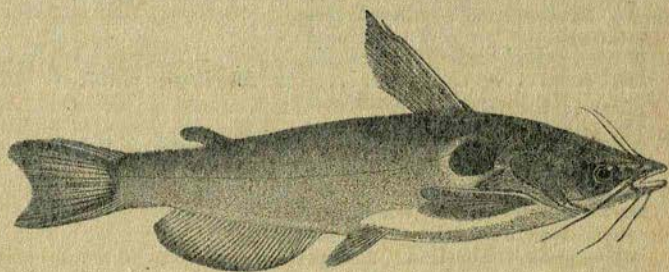


Fig. 63.—*Macrones chryseus*.

total length. Eyes—diameter 4 to 5 in the length of head,  $1\frac{1}{2}$  diameters from the end of snout, and 2 to  $2\frac{1}{2}$  apart. Greatest width of the head equals four fifths of its length. Upper jaw slightly the longer. Width of gape of mouth nearly equal to half the length





of the head. Upper surface of head, opercles, and humeral process with smooth ridges. Occipital process twice as long as wide at its base, no interspace between it and the basal bone. The superior longitudinal groove on the head shallow, reaching to opposite the hind edge of the eye. *Barbels*—the nasal rather above half the length of the head, the maxillary slightly longer, the external mandibular reach the base of the pectoral fin, the internal pair are one fourth shorter. *Teeth*—in a narrow uninterrupted semilunar band across the palate. *Fins*—dorsal spine as long as the head behind the middle of the eyes, strong, with about ten denticulations posteriorly, and three or four anteriorly near its summit; it ends in a soft prolongation; adipose fin short, commencing over the last fourth of the anal. Pectoral reaches the ventral; pectoral spine stronger than that of the dorsal and as long as the head excluding the snout, serrated externally and with 16 or 18 strong teeth internally. Ventral rather above half as long as the pectoral and reaching the anal; base of anal equal to the length of the head; the fin is highest anteriorly. Caudal slightly or deeply lunated or even forked. Free portion of tail rather higher than long. *Colour*—back greenish yellow, sides golden; a large round black mark on the shoulder surrounded by a light yellow ring. Dorsal and anal fins yellowish orange, stained with darker at their margins. Caudal yellow, with a black base and dark edges.

*Hab.* Rivers in Canara and Malabar, preferring the deepest pools. Longest specimen obtained 8 inches, but double that size is said to be attained. Wounds from the spines of this fish are deemed venomous by the natives.

✓ 156. (2.) *Macrones aor.*

*Pimelodus aor*, *Ham. Buch. Fish. Ganges*, pp. 205, 379, pl. 20, fig. 68.  
*Macrones aor*, *Day, Fish. India*, p. 444.

*Singapore*

*Mukul-jellah*, Tel.; *Cumboo kelletee*, Tam.; *Nga-joung* and *Nga uéy*, Burm.; *Seengala* and *Sang-go-ah*, Punj.; *Singharee*, Sind.; *Alli* or *Addi*, Ooriah.

B. xii. D.  $1\frac{1}{7}$  | 0. P. 1/9–10. V. 6. A. 12–13 (3–4/9). C. 17.

Length of head  $4\frac{1}{2}$  to 5, of caudal fin 4, height of body 6 in the total length. *Eyes*—transversely oval, diameter 5 to 8 in the length of the head,  $2\frac{1}{2}$  to 3 diameters from the end of snout, and  $1\frac{2}{3}$  to 2 apart. Snout broad, depressed, the width of the gape being equal to from two fifths to three sevenths of the length of the head, while the cleft does not extend halfway to the orbit. The upper jaw the longer. Width of the head three fifths of its length, its upper surface rugose in tuberculated ridges. Occipital process not extending halfway to the basal bone of the dorsal, while an intermediate interneural shield exists, which is usually wider than the occipital process. The width of this bone is subject to great variation: thus in some old specimens it is only twice as long as broad, whilst in others and in some immature it is four times





as long as wide. The longitudinal furrow on the head extends to the base of the occipital process. *Barbels*—the maxillary extend to, or even beyond, the base of the caudal fin; the nasal halfway to the orbit; the outer mandibular to the base of the pectoral, and the inner two-thirds of that distance. *Teeth*—in an uninterrupted semilunar band across the palate. *Fins*—dorsal spine rather weak, nearly or quite as long as the head (in the young occasionally shorter), finely serrated posteriorly. Pectoral as long as the head excluding the snout, and reaching four sevenths of the distance to the ventral; pectoral spine stronger than dorsal but shorter, being from one half to three fifths of the length of the head, it is rugose or finely serrated externally and denticulated internally. The adipose dorsal commences above the last third or end of the ventral, and its base equals about that of the rayed fin or even a little more, whilst the extent of the interspace between the two fins equals half the length of that of the rayed dorsal fin. Ventral does not reach the anal. Caudal with deeply pointed lobes, the three outer rays in the upper lobe being produced. *Air-bladder*—large and pyriform. *Colour*—bluish leaden superiorly, becoming white beneath; fins yellowish, stained with dark externally in both the dorsal and caudal. A black spot about equal to the diameter of the eye on the posterior and inferior portion of the soft dorsal.

*Hab.* Throughout Sind and India to Burma. Said to attain 6 feet; a specimen in Calcutta is 3 feet long.

### 157. (3.) *Macrones seenghala*.

*Platystoma seenghala*, *Sykes*, *Tr. Z. S.* ii, p. 371, pl. 65, fig. 2.

*Macrones seenghala*, *Day*, *Fish. India*, p. 444, pl. xcix, fig. 1 (see synon.).

*Teng-ga-ra*, Punj.; *Muti-jellah*, *Seenghala*, and *Shengal*, Telugu.

B. xii. D. 17.  $\frac{1}{2}$  0. P. 19. V. 6. A. 11-12 (3/8-9). C. 19-21.

Length of head  $4\frac{1}{2}$ , of caudal fin  $4\frac{1}{2}$ , height of body  $7\frac{1}{2}$  to 8 in the total length. *Eyes*—diameter 7 to 8 in the length of head, 2 to  $2\frac{1}{2}$  diameters from the end of snout, and  $1\frac{1}{2}$  to 2 apart. The greatest width of the head equals one half to four ninths of its length; snout spatulate; upper jaw rather the longer; the width of the gape equals one third of the length of the head, the cleft shallow. Upper surface of the head granulated in ridges, its median longitudinal groove reaches the base of the occipital process, which is twice as long as wide at its base, between its posterior extremity and the basal bone of the dorsal fin is a separate interneural shield from four times as long as broad in the young, to twice as long in the adult. *Barbels*—the maxillary extend to the middle or just beyond the hind margin of the dorsal fin, the nasal to opposite the middle of the orbit, the external mandibular to the base of the pectoral, whilst the internal are one third shorter. *Teeth*—on the palate in an uninterrupted crescentic band. *Fins*—dorsal one





third to one half higher than the body, its spine rather weak, anteriorly rugose, indistinctly serrated posteriorly, and as long as the head excluding the snout; the length of the base of the adipose dorsal equals or exceeds that of the rayed fin, while the intermediate distance is of the same length. Pectoral extends rather above halfway to the ventral; pectoral spine is stronger than dorsal and half as long as the head, roughened externally, denticulated internally. Ventral extending two thirds of the distance to the anal. Caudal deeply forked, upper lobe the longer. *Air-bladder*—large, pear-shaped, and not enclosed in bone. *Colour*—brownish along the back, silvery on the sides and beneath, a round black spot at the posterior end of the base of the adipose dorsal fin.

Very closely allied to *M. aor*, and chiefly distinguished by its much shorter maxillary barbels.

*Hab.* The Indus, salt-ranges of the Punjab, Jumna, and Ganges certainly as low as Delhi, also the Deccan, Kistna river to its termination, and Assam. This species attains a considerable size.

#### 158. (4.) *Macrones blythii*.

*Batasio affinis*, *Blyth*, *J. A. S. B.* xxix, 1860, p. 150 (not *Bagrus affinis*, *Jerdon*, 1849).

*Macrones blythii*, *Day*, *Fish. India*, p. 445 (see synon.).

D. 17 | 0. P. 17. V. 6. A. 12 (3/9). C. 17.

Length of head nearly 5, of pectoral fin 6, of caudal 6, height of body 5 in the total length. *Eyes*—diameter  $3\frac{1}{2}$  in the length of head, 1 diameter from end of snout and  $1\frac{1}{4}$  apart. Snout projecting. Median longitudinal groove on head indistinct, but reaching the base of the occipital process, which is narrow, twice as long as wide at its base, and separated from the basal bone of the dorsal fin by an interneural shield. *Barbels*—the maxillary, which are the longest, only reach the anterior margin of the orbit. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal spine moderately strong, slightly serrated posteriorly in its upper fourth, and rather above half the length of the head. Pectoral spine slightly longer and stronger than that of the dorsal, and denticulated internally. Adipose dorsal commencing not far from the hind edge of the first dorsal, while the base is a little longer than that of the anal. Caudal forked, the lobes of nearly equal length. *Colour*—a dark spot on the shoulder, a second on the base of the adipose dorsal fin; body with indistinct cross bands.

*Hab.* Tenasserim provinces, whence one specimen 3.5 inches long was sent to the Calcutta Museum.

#### 159. (5.) *Macrones gulio*. (Fig. 64.)

*Pimelodus gulio*, *Ham. Buch. Fish. Ganges*, pp. 201, 379, pl. 23, fig. 66.

*Macrones gulio*, *Day*, *Fish. India*, p. 445, pl. xcix, fig. 2 (see synon.).

*Nuna tenggara*, Beng.; *Nga jerung*, Arracan.



B. ix. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{8}$ -9. V. 6. A. 12-15 (3-4/9-11). C. 17.

Length of head  $4\frac{1}{3}$  to  $4\frac{2}{3}$ , of caudal fin  $4\frac{1}{2}$ , height of body 5 to  $5\frac{1}{2}$  in the total length. *Eyes*—diameter 5 to 6 in the length of head,  $1\frac{1}{2}$  diameters from the end of snout, and 2 diameters apart. Snout broad and slightly depressed, upper jaw somewhat the longer. Greatest width of head equal to its length excluding the snout, and one fourth broader than high. Upper surface of the head granulated, its median longitudinal groove lanceolate, extending to opposite the hind edge of the orbit. Occipital process rounded posteriorly and half longer than wide at its base, a considerable interspace between it and the basal bone of the dorsal fin.

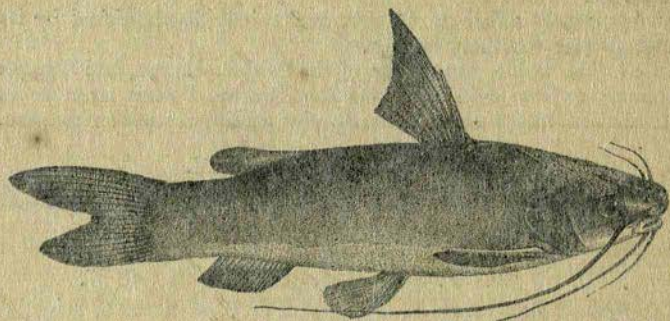


Fig. 64.—*Macrones gulosus*.

*Barbels*—nasal shorter than the head, the maxillary reach to the middle or nearly the end of the ventral fin, the external mandibular are longer than the head or than the internal pair. *Teeth*—in a narrow, uninterrupted, crescentic band across the palate. *Fins*—dorsal spine half as long as the head, strong, anteriorly with one or two teeth at its upper extremity, serrated posteriorly. Anterior rays longer than the spine. Adipose dorsal with a short base equalling about half of the interspace between the two fins. Pectoral spine as long as the head excluding the snout, strong, and denticulated internally. The ventral fin does not reach the anal. Upper caudal lobe the longer, inferior sometimes rounded. *Air-bladder*—heart-shaped, divided along its centre by a strong partition, having a communicating orifice in its upper back part, while the whole has many subdivisions internally. *Colour*—lurid bluish brown on the back, becoming dull white beneath; fins, especially on their outer halves, usually black; maxillary barbels mostly black, fish from fresh waters sometimes have them whitish or white-tipped.

As in the rest of the genus *Macrones*, the ova in this species are small. Some specimens from the Hooghly have 11 branched anal rays, and the maxillary barbels only reach the end of the pectoral fin.





*Hab.* Seas, estuaries, and tidal waters from Sind and Bombay, throughout India and Burma to the Malay Archipelago. There are stuffed specimens in the Calcutta Museum 18 inches in length.

160. (6.) *Macrones punctatus*.

*Bagrus punctatus*, *Jerdon, Mad. Jour. L. Sc.* xv, 1849, p. 339.

*Macrones punctatus*, *Day, Fish. India*, p. 445, pl. c, fig. 3 (see synon.).

*Sholang kelleté*, Tam.

B. xi. D. 1/7 | 0. P. 1/7. V. 6. A. 11-13 (3-4/8-9). C. 17.

Length of head  $4\frac{1}{2}$  in the young to 5, of caudal fin  $5\frac{1}{2}$ , height of body  $6\frac{1}{2}$  in the total length. *Eyes*—diameter 6 to 7 in the length of head, 2 diameters from end of snout, and  $2\frac{1}{2}$  apart. Greatest width of head equals its length behind the nostrils; width of the gape of mouth equals two fifths of length of head. Upper jaw slightly the longer. Interorbital space rather convex and equal to the length of the snout; upper surface of the head and shoulder-bones furrowed, but without any tuberculated ridges. Median longitudinal groove very indistinct, lanceolate, and extending almost to the base of the occipital process, which is narrow and has an interval equal to twice its length between it and the basal bone. *Barbels*—the nasal reach the hinder edge of the orbit, the maxillary the base or middle of the ventral fin, the external mandibular the base of the pectoral, the internal are one third shorter. *Teeth*—on the palate in an uninterrupted crescentic band. *Fins*—dorsal spine of moderate strength, serrated posteriorly in its upper third, it is one half as long as the head but shorter than the first ray; adipose dorsal with a short base, equalling half the distance of the interspace between it and the first dorsal fin. Pectoral spine longer and stronger than that of the dorsal, equal in length to the head excluding the snout, rugose externally, denticulated internally. The ventrals arise on a vertical line just posterior to the last dorsal ray. Upper caudal lobe the longer. *Colour*—head and back dark greyish olive, becoming yellow on the abdomen; about ten black, rounded spots along the lateral line; fins dusky, except the ventrals, which are yellowish.

This fish is closely allied to *M. corsula*, but its head is much shorter in the adult, its upper surface is almost smooth, and its snout is not so flat.

*Hab.* Bhavani river at base of Nilgiri hills; attaining at least 18 inches in length.

161. (7.) *Macrones corsula*.

*Pimelodus corsula*, *Ham. Buch. Fish. Ganges*, pl. i, fig. 72.

*Macrones corsula*, *Day, Fish. India*, p. 446, pl. c, fig. 5 (see synon.).

*Punjab-gagah*, Oorlah; *Kala shengul*, Maráthi.

B. x. D. 1/7 | 0. P. 1/9. V. 6. A. 11-13 (3-5/8). C. 17.

Length of head 4 to  $4\frac{1}{2}$ , of caudal fin 5 to 6, height of body 6 in





the total length. *Eyes*—diameter  $5\frac{1}{2}$  to 7 in the length of head, 2 diameters from the end of snout, and 2 to  $2\frac{1}{2}$  apart; interorbital space nearly flat. The greatest width of the head equals its length excluding the snout. Upper jaw the longer. Median longitudinal groove on the head extending to the base of the occipital process in the young, not so far in the adult. Occipital process very long and narrow, the width of its base being hardly equal to one fifth of its length; but in old specimens the anterior portion of this bone becomes concealed by skin, and appears to be very short, a very slight interspace exists between it and the basal bone of the dorsal fin. Extent of gape of the mouth equals three eighths of length of head. Upper surface of the head, opercles, and shoulder-bone roughened by the presence of tubercular ridges. *Barbels*—the nasal extend to below the middle of the orbit; the maxillary to nearly or quite the base of the anal; the external mandibular to the base of the pectoral, and the internal to opposite the posterior extremity of the preopercle. *Teeth*—in an uninterrupted semilunar band across the palate. *Fins*—dorsal spine slender, serrated posteriorly in its upper half, half as long as the head; base of adipose dorsal varying in length, usually as long as, or longer than, that of the rayed fin. Pectoral spine strong, compressed, rugose externally, denticulated along its whole extent internally; it is as long as the head excluding the snout, and slightly longer than that of the dorsal. Ventral half as long as the head, and not reaching the anal; in some specimens the upper caudal lobe is prolonged. Free portion of the tail rather longer than high. *Colour*—above greyish brown, below dull white. Fins greyish, stained with black. Several vertical black spots along the anterior portion of the lateral line.

Blyth observed that this is "a very mucous fish, and those brought to the bazaar are commonly much clotted over with an adhesive clayey mud, as if they had burrowed into it, and they are mostly brought many together, appearing as if dug out from the mud of ponds more or less dried up."

*Hab.* From Orissa through Bengal and Assam; attaining a foot or more in length.

#### 162. (8.) *Macrones microphthalmus*.

*Macrones microphthalmus*, Day, *Fish. India*, p. 446, pl. c, fig. 4.  
*Nga-ike*, Burmese.

B. x. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{9}$ . V. 6. A. 12 ( $3\frac{1}{9}$ ). C. 17.

Length of head 4, of caudal fin  $5\frac{1}{2}$ , height of body  $6\frac{1}{2}$  in the total length (excluding the filamentous prolongation of the caudal fin). *Eyes*—diameter 6 in the length of head, 2 diameters from the end of snout, and  $2\frac{1}{2}$  apart. The greatest width of the head equals its length excluding the snout. Upper jaw the longer, snout spatulate. Median longitudinal groove on the head reaching nearly to the base of the occipital process, which is pointed, scarcely longer than wide at its base, and with a long interspace between it and the





basal bone of the dorsal fin. Upper surface of the head nearly smooth, the few ridges not being tuberculated. *Barbels*—nasal reaching the hinder third of the eye, maxillary the base of the caudal, external mandibular the first third of the pectoral, while the inner pair are shorter. *Teeth*—in an uninterrupted semilunar band across the palate. *Fins*—dorsal as high as the body, its spine very slender, only osseous at its base and articulated in its upper two thirds; length of base of adipose dorsal equal to that of the rayed fin, whilst the interspace between the two fins is of the same length. Pectoral as long as the postorbital portion of the head, the spine moderately strong and one half as long as the head, denticulated internally. Ventral nearly one half as long as head and just extending to the anal. Upper caudal lobe with a filamentous prolongation. Free portion of tail one half longer than high. *Colour*—of a light brown, shot with purple; fins darkest externally.

Possibly all these three last forms are local races of one species.

*Hab.* Burma, along the valley of the Irrawaddi.

163. (9.) *Macrones cavasius*.

*Pimelodus cavasius*, *Ham. Buch. Fish. Ganges*, pp. 203, 379, pl. xi, fig. 67.

*Macrones cavasius*, *Day, Fish. India*, p. 447, pl. c, fig. 1 (see synon.).

*Vella kelletee* and *Cutta*, Tam.; *Nahra jella*, Tel.; *Guntea*, Ooriah; *Kavasi tengara*, Beng.; *Nga-zin-zine*, Burmese; *Shingti* and *Shingata*, Marathi.

B. vi. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{8}$ . V. 6. A. 11-13 ( $4\frac{7}{9}$ -9). C. 16.

Length of head 6 to  $6\frac{1}{4}$ , of caudal fin 6, height of body  $5\frac{1}{2}$  in the total length. *Eyes*—diameter  $3\frac{1}{4}$  to  $3\frac{1}{2}$  in the length of head, 1 to  $1\frac{1}{2}$  diameters from the end of snout, and  $1\frac{1}{4}$  apart. The greatest width of the head equal to its length excluding the snout. Snout rather obtuse, upper jaw a little the longer; width of the gape equal to two fifths of the length of the head; the cleft extends halfway to below the orbit. Upper surface of the head slightly roughened, its median longitudinal groove rather wide and extending to the base of the occipital process, which last is narrow and three or four times as long as wide at its base, and with a shallow groove along its last half or two thirds; no interspace between its posterior extremity and the basal bone of the dorsal fin. *Barbels*—the nasal nearly or quite as long as the head, the maxillary extending to beyond the base of the caudal fin, the external mandibular almost to the base of the ventral, while the internal are as long as the head. *Teeth*—on the palate in an uninterrupted crescentic band. *Fins*—dorsal spine weak, entire, and nearly or quite as long as the head excluding the snout, the fin is rather higher than the body and pointed; the adipose dorsal commences just behind the rayed one, and the length of its base is three times as long. Pectoral spine as long as, but stronger than, the dorsal, smooth externally, denticulated internally. Ventral arising just





posterior to the vertical from the last dorsal ray. Caudal pointed, upper lobe the longer. *Colour*—leaden superiorly, becoming yellowish along the abdomen and cheeks. Maxillary barbels, dorsal and caudal fins dusky; pectoral, ventral, and anal dull white. There is usually a black spot covering the basal bone of the dorsal fin. Occasionally there is a bluish band along the lateral line.

*Hab.* From Sind, throughout India, Assam, and Burma; attaining at least 18 inches in length.

#### 164. (10.) *Macrones tengara*.

*Pimelodus tengara*, *Ham. Buch. Fish. Ganges*, pp. 183, 377, and *Pimelodus batasianus*, pl. 23, fig. 60.

*Macrones tengara*, *Day, Fish. India*, p. 447, pl. ci, fig. 5 (see *synon.*).

*Kuttahrah*, Hind.; *Ting-ga-rah*, Assam and Punj.; *Karaal*, Punj.; *Bikuntia*, Ooriah.

B. x. D. 1/7 | 0. P. 1/8. V. 6. A. 11-13 (2-3/9-10). C. 19.

Length of head  $4\frac{1}{3}$ , of caudal fin  $4\frac{1}{3}$ , height of body  $4\frac{1}{3}$  in the total length. *Eyes*—diameter  $3\frac{1}{2}$  in the length of the head,  $\frac{2}{3}$  to 1 diameter from the end of snout, and  $1\frac{1}{2}$  apart. Greatest width of the head equal to its length excluding the snout. Gape of mouth equal to two fifths of the length of the head. Upper jaw slightly the longer. Median longitudinal groove extending to the base of the occipital process, which latter (as well as the upper surface of the head) is corrugated and about thrice as long as it is wide at its base, it reaches the basal bone of the dorsal fin. *Barbels*—the nasal are nearly as long as the head, the maxillary reach the base of the ventral, the external mandibular the base of the pectoral, while the internal are shorter. *Teeth*—in a narrow uninterrupted band across the palate. *Fins*—dorsal spine as long as the head excluding the snout, slightly serrated anteriorly in its upper third, and posteriorly in its whole extent; the length of the base of the adipose dorsal one third less than that of the rayed fin, and equal to one half the length of the interspace between the two fins; in some specimens it is much longer. Pectoral spine nearly as long as the head, stronger than that of the dorsal, smooth externally, and with about 13 denticulations internally. Ventrals arising on a vertical line just behind the last dorsal ray. Caudal forked, upper lobe the longer. *Colour*—brilliant yellow, with a black shoulder-spot and about five black longitudinal lines. In some specimens the mandibular barbels are white with a black streak.

*Hab.* Northern India, the Punjab and Assam; attaining 3 to 4 inches in length.

#### 165. (11.) *Macrones oculatus*.

*Bagrus oculatus*, *Cuv. & Val. H. N. Poiss.* xiv, p. 424.

*Macrones oculatus*, *Day, Fish. India*, p. 448, pl. xeviii, fig. 4 (see *synon.*).

B. x. D. 1/7 | 0. P. 1/6. V. 6. A. 11-13 (3-4/8-9). C. 15.





Length of head  $5\frac{1}{2}$ , of caudal fin  $4\frac{1}{2}$ , height of body 5 in the total length. *Eyes*—diameter 3 to  $3\frac{1}{2}$  in the length of head, about one diameter from end of snout and also apart. Profile from snout to dorsal fin rather elevated. Greatest width of the head equal to its length excluding the snout; upper jaw slightly the longer. Summit of the head rough; median longitudinal groove extending nearly to the base of the occipital process, which last is three times as long as wide at its base, whilst there is no interspace between it and the basal bone of the dorsal fin. *Barbels*—the nasal half as long as the head, the maxillary reach the middle of the anal fin, the outer mandibular the middle of the pectoral, whilst the inner are rather shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal spine of moderate strength, as long as the head excluding the snout, two or three teeth anteriorly, serrated posteriorly; the length of the base of the adipose dorsal equal to that of the rayed fin, but about one fourth less than the interspace between the two fins. Pectoral spine stronger than the dorsal, as long as the head behind the angle of the mouth, and with about ten very strong teeth internally. Caudal deeply forked, the upper lobe being the longer. *Colour*—silvery, lightest beneath, a dark spot at the commencement of the base of the dorsal fin, which is also black-tipped, a darkish band along the middle of the fin.

*Hab.* Malabar coast and the Coimbatore district. This species attains 5 or 6 inches in length.

166. (12.) *Macrones vittatus*.

*Silurus vittatus*, Bloch, *Ich.* t. 371, fig. 2.

*Macrones vittatus*, Day, *Fish. India*, p. 448, pl. xcviii, fig. 3 & pl. xcix, fig. 4 (see synon.).

*Chicana*, Marāthi; *Tengra*, Beng.; *Kuggur*, Hind.; *Kel-le-tee*, Tam.; *Sukujallah*, Tel.; *Kuntia*, Ooriah; *Mulleer* and *Kuggur*, Sind.; *Sin-gorah*, Assam; *Nga-sa-ring*, Mugh.; *Nga-zin-yine*, Burmese.

B. x. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{9}$ . V. 6. A. 9–12 (2–3/7–9). C. 17.

Length of head  $4\frac{3}{4}$  to 5, of caudal fin  $5\frac{1}{2}$ , height of body 5 in the total length. *Eyes*—diameter  $4\frac{1}{2}$  to 6 in the length of head,  $1\frac{3}{4}$  to 2 diameters from end of snout, and  $1\frac{1}{2}$  to 2 apart. The greatest width of the head equal to its length excluding the snout or behind the angle of the mouth, and very little more than its height; in some specimens there is a considerable rise to base of the first dorsal fin. Upper surface of the head roughened in tubercles hardly forming lines, median longitudinal groove reaching to mid-way behind the hind edge of the eye and the base of the occipital process, which is rough, three times as long as wide at its base, and a short (if any) interspace exists between it and the basal bone of the dorsal fin; radiating rough lines on the opercle; shoulder-bone with its triangular portion a little longer than wide at its base, and roughened in raised lines. *Barbels*—the maxillary reach the ventrals, the nasal the opercle, the external mandibular the first third of the pectoral spine, whilst the internal are shorter. *Teeth*—in





an uninterrupted semilunar band across the palate. *Fins*—dorsal two thirds as high as the body, its spine half as long as the head, with two or three teeth anteriorly in the young, while it is finely serrated posteriorly; length of the base of the adipose dorsal variable, in some specimens it is equal to that of the interspace between the two fins, and a little more than the length of the rayed fin. Pectoral spine strong, as long as the head excluding the snout, denticulated internally with about 16 coarse teeth. Ventral reaching from half to two thirds of the distance to the base of the anal. Upper caudal lobe the longer. *Colour*—silvery or golden; old specimens at Madras have a light bluish band along the middle of the side, and a narrow light one above and below it, a dark shoulder-spot, and sometimes another near the base of the caudal fin. More to the eastward, as in Orissa and Bengal, the colours are more vivid, usually of a golden hue, with a black shoulder-spot, a narrow black band along either side of the lateral line, a lighter parallel one below, and two wider ones above. Sometimes these fish appear to be dark, with five longitudinal silvery bands. Tips of fins usually dark.

This fish is termed "the fiddler" in Mysore; I touched one which was on the wet ground, at which it appeared to become very irate, erecting its dorsal fin and making a noise resembling the buzzing of a bee, evidently a sign of anger. When I put some small carp into an aquarium containing one of these fishes it rushed at a small example, seized it by the middle of its back and shook it like a dog killing a rat; at this time the barbels of the *Macrones* were stiffened out laterally like a cat's whiskers.

*Hab.* Throughout Sind, the continent of India, Assam, Burma, Siam, also Ceylon; attaining 7 or 8 inches in length.

#### 167. (13.) *Macrones leucophasis*.

*Bagrus leucophasis*, *Blyth, J. A. S. B.* xxix, 1860, p. 148.

*Macrones leucophasis*, *Day, Fish. India*, p. 449, pl. c, fig. 2 (see synon.).

*Nga-pet-lek* and *Nga-nouk-thawa*, Burmese (signifies "topsy-turvy," as the fish is believed to swim in that position). Also *Nga pulley* or *pā-léy* at Moulmein.

B. xi. D. 1/7 | 0. P. 1/8–10. V. 6. A. 11–12 (3/8–9). C. 17.

Length of head  $4\frac{1}{2}$  to 5, of caudal fin  $3\frac{1}{2}$  to  $4\frac{1}{2}$ , height of body  $4\frac{1}{2}$  in the total length. *Eyes*—diameter 4 to 5 in the length of the head,  $1\frac{1}{2}$  to 2 diameters from the end of snout, and 1 to  $1\frac{1}{2}$  apart. The greatest width of the head equal to its length behind the nostrils. Snout rounded, the upper jaw slightly the longer. Median longitudinal groove on the head does not quite reach the base of the occipital process, which last is twice as long as wide at its base, while between it and the basal bone of the dorsal fin is a pyriform bone about twice as long as wide. Upper surface of the head rather rugose. *Barbels*—the nasal reach to the front edge or the middle of the eye, the maxillary to the anal fin, the external man-





dibular to the middle of the pectoral, and the internal to the gill-openings. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal spine moderately strong, as long as the head posterior to the nostrils or angle of the mouth, finely serrated posteriorly in the upper fourth; the adipose fin commences just behind the first dorsal, and the length of the base is from twice to two and a half times that of the base of the first dorsal. Pectoral spine much stronger than that of the dorsal, a little shorter, and denticulated internally. Caudal deeply forked, the lobes having filamentous prolongations. *Air-bladder*—large. *Colour*—when alive the lower surface is olive-green or yellow and the head white, but after death it becomes purplish black over the body and fins; some white dots exist on the body.

*Hab.* Rivers of Burma; attaining a foot or more in length.

168. (14.) *Macrones montanus*.

*Bagrus montanus*, Jerdon, *Mad. Jour. L. Sc.* xv, 1849, p. 337.

*Macrones montanus*, Day, *Fish. India*, p. 449, pl. ci, fig. 4.

B. x. D.  $1\frac{7}{8}$  | 0. P.  $1\frac{1}{6}$ . V. 6. A. 12 ( $3\frac{9}{10}$ ). C. 19.

Length of head 5, of caudal fin 5, height of body 6 in the total length. *Eyes*—diameter  $3\frac{1}{2}$  to 4 in the length of the head, rather above 1 diameter from the end of snout, and  $1\frac{1}{2}$  apart. A very slight rise in the profile from snout to base of first dorsal fin. Greatest width of the head equal to its length behind the angle of the mouth. Upper jaw slightly the longer; the width of the mouth equal to two fifths of the length of the head. Upper surface of the head roughened in granulated lines which extend on to the occipital process. Median longitudinal groove extending to mid-way between the eye and the base of the occipital process, which is narrow, about four times as long as wide at its base, and reaching the basal bone of the dorsal fin; opercle with roughened radiating lines; shoulder-bone rather longer than deep at its base and with roughened lines. *Barbels*—the nasal extend to rather behind the hinder edge of the eye, the maxillary to the anal fin, the external mandibular to the end of the pectoral, the internal are shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal nearly as high as the body, its spine rather weak, half as long as the head and posteriorly serrated; length of base of adipose dorsal one third more than that of rayed fin, which equals that of the interspace. Pectoral spine strong, as long as the head excluding the snout, and with about 16 strong denticulations internally. Ventral does not reach anal; upper caudal lobe the longer. *Colour*—silvery superiorly, with a tinge of yellow on the under surface of the head and along the abdomen, a bluish shoulder-spot, and a silvery line along the side ending in a dark spot at the base of the caudal fin, one or two light bands along the side above the lateral line; fins tinged with green.

*Hab.* Wynad range of hills and Manantoddy.



169. (15.) *Macrones keletius*.

*Bagrus keletius*, *Cuv. & Val. H. N. Poiss.* xiv, p. 411.

*Macrones keletius*, *Day, Fish. India*, p. 449, pl. xviii, fig. 5 (see *synon.*).

*Tengali*, Maráthi.

B. x. D.  $1/7$  | 0. P.  $1/10$ . V. 6. A. 9–10 ( $2-3/7-8$ ). C. 17.

Length of head  $4\frac{3}{4}$ , of caudal fin 5 to  $5\frac{1}{4}$ , height of body 6 to  $6\frac{1}{2}$  in the total length. *Eyes*—diameter  $4\frac{1}{2}$  in the length of the head,  $1\frac{1}{2}$  diameters from the end of snout, and 2 apart. The greatest width of the head equal to its length excluding the snout. Upper jaw slightly the longer. The upper surface of the head roughened in closely set tubercular lines continued on to the occipital process, opercle likewise striated with similar lines. Median longitudinal groove rather constricted in its centre, it reaches to opposite the hind border of the preopercle. Occipital process narrow, three times as long as wide at its base, and not quite reaching the basal bone. *Barbels*—the nasal reach the opercle, the maxillary the middle of the anal fin, the external mandibular the end of the pectoral spine, while the internal are shorter. Humeral process rather short and pointed. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal as high as body, its spine with two or three teeth anteriorly near its summit and serrated posteriorly, it equals three sevenths of the length of the head; length of the base of the adipose dorsal equal to that of the rayed fin or of the interspace between the two. Pectoral reaching two thirds of the way to the ventral; pectoral spine stronger than that of the dorsal, and equal to the length of the head excluding the snout. The ventral does not reach the anal. Upper caudal lobe the longer. A well-marked pre-anal papilla. *Colour*—silvery along the back, becoming dull white beneath. A dark shoulder-spot, a light band along the lateral line, and a silvery one above and another below it; dorsal and caudal black-tipped, anterior half of anal dark.

*Hab.* Madras to Pondicherry and inland to Coimbatore, also Ceylon; attaining about 4 inches in length. Jerdon observed that this species is also found in Mysore.

170. (16.) *Macrones malabaricus*.

*Bagrus malabaricus*, *Jerdon, Mad. Jour. L. Sc.* xv, 1849, p. 333.

*Macrones malabaricus*, *Day, Fish. India*, p. 450, pl. ci, fig. 2 (see *synon.*).

B. x. D.  $1/7$  | 0. P.  $1/9$ . V. 6. A. 10–11 ( $2-3/8$ ). C. 18.

Length of head  $4\frac{3}{4}$  in a Wynaad specimen to  $5\frac{1}{2}$ , of pectoral 6 to 7, of caudal fin 5 to 6, height of body 6 to 7 in the total length. *Eyes*—diameter 4 to  $4\frac{1}{2}$  in the length of head,  $1\frac{1}{4}$  diameters from the end of snout, and  $1\frac{1}{4}$  apart. Scarcely any rise in the dorsal profile from the snout to the base of the dorsal fin.





Greatest width of the head equal to its length behind the angle of the mouth. Upper surface of the head nearly smooth. Median longitudinal groove extending to midway between hind edge of the eye and the base of the occipital process, which last is about twice as long as wide, whilst there exists a considerable interspace between it and the basal bone of the dorsal fin. The triangular portion of the shoulder-bone curves rather upwards, and is one fourth longer than deep at its base. *Barbels*—the nasal reach to a little behind the orbit, the maxillary to the middle or end of the ventral fin, the external mandibular to the end of the pectoral, while the internal are a little shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal nearly as high as the body; the spine weak, finely serrated or almost entire posteriorly, with one denticulation anteriorly near the summit, the length of the spine equal to that of the postorbital portion of the head; length of base of adipose dorsal one third more than that of the rayed fin, or of the interspace between the two fins. Pectoral spine strong and equal to the length of the head excluding the snout, internally with about eight or ten strong denticulations, roughened externally. Upper caudal lobe the longer. *Colour*—deep leaden, usually with a dark blotch on the shoulder surrounded by a lighter edge, another at the base of the caudal fin; a dark band along the lateral line; abdomen of a dull white. Fins with minute dark spots, making the upper portion of the dorsal and the lower third of the anal blackish.

*Hab.* Malabar coast of India and the Wynaad; attaining upwards of 6 inches in length.

171. (17.) *Macrones armatus*.

*Hypsleobagrus armatus*, Day, P. Z. S. 1865, p. 289.

*Macrones armatus*, Day, *Fish. India*, p. 450, pl. ci, fig. 3.

Cuaree, Mal.

B. x. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{9}$ . V. 6. A. 11 (3/8). C. 17.

Length of head  $5\frac{1}{2}$ , of caudal fin  $5\frac{1}{2}$ , height of body  $5\frac{1}{2}$  in the total length. *Eyes*—diameter 5 in the length of the head,  $1\frac{1}{4}$  from end of snout, and 2 apart. A considerable rise from the snout to the base of the dorsal fin. The greatest width of the head equals its height or its length excluding the snout. Upper surface of the head roughened, the median longitudinal groove almost reaching the base of the occipital process, which last is about three times as long as wide, and reaches the basal bone of the dorsal fin; shoulder-bone roughened in lines and half longer than deep at its base. *Barbels*—the nasal nearly reach the opercle, the maxillary the end of ventral fin, the outer mandibular the end of pectoral spine, while the internal are shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal as high as the body below it, its spine very finely serrated posteriorly, or entire, and four ninths of the length of the head; length of base of adipose dorsal exceeding that of the rayed fin, or of the interspace between





the two. Pectoral spine strong, as long as the head excluding the snout, and having from ten to fourteen strong denticulations internally. Upper caudal lobe the longer. An anal papilla before the fin. *Colour*—leadon or brown superiorly, lighter beneath, with or without a brown band along the side, and a dark blotch at the base of the caudal fin. Upper half of dorsal fin darkish, and a dark band along the anal.

*Hab.* Malabar and the Wynaad range of hills.

172. (18.) *Macrones bleekeri*.

*Bagrus keletius*, Bleeker, *Batav. Genootsch. Verhand.* xxv, *Ich. Beng.* p. 115 (not *Cuv. & Val.*).

*Macrones bleekeri*, Day, *Fish. India*, p. 451, pl. ci, fig. 1 (see synon.).

B. x. D. 1/7 | 0. P. 1/9-10. V. 6. A. 9-10 (3/6-7). C. 17.

Length of head  $5\frac{1}{4}$  to  $5\frac{1}{2}$ , of caudal fin  $5\frac{1}{2}$ , height of body 5 in the total length. *Eyes*—diameter  $4\frac{1}{2}$  in length of head, nearly 2 diameters from end of snout, and  $1\frac{1}{2}$  apart. The greatest width of the head equals its length behind the hind nostril. Snout somewhat obtuse. Width of the gape of the mouth nearly equals half the length of the head. Upper surface of head, opercles, occipital bone, and humeral process granulated. Median longitudinal groove on the head shallow, and reaching to the base of the occipital process, which is twice as long as broad at its base, and reaches the basal bone of the dorsal fin. Occipital process not grooved, but with ridged lines. *Barbels*—nasal reaching the hind edge of the eye, maxillary the anal fin, external mandibular the base of the pectoral, internal a little shorter. *Teeth*—on the palate in an uninterrupted semilunar band. *Fins*—dorsal fin rounded, not so high as the body, the spine smooth and equal to half the length of the head (in Sind specimens the spine is slightly serrated posteriorly, and I once saw a specimen that had eight branched dorsal rays); adipose dorsal commencing just behind the rayed fin, and having its base twice the length of the head. Pectoral spine stronger than that of the dorsal, and as long as the head excluding the snout; denticulated internally. Caudal with pointed lobes, the upper being the longer. *Colour*—brownish-grey, with two light longitudinal bands, one above the other, below the lateral line; some specimens have a dark shoulder-spot and a dark band along the middle of the anal fin. The fins are mostly darkest at their edges. In a specimen from Burma there is a dark spot at the end of the lateral line and light longitudinal body-bands.

*Hab.* Sind, Jumna, upper waters of the Ganges, and Burma, not attaining to a large size. It descends the rivers as low as Bengal.

20. Genus *LIOCASSIS*, Bleeker.

Syn. *Rama*, Bleeker; *Macrones*, pl., Günther.

Branchiostegals six. Gill-openings very wide, the membrane



not being confluent with the skin of the isthmus, and notched as far as the chin. Mouth of moderate size, anterior, the upper jaw the longer. Nostrils distant one from the other. Barbels consisting of a short maxillary pair, and either two pairs or none on the mandible. Teeth villiform in both jaws, and in an uninterrupted band across the palate. One spine and six rays in the first dorsal; adipose fin present, it and the anal of moderate length. Ventral with six rays, situated behind the base of the dorsal; caudal forked. Air-bladder not enclosed in bone.

*Geographical Distribution.* Eastern Bengal, Assam and Burma, to the Malay Archipelago.

*Synopsis of Indian Species.*

- A. 16. A dark shoulder-mark. Body with short vertical dark marks. 3 pairs of barbels.... 1. *L. rama*, p. 163.  
A. 11. Two black blotches on the lateral line. A pair of maxillary barbels only ..... 2. *L. fluviatilis*, p. 164.

173. (1.) *Liocassis rama*. (Fig. 65.)

*Pimelodus rama*, *Ham. Buch. Fish. Ganges*, pp. 176, 377, pl. 3, fig. 55.

*Leiocassis rama*, *Day, Fish. India*, p. 451, pl. cxv, fig. 2 (see synon.).

B. vi. D. 1/6 | O. P. 1/9. V. 6. A. 16 (3/13). C. 18.

Length of head 4 to  $4\frac{1}{2}$ , of caudal fin  $4\frac{1}{2}$ , height of body  $4\frac{1}{2}$  to 5 in the total length. *Eyes*—subcutaneous, diameter 3 to  $3\frac{1}{4}$  in the length of the head, 1 diameter from the end of the snout, and also apart. The greatest width of the head equal to its length excluding the snout. There is a considerable rise in the dorsal profile to the base of the rayed fin. Upper jaw the longer. Upper surface of

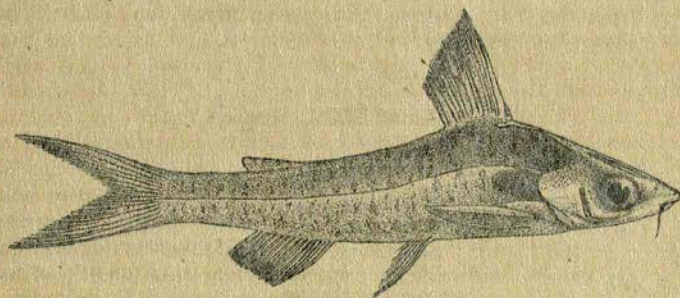


Fig. 65.—*Liocassis rama*.

the head covered with skin; a rather wide median longitudinal groove extends up the first third of the occipital process, which is twice as long as wide at its base, and a distinct oval interneural





shield exists between the process and the basal bone of the dorsal fin. Scapular process well developed; humero-cubital process rather longer than high at its base. *Barbels*—a short maxillary pair, two pairs behind the symphysis of the lower jaw. *Teeth*—in an uninterrupted, semicircular villiform band across the palate. *Colour*—dull yellow, with short, vertical, brown marks and a dark shoulder-spot.

*Hab.* Eastern Bengal and Assam. This fish appears not to exceed 2 or 3 inches in length. The figure is twice the natural size.

174. (2.) *Liocassis fluviatilis*.

*Liocassis fluviatilis*, Day, *Fishes of India, Supplement*, 1888, p. 805.

B. vi. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{7}$ . V. 6. A. 11. C. 18.

Length of head  $4\frac{1}{2}$ , of caudal fin  $5\frac{1}{2}$ , height of body 5 in the total length. *Eyes*—rather small, high up and in the anterior half of the head. The greatest width of the head equal to two thirds of its length. There is a moderate rise from the snout to the base of the dorsal fin. Upper jaw the longer; upper surface of head smooth. *Barbels*—a maxillary pair reaching to the posterior edge of the orbit, no others were detected. *Teeth*—in an uninterrupted villiform band across the palate. *Fins*—dorsal spine smooth and nearly as long as the fourth ray, which is four fifths as high as the body below it. Adipose dorsal rather long, commencing a short distance behind the base of the rayed fin. Pectoral spine denticulated internally. *Colour*—yellowish horny, with darker shades of olive-brown on the snout and along the back, also some cloudy markings. A large black blotch on the lateral line above the anal fin, another between the pectoral and first dorsal. Tip of dorsal and ends of both caudal lobes black.

*Hab.* Col. Tickell obtained four examples, the largest  $3\frac{1}{2}$  inches long, from the Anin, a stream rising near Weywoon, Wagroo, in the Tenasserim Provinces.

21. Genus *RITA*, Bleeker.

*Syn. Gogrius*, Day.

Branchiostegals eight. Gill-openings with a free posterior edge and not confluent with the skin of the isthmus. Mouth transverse, upper jaw the longer; nostrils on either side subcontiguous, but the pair on one side widely separated from that on the other. Eyes subcutaneous, without free circular margins. *Barbels* six, a minute pair at the posterior nostrils, a maxillary and a mandibular pair. Teeth villiform in both jaws or mixed with molariform ones in the mandibles, molariform on the palate. One strong spine and six rays in first dorsal fin, the adipose and the anal of moderate length. Ventral posterior to the base of the dorsal, and having





seven or eight rays; caudal forked. Air-bladder not enclosed in bone, with or without a posterior prolongation. The ova are much larger than in *Macrones*, but very much smaller than in *Arius* and its allies. A strong cubito-humeral process protects the pectoral spine when it is flexed along the side of the body.

*Geographical Distribution.* Large rivers of Sind, India (except its southern portions), and Burma far above Mandalay.

*Uses.* Food for the lower classes. These fishes retain life long after their removal from water, and can be conveyed fresh for long distances.

*Synopsis of Indian Species.*

- A. Some of the posterior teeth in the lower jaw molariform.
  - Eye 8 to 10 diameters in length of head. Patches of teeth in palate wide apart. Dorsal spine in the adult as long as the head or longer, entire anteriorly. . . . . 1. *R. buchanani*, p. 165.
  - Eye  $5\frac{1}{2}$  to 6 diameters in length of head. Patches of teeth in palate close together. Dorsal spine as long as head excluding the snout, entire anteriorly. . . . . 2. *R. pavimentata*, p. 167.
  - Eye 4 diameters in the length of head. Patches of teeth in palate close together in their front halves. Dorsal spine longer than the head, coarsely serrated anteriorly in its whole extent. . . . . 3. *R. chrysea*, p. 167.
- B. Teeth in lower jaw villiform or cardiform.
  - Eye  $4\frac{1}{2}$  to 5 diameters in length of head. Patches of teeth in palate wide apart. Dorsal spine as long as the head or longer, serrated anteriorly in its lower third. . . . . 4. *R. hastata*, p. 168.

175. (1.) *Rita buchanani*. (Fig. 66.)

*Pimelodus rita*, *Ham. Buch. Fish. Ganges*, pp. 165, 376 pl. xxiv, fig. 53.  
*Rita buchanani*, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Ich. Beng.* p. 123, t. 3, fig. 1; *Day, Fish. India*, p. 454, pl. ciii, fig. 1 (semi-adult), fig. 2 (immature), and pl. civ, fig. 2 (young) (see *synon.*).

*Nga-htway*, Burmese.

B. viii. D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{10}$ . V. 8. A. 12-13 (4-5/9). C. 19.

Length of head 4 to  $4\frac{1}{2}$ , of caudal fin 5, height of body  $5\frac{1}{2}$  to 6 in the total length. *Eyes*—diameter 8 to 10 in the length of head, 3 diameters from the end of snout and  $4\frac{1}{2}$  apart. The greatest width of the head equal to its length behind the nostrils, whilst its height is a little less. Upper surface of the head covered with skin except a strip anterior to the base of the occipital process, that bone, the scapular and cubito-humeral processes granulated;





the occipital process nearly as long as wide at its base, notched anteriorly to receive the basal bone of the dorsal fin, which is nearly as long as the occipital process. Upper jaw the longer; width of the mouth nearly equal to half the length of the head. Cubito-humeral process more pointed in young than in adult specimens and about three fourths the length of the head. *Barbels*—the nasal short; the maxillary nearly reaching the end of the head, and the mandibular almost as far. *Teeth*—villiform in the upper jaw, also in the anterior portion of the mandible, and in an outer row along either ramus, while internally are two or three rows of rounded teeth, the posterior of which are the largest; two elliptical patches of rounded teeth on the palate, which are wide asunder along the median line but coalesce anteriorly. *Fins*—dorsal spine very strong, and slightly serrated posteriorly in its upper portion; its length varies, being shortest in the immature, it is generally as long as the head (except in the young) or even one third longer in adults, especially in those from the Indus; base of adipose fin half or two thirds that of the rayed fin, or of the interspace between the two fins. Pectoral spine (except in the very young) somewhat shorter than that of the dorsal and denticulated on both edges. Ventrals arising just behind the vertical from the last dorsal ray.

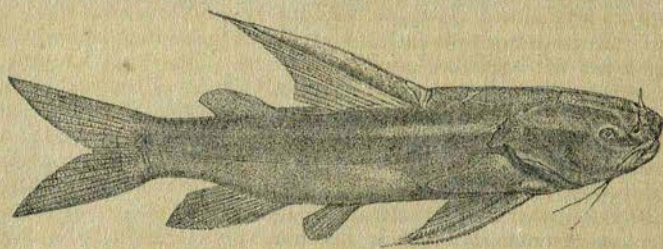


Fig. 66.—*Rita buchanani*.

Anal one half higher than its base is long. *Colour*—lurid green, lightest below, and the hind edge of the dorsal sometimes blackish. *Air-bladder*—with a thick outer covering, and of an almost quadrangular form, whilst posteriorly it is continued into two horn-like prolongations nearly as long as the abdominal cavity, the right one generally passing over to the left side and curving across the commencement of its fellow, whereas the left one passes backwards, and is then as a rule recurved on itself. On the inferior wall being removed a longitudinal median partition is seen in the posterior half, dividing it into two lateral chambers which anteriorly communicate together, while posteriorly they are continued down the two horn-like processes.

*Hab.* Indus and affluent rivers, Jumna and Ganges, also the Irrawaddy; attaining at least 4 feet in length. This fish is esteemed as food by the natives, but is a very foul feeder.



176. (2.) *Rita pavementata*.

*Arius pavementatus*, *Fal. Jacquemont, Voy. Ind., Atlas*, 2; *Poiss.* pl. 17, fig. 2.

*Rita pavementata*, *Day, Fish. India*, p. 455, pl. ciii, fig. 3 (see synon.).

*Banki yeddu*, Tel.; *Filah-gokundu*, Hind.; *Ghogra*, Maráthi.

B viii. D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{10}$ . V. 8. A. 12-13 (4/8-9). C. 17.

Length of head  $3\frac{3}{4}$  to 4, of caudal fin  $6\frac{1}{2}$ , height of body 6 in the total length. *Eyes*—covered by skin which, however, forms a rather free margin along their lower edges; diameter  $5\frac{1}{2}$  to 6 in the length of head, 2 to  $2\frac{1}{4}$  diameters from the end of snout and  $2\frac{1}{2}$  apart. Greatest width of the head equal to its length behind the angle of the mouth. Upper jaw the longer, the width of the mouth equal to three tenths of the length of the head. Upper surface of the head and occipital process smooth, covered by skin. Occipital process rather more than twice as long as wide at its base, it is notched anteriorly to receive the V-shaped basal bone. Scapular process short, the cubito-humeral one pointed, as long as the head behind the middle of the eyes, or even a little longer, and roughened in lines. *Barbels*—the maxillary do not quite reach the posterior end of the head, the mandibular pair extend a little further; the nasal are very short. *Teeth*—in villiform or cardiform rows in both jaws; the posterior rows in the lower jaw, commencing behind the symphysis, with rounded crowns, their size augmenting laterally. Those in the palate in two semi-elliptical patches of rounded ones, which are almost continuous along the median line, the posterior being much the largest. *Fins*—dorsal spine of moderate strength, as long as the head excluding the snout, and finely serrated posteriorly in almost its entire extent; length of the base of the adipose three fourths of that of the rayed fin and nearly equal to the extent of the interspace between the two fins. Pectoral spine stronger and a little longer than that of the dorsal, denticulated on both edges, not reaching so far as the ventral fin. Anal rays appear to be sometimes deficient in number. *Colour*—of a dull yellowish colour, with dark or even black fins.

A drawing and description of this species exists amongst Sir W. Elliot's collection; the locality is not given, but was probably the Kistna; the fish is termed "*Ghogra*."

*Hab.* From Poona and the rivers in the Deccan and affluents of the Kistna.

177. (3.) *Rita chrysea*.

*Rita chrysea*, *Day, Fish. India*, p. 455, pl. civ, fig. 1.

B. viii. D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{9}$ . V. 8. A. 12 (2/10). C. 18.

Length of head  $4\frac{1}{4}$ , of caudal fin  $4\frac{1}{2}$ , height of body 6 in the total length. *Eyes*—covered by the skin, which, however, is a little reflected along its lower edge, diameter 4 in the length of the head,  $1\frac{1}{4}$  diameters from the end of snout, and 1 apart. The greatest





width of the head equals its length excluding the snout, its height is slightly less. Upper jaw the longer, the width of the mouth equals four thirteenths of the length of the head. Upper surface of the head mesially and posteriorly, also the occipital and scapular processes, rough. Occipital process as wide at its base as it is long, notched anteriorly to receive the basal bone. Cubito-humeral process as long as the head excluding the snout. *Barbels*—nasal short, the maxillary reach the base of the pectoral fin, the mandibular slightly shorter. *Teeth*—villiform in both jaws, and two or three of the inner rows in the mandibles with globular crowns; two patches of globular-headed teeth on the palate converge anteriorly so as to touch one another in their front half. *Fins*—dorsal spine strong, reaching to about the middle of the adipose fin and nearly one half longer than the head, coarsely serrated anteriorly in its whole extent, and very finely serrated posteriorly. Pectoral spine rather longer than the head, and denticulated on both sides. Caudal deeply forked. *Colour*—yellowish, the ends of the fins stained greyish.

*Hab.* Orissa, where a single specimen was captured.

#### 178. (4.) *Rita hastata*.

*Arius hastatus*, Val. Jacquemont, *Voy. Ind.*, *Atlas*, Poiss. pl. 18, fig. 2.

*Rita hastata*, Day, *Fish. India*, p. 456, pl. ciii, fig. 4 (see synonym).

*Kurdu*, Maráthi; *Mussayahri*, Oriah.

B. viii. D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{10}$ . V. 7-8. A. 13-14 (5/8-9). C. 17.

Length of head  $4\frac{1}{2}$  to  $4\frac{3}{4}$ , of caudal fin 5 to 6, height of body 6 in the total length. *Eyes*—covered with skin, pupil oval, diameter  $4\frac{1}{2}$  to 5 in the length of head,  $1\frac{1}{2}$  diameters from the end of snout, and 1 apart. Greatest width of the head equal to its length behind the angle of the mouth; upper jaw the longer; the width of the mouth three eighths of the length of the head. Upper surface of the head (except just anterior to the occipital process) covered with skin, the portion in front of the occipital process and the process itself with roughened lines, the latter half longer than wide at its base, anteriorly emarginate to receive the basal bone of the dorsal fin. Scapular process rough but not elongated. Cubito-humeral process as long as the head, sharply pointed posteriorly, and rugose in lines. *Barbels*—the maxillary reaching the base of the pectoral fin, the mandibular to below the hind edge of the eye; the nasal short. *Teeth*—in villiform or cardiform rows in both jaws; in two elliptical patches on the palate, converging anteriorly, and widely asunder along the median line, they consist of pointed ones anteriorly and more granular ones behind. *Fins*—dorsal spine of moderate strength, as long as, or even longer than, the head, finely serrated posteriorly in its upper portion, and also anteriorly along its lower third; length of the base of the adipose dorsal two thirds of that of the rayed fin; pectoral spine stronger





and a little longer than that of the dorsal, denticulated on both edges; caudal forked. Colour—brownish along the back, silvery on the sides.

*Hab.* Deccan, Poona, Tungabhadra and Kistna rivers.

## 22. Genus ARIUS, Cuvier and Valenciennes.

Syn. *Seiades*, sp., and *Ariodes*, Müll. & Trosch.; *Hexanematoichthys*, *Güvritinga*, *Hemiaris*, *Cephalocassis*, *Netuma*, and *Pseudarius*, Bleeker.

✓ Branchiostegals from five to six. Gill-membranes not confluent with the skin of the isthmus, and scarcely or not notched. Head osseous superiorly, or covered with very thin skin. Eyes with free orbital margins. Mouth anterior; upper jaw generally the longer. Anterior and posterior nostrils placed close together, the latter being provided with a valve. Barbels six—one maxillary, and two mandibular pairs. Teeth in the jaws villiform; there are nearly always palatine, and sometimes vomerine teeth, these may be villiform or granular. First dorsal with one spine and seven rays; the adipose of moderate length or short; pectoral spine strong and serrated; ventral fin with six rays, situated behind the vertical from the posterior margin of the rayed dorsal fin; caudal forked or emarginate. An axillary pore. Air-bladder not enclosed in bone.

Considerable stress has been laid in this genus upon the character of the teeth, and whether they are villiform or granular forms a good method of division. Further subdivisions, dependent upon the groups being continuous or not, appear unadvisable, because in some species the size of the patches of palatine teeth increases with age, thus altering their original conformation, and causing one patch to impinge on its neighbour.

There is likewise another question regarding the palatine teeth in these fishes; in *Arius jatinus* there are usually two small patches of palatine teeth widely separated along the median line, but in some specimens they are entirely absent as was stated by Hamilton Buchanan, but subsequently denied by others. Consequently the genus *Hemipimelodus*, Bleeker, has representatives in India, but they are abnormal specimens in which either the palatine teeth were absent from birth, or else have become lost through age. Such species would appear to be amongst those having globular teeth.

✓ The air-bladder is not enclosed in bone, is large, heart-shaped, and internally subdivided into five chambers, which communicate together anteriorly: the front one, which is the largest, occupies the anterior portion; behind this a median septum divides the bladder down the centre, and lateral partitions subdivide the posterior chambers into four. (See *A. gagora*, p. 185.) ✓

The breeding of these fishes is peculiar and deserves attention. The eggs of *Arius* are large, averaging about 0.5 to 0.6 of an inch in diameter, and I have found many males of the genus, and also





of *Osteogobius*, with from 15 to 20 eggs in their mouths. Some of these eggs were in an early stage of development, others nearly ready to be hatched; while in the mouth of one specimen was a hatched fry having the yolk-bag still adherent. The eggs filled the cavity of the mouth and extended far back to the branchia.

In the female organs of generation the eggs seemed to come to maturity in batches of perhaps 50 at a time. On examining the conformation of the ventral fins, those of the females appeared to be larger than those of the males; the rays were thickened by a deposit of fat, whilst the innermost one had a large pad attached to its posterior edge. These fins can be expanded into a cup-like surface, the use of which may be to receive the eggs as extruded, which may be vivified there by the male.

Whether the male carries about these eggs in his mouth until hatched or only removes them when danger is imminent from some spot where he is guarding them is questionable, but in none of the specimens which I examined did I find a trace of food in the intestines of the males which had been engaged in this interesting occupation. ✓

(This has been observed likewise elsewhere by Mr. Boake in Ceylon, and Dr. Hensel has recorded the same of a Brazil species, *A. commersonii*; Dr. Günther of *Arius fissus* from Cayenne; and the same facts have been remarked in other Siluroid fishes.)

✓ *Geographical Distribution.* Seas and estuaries of tropical regions, ascending to within tidal influence or even entering fresh waters. *Arius* appears to be almost as unknown in the Red Sea as the *Sciænidæ*, and probably from the same cause.

*Uses.* As food of an inferior quality. On the western coast of India species of this genus are largely salted and a considerable amount of coarse isinglass is procured for export to China by drying their air-bladders. ✓

### *Synopsis of Indian Species.*

#### A. Villiform teeth on the palate.

A. 19-22. Head  $3\frac{1}{2}$  to  $3\frac{3}{4}$  in total length.

Eye 7 to  $8\frac{1}{2}$  in length of head. Mouth spatulate. One patch of teeth not as large as eye on either side of palate . . .

1. *A. burmanicus*, p. 173.

A. 19. Head  $4\frac{1}{2}$  in total. Eye 6 in length of head. Maxillary barbels reach last third of pectoral fin. Two triangular patches of teeth approximating superiorly. Dorsal spine as long as head.

Dull yellow, fins blackish . . . . .

2. *A. nengra*, p. 173.

A. 19. Head  $4\frac{1}{2}$  to  $4\frac{3}{4}$  in total. Eye 6 to 9 in length of head. Maxillary barbels reach middle of pectoral fin. Two somewhat triangular patches of teeth, approximating anteriorly. Dorsal spine about as long as head . . . . .

3. *A. calatus*, p. 174.





- A. 19. Head  $3\frac{1}{2}$  in total. Eye 7 in length of head. Snout much produced. Maxillary barbels reach hind edge of eye. Teeth in two obliquely ovate diverging patches. Dorsal spine half as long as head ..... 4. *A. acutirostris*, p. 175.
- A. 18-19. Head  $4\frac{1}{2}$  to  $4\frac{1}{2}$  in total. Eye 5 in length of head. Maxillary barbels reach end of head. Palatine teeth in two triangular patches diverging posteriorly. Dorsal spine not so long as head ..... 5. *A. sumatranus*, p. 176.
- A. 18-19. Head  $5\frac{1}{2}$  in total. Eye  $4\frac{1}{2}$  in length of head. Maxillary barbels reach base of pectoral fin. Teeth on palate in triangular patches as large as the eye, as broad as long. Dorsal spine as long as the head behind the angle of the mouth. .... 6. *A. venosus*, p. 176.
- A. 19. Head  $4\frac{3}{4}$  in total. Eye  $5\frac{1}{2}$  in length of head. Maxillary barbels reach the end of the pectoral fin. Palatine teeth in two pear-shaped patches, the small ends forwards and converging, widely diverging posteriorly. Dorsal spine nearly as long as the head ..... 7. *A. parvipinnis*, p. 177.
- A. 17-20. Head  $3\frac{1}{2}$  to 4 in total. Eye 5 to 6 in length of head, and  $2\frac{1}{2}$  to 3 diameters from end of snout. Maxillary barbels do not quite reach the eye. Teeth on the palate in a patch on either side not longer than the eye, and wide asunder. Dorsal spine rather above half as long as head ..... 8. *A. subrostratus*, p. 178.
- A. 17-19. Head  $4\frac{1}{2}$  to  $4\frac{1}{2}$  in total. Eye  $6\frac{1}{2}$  to 7 in length of head. Head very broad; basal bone of dorsal fin large and butterfly-shaped. Maxillary barbels reach middle or end of pectoral spine. Teeth in two confluent patches on either side meeting anteriorly. Dorsal spine as long as the head excluding the snout ..... 9. *A. sagor*, p. 178.
- A. 17. Head 4 in total. Eye 7 to 9 in length of head. Maxillary barbels reach end of head. Palatine teeth on either side in a large triangular patch, emarginate posteriorly, and anteriorly conjoined by a small vomerine patch. Dorsal spine as long as head excluding snout ..... 10. *A. sona*, p. 179.
- A. 16. Head  $5\frac{1}{2}$  in total. Eye  $4\frac{1}{2}$  in length of head. Maxillary barbels reach middle of pectoral fin. Teeth on vomer and palatines in three patches on either side converging in median line anteriorly. Dorsal spine as long as head behind middle of eyes ..... 11. *A. serratus*, p. 180.
- A. 15-17. Head  $4\frac{1}{2}$  to 5 in total. Eye 5 in length of head. Maxillary barbels reach base of pectoral fin. Teeth on





vomer and palatines in three patches on either side joining anteriorly in the median line. Dorsal spine nearly or quite as long as the head ..... 12. *A. thulassinus*, p. 181.

B. Globular teeth on the palate.

- A. 22. Head  $4\frac{3}{8}$  in total. Eye  $7$  to  $8\frac{1}{2}$  in length of head. Maxillary barbels reach first third of pectoral spine. Teeth on palate in two oval patches placed far back. Dorsal spine as long as head behind angle of mouth ..... 13. *A. buehanani*, p. 181.
- A. 18-20. Head  $4$  to  $5$  in total. Eye  $5\frac{3}{8}$  to  $6$  in length of head. Maxillary barbels reach end of head. Teeth on palate in two semi-triangular patches, parallel along median line. Dorsal spine as long as head excluding snout ..... 14. *A. falcarius*, p. 182.
- A. 20. Head  $4\frac{1}{2}$  in total. Eye  $6\frac{1}{2}$  in length of head. Gape of mouth two fifths of length of head. Maxillary barbels as long as head. Teeth on palate in two oval patches well forwards and slightly convergent anteriorly. Dorsal spine as long as head behind angle of mouth ..... 15. *A. malabaricus*, p. 183.
- A. 19. Head  $4$  in total. Eye  $7$  in length of head. Width of gape of mouth four sevenths of length of head. Maxillary barbels reach just beyond base of pectoral. Teeth on palate in a pyriform band, placed well forward, slightly converging anteriorly. Dorsal spine as long as head excluding snout ..... 16. *A. platystomus*, p. 183.
- A. 19. Eyes small, in front half of head . 17. *A. nella*, p. 184.
- A. 18-19. Head  $4$  to  $4\frac{1}{2}$  in total. Eye  $5\frac{1}{2}$  to  $6$  in length of head. Maxillary barbels reach middle of pectoral spine. Teeth on palate in a pyriform band, placed well forwards, and widely divergent posteriorly. Dorsal spine as long as head behind nostrils ..... [p. 184.
18. *A. macronotacanthus*,
- A. 18. Head  $4$  to  $4\frac{1}{2}$  in total. Eye  $7$  to  $8$  in length of head. Maxillary barbels not quite so long as head. Teeth on palate in a large semi-ovate patch on either side. Dorsal spine as long as the post-orbital portion of the head ..... 19. *A. gagora*, p. 185.
- A. 18. Head  $4\frac{1}{2}$  in total length. Eye  $4\frac{1}{2}$  to  $5$  in length of head. Maxillary barbels shorter than head. Teeth in a small ovate patch posteriorly on either side or else absent. Dorsal spine as long as head excluding snout ..... 20. *A. jatus*, p. 186.
- A. 18. Head  $3\frac{1}{2}$  in total. Eye  $7$  in length of head. Maxillary barbels as long as head. Teeth on palate absent (? two pear-shaped globular patches normally). 21. *A. tenuispinis*, p. 187.





- A. 17-18. Head  $4\frac{1}{2}$  in total. Eye 6 in length of head. Maxillary barbels nearly as long as head. Teeth on palate in two convex, oblong ovate patches, rather convergent behind. Dorsal spine as long as head excluding snout..... 22. *A. jella*, p. 187.
- A. 14-16. Head 4 to  $4\frac{1}{2}$  in total. Eye  $6\frac{1}{2}$  in length of head. Maxillary barbels rather longer than head. Teeth on palate in two patches on each side. Dorsal spine as long as head excluding snout ..... 23. *A. dussumieri*, p. 188.

179. (1.) *Arius burmanicus*.

*Arius burmanicus*, Day, P. Z. S. 1869, p. 618, and *Fish. India*, p. 458, pl. cv, fig. 4.

*Nga-kyoung*, Burmese.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 19-22 (4-6/15-16). C. 15.

Length of head  $3\frac{1}{2}$  to  $3\frac{3}{4}$ , of caudal fin 5, height of body 7 in the total length. *Eyes*—without free orbital edges, diameter 7 to  $8\frac{1}{2}$  in the length of head,  $2\frac{1}{2}$  to 3 diameters from the end of snout, and  $1\frac{1}{2}$  to 2 apart. Head depressed, snout spatulate, upper jaw the longer; the greatest width of head equals two fifths of its length, while its height is less. The median longitudinal groove on the head narrow and not extending so far as to the base of the occipital process, which is keeled and rather wider at its base than it is long, while superiorly it reaches a V-shaped basal bone. Upper surface of the head with roughened lines, which are closest together at the posterior end of the median groove and on the occipital process. *Barbels*—short, the maxillary do not quite reach the base of the pectoral fin, the outer mandibular are nearly as long. *Teeth*—those on the palate villiform in two small, oval, obliquely set patches (not so large as the eye) diverging posteriorly. *Fins*—the dorsal half as high again as the body, its spine strong, half as long as the head, and serrated anteriorly and posteriorly; base of adipose dorsal about as long as that of the rayed fin. Pectoral spine of the same length as the dorsal, stronger, serrated on both edges. Ventral nearly reaching the anal. *Colour*—purplish, dashed with copper, becoming dull white on the sides and beneath. Both dorsal fins externally stained with black.

*Hab.* Tidal rivers of Burma; attaining at least a foot in length.

180. (2.) *Arius nenga*. (Fig. 67.)

*Pimelodus nenga*, Ham. Buch. *Fish. Ganges*, pp. 171, 376.

*Arius nenga*, Day, *Fish. India*, p. 458, pl. civ, fig. 3 (see synon.).

*Shingulpetda*, Maráthi.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 19 (6/13). C. 17.

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





length. *Eyes*—diameter 6 in the length of head,  $2\frac{1}{2}$  diameters from the end of snout, and 3 apart. The greatest width of the head exceeds its height by one third, and is one sixth less than its length. Upper jaw the longer, the width of the gape of the mouth

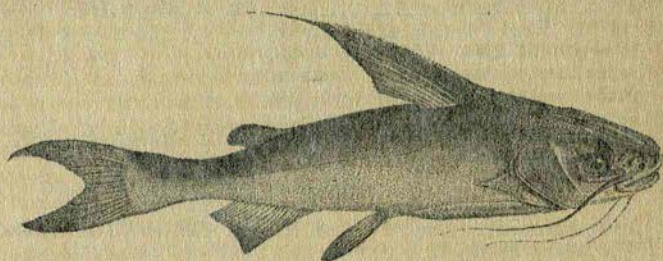


Fig. 67.—*Arius nenga*.

equal to half the length of the head. The median longitudinal groove on the head is shallow anteriorly, but becomes narrow posteriorly and does not quite extend to the base of the occipital process, which is keeled, nearly as broad at its base as it is long; basal bone of dorsal fin narrow and crescent-shaped. Upper surface of the head, almost as far forward as the eyes, and the occipital process studded with coarse granules. *Barbels*—the maxillary pair reach the posterior third of the pectoral fin, whilst the outer mandibular pair are as long as the head. *Teeth*—on the palate villiform in two triangular patches, approximating superiorly and parallel along the median line. *Fins*—dorsal much higher than the body, the dorsal spine strong, as long as the head, and having an elongated soft prolongation, it is granulated anteriorly in its lower half, serrated in its upper, and also posteriorly; base of adipose dorsal nearly as long as that of the rayed fin. Pectoral fin almost reaching the ventral; pectoral spine nearly as long as the head, rough, granulated externally and denticulated internally. Upper caudal lobe the longer. *Colour*—dull yellow, the fins being externally stained with black.

This species is closely allied to *A. calatus*, its maxillary barbel is longer, the dorsal spine more produced, and the colours different. It may be only a variety.

*Hab.* Hooghly at Calcutta. Blyth says this fish attains 12 or 13 inches in length.

### 181. (3.) *Arius calatus*.

*Arius calatus*, *Cuv. & Val. H. N. Poiss.* xv, p. 66; *Day, Fish. India*, p. 459, pl. cv, fig. 5 (see synon.).

B. vi. D.  $1\frac{7}{10}$  | 0. P.  $1\frac{9}{10}$ . V. 6. A. 19 (5-6/13-14). C. 15.

Length of head  $4\frac{1}{2}$  to  $4\frac{3}{4}$ , of caudal fin 5 to 6, height of body  $6\frac{1}{2}$  in the total length. *Eyes*—diameter 6 to 9 in the length of the





head, 2 to  $2\frac{1}{2}$  diameters from the end of snout, and from 3 to 4 apart. Head broader than high, its greatest width being equal to its length behind the nostrils, the width of the mouth equals the postorbital length of the head or a little more. Upper jaw the longer, the angle of the mouth does not extend so far posteriorly as to below the orbit. Upper surface of the head and occipital process strongly granulated, the median longitudinal groove narrow and deep posteriorly and not quite reaching the base of the occipital process, which is a little keeled, as broad at its base as it is long or slightly broader, its anterior extremity slightly concave and extending to the basal bone, which is V-shaped and rather narrow. *Barbels*—the maxillary reach the middle of the pectoral fin, whilst the external mandibular pair are one fifth shorter. *Teeth*—villiform in two somewhat widely separated triangular patches, the vomerine being confluent with the palatine. *Fins*—dorsal spine very strong especially in its lower half, which is granulated both laterally and anteriorly, serrated in its upper portion, also posteriorly in its whole extent, it is nearly or quite as long as the head and has a soft prolongation; base of adipose dorsal shorter than that of the rayed fin, and equal to about half the extent of the interspace between the two fins. Pectoral spine as strong as, but rather shorter than, that of the dorsal, granulated externally, serrated internally. Ventral not reaching the anal. Upper caudal lobe sometimes the longer. *Colour*—bluish along the back and sides, becoming white beneath. Adipose dorsal black, with its inferior and posterior margins yellow. Superior portion of dorsal, the end of the pectoral and ventrals black, as is also the anterior part of the anal.

*Hab.* From Bombay through the Indian Seas to the Malay Archipelago, not uncommon at Calcutta; attaining to a considerable size.

182. (4.) *Arius acutirostris*.

*Arius acutirostris*, Day, *Fish. India*, p. 450, pl. cvii, fig. 1.

B. v. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{10}$ . V. 6. A.  $19\frac{5}{14}$ . C. 17.

Length of head  $3\frac{1}{2}$ , of caudal fin 6, height of body 7 in the total length. *Eyes*—diameter 7 in the length of head,  $3\frac{1}{2}$  diameters from the end of snout, and 2 apart. The greatest width of the head equals about half its length, and is one sixth more than its height. Snout fleshy and elongated, extending some distance beyond the mouth; mouth inferior, the extent of its gape equalling one third of the length of the head. Upper surface of the head granulated, or with roughened lines. Median longitudinal groove on head not extending to the base of the occipital process, which is slightly keeled, is rather longer than wide at its base, and reaches the narrow V-shaped basal bone of the dorsal fin. *Barbels*—short, the maxillary reach beyond the hind edge of the eye; the outer mandibular are about one third of the length of the head; the





inner are shorter. *Teeth*—the villiform band in the premaxillaries is about one third as deep as wide; those on the palate likewise villiform in two somewhat obliquely oval patches diverging anteriorly. *Fins*—dorsal spine rather strong, half as long as the head and serrated on both sides; the base of the adipose fin is two thirds as long as that of the rayed fin. Pectoral spine of about the same length as the dorsal and serrated on both edges; the fin reaches two thirds of the distance to the ventral; the latter does not extend to the anal. *Colour*—upper portion of rayed and upper two thirds of adipose dorsal black; pectoral, ventral, and anal stained grey.

*Hab.* The Salween river at Moulmein in Burma. Tickell observed that this species was one of the commonest fishes in the Moulmein bazaar. It attains a foot or more in length.

183. (5.) *Arius sumatranus*.

*Bagrus sumatranus*, Bennett, *Life of Sir S. Raffles*, p. 691.

*Arius sumatranus*, Day, *Fish. India*, p. 460, pl. cvii, fig. 6 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18-19 (5/13-14). C. 17.

Length of head  $4\frac{1}{2}$  to  $4\frac{3}{4}$ , of caudal fin  $5\frac{1}{4}$ , height of body  $5\frac{1}{2}$  in the total length. *Eyes*—diameter 5 in the length of head,  $1\frac{1}{2}$  diameters from the end of snout, and 2 apart. The greatest width of the head exceeds its height and equals its length behind the angle of the mouth. Upper surface of the head with scattered granulations, which are more lined on the occipital process. Median longitudinal groove narrow posteriorly, nearly reaching the base of the occipital process, the edges in the last portion of the groove are raised. Occipital process slightly keeled, as broad at its base as it is long; basal bone crescent-shaped and narrow. *Barbels*—the maxillary reach end of head, the outer mandibular the base of the pectoral fin. *Teeth*—in palate villiform, in two triangular patches diverging posteriorly. *Fins*—dorsal spine as long as the head behind the angle of the mouth, and serrated on both edges; base of adipose dorsal two thirds of that of the rayed fin. Pectoral spine as long as the head excluding the snout, externally roughened in the lower, serrated in the upper portion, internally denticulated, not reaching the ventral. Ventral extending two thirds of the way to the anal. *Colour*—bluish green above, becoming lighter on the sides and beneath; edges of fins stained gray, very little black on adipose dorsal.

*Hab.* Andamans to the Malay Archipelago.

184. (6.) *Arius venosus*.

*Arius venosus*, Cuv. & Val. *H. N. Poiss.* xv, p. 69; Day, *Fish. India*, p. 460, pl. cvi, fig. 2 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18-19 (5-6/13). C. 17.

Length of head  $5\frac{1}{2}$ , of caudal fin 5, height of body 6 in the total length. *Eyes*—diameter  $4\frac{1}{4}$  in the length of head,  $1\frac{1}{2}$  diameters





from the end of snout, and 2 apart. Snout rather obtuse, and the upper jaw the longer; the width of the gape of the mouth equal to one half the length of the head. The greatest width of the head equal to its length excluding the snout, and slightly exceeding its height. Upper surface of the head with scattered granulations, which are more numerous on the occipital process. Median longitudinal groove on the head shallow except in its posterior portion, which is narrow and deep as far as the base of the occipital process, this is keeled and as broad at its base as it is long. Basal bone V-shaped, and laterally narrow. *Barbels*—the maxillary extend to the base of the pectoral fin, the outer mandibular are shorter. *Teeth*—villiform on the palate, in two triangular patches, the points of which are directed backwards, the patches are about as large as the eye, as broad as long, and approximate somewhat anteriorly. *Fins*—the dorsal as high as the body, its spine rather strong and as long as the head behind the angle of the mouth; anteriorly the spine is serrated in its upper, granulated in its lower half, posteriorly it is serrated; base of adipose dorsal equal to half that of the rayed fin. Pectoral spine as long as that of the dorsal, granulated and serrated externally, denticulated internally. The ventral reaches the anal; upper caudal lobe the longer. *Colour*—bluish.

*Hab.* From Burma to the Malay Archipelago.

185. (7.) *Arius parvipinnis*.

*Arius parvipinnis*, Day, *Fish. India*, p. 460, pl. cxiii, fig. 1 (see synon.).

*Chinta jella*, Tel.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 19 (5/14). C. 18.

Length of head  $4\frac{3}{4}$ , of caudal fin  $4\frac{1}{4}$ , height of body 6 in the total length. *Eyes*—in anterior half of the head, diameter  $5\frac{3}{4}$  in the length of the head,  $1\frac{3}{4}$  diameters from the end of snout, and 3 apart. Greatest width of the head equal to its length behind the nostrils, and exceeding its height by one fourth. Upper jaw somewhat the longer; the width of the gape of the mouth equal to that of the postorbital length of the head. Upper surface of the head and occipital process studded with coarse granulations. Median longitudinal groove on head well marked, lanceolate, its last portion deep and not extending so far as the base of the occipital process, which has a granulated keel along its centre, is as long as wide, and reaches a narrow crescentic basal bone. *Barbels*—the maxillary reach the end of the pectoral fin. *Teeth*—villiform in two pear-shaped crescentic patches placed well forwards, diverging, and their small end anterior. *Fins*—dorsal spine strong, laterally roughened, serrated anteriorly in its upper half, also posteriorly, as long as the head behind the angle of the mouth. Pectoral spine stronger than the dorsal, of the same length, and serrated on both edges, it reaches two thirds of the distance to





the ventral; the latter is very small, a little above half as long as the pectoral, and does not reach the anal. Caudal deeply lobed, with its upper lobe rather produced. *Colour*—on the upper surface dull leaden, sides and abdomen whitish, adipose dorsal with a black blotch; pectoral, ventral, and outer half of anal dark.

*Hab.* Coromandel coast of India.

186. (8.) *Arius subrostratus*.

*Arius subrostratus*, *Cuv. & Val. H. N. Poiss.* xv, p. 62; *Day, Fish. India*, p. 461, pl. cvi, fig. 6 (see synon.).

B. vi. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{9}$ . V. 6. A. 17–20 (5–6/12–14). C. 17.

Length of head  $3\frac{1}{2}$  to 4, of caudal fin 6 to 7, height of body 5 in the total length. *Eyes*—diameter 5 to 6 in length of head,  $2\frac{1}{2}$  to 3 diameters from the end of snout, and 2 to  $2\frac{1}{2}$  apart. The greatest width of the head rather exceeds its height and equals four sevenths of its length. Snout elongated and a little depressed, the upper jaw the longer, the width of the gape equals two sevenths of the length of the head, cleft short, extending one third of the distance to the orbit; median longitudinal groove on the head shallow, anteriorly becoming narrow, and posteriorly deep, extending nearly to the base of the occipital process. Upper surface of the head behind the middle of the orbit granulated, as is also the occipital process, which is rather wider at its base than it is long, has nearly straight lateral edges, and reaches the narrow basal bone of the dorsal fin. *Barbels*—short, the maxillary pair do not quite reach the eye, the outer mandibular are still shorter, and the internal the shortest. *Teeth*—those on the palate villiform, in two small patches wide asunder, one on either side of the palate, not longer than the diameter of the eye. *Fins*—dorsal one fourth higher than the body, its spine not very strong, rather above half as long as the head, rugose anteriorly, serrated posteriorly; length of the base of the adipose dorsal equal to two thirds of that of the rayed fin. Pectoral scarcely reaching the ventral; pectoral spine as long as that of the dorsal, or a little longer, serrated internally. Ventral reaching the anal; caudal forked. *Colour*—silvery leaden along the back when fresh, a series of about fifteen minutely spotted vertical bands seen on the body. Fins stained with grey.

*Hab.* Malabar coast of India; attaining to a foot in length.

187. (9.) *Arius sagor*.

*Pimelodus sagor*, *Ham. Buch. Fish. Ganges*, pp. 169, 376.

*Arius sagor*, *Day, Fish. India*, p. 461, pl. cv, fig. 1 (see synon.).

B. vi. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{10}$ . V. 6. A. 17–19 (3–4/14–15). C. 15.

Length of head  $4\frac{1}{2}$  to  $4\frac{3}{4}$ , of caudal fin 5 to 6, height of body 5 in the total length. *Eyes*—diameter  $6\frac{1}{2}$  to 7 in the length of head, 2 diameters from end of snout, and  $3\frac{1}{2}$  apart. Head depressed, much broader than high, its width equal to its length or a little





less. Upper jaw the longer, the width of the gape of the mouth half the length of the head. The median longitudinal groove on the head shallow, extending to a little behind the posterior edge of the eye. Upper surface of the head granulated in radiating lines. Occipital process one half wider at its base than it is long, its posterior extremity rounded where it meets the basal bone of the dorsal fin, which is large and somewhat butterfly-shaped. *Barbels*—the maxillary reach to the middle or end of the pectoral spine, the outer mandibular to its base or middle. *Teeth*—on the palate in two confluent villiform patches on either side, meeting in the mesial line, each of these patches has a convex inner edge. *Fins*—dorsal higher than the body, the spine strong and as long as the head excluding the snout, granulated or serrated anteriorly, serrated posteriorly; the base of the adipose nearly as long as that of the rayed fin. Pectoral spine stronger than that of the dorsal and equally long, serrated externally along its outer fourth and denticulated internally, its outer ray often prolonged. Ventral nearly reaching the anal. Upper caudal lobe the longer. *Colour*—greenish brown, becoming lighter on the abdomen; some specimens have narrow vertical bands of spots on the body. Fins tinged with dark.

*Hab.* From Bombay through the seas and estuaries of India to the Malay Archipelago. Said to be very common at Batavia, where it is largely consumed. This species attains to at least 3 feet in length.

188. (10.) *Arius sona*.

*Pimelodus sona*, *Ham. Buch. Fish. Ganges*, pp. 172, 376.

*Arius sona*, *Day, Fish. India*, p. 462, pl. cv, fig. 2 (see synon.).

B. vi. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{12}$ . V. 6. A.  $1\frac{1}{7}$  (6/11). C. 17.

Length of head 4, of caudal fin 5 to 6, height of body 6 in the total length. *Eyes*—diameter 7 to 9 in the length of head,  $2\frac{1}{2}$  to 3 diameters from end of snout, and  $3\frac{1}{2}$  to  $4\frac{1}{2}$  apart. Head one half broader than high, and almost as wide as long. Upper jaw the longer; the extent of the gape of the mouth equal to two thirds of the length of the head. Median longitudinal groove on the head wide, but not extending so far as the base of the occipital process; the latter keeled, convex at its posterior extremity where it reaches the basal bone of the dorsal fin which is somewhat narrow, especially in its centre, while each side is slightly bent into an S-shaped form. The occipital process is as wide at its base as it is long or rather wider; it and also the crown of the head from behind the eyes are granulated, these granulations have somewhat of a radiating direction. *Barbels*—the maxillary reach to the end of the head, the outer mandibular are shorter. *Teeth*—on palate villiform, those on each palatine in a large somewhat triangular patch which is emarginate posteriorly, anteriorly two small patches on the vomer connect the two palatine ones together. *Fins*—dorsal spine strong, granulated anteriorly, serrated posteriorly, and as long as the head excluding the snout, but not so high as the





rays, which are higher than the body; length of the base of the adipose dorsal equal to that of the rayed fin. Pectoral spine stronger and usually slightly shorter than that of the dorsal, rough externally, sometimes even with a few serrations near its tip, serrated internally. Ventrals not reaching the anal. Caudal forked. *Colour*—brownish above, bluish on the sides where it is glossed with gold, and of a dull white beneath. Fins with a bluish-black tinge. Young specimens are of a brownish colour, superiorly glossed with purplish and yellow, the fins nearly black.

*Hab.* From Bombay through the seas of India, entering estuaries and tidal rivers; attaining at least 3 feet in length.

189. (11.) *Arius serratus*.

*Arius serratus*, Day, *Fish. India*, p. 462, pl. cv, fig. 3.

B. vi. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{10}$ . V. 6. A. 16 (5/11). C. 17.

Length of head  $5\frac{1}{4}$ , of caudal fin  $4\frac{1}{2}$ , height of body  $5\frac{3}{4}$  in the total length. *Eyes*—diameter  $4\frac{1}{2}$  in the length of head,  $1\frac{1}{4}$  diameters from end of snout, and 2 apart. The greatest width of the head equals its length behind the angle of the mouth. Upper jaw the longer, the width of the gape of the mouth equal to half the length of the head. Upper surface of the head granulated or with rough lines, most distinct on the occipital process. The median longitudinal groove on the head does not quite reach posteriorly to above the hind edge of the opercle; from the groove commences a serrated ridge, which is continued along the occipital process. Occipital process with a serrated keel, a little longer than wide at its base. Basal bone narrow and crescent-shaped. *Barbels*—the maxillary reach to the middle of the pectoral fin, the outer mandibular to the gill-opening. *Teeth*—in the palate villiform in three distinct patches on either side, the two vomerine patches round, small, and with an interspace between them, outside each there is another rather longer oval patch; the third or posterior patch is parallel to the one on the opposite side. *Fins*—dorsal higher than the body; its spine, which is serrated on both edges, is as long as the head behind the middle of the eyes, and has a soft termination; the length of the base of the adipose half that of the rayed fin. Pectoral reaching rather above halfway to the ventral; pectoral spine stronger than that of the dorsal, but not quite so long; externally the former is rough in its lower, serrated in its outer half, internally it is denticulated. The ventral does not reach the anal. Upper caudal lobe the longer. *Colour*—upper surface of the head copper-coloured shot with gold, sides silvery. Fins yellowish, rayed dorsal stained with dark in its outer half; adipose fin with a black spot; a dark band, edged with white, along the outer half of the anal; both caudal lobes dark at their extremities.

This fish is nearly allied to *A. thalassinus*, but has much shorter pectoral fins and longer maxillary barbels. Whether the serrations along the occipital ridge are merely due to the specimen being young is questionable.

*Hab.* Sind.



190. (12.) *Arius thalassinus*.

*Bagrus thalassinus*, Rüpp. *N. W. Fische*, p. 75, t. 20, fig. 2.

*Arius thalassinus*, Day, *Fish. India*, p. 463, pl. civ, fig. 4, and pl. cvi, fig. 1 (see synon.).

B. vi. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{12}$ . V. 6. A. 15-17 (3-5/12-13). C. 17.

Length of head  $4\frac{1}{2}$  to 5, of caudal fin 5, height of body  $5\frac{1}{2}$  to 6 in the total length. *Eyes*—longest diameter obliquely transverse, 5 in the length of the head,  $1\frac{1}{2}$  to  $1\frac{3}{4}$  diameters from end of snout, and  $2\frac{1}{2}$  to 3 apart. Width of head equal to its length behind the angle of the mouth, breadth exceeding the height. Upper surface of the head granulated; the median longitudinal groove, which is narrow posteriorly, extends to opposite the hind edge of the opercle. The occipital process is granulated, keeled, rather longer than wide at its base, and extends to the basal bone of the dorsal fin, which is small and crescentic in shape. *Barbels*—the maxillary extend nearly or quite to the base of the pectoral fin, the outer mandibular are a little shorter. *Teeth*—on the palate villiform, those of each side forming a triangle composed of three patches, two in front and a larger one behind. *Fins*—dorsal spine as long as the head without the snout, or even a little longer, granulated anteriorly (with some serrations in the young), serrated posteriorly; base of adipose dorsal two fifths of that of the rayed fin. Pectoral spine strong, but a little shorter than the dorsal, rough externally, feebly serrated internally; caudal with the upper lobe usually the longer. *Colour*—silvery, darkest superiorly; the upper half of the adipose dorsal black. In some specimens the dorsal surface is of a rich brown, and each of the granules on the head appears to be tipped with gold.

*Hab.* From the Red Sea, through the seas of Africa and India to the Malay Archipelago and beyond, entering tidal rivers. Attains a large size.

191. (13.) *Arius buchanani*.

*Pimelodus arius*, Ham. *Buch. Fish. Ganges*, pp. 170, 376.

*Arius buchanani*, Day, *Fish. India*, p. 463, pl. cv, fig. 6.

B. vi. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{10}$ . V. 6. A. 22 (6/16). C. 17.

Length of head  $4\frac{3}{4}$ , of caudal fin  $5\frac{1}{2}$ , height of body  $5\frac{3}{4}$  in the total length. *Eyes*—diameter  $5\frac{1}{2}$  in the length of head,  $1\frac{3}{4}$  diameters from end of snout, and  $2\frac{1}{4}$  apart. Greatest width of the head equal to its length behind the angle of the mouth. Upper jaw the longer, width of gape of mouth three eighths of the length of the head. Median longitudinal groove on the head rather shallow, and not reaching the base of the occipital process. Upper surface of the head lined in roughened lines, which are rather close together on the occipital process; the latter is scarcely keeled, and as wide at its base as it is long. Opercle higher than wide. *Barbels*—the maxillary extend to the first third of the pectoral fin, the outer mandibular almost to its base. *Teeth*—on the palate in two oval patches, one on either side, each as large as the eye, placed far back and parallel to one another, the teeth have large globular





heads. *Fins*—dorsal higher than the body, its spine as long as the head behind the angle of the mouth, anteriorly roughened in its lower two thirds, and serrated in its upper, posteriorly very feebly serrated; base of the adipose dorsal three fourths of that of the rayed fin. Pectoral reaching the base of the ventral, the spine stronger than that of the dorsal but of equal length, serrated on both sides. Ventral almost reaching the anal; upper caudal lobe the longer. *Colour*—silvery along the back, lighter on the sides and below, pectoral and dorsal edged posteriorly with blackish; adipose dorsal with a well-defined black spot.

*Hab.* Hooghly at Calcutta; also in Burma.

192. (14.) *Arius falcarius*.

*Arius falcarius*, Richardson, *Voy. Sulphur, Ich.* p. 134, pl. lxii. figs. 7-9; Day, *Fish. India*, p. 463, pl. cvi, fig. 5 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18-20 (5-6/13-14). C. 17.

Length of head 4 to 5, of caudal fin 6, height of body  $5\frac{1}{2}$  to 6 in the total length. *Eyes*—diameter  $5\frac{1}{2}$  to 6 in the length of head,  $2\frac{1}{2}$  diameters from end of snout, and 3 to  $3\frac{1}{2}$  apart. The greatest width of the head equals its length behind the angle of the mouth, and exceeds its height by about one sixth. Upper jaw the longer, the width of the gape of the mouth equal to three sevenths of the length of the head. The median longitudinal groove on the head, which is wide anteriorly, becomes suddenly narrow midway between the front edge of the eye and the hind edge of the opercle, and does not quite reach the base of the occipital process, which is keeled, rather longer than wide at its base, and reaches the basal bone of the dorsal fin, which is V-shaped, narrow, and short. Upper surface of the head behind the eyes (except in the groove) strongly granulated, as is also the occipital process. *Barbels*—the maxillary pair, which are black, reach to the hind edge of the head, the outer mandibular to the gill-opening, while the inner are shorter. *Teeth*—the villiform band in the premaxillaries four times as long as wide; those on the palate granular anteriorly, becoming globular posteriorly, in two elongated subtriangular patches, longer than wide, parallel to one another along the median line, their external edge is convex, anteriorly they nearly reach the premaxillary teeth. *Fins*—dorsal higher than the body, its spine usually ending in a soft point, it equals the length of the head excluding the snout, anteriorly it is serrated in its upper, rough in its lower half, and serrated posteriorly; the base of the adipose fin equals three sevenths of that of the rayed fin. Pectoral spine a little longer than the dorsal, serrated externally in its outer half, rough in its lower; externally it is denticulated; it nearly reaches the ventral, whilst the latter extends to the anal or even to as far as the third ray of that fin. *Colour*—bluish grey above, becoming dull white beneath; fins greyish, dorsal black-tipped; a black blotch on the adipose dorsal, and sometimes one on the anal.

*Hab.* Calcutta, and seas of India, to China. Very numerous along the Malabar coast.



193. (15.) *Arius malabaricus*.

*Arius malabaricus*, Day, *Fish. India*, p. 464, pl. cvii, fig. 4.

B. vi. D.  $1/7$  | 0. P.  $1/10$ . V. 6. A.  $20$  ( $6/14$ ). C. 17.

Length of head  $4\frac{1}{2}$ , of caudal fin  $5\frac{1}{2}$ , height of body 5 in the total length. *Eyes*—diameter  $6\frac{1}{2}$  in the length of head,  $2\frac{1}{2}$  diameters from the end of snout, and  $3\frac{1}{2}$  apart. The greatest width of the head equals its length behind the nostrils, it is rather wider than high. Upper jaw the longer, the width of the gape of the mouth equals two fifths of the length of the head. Upper surface of the head sparingly granulated. The median longitudinal groove on the head commences opposite the hind edge of the eyes, it is very narrow and deep, and is continued nearly to the base of the occipital process, which latter is slightly keeled and granulated, as broad at its base as it is long, and emarginate posteriorly to receive the V-shaped basal bone of the dorsal fin. *Barbels*—the maxillary pair black and as long as the head, the outer mandibular pair rather shorter. *Teeth*—in the upper jaw one fourth as wide as long, those on the palate granular and in two elongated oval patches which reach far forwards, and are slightly convergent anteriorly, they extend some distance posteriorly. *Fins*—dorsal spine of moderate strength, as long as the head behind the angle of the mouth, anteriorly granulated in its lower, serrated in its upper portion, posteriorly serrated; base of soft dorsal rather short. Pectoral spine nearly as long as the head, denticulated internally, and extending to below the last dorsal ray. Ventral not quite reaching the anal. *Colour*—silvery, glossed with gold below; adipose dorsal with a black spot in its upper half.

*Hab.* Canara.

194. (16.) *Arius platystomus*.

*Arius platystomus*, Day, *Fish. India*, p. 464, pl. cvii, fig. 3.

B. vi. D.  $1/7$  | 0. P.  $1/10$ . V. 6. A.  $19$  ( $5/14$ ). C. 17.

Length of head 4, of caudal fin  $5\frac{1}{2}$ , height of body 5 in the total length. *Eyes*—diameter 7 in the length of head, 2 diameters from the end of snout, and 4 apart. The greatest width of the head exceeds its height by one third, and is as long as the head without the snout. Upper jaw the longer; the width of the gape of the mouth equal to four sevenths of the length of the head. Median longitudinal groove on head becoming narrow posteriorly, where it just reaches the base of the occipital process, which is strongly keeled, rather longer than wide at its base, with straight lateral edges, and extending to the basal bone of the dorsal fin, which is rather narrow and S-shaped. A very few scattered granulations over the posterior half of the head and the occipital process. *Barbels*—the maxillary reach just beyond the base of the pectoral, the outer





mandibular are not quite so long. *Teeth*—the villiform band in the premaxillaries is six times longer than wide; obtusely conical in the palate in two pyriform patches, rather longer than broad, each placed well forward, and largest anteriorly where the two slightly converge, the interspace equal to two thirds of the diameter of the eye. *Fins*—the dorsal about as high as the body, its spine as long as the head excluding the snout, anteriorly its upper half is serrated, its lower roughened, the whole is serrated posteriorly: the length of the base of the adipose dorsal nearly equals that of the rayed fin. Pectoral spine rather shorter than the dorsal, externally serrated in its anterior, rough in its posterior half, internally it is denticulated, it reaches three fourths of the distance to the ventral. The ventral just reaches the anal. *Colour*—bluish along the back, becoming lighter on the sides and beneath; dorsal, pectoral, and ventral with a slight tinge of grey. No black mark upon the adipose dorsal.

*Hab.* Canara.

195. (17.) *Arius nella*.

*Pimelodus* (?) *nella*, Cuv. & Val. *H. N. Poiss.* xv, p. 162.

*Arius nella*, Day, *Fish. India*, p. 465 (see *synon.*).

*Nallah jellah*, Tel.

D. 1/7 | 0. P. 1/10. V. 6. A. 19. C. 19.

Head broad, depressed. *Eyes*—small, in front half of the head. *Teeth*—on palate, globular. *Barbels*—the maxillary reach to the middle of pectoral fin. *Fins*—caudal subtruncate. *Colour*—head and back bluish leaden; belly, throat, and hinder part of the tail a dull white. The whole trunk strewn with small, obscure, dusky dots. Dorsal, ventral, and anal with blackish margins. Pectoral and caudal glossy with a faint yellowish tinge.

This fish has been placed by Cuvier and Valenciennes amongst those having no teeth in the palate, in consequence of their having misunderstood Russell's description.

*Hab.* Coromandel coast; growing to 9½ inches in length.

196. (18.) *Arius macronotacanthus*.

*Arius macronotacanthus*, Bleeker, *Atl. Ich.* ii, p. 32, t. 55; Day, *Fish. India*, p. 465, pl. cxiii, fig. 1 (see *synon.*).

B. vi. D. 1/7 | 0. P. 1/9. V. 6. A. 18–19 (6–7/12–13). C. 15.

Length of head 4 to 4½, of caudal fin 6½, height of body 5½ in the total length. *Eyes*—diameter 5¼ to 6 in the length of head, 1½ diameters from end of snout, and 2½ apart. The width of the head exceeds its height, and equals its length excluding the snout. Extent of the gape of the mouth equal to four ninths of the length of the head. The median longitudinal groove is wide between the eyes, becomes pointed both anteriorly and posteriorly, and does not





reach so far as the base of the occipital process, which latter is as wide at its base as it is long, and reaches a narrow V-shaped basal bone. Upper surface of the head granulated in groups, the occipital process densely so in lines. *Barbels*—the maxillary reach the middle of the pectoral spine, the outer mandibular its base. *Teeth*—on the palate obtusely conical or granular, placed in two pear-shaped patches, each as long as the eye, the large ends posterior and divergent, the anterior terminating near the band on the premaxillaries. *Fins*—dorsal spine strong, very rugose laterally, as long as the head behind the nostrils, and serrated both anteriorly and posteriorly, it has a soft termination; the length of the base of the adipose equals two thirds of that of the rayed fin. Pectoral spine as long as the head excluding the snout, roughened and serrated externally, denticulated internally, it reaches two thirds the distance to the ventral, which does not reach the anal. *Colour*—base of dorsal darkish, a large black blotch on the adipose fin.

*Hab.* India to Java, Sumatra, and Pinang.

197. (19.) *Arius gagora*.

*Pimelodus gagora*, Ham. Buch. *Fish. Ganges*, pp. 167, 376, pl. 10, fig. 54.

*Arius gagora*, Day, *Fish India*, p. 465, pl. cvii, fig. 2 (see synonym.).

*Nga-youn*, Burmese.

B. vi. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{10}$ . V. 6. A. 18 (5-6/13-12). C. 17.

Length of head 4 to  $4\frac{1}{4}$ , of caudal fin  $5\frac{1}{2}$  to  $5\frac{3}{4}$ , height of body  $6\frac{1}{2}$  in the total length. *Eyes*—diameter 7 to 8 in the length of head,  $2\frac{1}{2}$  diameters from the end of snout, and 3 to  $3\frac{1}{2}$  apart. Head one fourth wider than high, its width equal to its length excluding the snout. Upper jaw the longer, the width of the gape of the mouth four elevenths of the length of the head. Most of the occiput and the whole of the occipital process granulated. Median longitudinal groove on the head narrow, rather deep, and reaching nearly to the base of the occipital process, which is keeled, very slightly longer than wide at its base and extending to a narrow V-shaped basal bone. Opercle higher than wide. *Barbels*—the maxillary not quite so long as the head, the outer mandibular reach the gill-opening. *Teeth*—those on the palate with globular heads, in large semi-ovate patches; considerable variation in size and direction of these patches of teeth exists, as it not unfrequently happens that some are wanting. *Fins*—dorsal rather higher than the body, the spine of moderate strength, anteriorly serrated in its upper, rough in its lower half, posteriorly serrated, it is as long as the postorbital portion of the head; length of the base of the adipose dorsal two thirds of that of the rayed fin. Pectoral reaching two thirds of the distance to the ventral; pectoral spine rather stronger than the dorsal, which it equals in length, externally it is serrated, internally denticulated. The ventral does not extend so far as the anal.





Upper caudal lobe the longer. *Colour*—purplish superiorly, becoming dull white beneath; fins externally stained with grey or black, and a blackish spot on the adipose dorsal. *Air-bladder*—large and somewhat heart-shaped. On removing its lower wall a longitudinal septum is seen in its posterior half but not anteriorly. It has three transverse subdivisions, forming it into five chambers, the anterior of which is nearly half the size of the entire organ, and has no longitudinal septum. The four lateral chambers communicate freely with each other on both sides, also anteriorly with the large chamber.

*Hab.* Seas, estuaries, and tidal rivers of Orissa and Bengal to Siam. It attains  $1\frac{1}{2}$  feet (or according to Hamilton Buchanan 3 feet) or more in length; it is commonly seen about 8 or 10 inches long.

198. (20.) *Arius jatus*.

*Pimelodus jatus*, *Ham. Buch. Fish. Ganges*, pp. 171, 376.

*Arius jatus*, *Day, Fish. India*, p. 466, pl. cvi, fig. 4 (see synon.).

*Nga-youn* and *Nga-yeh*, Burmese.

B. vi. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{10}$ . V. 6. A. 18 (5/13). C. 17.

Length of head  $4\frac{1}{4}$ , of caudal fin 5, height of body  $5\frac{1}{4}$  in the total length. *Eyes*—diameter  $4\frac{1}{2}$  to 5 in the length of head,  $1\frac{1}{2}$  diameters from the end of snout, and  $1\frac{3}{4}$  to 2 apart. Height of head nearly equal to its width, the latter equal to its length excluding the snout. Upper jaw the longer; the extent of the gape of the mouth equals one third of the length of the head. Summit of the posterior portion of the head sparingly granulated, the occipital process more thickly so. The median longitudinal groove on the head narrow, and continued almost to the base of the occipital process, which latter is keeled, as wide at its base as long, and reaches the narrow V-shaped basal bone of the dorsal fin. Opercle wider than high. *Barbels*—short, the maxillary pair shorter than the head, the outer mandibular pair just reach the gill-opening. *Teeth*—villiform, in a band six times as long as wide in the premaxillaries; on the palate globular, in a small oval patch posteriorly, scarcely exceeding half the diameter of the eye; they may be entirely absent. *Fins*—dorsal as high as the body; dorsal spine strong, as long as the head excluding the snout, serrated on both sides; the base of the adipose dorsal four fifths of that of the rayed fin. Pectoral spine as long as that of the dorsal, serrated externally, denticulated internally, reaching as far as the ventral fin. The latter extends to the anal. *Colour*—dark bluish along the back, becoming lighter on the sides and beneath. Fins yellowish, lower half of dorsal stained with grey. Upper edge deep black. A deep black spot on the upper half of the adipose fin; caudal edged with black, and anal with a dark spot on its edge near the middle.

*Hab.* Estuaries and rivers of Bengal and Burma, ascending far above tidal reach, and attaining a foot or more in length.



199. (21.) *Arius tenuispinis*.

*Arius tenuispinis*, Day, *Fish. India*, p. 466, pl. cvii, fig. 5 (see synon.).

B. vi. D.  $1/7$  | 0. P.  $1/10$ . V. 6. A. 18 (5/13). C. 17.

Length of head  $3\frac{1}{2}$ , of caudal fin  $4\frac{1}{2}$ , height of body  $5\frac{1}{2}$  in the total length. *Eyes*—diameter 7 in the length of head,  $2\frac{1}{2}$  diameters from end of snout, and  $3\frac{1}{2}$  apart. The greatest width of the head equals its length excluding the snout. The extent of the gape of the mouth equal to one third of the length of the head. Median longitudinal groove on the head narrow, and not quite reaching the base of the occipital process, which has a slight keel, is a little longer than wide at its base, and rather convex posteriorly, where it reaches the narrow and V-shaped basal bone of the dorsal fin. A few granulations on the top of the head, also along the middle of the occipital process. *Barbels*—the maxillary reach the end of the head, the outer mandibular are one third shorter. *Teeth*—none on palate. *Fins*—dorsal spine very weak and thin, nearly as long as the head excluding the snout, serrated posteriorly; base of the adipose equal to half that of the rayed dorsal fin. Pectoral spine as long as the dorsal, but slightly stronger, roughened externally, serrated internally. Caudal forked. *Colour*—silvery along the back, becoming lighter on the sides and beneath.

*Hab.* Bombay, and perhaps Ceylon.

200. (22.) *Arius jella*.

*Arius jella*, Day, *Fish. India*, p. 467, pl. cvi, fig. 3 (see synon.).

*Deddi jellah*, Tel.

B. vi. D.  $1/7$  | 0. P.  $1/10$ . V. 6. A. 17–18 (4–5/13). C. 19.

Length of head  $4\frac{1}{2}$ , of caudal fin  $5\frac{1}{2}$ , height of dorsal fin  $5\frac{1}{3}$ , of body  $6\frac{1}{3}$  in the total length. *Eyes*—diameter 6 in the length of head, 2 to  $2\frac{1}{2}$  diameters from the end of snout, and 3 apart. Greatest width of the head one sixth more than its height, and equal to its length behind the nostrils. Upper jaw the longer, the extent of the gape of the mouth three eighths of the length of the head. The median longitudinal groove becomes narrow and deep posteriorly, and reaches nearly to the base of the occipital process, which is slightly keeled, has nearly straight sides and is slightly longer than broad, posteriorly it is a little emarginate and reaches the narrow basal bone of the dorsal fin. Most of the occiput and the occipital process are closely granulated. *Barbels*—the maxillary are nearly as long as the head, the outer mandibular almost reach the gill-opening, the inner are shorter. *Teeth*—globular on the palate in two convex, oblong-ovate patches, which are slightly convergent behind; none on the vomer. *Fins*—dorsal spine of moderate strength, as long as the head excluding the snout, sometimes with a very long soft termination, slightly serrated anteriorly, or merely rough in large specimens, strongly serrated posteriorly.





Pectoral spine stronger than dorsal and rather longer, roughened and slightly serrated externally, denticulated internally. Base of adipose dorsal slightly shorter than that of the rayed fin. Ventral scarcely reaching the anal. Upper caudal lobe the longer. *Colour*—greyish silvery, becoming white on the sides and below. Fins stained grey, with a white outer edge to the anal. Adipose dorsal with a dark blotch.

*Hab.* Coasts of India.

### 201. (23.) *Arius dussumieri*.

*Arius dussumieri*, Cuv. & Val. *H. N. Poiss.* xv, p. 84; *Day, Fish. India*, p. 467, pl. cvii, fig. 7 (see synonym.).

B. vi. D.  $1\frac{7}{7}$  | 0. P.  $1\frac{1}{12}$ . V. 6. A. 14–16 (4–5/10–11). C. 17.

Length of head 4 to  $4\frac{1}{2}$ , of caudal fin 5, height of body 5 in the total length. *Eyes*—diameter  $8\frac{1}{2}$  in the length of head,  $2\frac{1}{2}$  diameters from the end of snout, and 4 apart. Head one fourth wider than high, its width equals its length excluding the snout, or even behind the angle of the mouth. Upper jaw the longer, the width of the gape of the mouth equals four ninths of the length of the head. Median longitudinal groove shallow, becoming most distinct posteriorly, where it reaches the base of the occipital process, which is strongly keeled and nearly (or quite) as wide at its base as it is long, its lateral edges are nearly straight, and it extends to the basal bone, which is narrow and S-shaped. A few scattered granulations on the posterior portion of the head and over the base of the occipital process. *Barbels*—the maxillary reach just beyond the base of the pectoral, the external mandibular are not quite so long. *Teeth*—obtusely conical on the palate, in four widely separated patches, those on either side of the vomer being smaller than the palatine patches. *Fins*—the dorsal as high as the body, its spine as long as the head excluding the snout, anteriorly in the upper half serrated, in the lower roughened, posteriorly serrated throughout; the length of the base of the adipose dorsal equals half of that of the rayed fin. Pectoral spine rather shorter than that of the dorsal, externally it is serrated in its anterior half, rough in its posterior, internally it is serrated; it reaches two thirds of the way to the ventral. Ventral just reaching the anal. *Colour*—bluish along the back, becoming lighter on the sides and below, fins blackish externally.

*Hab.* Malabar coast of India and Ceylon.

### 23. Genus *KETENGUS*, Bleeker.

Branchiostegals five. Gill-membranes united, not confluent with the isthmus, but having a free posterior edge, which is notched. Upper surface of head osseous. Eyelids with a free circular margin. Cleft of mouth deep; upper jaw the longer. Barbels six, small, no nasal ones. Nostrils approximating, the





posterior provided with a valve. A single row of compressed teeth, which are subtruncated or almost tricuspid in the jaws; palate edentulous. Dorsal fin with one spine and seven rays, inserted nearer the snout than the ventrals are; adipose fin short; anal of moderate length and not continuous with the caudal, which latter is forked. Ventral with six rays. Air-bladder not enclosed in bone. An axillary pore.

*Geographical Distribution.* Andamans to the Malay Archipelago.

202. (1.) *Ketengus typus*. (Fig. 68.)

*Ketengus typus*, Bleeker, *Atl. Ich.* ii, p. 44, t. 82, fig. 1; Day, *Fish. India*, p. 468, pl. cviii, fig. 2 (see synonym.).

B. v. D.  $1\frac{1}{7}$  | 0. P.  $1\frac{1}{7}$ -8. V. 6. A. 19-20 (5-6/14). C. 15.

Length of head  $4\frac{1}{4}$ , of caudal fin  $5\frac{1}{4}$ , height of body  $5\frac{1}{4}$  in the total length. *Eyes*—diameter  $5\frac{1}{4}$  in the length of head,  $1\frac{1}{4}$  diameters from end of snout, and  $2\frac{1}{2}$  apart. The greatest width of the head equals its length excluding the snout. Upper surface of the head, occipital process, and basal bone of the dorsal fin densely granulated.

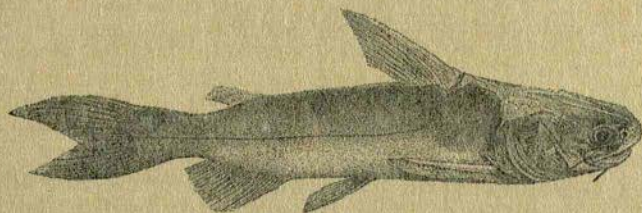


Fig. 68.—*Ketengus typus*.

The width of the gape of the mouth equals the length of the head excluding the snout. Longitudinal groove along the upper surface of the head deep but narrow, commencing on the snout it is not continued so far as to the base of the occipital process which is as long as wide at its base. *Teeth*—as defined in the genus. *Fins*—dorsal spine as long as the head and serrated on both edges; base of the adipose nearly as long as that of the rayed fin. Pectoral spine a little shorter than that of the dorsal and serrated on both edges. *Colour*—silvery.

*Hab.* The Andamans to the Malay Archipelago.

24. Genus **OSTEOGENIOSUS**, Bleeker.

Branchiostegals five. Gill-membranes united at the throat, emarginate and overlapping the isthmus but not confluent with it; upper surface of the head covered with very thin skin; mouth anterior; upper jaw the longer. Nostrils approximating, the posterior provided with a valve. Barbels, a single semi-osseous maxillary pair. Teeth in the jaws villiform; obtusely conical on



the palate, where they form two widely separated patches. Dorsal with one spine and seven rays, inserted anteriorly to the ventrals; adipose fin short. Anal of moderate length, not united with the caudal, which is forked. Ventral with six rays. Air-bladder not enclosed in bone. An axillary pore.

*Geographical Distribution.* Seas and estuaries of India to the Malay Archipelago, sometimes entering rivers.

*Uses.* Eaten by the poorer classes. A coarse isinglass is made from the air-bladder.

*Synopsis of Indian Species.*

- A. 19-22. Length of head  $4\frac{1}{4}$  to  $4\frac{1}{2}$  in the total length. Greatest width of head equals its length behind the angle of the mouth ..... 1. *O. militaris*, p. 190.  
 A. 20. Length of head  $4\frac{3}{4}$  in the total length. Greatest width of head equals half its length ..... 2. *O. stenocephalus*, p. 191.

203. (1.) *Osteogeniosus militaris*. (Fig. 69.)

*Silurus militaris*, *Linna. Syst. Nat.* i, p. 503.

*Osteogeniosus militaris*, *Day, Fish. India*, p. 469, pl. cviii, fig. 4 (see synon.).

*Poné Keliti*, Tam.

B. v. D.  $1\frac{7}{7}$  | O. P. 1/10-11. V. 6. A. 19-22 ( $4\frac{5}{15}$ -17).  
 C. 17. Vert. 18-29.

Length of head  $4\frac{1}{4}$  to  $4\frac{1}{2}$ , of caudal fin  $7\frac{1}{2}$ , height of body  $5\frac{1}{2}$  to  $6\frac{1}{2}$  in the total length. *Eyes*—diameter 7 in the length of head, 2 diameters from the end of snout, and 4 apart. The greatest width of the head equals its length behind the angle of the mouth; its height two thirds of its length; the width of the gape of the

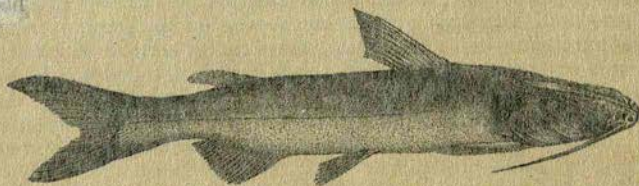


Fig. 69.—*Osteogeniosus militaris*.

mouth equals half the length of the head. Occipital process  $2\frac{1}{2}$  times as long as wide at its base, and its length equals one third of that of the head. Median longitudinal groove of moderate width, not extending so far as the base of the occipital process. Upper surface of the head almost or quite smooth, a few granulations generally present between the posterior end of the median longitudinal groove and the base of the occipital process, which last is roughened in ridges which are sometimes granular; there also





usually exists a patch of granulations above the upper edge of the opercle on the head. *Barbels*—rather longer than the head. *Teeth*—on the palate in two somewhat crescentic patches converging anteriorly. *Fins*—dorsal spine as long as the head excluding the snout, serrated in the upper portion anteriorly and in the whole extent posteriorly. Pectoral spine somewhat stronger than that of the dorsal, the fin reaches about halfway to the ventral. Anal highest anteriorly, where its height is equal to half the length of the head. *Colour*—silvery, darkish superiorly, fins tinged with red.

*Hab.* Seas, estuaries, and tidal rivers of India to the Malay Archipelago. A specimen in the Calcutta Museum is 14 inches long.

204. (2.) *Osteogeniosus sthenocephalus*.

*Osteogeniosus sthenocephalus*, Day, *Fish. India*, p. 469, pl. cviii, fig. 3.

B. v. D.  $1\frac{7}{7}$  | O. P.  $1\frac{9}{9}$ . V. 6. A. 20 ( $5\frac{15}{15}$ ). C. 17.

Length of head  $4\frac{2}{3}$ , of caudal fin  $5\frac{1}{2}$ , height of body  $7\frac{1}{2}$  in the total length. *Eyes*—diameter  $6\frac{1}{3}$  in the length of head, 2 diameters from the end of snout, and 3 apart. The greatest width of the head equals half its length; the width of the gape of the mouth equals half the length of the head. Occipital process three times as long as wide at its base, its length equals one third of that of the head. Median longitudinal groove rather wide and does not extend quite to the base of the occipital process. Upper surface of the head with a few granulations between the posterior end of the median groove and the base of the occipital process, which last is roughened in ridges. *Barbels*—as long as the head. *Fins*—as in the last species, except that the anterior portion of the anal fin is as deep as the head (excluding the snout) is long. *Colour*—silvery, darkest superiorly.

*Hab.* A single specimen captured at Moulmein.

25. Genus *BATRACHOCEPHALUS*, Bleeker.

Branchiostegals five. Gill-membranes united at the throat, without a notch, not confluent with the skin of the isthmus. Cleft of mouth wide; lower jaw the longer. Eyes with a free circular margin. Nostrils approximating, the posterior provided with a valve. Barbels two, rudimentary, and inserted at the chin. Teeth obtusely conical in either jaw, with an interspace between the outer and the inner rows, in a broad longitudinal band on the palate; none on the vomer. Dorsal fin with one spine and seven rays, inserted in advance of the ventrals; adipose fin short. Anal of moderate length, not confluent with the caudal, which is forked. Ventral with six rays. Air-bladder not enclosed by bone. An axillary pore.



*Geographical Distribution.* From Beluchistan through the seas, estuaries, and tidal rivers of India to the Malay Archipelago and beyond.

205. (1.) *Batrachiocephalus mino*. (Fig. 70.)

*Ageneiosus mino*, Ham. *Buch. Fish. Ganges*, pp. 159, 375.

*Batrachiocephalus mino*, Day, *Fish. India*, p. 468, pl. cviii, fig. 1 (see synon.).

B. v. D.  $1\frac{1}{7}$  | O. P.  $1\frac{1}{7}$ . V. 6. A. 20 (5/15). C. 15.

Length of head  $4\frac{1}{2}$ , of caudal fin 5, height of body 6 in the total length. *Eyes*—diameter 4 in the length of head,  $\frac{1}{2}$  a diameter from the end of snout, and  $1\frac{1}{2}$  apart. The greatest width of the head equals its length behind the middle of the eyes. Gape of mouth wide, the cleft of the mouth reaches to below the centre of the orbit. Occipital process rather longer than wide at its base, and lineated

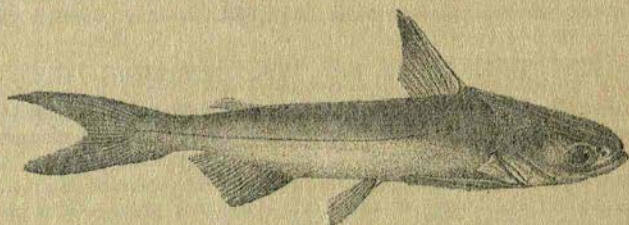


Fig. 70.—*Batrachiocephalus mino*.

in roughened lines. Basal bone crescentic and narrow. *Barbels*—minute. *Teeth*—in a broad longitudinal band on the palate. *Fins*—dorsal spine of moderate strength, as long as the head behind the middle of the eyes; base of the adipose dorsal equal to half that of the rayed fin. Dorsal and pectoral spines serrated on both edges. Upper caudal lobe a little the longer. *Colour*—silvery, darkest along the back and upper lobe of the caudal fin.

*Hab.* Seas, estuaries, and tidal rivers of India and Burma to the Malay Archipelago. Not common, and held in no esteem as food.

26. Genus **AKYSIS**.

Body somewhat elongated; head broad and covered with soft skin. Gill-openings of moderate width, the membrane stretching across the isthmus and being slightly notched posteriorly. Mouth terminal, the upper jaw slightly the longer. Anterior nostrils tubular and widely separated from one another and from the posterior nostrils. Barbels eight. Eyes small. Villiform teeth in the jaws, none on the palate. A short dorsal fin with one spine and five rays; pectorals horizontal, ventral with six rays, caudal emarginate or forked. Lateral line present. Skin tubercular.

*Geographical Distribution.* These small freshwater forms extend from the Tenasserim Provinces to the Malay Archipelago.



206. (1.) *Akysis pictus*.

*Akysis pictus*, Günther, *A. M. N. H.* (5) xi. 1883, p. 138; *Day, Fish. India, Supplement*, 1888, p. 806.

D. 1/6 | O. P. 1/7. V. 6. A. 9.

Head broader than deep. *Eyes*—twice as far from the gill-opening as from the end of the snout. The distance of the anterior nostrils apart equals about half the length of the snout, while the interspace between the anterior and posterior nostril equals half that between the front pair. *Barbels*—nasal half as long as the head, maxillary reaching to the origin of the dorsal fin, the outer mandibular to the axil of the pectoral, the inner are shorter. *Fins*—dorsal commencing midway between the snout and the adipose fin, its spine comparatively strong. Anal arising nearer to the root of the caudal than to that of the pectoral. Caudal emarginate; pectoral extending a little beyond the origin of the dorsal, its spine strong and entire; ventrals reaching the vent. *Colour*—head greyish, with minute black spots; body anteriorly black; this colour is contracted behind into an irregular band that runs along the middle of the posterior part of the body and tail. Dorsal fin with a black band covering all but its front corner and upper edge; caudal and pectoral banded.

*Hab.* Tenasserim; growing to 45 millim. long (1·8 inches).

27. Genus *BAGARIUS*, Bleeker.

Branchiostegals twelve. Gill-membranes not confluent with the skin of the isthmus, having a free posterior edge and notched half-way to the chin. Head depressed, its upper surface osseous. Mouth anterior; upper jaw the longer. Eyes with free orbital margins. Nostrils approximating, the posterior provided with a barbel. *Barbels* eight—one nasal, one maxillary, and two mandibular pairs. Teeth in jaws pointed and of unequal size; palate edentulous. Thorax destitute of any adhesive apparatus. First dorsal fin in advance of the ventrals, having one spine and six rays; adipose fin present. Ventral with six rays. Anal of moderate length. Caudal deeply forked. Air-bladder small, consisting of two rounded portions enclosed in bone. An axillary pore.

The air- or swim-bladder of this fish is present, but small. Taylor ('Gleanings in Science,' ii, p. 172) remarks that the *P. bagharia* (*Bagarius yarrellii*) "has also two air-bladders, which closely resemble the former (*Succobranchus*, &c.) in the argentine tendinous texture of the external coat, and in having no communication with each other or with the alimentary canal. They are situated one on each side of the body, in a deep groove or furrow of the consolidated transverse processes of the cervical vertebrae, and are extremely small in proportion to the bulk of the fish; each of them, in an individual weighing 10 lbs., not exceeding a large garden-pea



in size; they are placed in the middle of the grooves at about an equal distance from the common integuments (immediately behind the pectoral fins) and the vertebral column: the space between each of them and the former being filled up with adipose substance, whilst that next to the spine is occupied by the malleus."

*Geographical Distribution.* Throughout the course of the larger rivers of the Punjab, India, and Burma, and extending to the Malay Archipelago.

207. (1.) *Bagarius yarrellii*. (Fig. 71.)

*Pimelodus bagarius*, *Ham. Buch. Fish. Ganges*, pp. 186, 378, pl. 7, fig. 62.

*Bagrus yarrellii*, *Sykes, Tr. Z. S. ii*, p. 370, pl. 65, fig. 1.

*Bagarius yarrellii*, *Day, Fish. India*, p. 405, pl. cxv, fig. 3 (see *synon.*).

*Boonch* or *Goonch*, Hind. (N. W. P.); *Goreah*, Assam; *Rakhi jellah* Tel.; *Sah-tun*, Oriah; *Mutanda* and *Tharota*, Marathi.

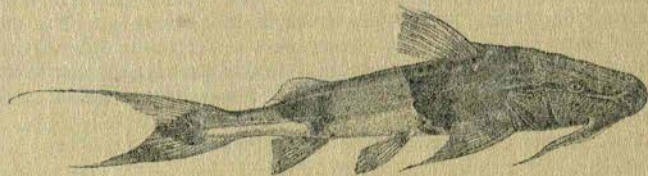


Fig. 71.—*Bagarius yarrellii*.

B. xii. D.  $1/6 \mid 0$ . P.  $1/12$ . V. 6. A. 13–15 (3/10–12). C. 17.

Length of head  $3\frac{3}{4}$ , of caudal fin  $4\frac{1}{4}$ , height of body 5 in the total length excluding the prolonged caudal ray. *Eyes*—small, situated in the middle of the length of the head. The greatest width of the head equals from two thirds of its length in the young to its entire length in the adult, its upper surface is rugose in irregular bands and lines. Upper jaw the longer, the extent of the gape of the mouth equal to four sevenths of the length of the head. *Barbels*—the maxillary with broad bases and rather longer than the head; the nasal pair short. *Teeth*—sharp, and of unequal size in the jaws, an outer widely separated row of larger ones in the mandibles. *Fins*—dorsal spine smooth, with an elongated soft termination, the osseous portion as long as the head excluding the snout; length of the base of the adipose dorsal as long as that of the rayed fin. Pectoral spine stronger than that of the dorsal and equally long, serrated internally, and having a soft prolongation. Caudal deeply forked, its upper lobe prolonged. *Skin*—somewhat scabrous over the summit of the head, and slightly so on the body. *Colour*—body grey or yellowish, with large, irregular, brown or black markings and cross bands. A black base to all the fins, and generally also a dark band across each.

*Hab.* Large rivers of India and Java, descending to the estuaries.





It attains 6 feet or more in length, and is often termed a "fresh-water shark," partly on account of its voracity, and partly because of its underhung mouth and general ugliness.

This fish takes a live-bait, but is difficult to kill; it is sluggish, goes to the bottom, and it generally escapes by destroying the tackle. Mr. Van Cortland, at the end of 1875, angling at the Okla weir, a few miles below Delhi, killed one which was 5 feet long and weighed 136 lbs.

## 28. Genus **GLYPTOSTERNUM**, McClelland.

Syn. *Glyptothorax*, Blyth.

Branchiostegals from six to about ten. Gill-openings rather wide; gill-membranes confluent with the skin of the isthmus, but with their posterior margin remaining free. Head rather depressed and covered with soft skin. Eyes small, subcutaneous. Mouth inferior, transverse, with the upper jaw the longer. Nostrils close together, separated by a barbel. Barbels eight—one nasal, one maxillary, and two mandibular pairs, the maxillary with broad bases. Villiform both in the jaws; palate edentulous. Dorsal fin with a spine and six or seven rays; an adipose fin present. Pectoral horizontal, with a strong spine, some of its rays being occasionally plaited inferiorly. An adhesive apparatus, composed of longitudinal plaits, exists between the bases of the two pectoral fins on the chest. Ventral with six rays, situated posterior to the dorsal. Anal with a moderate (9-12) number of rays. Caudal forked. Air-bladder in two lateral portions more or less enclosed in bone.

*Geographical Distribution.* These fishes are found along the Himalayas and the river at their bases from Afghanistan to the extreme east of Assam, also in the Malay Archipelago. They are also present in some rivers in the plains of India, but usually not far removed from hills. They appear especially adapted for strong streams and those of hilly districts.

It is open to question whether some of the following might not more properly be termed varieties than species. Roughness of the external edge of the pectoral spine may exist in species in which the spine is normally smooth.

### *Synopsis of Indian Species.*

- A. 11-13. Length of head 5 to 5½ in the total. Maxillary barbels reach pectoral fin. Pectoral spine rough or smooth externally. Dorsal spine smooth. Brown, with black marks. 1. *G. lonah*, p. 196.
- A. 13. Length of head 6 in the total. Maxillary barbels reach the pectoral fin. Chestnut-brown, with two light longitudinal bands. 2. *G. trilineatum*, p. 197.





- A. 11-12. Width of head two thirds of its length. Adhesive apparatus rather elongated and narrow. Maxillary barbels reach middle of pectoral fin..... 3. *G. conirostre*, p. 198.
- A. 11-12. Pupil of eyes transversely oval. Maxillary barbels reach to below the hind edge of the eye. Skin roughened with small spinate tuberosities..... 4. *G. botium*, p. 198.
- A. 11. Pupil of eyes circular. Maxillary barbels reach to below the hind edge of the eyes. Skin looks as if it had scales imbedded in it..... 5. *G. telchitta*, p. 199.
- A. 11. Head  $4\frac{1}{4}$  in the total length. Maxillary barbels reach first third of the pectorals..... 6. *G. striatum*, p. 200.
- A. 10-11. Maxillary barbels reach base of pectoral fin. Dorsal spine with serrations on both edges..... 7. *G. madraspatanum*, p. 200.
- A. 9-11. Width of head nearly equals its length. Maxillary barbels reach base of pectoral spine. Adhesive apparatus wider than long..... 8. *G. pectinopterum*, p. 201.
- A. 9. Upper surface of head with elevated spots. Maxillary barbels as long as the head..... 9. *G. cavia*, p. 202.

208. (1.) *Glyptosternum lonah*. (Fig. 72.)

*Bagrus lonah*, Sykes, Tr. Z. S. ii, p. 371.

*Glyptosternum lonah*, Day, Fish. India, p. 496, pl. cxiii, fig. 5 (see synon.).

D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{9}$ . V. 6. A. 11-15 (4/8-10). C. 15-17.

Length of head 5 to  $5\frac{1}{4}$ , of caudal fin 5, height of body 7 in the total length. Eyes—slightly behind the middle of the length of the head, the width of the interorbital space equals one third to two sevenths of the length of the head. Width of head nearly or quite equals its length; upper surface rough. Width of gape of mouth  $2\frac{1}{2}$  to 3 in the length of the head. Lips not fringed. Occipital process nearly or quite four times as long as broad. Thoracic adhesive apparatus rather elongated reaching to the first third of the pectoral spine, its plaits are scarcely branched. Barbels—the nasal reach halfway to the orbit, the maxillary extend to the base or first third of the pectoral, the outer mandibular pair to the gill-opening, the inner are shorter. Fins—dorsal higher than the body, its spine rather slender, enveloped in skin,  $1\frac{1}{4}$  to  $2\frac{1}{4}$  in the length of the head; adipose dorsal with its base longer than that of the first dorsal, and equal to half the interspace between the two fins. Pectoral spine moderately broad, internally strongly denticulated, externally roughened in some specimens, smooth in others, the fin does not nearly reach the ventral.





Caudal forked. *Caudal peduncle*—twice as long as high in the young, two thirds in the adult. *Colour*—yellowish brown, banded with blackish; fins yellow; dorsal, caudal, and anal with black bands.

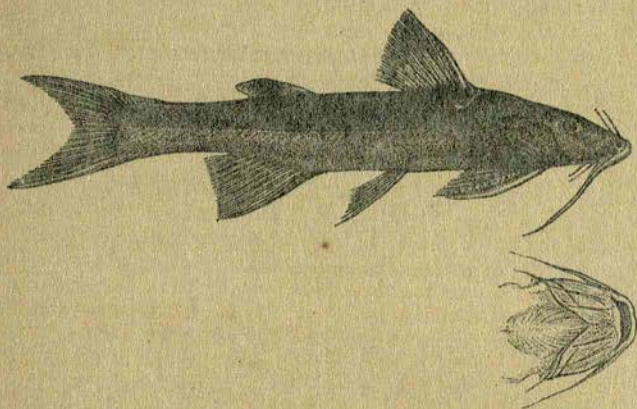


Fig. 72.—*Glyptosternum onah*.

*Hab.* Deccan, attaining at least 6 inches in length. I have taken this species at Poona, and also in the head-waters of the Jumna.

209. (2.) *Glyptosternum trilineatum*.

*Glyptothorax trilineatus*, *Blyth, J. A. S. B.* xxix, 1860, p. 154.

*Glyptosternum trilineatum*, *Day, Fish. India*, p. 497, pl. cxvi, fig. 3 (see synon.).

D.  $1\frac{1}{6}$  | O. P.  $1\frac{1}{10}$ . V. 6. A. 13 ( $3\frac{1}{10}$ ). C. 19.

Length of head 6, of caudal fin  $5\frac{1}{2}$ , height of body 6 in the total length. *Eyes*—small, behind or in the middle of the length of the head. Head about as long as broad and covered with soft skin, snout obtuse. Lips not fringed. Occipital process nearly three times as long as broad. *Barbels*—the maxillary reach to the end of the head; nasal barbels nearly to the orbit; the external mandibular pair longer than the internal, and reaching to the base of the pectoral fin. Thoracic adhesive apparatus rather large. *Teeth*—villiform in the jaws, none on the palate. *Fins*—dorsal fin as high as the body, its spine weak, slightly serrated posteriorly, and its bony portion rather above half the length of the head; adipose dorsal of moderate height, its base being equal to more than that of the first dorsal, and to about half the distance between the two fins. Pectoral spine rather broad, denticulated internally, smooth externally, reaching two thirds of the distance to the base of the ventral. Caudal deeply forked. Skin smooth. *Caudal peduncle*—





twice as long as high. *Colour*—chestnut-brown, with a light streak along the back, another along the lateral line, and a third near the abdominal margin.

*Hab.* Burma, Tenasserim, and Nepal; attaining 12 inches or more in length.

#### 210. (3.) *Glyptosternum conirostre*.

*Glyptosternum conirostre*, Steindachner, *Sitzungs. Ak. Wiss. Wien*, lv, 1<sup>o</sup> Abth. 1867, p. 532, pls. v, vi, figs. 2; *Day, Fish. India*, p. 497, pl. cxvi, fig. 5.

D. 1/6 | O. P. 1/9. V. 6. A. 11-12 (2/9-10). C. 17.

Length of head  $5\frac{1}{4}$ , of caudal fin  $5\frac{1}{2}$ , height of body  $5\frac{1}{2}$  in the total length. *Eyes*—slightly behind the middle of the length of the head, the width of the interorbital space equals one fourth of the length of the head. The width of the head equals two thirds of its length. Upper jaw the longer; the width of the gape of the mouth equals half of the length of the head. Lips not fringed. Occipital process three times as long as wide. *Barbels*—the maxillary have broad bases and extend to the middle of the pectoral fin; the nasal, which have a very wide fringe, reach the hinder edge of the eye; the outer mandibular, which are also broad, to the gill-openings; the inner are shorter. *Teeth*—generic. *Fins*—dorsal as high as the body or rather higher, its spine strong, as long as the head behind the nostrils and smooth, serrated posteriorly in some specimens; length of the base of the adipose dorsal exceeding that of the rayed fin, and equal to two thirds of the extent of the interspace between the two fins. Pectoral reaching nearly to the ventral, the spine strong, as long as that of the dorsal, not striated inferiorly, and having about 13 denticulations internally. Ventral does not quite reach the anal. Caudal forked. Adhesive apparatus in the chest rather broad, horseshoe-shaped, convex in front, with a large smooth space inside. Caudal peduncle about as high at its base as it is long. *Colour*—brownish, fins yellow, stained with black.

This fish has a considerable similarity to *G. pectinopteron*, but possesses a wider mouth, a narrower head, broader barbels, a higher caudal peduncle, and a more elongated adhesive apparatus.

*Hab.* Himalayan streams. Specimens from Kangra have the pectoral spine serrated externally.

#### 211. (4.) *Glyptosternum botium*.

*Pimelodus botius*, Ham. *Buch. Fish. Ganges*, pp. 192, 378.

*Glyptosternum botia*, Day, *Fish. India*, p. 497, pl. cxiii, fig. 4 (see *synon.*).

B. vi. D. 1/6 | O. P. 1/8. V. 6. A. 11-12 (2/9-10). C. 18.

Length of head  $5\frac{1}{2}$ , of caudal fin  $4\frac{1}{2}$ , height of body  $6\frac{1}{2}$  in the total length. *Eyes*—pupils transversely oval, small, situated in the commencement of the front half of the head; the width of the interorbital space, which is convex, equal to one third of the length





of the head. The greatest width of the head equals its length excluding the snout. Upper jaw the longer; the width of the mouth equals one third of the length of the head. *Barbels*—eight, the maxillary reach to below the hind edge of the eyes, the nasal halfway to the orbits, the mandibular pairs are short. *Teeth*—villiform in the jaws. *Fins*—dorsal spine smooth, as long as the head excluding the snout; length of the base of the adipose fin equal to one third of the interspace between the two fins. Pectoral reaching two thirds of the distance to the ventral, the spine strong, as long as the head excluding the snout, and with about twenty strong teeth internally. Ventral reaching the anal. Caudal deeply lobed, lobes of equal length. Adhesive apparatus well-marked. *Skin*—roughened with small spiny tuberosities arranged in longitudinal rows all over the body. Free portion of the tail twice as long as high at its base. *Colour*—brownish, intermixed with yellow, and blotched with blackish. Fins yellow with black marks and spots.

This fish very closely resembles *G. telchitta*, but has a more roughened skin, whilst the profile of the eye is transversely oval. Hamilton Buchanan (MSS.) observes of this species in the Rangpur district, "the *Bhot Magur* of the Dharka if possible is still uglier (than the *Erethistes conta*). The people of Bhutan are said to be remarkably fond of it, from whence its name is derived. The people of Behar will not eat it."

*Hab.* It is common at Delhi. Hamilton Buchanan observed that it was from the northern rivers of Bengal, and attained 6 inches in length.

## 212. (5.) *Glyptosternum telchitta*.

*Pimelodus telchitta*, *Ham. Buch. Fish. Ganges*, pp. 185, 378.

*Glyptosternum telchitta*, *Day, Fish. India*, p. 498, pl. cxvi, fig. 2 (see synon.).

*Gooacherah*, Beng.; *Telliah*, Hind. (N. W. P.).

B. vi. D.  $1/6$  | O. P.  $1/8$ . V. 6. A. 11 (2/9). C. 17.

Length of head  $5\frac{1}{2}$  to  $5\frac{3}{4}$ , of caudal fin  $5\frac{3}{4}$ , height of body  $7\frac{1}{2}$  to 8 in the total length. *Eyes*—small, with a circular pupil situated in the middle of the length or in the commencement of the posterior half of the head; interorbital space flat, its width  $3\frac{1}{2}$  to 4 in the length of the head. The greatest width of the head equals three fourths of its length. Upper jaw the longer, the width of the gape of the mouth equals one third of the length of the head; lips not fringed. Opercle ends posteriorly in an elongated pointed termination; occipital process three times as long as wide at its base. *Barbels*—the nasal very short, the maxillary reach to rather behind the posterior edge of the orbit; the outer mandibular pair reach the gill-opening, the internal are shorter. *Teeth*—generic. *Fins*—dorsal nearly as high as the body, the spine, which is four sevenths as long as the head, has a soft continuation, is slightly enveloped in skin and entire; adipose dorsal of moderate height, the extent





of its base equal to that of the rayed fin, or half that of the interspace between the two fins. Pectoral spine broad, reaching two thirds of the distance to the base of the ventral, smooth externally, bearing from 13 to 14 teeth internally, and not plaited below. Caudal deeply forked. Thoracic adhesive apparatus rather large, its plaits nearly longitudinal. Skin everywhere covered with small longitudinal elevations, like scales, imbedded in it. Free portion of the tail twice as long as high at its base. *Colour*—blackish-brown, fins yellow with black bands; caudal blackish, with a yellow edge.

*Hab.* Punjab, N.W. Provinces, Bengal, and Behar. This species attains 5 or 6 inches in length.

### 213. (6.) *Glyptosternum striatum*.

*Glyptosternum striatum*, McClelland, *Calc. Jour. N. H.* ii, p. 587; *Day, Fish. India*, p. 498 (see synonym.).

B. vi. D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{11}$ . V. 6. A. 11 (2/9). C. 15.

Length of head  $4\frac{3}{4}$ , of caudal 5, height of body 6 in the total length. *Eyes*—situated in about the middle of the length of the head, the width of the interorbital space equal to one third of the length of the head. Head nearly as broad as long. Upper jaw the longer, the width of the gape of the mouth equals half the length of the head. Lips not fringed. Occipital process three times as long as wide at its base. *Barbels*—the maxillary reach beyond the base of the pectoral fin. *Fins*—dorsal higher than the body, its spine slender, half as long as the head and enveloped in skin; length of the base of the adipose dorsal two thirds of that of the interspace between the two fins. Pectoral spine much stronger than that of the dorsal, with about twenty fine denticulations internally and striated along the under surface. Free portion of the tail twice as long as high at its base. *Colour*—uniform brown.

*Hab.* Khasi hills in Assam; attaining at least  $8\frac{1}{2}$  inches in length.

### 214. (7.) *Glyptosternum madraspatanum*.

*Glyptosternum madraspatanum*, Day, *Jour. L. S.* xi, p. 526; *Fish. India*, p. 498, pl. cxvi, fig. 4.

B. vi. D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{10}$ . V. 6. A. 10–11 (2–3/8–9). C. 17.

Length of head 5 to  $5\frac{1}{4}$ , of caudal  $4\frac{1}{2}$  to  $4\frac{3}{4}$ , height of body  $6\frac{1}{2}$  in the total length. *Eyes*—small, situated in the middle or the commencement of the posterior half of the head, the distance between the eyes equals two sevenths of the length of the head. The greatest width of the head equals its length behind the front nostrils. Upper surface of the head rather rough, upper jaw the longer; the width of the mouth equals two fifths of the length of the head; lips not fringed. Occipital process very narrow, four times as long as wide at its base. *Barbels*—the maxillary reach the base of the pectoral, the nasal two thirds to three fourths of the distance to the orbit; the outer mandibular to the gill-





openings, whilst the internal are a little shorter. *Teeth*—generic. *Fins*—dorsal spine rather strong, not enveloped in skin, serrated posteriorly, and in some specimens anteriorly in its upper third. It is as long as the head behind the angle of the mouth; base of adipose rather longer than that of the rayed dorsal fin. Pectoral almost reaches the ventral, pectoral spine not plaited, moderately strong and three fourths as long as the head. *Caudal peduncle*—half as high as long. Skin smooth. *Colour*—yellowish, with dark bands; fins also yellow, with black bands. *Air-bladder*—apparently absent.

*Hab.* Bhavani river at the foot of the Nilgiri hills, where I obtained 16 specimens up to 5 inches in length.

### 215. (8.) *Glyptosternum pectinopterum*.

*Glyptosternum pectinopterum*, McClelland, *Calc. Jour. N. H.* ii, p. 587; *Day, Fish. India*, p. 499, pl. cxvi, fig. 6 (see synonym.).

*Juppah*, Punjābi (at Chumba); *Nmg-grare*, Punj. in Beas R., if small, *Kuggar*, if large; *No-woo*, Punj. at Kangra.

B. x. D.  $\frac{1}{2}$  | O. P. 1/8-9. V. 6. A. 9-11 ( $\frac{1-2}{6-9}$ ). C. 17. Vert. 15-17.

Length of head  $4\frac{1}{2}$  to 5, of caudal  $5\frac{1}{2}$  to 6, height of body 6 in the total length. *Eyes*—in the middle of the length of the head, the width of the interorbital space equals  $3\frac{1}{2}$  in the length of the head. The width of the head nearly or quite equals its length. Upper jaw the longer, the width of the gape of the mouth  $2\frac{1}{2}$  to 3 in the length of the head. Lips not fringed. Occipital process three times as long as wide at its base. *Barbels*—the maxillary extend nearly to the middle of the pectoral fin; the nasal reach the orbit; the outer mandibular to the base of the pectoral, whilst the inner are rather shorter. *Teeth*—generic. *Fins*—dorsal nearly as high as the body, the spine rather slender, and more than half as long as the head; in many specimens up to three or four inches in length the soft termination of the spine is continuous with it, and on bending it appears as if there were numerous points anteriorly, this appearance is usually lost in the adult fish; base of the adipose dorsal rather longer than that of the rayed fin and equal to four fifths of the interspace between the two fins. Pectoral extends three fifths of the distance to the ventral; pectoral spine flattened, strong, as long as the head excluding the snout, and having coarse denticulations internally. The outer rays of the ventral and pectoral are plaited inferiorly; this appearance is usually lost in specimens preserved in spirit unless the alcohol was very strong at the commencement. *Caudal peduncle*—one third to twice as long as high at its base. Adhesive apparatus well marked. *Colour*—uniform brown, with a yellowish mark along the back; fins yellow, stained with black. *Air-bladder*—in two lateral portions, partially enclosed in bony capsules formed by a trumpet-shaped process from the anterior vertebra.

*Hab.* Himalayas throughout the Punjab, and at Kangra, Simla, and Darjeeling.



216. (9.) *Glyptosternum cavia*.*Pimelodus cavia*, *Ham. Buch. Fish Ganges*, pp. 188, 378.*Glyptosternum cavia*, *Day, Fish. India*, p. 490 (see synon.).*Kanya tenggara*, Hind.

D. 1/6 | O. P. 1/8. V. 6. A. 9 (3/6). C. 17.

"It is flattened before, conical behind, and all its upper parts are scabrous from elevated spots." "Head very large, a good deal flattened, blunt, and covered above with bony plates, forming various ridges." Upper jaw the longer. *Barbels*—nasal very short, the maxillary as long as the head, the two mandibular pairs shorter. *Teeth*—none on the palate. *Fins*—dorsal spine blunt, rough, but not serrated on the anterior surface; adipose fin small and rough; pectoral spine serrated on both edges; lower caudal lobe the longer. *Colour*—"lurid, and the back is variegated with brown dots, collected into cloud-like marks, while the sides have a gloss like silver, changing into the hue of copper. The abdomen is of a dirty livid appearance. Across the tail are two transverse bars, and on the tail-fin a third, all of which have fewer dots than the adjacent parts. The eyes are white."

*Hab.* Rivers of Northern Bengal, where this fish attains about 6 inches in length.

29. Genus **EUGLYPTOSTERNUM**, Bleeker.*Syn. Acliptostenon*, Bleeker.

Dorsal profile nearly horizontal; head covered with soft skin. Gill-openings rather wide; the gill-membranes confluent with the skin of the isthmus, but with a free posterior margin. Mouth transverse, upper jaw the longer. Eyes small, subcutaneous. Nostrils close together, separated by a barbel. Barbels eight. Teeth villiform in the jaws and on the palate. Dorsal fin with a spine and six rays; an adipose dorsal present. Pectorals horizontal, with an adhesive apparatus on the chest formed by longitudinal plaits of skin. Anal short (11 to 13 rays), not continuous with the caudal, which is forked. Ventrals situated behind the dorsal, and consisting of six rays. *Air-bladder* in two lateral portions, enclosed in bone.

*Geographical Distribution.* River Coic near Aleppo, Upper Assam, and the Jumna river.

217. (1.) *Euglyptosternum lineatum*. (Fig. 73.)*Euglyptosternum lineatum*, *Day, Fish. India*, p. 500, pl. cxvi, fig. 7.

D. 1/6 | O. P. 1/10. V. 6. A. 12-13 (3/9-10). C. 17.

Length of head  $4\frac{1}{4}$ , of caudal  $5\frac{2}{3}$  to 6, height of body 6 to 7 in the total length. *Eyes*—small, situated about 2 diameters behind or else in the middle of the length of the head, the width of the interorbital space one fourth of the length of the head. Head



rather flattened, its greatest width equals its length behind the nostrils. Upper jaw the longer, the width of the gape of the mouth equals half the length of the head. Lips smooth. Occipital process three times as long as wide at its base. *Barbels*—the nasal nearly reach to the orbit; the maxillary pair are as long as the head, the outer mandibular reach the gill-opening, the inner are shorter. *Teeth*—villiform in the jaws, and in one large patch

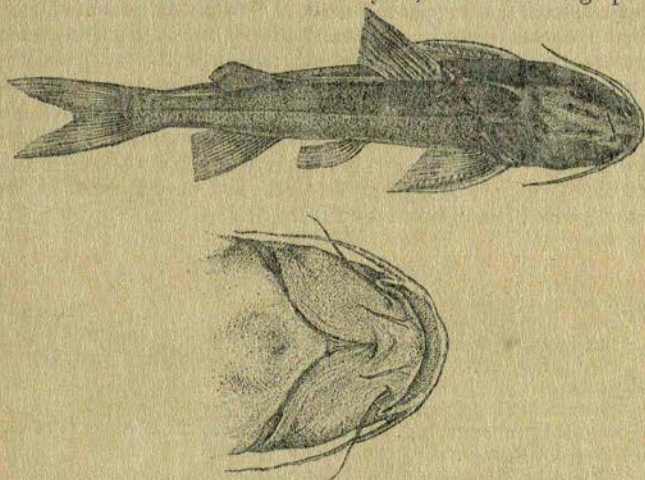


Fig. 73.—*Euglyptosternum lineatum*.

extending across the palate, and so closely approximating to the premaxillary teeth that they appear like a single large band. Adhesive apparatus on the thorax distinct. *Fins*—the dorsal as high as the body; its spine strong, entire, and about half the length of the head; adipose dorsal of moderate height, the length of its base equalling that of the rayed fin, or half the interspace between the two fins. Pectoral spine very strong, smooth externally, denticulated internally with about 9 or 10 teeth, and reaching two thirds of the distance to the base of the ventral. Caudal deeply forked. Skin smooth. *Caudal peduncle*—twice as long as high. *Colour*—brown, with a narrow light band along the side.

*Hab.* The Jumna river, and also near Sadiya in Upper Assam; growing to 12·5 inches in length.

### 30. Genus **ERETHISTES**\*, Müller and Troschel.

Syn. *Hara*, Blyth.

Head osseous above, somewhat depressed. Mouth small, sub-

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\* See P. A. S. B. 1872, p. 122, "On the identity of the Siluroid Genera *Erethistes* and *Hara*," by Francis Day.





inferior; besides the occipital and humero-cubital processes there is a strong scapular one, none of the processes are covered by skin. Gill-openings narrow, the membranes being confluent with the skin of the isthmus. Eyes small, without a free orbital edge. Nostrils close together, separated by a small barbel. Barbels eight, the maxillary with broad bases. Villiform teeth in the jaws; palate edentulous. First dorsal fin arising slightly in front of the ventrals, having a serrated spine and five or six branched rays; adipose dorsal present. Ventral with six rays. Pectoral with a serrated spine. Air-bladder not enclosed in bone.

*Geographical Distribution.* From the Mahanadi river in the West to the Salween in British Burma. This genus extends inland to the Mor river at Beerbhoom in Bengal, to Assam (where in the Brahmaputra and waters in its vicinity the finest specimens are procured), and also as high as Mandalay in Upper Burma. It has been reported from Chusan by McClelland.

*Synopsis of Indian Species.*

- Blunt spiny ossicles in the skin. Serrations on outer edge of pectoral spine, directed alternately forwards and backwards. No elongate caudal ray ..... 1. *E. hara*, p. 204.
- Skin tuberculate. Serrations on outer edge of pectoral spine directed backwards. Upper caudal ray elongate ..... 2. *E. conta*, p. 205.
- Skin smooth. Serrations on outer edge of pectoral spine directed backwards. Spine elongated. No prolonged caudal ray ..... 3. *E. jerdoni*, p. 206.
- Skin tuberculate. Head  $6\frac{1}{2}$  in the total length. Dorsal spine serrated on both edges. Both caudal lobes elongated ..... 4. *E. elongatus*, p. 207.

218. (1.) *Erethistes hara*. (Fig. 74.)

*Pimelodus hara*, *Ham. Buch. Fish. Ganges*, pp. 190, 378.

*Erethistes hara*, *Day, Fish. India*, p. 452, pl. cii, fig 1 (adult), fig. 2 (half-grown) (see synon.).

*Nga-kyouk-pah*, Burmese.

D.  $1\frac{1}{6}$  | 0. P.  $1\frac{1}{6}$ . V. 6. A. 10-11 (3/7-8). C. 15.

Length of head 4 to  $4\frac{1}{2}$ , of caudal 5, height of body  $4\frac{1}{2}$  to 5 in the total length. Eyes—diameter about 10 in the length of head, situated in the commencement of the hind half of the head, 3 diameters apart. The greatest width of the head equals its length, and one third or a fourth more than its height. Upper jaw slightly the longer, the width of the mouth equal to one third of the length of the head. A semilunar subcutaneous bone surrounds the anterior and lower margins of the nasal orifices, which are close together but divided by a barbel. Median longitudinal groove on the head shallow and reaching to opposite the hind edge of the eye. Occipital process from twice in the adult to about three times in





the young as long as it is wide at its base; humero-cubital process elongated and rugose, having two rounded osseous projections posteriorly; between the humero-cubital and occipital processes is a third intermediate one, the scapular, directed somewhat downwards; the basal bone of the dorsal fin considerably dilated externally. *Barbels*—the nasal short, the maxillary reach the base of the pectoral fin, the mandibular arise on a transverse line, the external reach the gill-openings, whilst the internal are shorter. *Teeth*—none on the palate. *Fins*—dorsal spine stout, from three fourths to nearly as long as the head (in the adult comparatively longest, as is also the pectoral spine), serrated posteriorly, and sometimes rugose anteriorly; length of the base of the adipose dorsal four sevenths of that of the rayed fin, and equal to the length of the interspace between the two fins: the adipose fin is one third longer than high. Pectoral spine from as long as, to one fourth

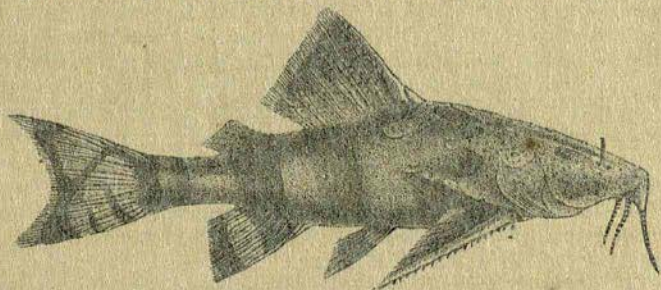


Fig. 74.—*Erethistes hara*.

longer than, the head, strong, flattened, denticulated internally and serrated externally, each alternate tooth (in many, especially small specimens) being directed anteriorly or posteriorly; the pectoral fin reaches the ventral, and the latter the anal, this last being highest anteriorly. Caudal forked. *Skin*—covered with small, pointed elevations, which in the posterior part of the body are arranged in parallel lines, they are also seen on the cheeks. When the fish is captured the secretion from each of these orifices forms over it a rounded incrustation, causing the skin to appear tuberculated. *Air-bladder*—large and not enclosed in bone. *Colour*—yellowish brown, banded or blotched darker; fins with black bands or markings; all the barbels annulated with black.

*Hab.* Rivers and contiguous pieces of water, from Orissa, through Bengal, Assam, and Burma; attaining at least  $5\frac{1}{2}$  inches in length. Specimens from the Naga hills are more deeply coloured, and the under surface of the chest is covered with the orifices of numerous glands.

219. (2.) *Erethistes conta*.

*Pimelodus conta*, *Ham. Buch. Fish. Ganges*, pp. 191, 378.

*Erethistes conta*, *Day, Fish. India*, p. 453, pl. cii, fig. 4 (see synon.).

*Nga-that-to* (Upper Burma); *Nga-kouk-thwa* (Bassien), Burmese.





D. 1/6 | O. P. 1/6. V. 6. A. 11 (3/8). C. 17.

Length of head 5, of caudal  $4\frac{1}{2}$ , height of body  $4\frac{1}{2}$  in the total length (excluding the filamentous prolongation of the upper lobe of the caudal fin). *Eyes*—situated slightly behind the middle of the length of the head, diameter 8 in the length of the head, and  $2\frac{1}{2}$  diameters apart. The greatest width of the head rather less than its length. Upper jaw slightly the longer, median longitudinal groove on the head rather deep and extending to the base of the occipital process, which latter is three times as long as wide at its base; humero-cubital process elongated, rough, and with two rounded osseous projections posteriorly; between the humero-cubital and occipital process is a third intermediate one, the scapular, directed somewhat downwards; basal bone of the dorsal fin not dilated externally. *Barbels*—the nasal short, the maxillary as long as the head, the mandibular, which arise on a transverse line, shorter. *Fins*—dorsal spine strong, nearly as long as the head, rugose anteriorly, denticulated posteriorly; length of the base of the adipose dorsal equal to that of the first dorsal fin, or the interspace between the two fins; the adipose fin is one third as high as long. Pectoral spine rather shorter than the head, denticulated internally, and with backwardly directed serrations externally. Caudal forked, its upper lobe having a filamentous prolongation. *Skin*—covered with smooth tubercles, most of which are on a rounded base. *Colour*—as in *E. hara*, except that the mandibular barbels do not appear ever to be annulated with black, and sometimes even the maxillary pair are destitute of colour.

*Hab.* Eastern Bengal, Assam, Burma as far as the Tenasserim provinces, whence Major Berdmore sent 5 or 6 specimens to the Calcutta Museum. This species is found as high up the Irrawaddy as Prome, and I have also taken it at Bassein.

220. (3.) *Erethistes jerdoni*.

*Hara jerdoni*, Day, *J. A. S. B.* xxxix, 1870, pt. 2, p. 39.

*Erethistes jerdoni*, Day, *Fish. India*, p. 453, pl. cii, fig. 3 (see synon.).

D. 1/5 | O. P. 1/6. V. 6. A. 10. C. 12.

Length of head  $3\frac{3}{4}$ , of caudal 6, height of body 4 in the total length. *Eyes*—in the anterior half of the head, 3 diameters from end of snout. Head one half wider than high opposite the opercles. Median longitudinal groove extends nearly to the base of the occipital process, where it terminates in a small depression. Occipital process half longer than wide at its base; cubito-humeral process of an elongated triangular shape, having two prominent ossicles posterior to it; between these two processes is a third. *Barbels*—the maxillary reach the gill-opening, the others are shorter. *Fins*—dorsal spine half as long as the head, serrated posteriorly; the length of the base of the adipose dorsal is two thirds of that of the rayed fin. Pectoral spine flattened and rather longer than the distance between the snout and the base of the





dorsal fin; when laid flat it reaches as far as the posterior end of the ventrals, it has 12 strong denticulations internally, 26 smaller ones, directed backwards, externally. All the caudal rays elongate, outer rays not produced. *Skin*—smooth. *Colour*—brownish, irregularly banded, barbels annulated with black.

*Hab.* Sylhet district, growing to at least 1·5 inches in length.

#### 221. (4.) *Erethistes elongatus*.

*Hara elongata*, Day, *P. Z. S.* 1871, p. 704.

*Erethistes elongata*, Day, *Fish. India*, p. 453, pl. cii fig. 5.

D. 1/6 | 0. P. 1/6. V. 6. A. 10 (3/7). C. 17.

Length of head  $6\frac{1}{2}$ , of caudal 4, height of body 7 in the total length. *Eyes*—small, situated in the posterior half of the head. Occipital process three times as long as it is wide at its base. The scapular and cubito-humeral processes well developed, the last having an oval ossicle posterior to it. *Fins*—dorsal spine stout, as long as the head, anteriorly strongly denticulated, the teeth being directed downwards, also slightly serrated posteriorly. Pectoral spine one fourth longer than that of the dorsal and serrated on both edges, most strongly internally. Ventral extending two thirds of the distance to the anal; caudal deeply forked, its outer rays being prolonged. *Skin*—covered with tubular pores. *Colour*—brownish, banded with darker: fins yellow with black bands.

*Hab.* Naga Hills, whence a single specimen was procured.

#### 31. Genus *GAGATA*, Bleeker.

Syn. *Batasio*, pt., Blyth; *Callomystax*, Günther.

Branchiostegals five to seven. Gill-openings rather narrow, the gill-membranes being confluent with the skin of the isthmus. Thorax smooth. Upper surface of the head with sharp longitudinal ridges, and covered by thin skin. Eyes subcutaneous. Snout overhanging the mouth. Nostrils close together, the anterior rounded, the posterior provided with a valve and usually with a barbel. Barbels eight, one pair nasal (sometimes rudimentary), one maxillary, and two mandibular pairs arising on a transverse line behind the chin, and usually with stiff bases. Villiform teeth in jaws; palate edentulous. First dorsal with one spine and six or seven rays; adipose of moderate length. Pectoral spine strong. Ventral with six rays and situated farther back than the dorsal fin. Anal with a moderate (11–16) number of rays. Caudal forked. Air-bladder in two rounded portions, each of which is enclosed in an osseous cup.

*Geographical Distribution.* Rivers of Sind, India (except Madras), and Burma.