SOME FISHES FROM BORNEO.

BY HENRY W. FOWLER.

The Wistar Institute of Anatomy of Philadelphia has received valuable collections of fishes from Borneo, principally from the Baram region of Sarawak, or Brunei as given on some maps, in the British possessions. The larger collections were made by Dr. William H. Furness, 3rd, of Philadelphia, in 1898. They are all from the Baram basin. Previously Mr. Alfred C. Harrison, Jr., and Dr. H. M. Hiller had also obtained material from the same region, together with some other from the Kapuas river in western Dutch Borneo.

The larger number of forms are either fluviatile or fresh-water and interesting on account of their apparent rarity. In order to facilitate satisfactory comparisons I have tried to give more or less complete accounts of these. Some others are represented by large series.

Drs. Horace Jayne and M. J. Greenman kindly submitted the collections to me for examination. I have also to thank them for their recommendation to the Institute of the services of the artist, Miss Helen Winchester, who made the accompanying figures. As usual the line with each represents an inch.

To the Academy of Natural Sciences of Philadelphia I am under obligations for many courtesies, such as the use of the library and collections. Among the latter are a number of Borneo fishes received from the Paris Museum by Prof. E. D. Cope, and presented by him to the Academy. As these form part of the collections of M. Chaper, reported by Prof. Léon Vaillant in 1893, they are of value as authoritative determinations. I beg to thank Prof. Vaillant for their verification. Dr. Samuel G. Dixon, President of the Academy, Dr. Henry A. Pilsbry, Mr. Witmer Stone and Mr. James A. G. Rehn have kindly given assistance and many suggestions.

For convenience it may be inferred that the material examined under each species was obtained by Dr. Furness, unless otherwise stated.

GALEIDÆ.

1. Carcharhinus tephrodes sp. nov.

Head about $4\frac{5}{6}$ to end of last caudal vertebra; depth about $7\frac{1}{2}$ to same; depth about $6\frac{1}{2}$ to origin of lower caudal lobe; upper caudal lobe

about 3 in rest of body; snout $2\frac{1}{3}$ in head; space between tip of snout and anterior curve of mouth $2\frac{7}{8}$; width of mouth at corners $2\frac{4}{7}$; interorbital space 2; length of pectoral along upper or outer margin $1\frac{1}{3}$; margin of pectoral posteriorly $1\frac{1}{3}$; base of pectoral $2\frac{2}{3}$; anterior margin of first dorsal 2; base of first dorsal $2\frac{1}{3}$; anterior margin of second dorsal $2\frac{2}{3}$; base of second dorsal $3\frac{3}{5}$; least depth of caudal peduncle $5\frac{1}{4}$;

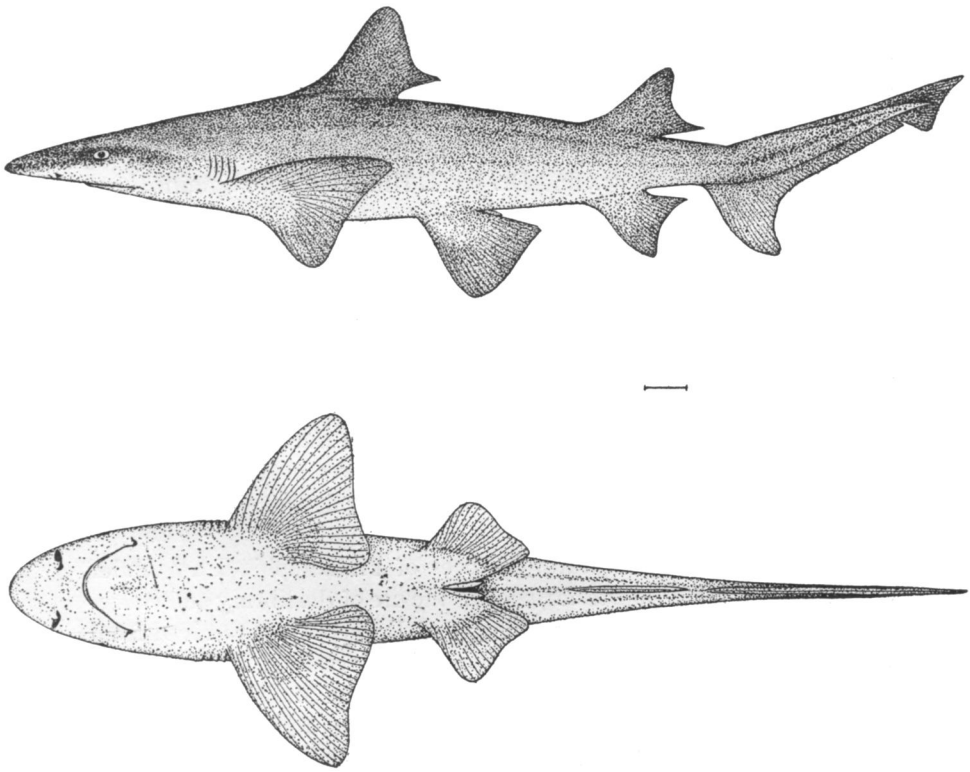

Fig. 1.—*Carcharhinus tephrodes* Fowler.

anterior margin of lower caudal lobe 2; anterior margin of anal 3; base of anal 3; anterior margin of ventral 3; base of ventral $3\frac{2}{3}$; eye $7\frac{2}{3}$ in interorbital space.

Body elongate, well compressed and greatest depth about origin of first dorsal fin. Caudal peduncle rather thick, compressed, flattened above and below, and a pit at origin of upper caudal lobe. A slight depression along middle of back above.

Head broad, its greatest width about $1\frac{3}{5}$ in its length, depressed, and

rather slightly convex above. Snout broad, depressed or somewhat flattened, and margin obtuse when viewed from above. Eye small, circular, lateral, nictitating membrane well developed, and position a little anterior. Symphysis of mandible about opposite front rim of orbit, mandible itself very broadly convex. Teeth in mandible entire, long, slender, sharp pointed and radiating more or less as it were from margin of jaw. Teeth of upper jaw radiating inward or parallel with those of mandible when mouth is closed. Upper teeth broad, triangular, and finely serrated along both margins, each one may be said to have a slight notch on its outer or distal edge near base, margin at this region also finely serrated. Tongue broad and flat, only a little free around edges. Each corner of mouth with a short fold which extends obliquely outward. Nostrils nearer front of upper jaw or eye than tip of snout, oblique, rather large and each with a small pointed flap. Interorbital space broad and a little convex.

Gill-openings 5, last two over base of pectoral, and median three largest. No spiracle.

Body covered with fine shagreen denticles, largest on middle of back and anterior margins of fins basally. Head with numerous inconspicuous pores.

First dorsal inserted nearer origin of pectoral than that of ventral, its upper margin about $\frac{3}{4}$ base of fin slightly undulate, and posteriorly ends in a short point. Second dorsal similar, about equal to anal in size, and inserted a trifle behind origin of latter or much nearer origin of upper caudal lobe than posterior basal margin of first dorsal. Anal similar to second dorsal. Upper caudal lobe long, notched near its end. Origin of lower caudal lobe a little in advance of that of upper, but without a pit. Pectoral broad, reaching nearly $\frac{3}{4}$ of distance to origin of ventral, and posterior margin but little curved. Ventral broad, inserted nearer origin of anal than that of pectoral and corners rounded obtusely. Claspers small, on outer margin about $2\frac{2}{3}$ in length of anterior edge of ventral.

Color in alcohol, more or less uniform gray above and on fins, below white. Lower surfaces of pectorals and ventrals white. Side of head till eye is included gray like upper surface, otherwise lower surface white. Caudal gray, paler along lower portion of vertebral column. Iris slaty.

Length $24\frac{1}{2}$ inches.

Type No. 2,390, W. I. A. P. Baram, Borneo. 1897. Mr. Alfred C. Harrison, Jr., and Dr. H. M. Hiller.

Also paratype No. 2,391, W. I. A. P. Same data. Length $14\frac{1}{2}$

inches. Eye about 5 in interorbital space. A pit at origin of lower caudal lobe and transverse fissure at origin of upper. Margins of dorsal and caudal brownish-gray. Pectoral $1\frac{2}{5}$ in head. In most other respects it agrees entirely.

This species differs from *Carcharhinus borneensis* (Bleeker) in the large broad pectoral. According to Bleeker's account it is $1\frac{2}{3}$ in the head.

(*Τεφρωδης*, ashy.)

2. Scoliodon acutus (Rüppell).

Head $5\frac{2}{3}$ to end of last vertebra; depth about $6\frac{1}{2}$ to same; depth about 5 to origin of lower caudal lobe; upper caudal lobe about $2\frac{9}{10}$ in rest of body; snout $2\frac{1}{3}$ in head; space between tip of snout and anterior curve of mouth $2\frac{1}{2}$; width of mouth at corners 3; interorbital space $2\frac{1}{10}$; length of pectoral along upper or outer margin $1\frac{3}{5}$; margin of pectoral posteriorly $2\frac{1}{6}$; base of pectoral $3\frac{1}{3}$; anterior margin of first dorsal $1\frac{3}{5}$; base of first dorsal about $1\frac{7}{8}$; posterior margin of second dorsal $3\frac{2}{3}$; base of second dorsal $5\frac{2}{3}$; least depth of caudal peduncle $4\frac{4}{5}$; anterior margin of lower caudal lobe $1\frac{2}{3}$; base of anal $3\frac{2}{3}$; anterior margin of ventral 4; base of ventral $4\frac{1}{3}$; eye $4\frac{1}{4}$ in interorbital space.

Body elongate, compressed, rather slender posteriorly, and greatest depth about origin of first dorsal fin. Caudal peduncle compressed, rather slender, also flattened above and below. Upper surface with a pronounced median groove and a transverse slit-like pit at origin of upper caudal lobe. Lower surface shallowly concave medianly, and also with a small pit at origin of lower lobe. Depression along middle of back between dorsals very slight.

Head rather slender, depressed, its greatest width about $1\frac{3}{4}$ in its length, and upper surface convex. Snout rather angular, depressed, and rising up more convexly posteriorly. Eye small, circular, and position a trifle anterior. Nictitating membrane well developed. Symphysis of mandible about opposite front rim of orbit. Mandible rather long, similar to shape of snout. Teeth oblique, slender, sharp pointed, entire, and those in upper jaw directed posteriorly, also with a notch on outer or posterior margin. Lower teeth a little more slender than upper. Tongue broad, flat, and little free except around edges. Each corner of mouth with a short groove running along outer margin of upper jaw. Nostrils nearer front of mouth or orbit than tip of snout, a little oblique, and each with a small pointed flap. Interorbital space broad and convex.

Gill-openings 5, last two above base of pectoral, and median three largest. No spiracle.

Body covered with fine shagreen denticles not especially enlarged on back or fins. Head with numerous small pores.

First dorsal inserted much nearer origin of pectoral than that of ventral, its upper margin about equal to base of fin and slightly undulate, and posteriorly ending in a slender point. Second dorsal inserted about opposite middle of base of anal, smaller than that fin, and ending in a small slender point posteriorly, and reaching about $\frac{3}{5}$ of space to origin of upper caudal lobe. Anal similar in shape, inserted about midway between posterior base of ventral and origin of lower caudal lobe, posterior slender point reaching about $\frac{4}{7}$ of space to latter. Pectoral rather small, posterior margin concave, and length of depressed fin about half way to origin of ventral. Ventral small, entirely behind base of first dorsal, or its origin a little nearer that of pectoral than origin of lower caudal lobe. Claspers long, on their outer margin about $2\frac{1}{4}$ in head.

Color in alcohol gray-brown above, belly and lower surface dirty creamy-white. Lower surface of pectoral and ventral same. Caudal paler along lower portion of vertebral column. Iris slaty.

Length $16\frac{1}{2}$ inches.

One example.

Rüppell suggests that *Pala sorra* Russell[1] may be this species, though later Day[2] considers it equally near *Scoliodon laticaudus* (Müller and Henle). Rüppell's figure is poor, as it shows a much thicker body, especially the caudal peduncle, and a longer snout than my example. The teeth also appear to be figured broader. Bleeker's account[3] agrees, and I follow him provisionally in the identity of the Red Sea form.

PRISTIDÆ.

3. Pristis zysron Bleeker.[4, 5, 6, 7]

---

[1] *Fishes of Coromandel*, I, 1803, p. 9, Pl. 14. Vizagapatam. Madras.

[2] *Fishes of India*, IV, 1878, p. 712, Pl. 188, fig. 2. Madras.

[3] *Verh. Bat. Genoot.* (Bijd. Plag. Ind. Arch.), XXIV, 1852, p. 30. Batavia, in mari.

[4] This species agrees with *Pristis pectinatus* Latham in the absence of a lower caudal lobe. *Pristis semisagittatus* Shaw and *P. perrotteti* Müller and Henle have a pronounced lower caudal lobe. The groups may now stand as:

PRISTIS Linck.

Mag. P. Naturg. Gotha, VI, 1790, p. 31. Type *Squalus pristis* Linnæus.

PRISTIOPSIS subg. nov.

Type *Pristis perrotteti* Müller and Henle.

Lower caudal lobe developed.

(Πρίστις, the ancient name of the sawfish; ὄψις, appearance.)

The teeth in the saws range from 23 to 27 in the left side and 23 to 28 in the right side, the usual number being 26. Eye $2\frac{3}{4}$ to $3\frac{1}{4}$ in interorbital space. Shagreen denticles along median keels of back, anterior margins of dorsals and caudal above, pectorals, ventrals, and along lateral keel of side of tail after ventral, enlarged. Keel after first dorsal obsolete after $\frac{2}{3}$ of space to second dorsal. Origin of first dorsal a little behind that of ventral. Eight examples $23\frac{3}{4}$ to $30\frac{7}{8}$ inches in length.

RHINOBATIDÆ.

4. Rhinobatos thouinianus (Shaw).

Internasal space about $\frac{4}{7}$ in length of nasal cavity. Denticles along middle of back enlarged, those along median line thorn-like. One example $27\frac{1}{2}$ inches long.

DASYBATIDÆ.

5. Dasybatus brevicauda (Swainson).

A small example from the mouth of the Baram river is almost entirely smooth above except the caudal spines and four short spines which precede them on the median line of tail at base of caudal. Length $10\frac{7}{8}$ inches.

Another from the Baram, taken by Messrs. Harrison and Hiller, agrees with Day's figure of *Trygon walga*. It also has the tail a little thickened just beyond tips of caudal spines. Length (caudal broken) $11\frac{1}{2}$ inches.

A young example, possibly this species, is $4\frac{5}{16}$ inches. Dr. Furness.

Swainson's name, *Pastinaca brevicauda*, seems to be the oldest available with any certainty of identification. *Raia fluviatilis* Hamilton[8] is only to be referred to with doubt, as no attempt is made to particularly designate any species under that name. *Trygon immunis* Bennett[9] is described thus: "Tryg. corpore subquadrato, omnino lævi; caudâ longiore, spinis duabus serratis citra medium armatâ." It may possibly be identical, but the account is too brief. *Pastinaca dorsalis*

Subgenus PRISTIS Linck.

Type *Squalus pristis* Linnæus.

No lower caudal lobe.

Nat. Tijds. Ned. Ind., III, 1852, p. 441. Bandjermassing, in fluviis.

First is in *Verh. Bat. Genoot.* (Bijd. Plag. Ind. Arch.), XXIV, 1852, p. 55. Bandjermassing, Borneo austro-orientalis, in fluviis.

[6] *Cat. Fish. Brit. Mus.*, VIII, 1870, p. 438.

[7] *Fishes of India*, IV, 1878, p. 729, Pl. 191, fig. 2. Madras.

[8] *Acc. Fish. Ganges*, 1822, p. 1 (apparently called *Raia lymma*, p. 361).

[9] *Mem. Life of Raffles* (Cat. Zool. Spec.), 1830, p. 694. Sumatra.

Swainson,[10] also based on Russell,[11] is probably identical though following *P. brevicauda*, and therefore to be considered subsequent. All of these names are older than *Trygon walga* Müller and Henle,[12] which has had more general usage.

6. Hypolophus sephen (Forskål).

Tail with a single spine, its length a little greater along free lower edge than space between tip of snout and front of eye. Tail without asperities in front of caudal spine, and apparently not so asperous posteriorly as shown in Day's figure.[13] Only two tubercles in middle of back enlarged. Length 35 inches.

7. Pteroplatea micrura (Schneider).

Length of body from tip of snout to base of tail 2 in width. Greatest width of disk would fall a little nearer center of length than shown in Day's figure.[14] Eye $3\frac{2}{5}$ in interorbital space. Width of disk $8\frac{1}{8}$ inches. Baram river. Alfred C. Harrison, Jr., and Dr. H. M. Hiller.

PLOTOSIDÆ.

8. Plotosus canius Hamilton.

A young example has a more flattened interorbital space than the larger which is $16\frac{3}{4}$ inches. The former has depressed first dorsal also reaching well beyond origin of second fin.

CHLARIIDÆ.[15]

9. Chlarias batrachus (Linnæus).

Head, from tip of snout to gill-opening, 5; depth, about middle of base of dorsal, 7; D. about 67; A. about 54?; space between origin of dorsal and occipital crest $2\frac{1}{2}$ in head from latter point; pectoral reaching about opposite origin of dorsal. One example in bad condition agreeing with my Sumatran specimens.

10. Chlarias leiacanthus (Bleeker).

Head 5; depth at origin of dorsal $6\frac{3}{4}$; width of head $1\frac{2}{5}$ in its length to end of occiput; pectoral spine about $2\frac{1}{4}$; space between dorsal and occiput about $2\frac{3}{4}$. Traces of pale spots in same pattern as those on

---

[10] *Lardner's Cabinet Cyclopædia Nat. Hist.*, II, 1839, p. 319.

[11] *Isacurrah tenkee* Russell, *Fishes of Coromandel*, I, 1803, p. 3, Pl. 4. Vizagapatam. Madras.

[12] *Syst. Besch. Plagiost.*, 1841, p. 159. Indien. Rothes Meer. (Britisches Museum. M. Hardwicke. Leyden, Paris. MM. Roux and Dussumier.)

[13] *Fishes of India*, IV, 1878, Pl. 195, fig. 2.

[14] *L. c.*, Pl. 194, fig. 2.

[15] *Phagorus* McClelland is a valid genus, differing in the confluent rayed dorsal, caudal and anal.

PHAGORUS NIEUHOFII (Valenciennes), examined.

former species. Length 7⅝ inches. Baram river. Messrs. Harrison and Hiller.

CHACIDÆ.

11. Chaca bankanensis Bleeker.

One from Kapuas river. Length 6¼ inches. Messrs. Harrison and Hiller.

SILURIDÆ.

TACHYSURINÆ.

12. Galeichthys sondaicus (Valenciennes).

A very interesting example has the mouth and pharynx nearly filled with ova in all stages of development. They are easily seen in the pharynx through the gill-arches. The largest eggs are about 15 mm. in diameter, the others varying down to rather large shot. Though not dissected the intestinal canal appears to be empty and the fish is a male. Length 12 inches. Two examples from Dr. Furness. Another was secured by Messrs. Harrison and Hiller in 1897.

A small example from the mouth of the Baram secured by Dr. Furness is 5⅞ inches long. Caudal more or less brownish, and no traces of the vertical pale lines shown in Bleeker's figure.[16] In this respect it agrees with the examples noted above, though the maxillary barbels are longer, reaching origins of ventrals.

13. Tachysurus argyropleuron (Valenciennes).

Head 3⅛ to 3⅔; depth 3⅞ to 4⅖; D. I, 7; A. v or vi, 15 or 16; total length of fish 4 to 9½ inches. Rakers short, shorter than filaments, and not numerous. Color in alcohol pale brown above, lower surface white and together with sides washed with silvery. Dorsal and caudal brownish. Pectoral and ventral brownish above, also outer portion of anal. From the largest one I extracted a small Siluroid, evidently the young, which measures a trifle over 2 inches (52 mm.).[17] It does not have the dark or dusky blotch seen on upper portion of adipose fin of the next example in size, and top of the head is nearly smooth or hardly rugose. Snout pale like the belly. The next example, or one second in size, has first dorsal ray prolonged considerably beyond dorsal spine. A third example has interorbital space and snout pale or whitish like belly. Lower fins also whiter and adipose fin a little paler. From the pharynx I extracted eggs, the largest about 10 mm. in diameter.

[16] *Atlas Ichth.*, II, 1863, Pl. (14) 62.
[17] I have not included this specimen in the above measurements, etc.

They all appear to be about the same size or of similar development, no small ones like those seen in the preceding species were noted.

Four examples.

SILURINÆ.

APODOGLANIS gen. nov.

Type *Apodoglanis furnessi* sp. nov.

This genus is related to *Parasilurus* Bleeker, differing in the absence of ventral fins and the fewer anal rays.

(*A*, without; πούς, foot; γλάνις, an old name applied to *Silurus*.)

14. Apodoglanis furnessi sp. nov.

Head $4\frac{3}{5}$; depth $4\frac{3}{4}$; D. 4; A. III, 47; P. I, 10; width of head $1\frac{1}{6}$ in its length; depth of head, about middle of its length, $1\frac{5}{6}$; snout $2\frac{3}{4}$;

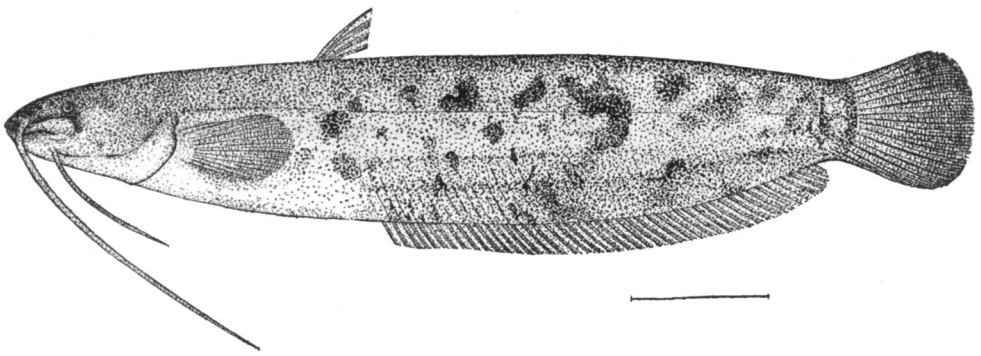

Fig. 2.—*Apodoglanis furnessi* Fowler.

width of mouth $1\frac{1}{2}$; interorbital space $2\frac{1}{10}$; length of dorsal $2\frac{2}{5}$; of caudal $1\frac{1}{3}$; of pectoral $1\frac{4}{7}$; base of anal about $1\frac{7}{8}$ in head and trunk.

Body rather elongate, robust anteriorly, and long anal region strongly compressed. Upper profile from nape to caudal nearly straight. Greatest depth of body about middle of length of body. Depth of base of caudal about $2\frac{1}{6}$ in head.

Head depressed, moderately broad, and triangular in profile. When viewed from above margin broadly convex. Snout broad, slightly convex, and projecting beyond mandible. Eye small, without eyelid, imbedded in skin of head and well anterior. Mouth broad, broadly convex, and with rather thick fleshy lips. A deep pit below front of eye, extended forward as a groove to below maxillary barbel. Teeth in rather broad bands in jaws without any projections, and mandibular series divided at symphysis posteriorly only. Teeth all small and pointed. On each side in front of roof of mouth a small patch of

vomerine teeth. Tongue large, thick, fleshy and hardly free in front. Nostrils with small elevated cutaneous rims, those of anterior pair a trifle more developed. Anterior pair near tip of snout, well separated or with space between nearly double distance each one is anterior to posterior. Posterior internasal space a trifle greater than anterior. Maxillary barbel long, in profile originating just behind anterior nostril and well laterally, and when extended reaching beyond tip of depressed dorsal fin or beyond anterior anal rays a short distance. A single mental barbel well back on each ramus or in profile originating just behind posterior nostril.

Gill-opening extending forward till about opposite front margin of orbit, and left branchiostegal flap folded broadly over right. Rakers short, sparse, pointed, slender, and much shorter than filaments or about equal to diameter of pupil. Filaments a trifle longer than horizontal orbital diameter. A cutaneous keel along margin of shoulder-girdle inside gill-opening.

Body entirely naked. Lateral line a little high at first, but descending till about midway in depth of trunk at beginning of anal fin, and then continuous to base of caudal. All of bifurcations, which form tubes, given off below.

Dorsal without spine, first rays longest, inserted before anal or a little before first third of length of entire fish. Anal long, rays more or less equal, lower margin straight and edges rounded, and insertion of fin a little before tip of depressed dorsal. Caudal broad, margin truncate, and corners rounded. Pectoral broadly expanded, its origin about level with mouth, spine small, about $\frac{2}{5}$ in fin, and depressed fin reaching about $\frac{3}{5}$ of space to origin of anal or not quite opposite origin of dorsal. Ventral absent. Vent close in front of anal fin, with papilla.

Color in alcohol brown, paler below. Fins pale brown. Dorsal apparently unmarked. Basal $\frac{3}{5}$ of anal a slightly tawny-brown, margin pale like dorsal and caudal. Base of caudal dusky, sharply defined, and outer submarginal portion with a broad diffuse dusky shade, showing traces of indistinct darker though diffuse spots. Pectoral unmarked. Back and base of anal variegated with dusky blotches, irregular in size, shape or pattern and definition, though mostly large. Lower surface of head pale brownish. Maxillary barbels like upper surface of head, though under edges like lower surface of head. Mandibular barbels similar to latter. Iris slaty.

Length 7 inches.

Type No. 2,485, W. I. A. P. Baram river, Borneo. 1897. Dr. W. H. Furness.

(Named for Dr. W. H. Furness, 3rd, of Philadelphia, explorer of Borneo, who collected the type.)

15. Ompok nebulosus (Vaillant).

Head $3\frac{9}{10}$; depth 5; D. I, 4; A. 69; P. I, 13; V. I, 10; width of head $1\frac{3}{4}$ in its length, from tip of mandible; depth of head, at occiput, $1\frac{5}{6}$; length of dorsal 2; of lower caudal lobes $1\frac{9}{10}$; of pectoral $1\frac{3}{4}$; of ventral $3\frac{1}{6}$; depth of caudal peduncle $6\frac{1}{3}$; snout $2\frac{3}{5}$ in head, from tip of upper jaw; maxillary $2\frac{1}{2}$; width of mouth $1\frac{4}{5}$; interorbital space 2; eye $6\frac{7}{8}$ in interorbital space; base of anal 2 in total length of fish.

Body elongate, compressed, greatest depth about origin of anal, and upper profile of back nearly straight from occiput to caudal. Lower basal profile of anal gradually sloping up to narrow caudal peduncle.

Head broad, depressed in front and becoming conic posteriorly. Upper profile slightly concave. Anterior margin of head when viewed from above broadly convex. Snout broad, depressed, and with convex margin. Eye small, lateral, ellipsoid, a little anterior, and behind corner of mouth. A deep convex fissure before lower anterior margin of orbit, leaving a narrow preorbital rim. Lips thick and fleshy, with thick folds at corners of mouth. Mandible well protruded. Teeth numerous, sharp pointed, slender, and in rather broad uninterrupted bands with projections in jaws. Vomerine teeth smaller, similar, in two approximated patches anteriorly in roof of mouth, which is otherwise smooth and edentulous. Tongue smooth, broad, thick, fleshy, rounded and but little free on edges. Nostrils small, inconspicuous, and space between each about equal. Anterior nostrils in short cutaneous tubes near front edge of snout, their distance from posterior about $\frac{1}{3}$ of space between. Posterior would fall about midway in space between anterior and front rim of orbit. Maxillary barbel long, slender, filamentous, and reaching beyond tip of depressed dorsal or about first $\frac{3}{10}$ of anal base. Each ramus of mandible with a small thin barbel placed about midway in space between nostrils, and length a trifle greater than same.

Gill-opening extending forward about opposite space between mandibular barbels. Rakers 5+10, first eight just below bend also with an inner prong. Several of those above bend also bifid. In form conic, sharp pointed, firm, and length nearly $\frac{1}{2}$ that of longest filaments. Longest filaments a trifle more than horizontal orbital diameter, or not quite equal to space between anterior and posterior nostrils. Branchiostegal flaps broad, left forming a broad flap over right, and radii 19. Isthmus rather broad and fleshy.

Skin smooth, naked and without papillæ. A number of pores on head, small and inconspicuous. Lateral line a little high at first, and

continuous, composed of short horizontally exposed tubes following one another and not arborescent.

Dorsal rather long, inserted about first third in total length of fish, first ray flexible, and not quite as long as second, which is longest, others graduated down. Anal long basally. Same region also overlaid by a cutaneous membrane extending out on half of depth of fin except posteriorly, where it gradually recedes till about ninth ray from end, where only a little less than a fourth is covered. First few graduated rays of anal enveloped in basal membrane. Caudal comparatively small, forked and lower lobe longer. Pectoral rather broadly expanded, reaching a little past base of dorsal, spine flexible distally, and second, and third rays longest. Ventral small, second and third developed rays longest, rounded, basally covered with membrane which is sharply defined like that of anal though not extending proportionately so far out, and inserted about opposite origin of dorsal. Pectoral with similar membrane to that of ventral basally. Anal begins a little before tip of depressed ventral, and vent in this space close behind ventral.

Color in alcohol deep brown. Abdomen and lower surface of head dull white. Fins brown, becoming dusky marginally on caudal and anal. Dorsal dusky-brown, and ventral more paler or whitish than pectoral. Upper edge of pectoral dusky. Margin of mandible brownish, composed of scattered brown dots of minute size gradually fading off to white of lower surface. Iris slaty brown.

Length $21\frac{3}{4}$ inches.

Three examples, largest described above. The others do not differ, showing about the same fin and branchiostegal radii, though the line of insertion of dorsal and anal is a trifle more anterior.

16. Ompok jaynei sp. nov.

Head $4\frac{2}{5}$; depth $4\frac{3}{5}$; D. 1, 3; A. 56; P. I, 12; V. 7; width of head $1\frac{2}{5}$ in its length; depth of head, at posterior margin of eye, 2; length of dorsal $1\frac{1}{3}$; pectoral $1\frac{1}{1\frac{1}{2}}$; ventral $2\frac{2}{3}$; base of caudal $4\frac{2}{5}$; snout 3, from tip of upper jaw; width of mouth $1\frac{7}{8}$; interorbital space $1\frac{5}{6}$; maxillary $3\frac{2}{5}$; pectoral spine $2\frac{1}{8}$; eye $4\frac{2}{3}$ in interorbital space; base of anal $1\frac{2}{3}$ in total length of fish.

Body long, compressed, upper profile rather evenly curved from tip of snout to dorsal and then more or less straight to caudal. Greatest depth at origin of ventral.

Head deep, flattened below, depressed in front, and somewhat constricted above posteriorly. Snout broad, depressed, and upper margin of head broadly convex when viewed above. Mouth broad, with rather thin lips, and mandible projecting. Eye small, circular, lateral,

anterior, and distinctly behind corner of mouth. A deep fissure before and below eye leaving a narrow preorbital rim. Teeth fine, sharp pointed, and in rather broad bands in jaws without backward projections. Vomerine teeth similar, small, and in two approximated patches in front of mouth. Tongue large, rounded, fleshy, thick, its margin little free and with a small papilla medianly above. Nostrils like those of preceding species, with small cutaneous rims, those of anterior pair better developed. Maxillary barbel long, filamentous and reaching a little more than half of length of entire fish or well beyond tip of depressed dorsal. Mandibular barbel slender, inserted about opposite posterior nostril and reaching about opposite origin of pectoral fin.

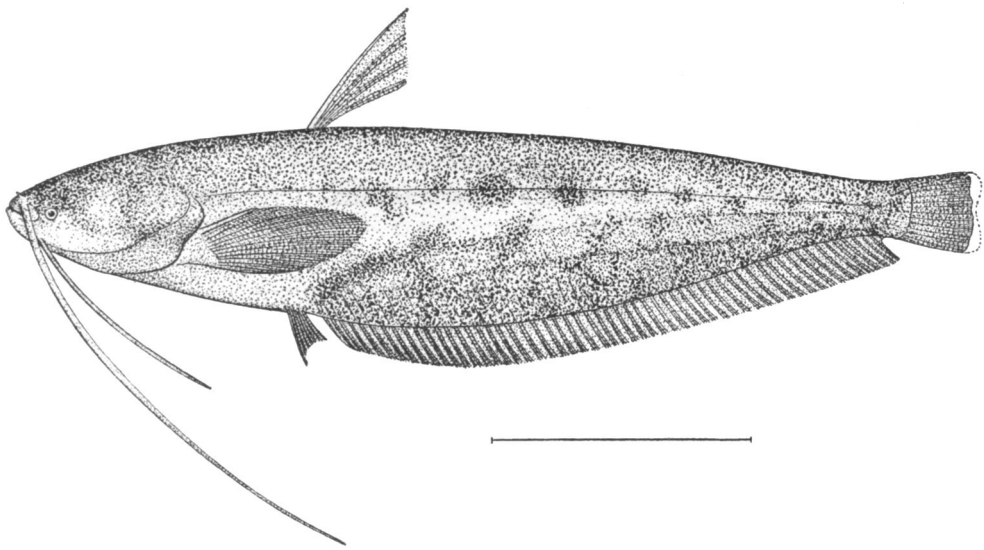

Fig. 3.—*Ompok jaynei* Fowler.

Gill-opening extending forward about opposite posterior nostril. Rakers 2+7, simple, rather firm, slender, pointed, and about $\frac{4}{5}$ of longest filaments. Longest filaments about equal to horizontal orbital diameter. Branchiostegal flaps broad, left one forming a broad flap over right, and radii about 8?. Isthmus broad.

Body naked, skin smooth. Head with a number of pores. Lateral line continued to base of caudal.

Dorsal small, slender, first ray flexible, and insertion of fin a little before first third in entire length of fish. Anal basis long, and basal enveloping membrane also continued along lower edge of caudal peduncle and out on base of caudal. Membrane on base of anal extend-

ing out as in preceding species, and last ray separate from caudal distally. Caudal small, damaged. Pectoral broad, expanded, rounded, median rays longest, and reaching beyond base of dorsal and first anal rays. Pectoral spine pungent, curved, outer margin entire, about $\frac{2}{3}$ length of fin or reaching opposite posterior basal margin of dorsal at least, and basally covered with a rather broad membrane. Ventral inserted about opposite origin of dorsal, small, rounded, reaching a little beyond tip of depressed pectoral, and also covered with a rather broad basal membrane. Vent close behind ventrals, with a papilla, and anal fin close behind it.

Color in alcohol brown, rather paler on trunk than on fins which are pale brownish. Several indistinct brown cloudings or blotches on trunk and base of anal. Barbels brownish. Iris slaty.

Length $3\frac{3}{4}$ inches.

Type No. 13,929, W. I. A. P. Borneo. 1898. Dr. W. H. Furness.

Only one example, the type described above. It is close to *Ompok leiacanthus* (Bleeker), but differs in coloration. That of *O. jaynei* is blotched and has dark ends to the pectoral fins. *Ompok borneensis* (Steindachner)[18] also differs in the uniform coloration, except the dark spot before the caudal.

(Named for Prof. Horace Jayne, formerly Director of the Wistar Institute of Anatomy, of Philadelphia, to whom I am principally indebted for this opportunity of studying the fishes of Borneo.)

17. Kryptopterus cryptopterus (Bleeker).

Head $5\frac{2}{5}$; depth $4\frac{2}{3}$; D. 2; A. 60; P. I, 14; V. I, 5; width of head $1\frac{3}{7}$ in its length; depth of head, at anterior margin of orbit, $2\frac{1}{6}$; width of mouth 2; snout 3; eye $3\frac{1}{4}$; interorbital space $1\frac{2}{3}$; ventral 5; pectoral 5 in head and trunk. Rakers rather long, slender and numerous.

18. Kryptopterus limpok (Bleeker).

Head 6 to $6\frac{1}{3}$; depth 5 to $5\frac{1}{3}$; D. 2; A. 69 to 77; P. I, 14 or 15; V. 1, 7 or 8; pectoral 1 to $1\frac{1}{10}$ in head; ventral $2\frac{1}{6}$ to $2\frac{2}{3}$; pectoral spine $1\frac{3}{5}$ to $1\frac{5}{6}$; width of head $1\frac{1}{3}$ to $1\frac{3}{5}$; snout $2\frac{7}{8}$ to 3, from tip of upper jaw; eye $3\frac{1}{3}$ to $4\frac{1}{10}$; width of mouth $2\frac{1}{10}$ to $2\frac{2}{5}$; interorbital space $2\frac{1}{10}$ to $2\frac{2}{5}$. Inner edge of pectoral spine pectinate. About 12 inches long. Four examples from the Baram river, some from upper waters.

19. Kryptopterus palembangensis (Bleeker).

Head $5\frac{2}{3}$; depth $3\frac{7}{8}$; D. 2; A. 61; P. I, 11; V. 1, 5; width of head $1\frac{1}{2}$ in its length; depth of head at posterior margin of orbit about $1\frac{2}{5}$ in

[18] *Callichrous* (*Silurodes*) *borneensis* Steindachner, *Abhand. Senck. Nat. Ges.* Frankfurt, XXV (2), 1901, p. 445, Pl. 18, fig. 3. Aus dem Baram-Flusse, Borneo. (Herr Prof. Kükenthal.)

its length; snout 3; eye 3; width of mouth $2\frac{1}{4}$; interorbital space 2; depth at base of caudal $2\frac{1}{6}$; length of pectoral 4 in head and trunk; upper caudal lobe $4\frac{9}{10}$. Each ramus of mandible with a short inconspicuous barbel. Rakers rather slender, long and numerous. Pectoral and margin of caudal tinted with dusky. A dark or dusky postopercular blotch. One example $5\frac{3}{4}$ inches long.

20. Micronema phalacronotus (Bleeker).

Head $5\frac{1}{8}$ and $5\frac{1}{4}$; depth $5\frac{7}{8}$ and $5\frac{3}{5}$; A. 85 and 87; P. I, 15, and I, 14; V. 1, 6, and 1, 7; width of head $1\frac{7}{8}$ and $1\frac{4}{5}$; depth of head at posterior margin of eye $2\frac{1}{6}$ and $2\frac{1}{7}$; pectoral $1\frac{1}{5}$ and $1\frac{1}{3}$; base of caudal $4\frac{1}{6}$ and $3\frac{2}{5}$; length of ventral 3 and $3\frac{1}{10}$; width of mouth at corners 2 and $2\frac{1}{10}$; length of snout $2\frac{3}{5}$ and 3 in head, from tip of upper jaw; maxillary $2\frac{2}{3}$ and $2\frac{3}{4}$; interorbital space $2\frac{1}{4}$ and $2\frac{1}{8}$; orbit $5\frac{1}{2}$ and 5. Two examples, larger 12 inches long. Baram river.

Micronema micronema (Bleeker),[19] Java, is closely related, and probably differs in the dark spot at the base of the caudal. The small example described as *Cryptopterus micronema* by Prof. Vaillant[20] cannot belong to this species on account of the exceptionally small number of anal rays. Bleeker's figure of *Micronema typus*[21] is, however, identical with the example before me.

BAGRINÆ.[22]

21. Hemibagrus nemurus (Valenciennes).

Head $3\frac{1}{4}$; depth $4\frac{1}{3}$; D. I, 7; A. IV, 9; width of head $1\frac{1}{2}$ in its length; eye 2 in interorbital space; width of mouth $2\frac{2}{5}$ in head. Depressed dorsal reaching adipose fin, membranes between rays not deeply incised, and rays themselves expanded. Ventral inserted nearly as far forward as opposite middle of base of dorsal, and when depressed reaching origin of anal. No dark humeral blotch. Length 12 inches. Baram river. Male. Harrison and Hiller.

Another example $18\frac{3}{4}$ inches long, with same data, evidently a

[19] *Silurus micronemus* Bleeker, *Verh. Bat. Genoot.* (Sil. Bat. Con.), XXI, 1846, p. —. [Not consulted.]

[20] *Notes Leyd. Mus.*, XXIV, November, 1902, p. 48.

[21] *Atlas Ichth.*, II, 1863, p. 91, Pl. 45 (93), fig. 1.

[22] BAGROIDES MELAPTERUS Bleeker.

Head 4; depth 4; D. I, 7; A. v, 11; width of head $1\frac{1}{3}$ in its length; snout 3; eye $5\frac{3}{5}$; interorbital space 4. Lateral line with a series of minute cutaneous filaments, most distinct anteriorly. Coloration not exactly agreeing with Bleeker's figure. More white on posterior portion of adipose dorsal, and distal portions of dorsal, anal, pectoral and ventral rays darker or deeper than body-color. A brown streak from upper edge of snout horizontally below eye back across cheek, also side of head with more brown. Upper lobe of caudal a little more forked than lower. Length $6\frac{5}{16}$ inches. One example from the Paris Museum in Acad. Nat. Sci. Phila.

female, has: Head $3\frac{1}{3}$; depth $4\frac{2}{5}$; D. I, 7; A. IV, 8; width of head $1\frac{2}{5}$ in its length; eye 3 in interorbital space; width of mouth $2\frac{1}{8}$ in head. Depressed dorsal with only prolonged tips of rays reaching adipose dorsal. The rays of this fin are similar to those found on examples by Prof. Vaillant.[23] In this case the dorsal spine is furnished with a long cutaneous point, while those of the three following branched rays are long, slender and pointed and graduated from the first which is longest. Ventral inserted about opposite the last dorsal rays and when depressed not reaching origin of anal.

22. Hypselobagrus nigriceps (Valenciennes).

Head $4\frac{1}{6}$; depth $4\frac{1}{6}$; snout $2\frac{1}{3}$ in head; eye 4; width of mouth $3\frac{2}{7}$; interorbital space $3\frac{1}{6}$. One example $6\frac{11}{16}$ inches long.[24]

23. Glyptothorax platypogon (Valenciennes).

Head $3\frac{1}{2}$; depth 5; D. I, 6; A. IV, 10; P. I, 9; V. I, 5; width of head $1\frac{2}{5}$ in its length; depth of head over middle of eye $2\frac{1}{3}$; snout $2\frac{1}{10}$; width of mouth 2; dorsal spine $1\frac{3}{4}$, to end of its filament $1\frac{1}{3}$; pectoral spine $1\frac{3}{4}$; length of pectoral fin $1\frac{1}{6}$; ventral $1\frac{7}{8}$; least depth of caudal peduncle $2\frac{1}{2}$; base of anal $1\frac{9}{10}$; interorbital space 4; eye $2\frac{1}{2}$ in interorbital space.

Body rather robust, compressed, and greatest depth about origin of spinous dorsal. Caudal peduncle compressed, rather deep, its least depth about $1\frac{1}{5}$ in its length.

Head broad, convex above, and depressed or flattened below. Upper profile evenly though shallowly convex from tip of snout to origin of spinous dorsal. Snout long, broad, flattened medianly, protruding well beyond mandible, and profile slightly curved. When viewed from above margin of head is broadly convex. Eye small, superior, a little longer than deep, and a trifle posterior in length of head. Mouth broad, and lips rather fleshy and thin. Maxillary barbel broad basally, and reaching a trifle beyond origin of pectoral. Nasal barbel small, reaching a trifle over half way to front of eye. Outer mental barbel not quite extending to origin of pectoral. Inner mental barbel a little shorter than outer. Rather broad bands of fine slender numerous pointed teeth in jaws. No teeth on roof of mouth or on tongue. Tongue broad, thick, but little differentiated, and only its front edge slightly free. Nostrils close together, large, near front edge

[23] *Macrones nemurus* Vaillant, *Notes Leyd. Mus.*, XXIV, November, 1902, p. 54.

[24] This agrees with an example from the Paris Museum in Acad. Nat. Sci. Phila., except as notes above will show. The Academy's example has: Head 4; depth $4\frac{1}{3}$; D. I, 7; A. IV, 7, I; P. I, 10; V. I, 5; width of head $1\frac{4}{7}$ in its length; snout $2\frac{1}{5}$; eye $3\frac{4}{7}$; width of mouth 3; interorbital space $3\frac{3}{4}$; dorsal spine $1\frac{4}{7}$; pectoral spine $1\frac{4}{7}$; base of adipose fin about $2\frac{1}{10}$ in head and trunk. Length $5\frac{1}{8}$ inches.

of snout, and nasal barbel situated between, posterior pair a little more remote from each other than space between anterior pair. Anterior internasal space about $1\frac{2}{5}$ in interorbital space. Top of head convex, and fontanel continued to interparietal region. Occipital process not joining dorsal process.

Gill-opening broad, membranes not free from isthmus, and extending anteriorly about first $\frac{4}{5}$ of snout. Rakers 3+8, slender, pungent, with flexible tips, and longest longer than filaments or about 2 in interorbital space. Knob on shoulder-girdle prominent. Isthmus broad.

Body covered with smooth skin. Traces of coriaceous-like longi tudinal papillæ on head above. Disk laminæ on chest obsolete owing perhaps to preservation. Humeral process with several rather coarse striæ. Lateral line continuous, sloping, and about midway on side of caudal peduncle.

Dorsal fin inserted about midway between tip of snout and origin of adipose fin, spine robust, margins entire, and with a prolonged cutaneous tip. Dorsal rays graduated down from first which is longest. Adipose dorsal small, inserted nearer base of caudal than base of last dorsal ray. Space between dorsal and adipose dorsal with about 9 rather small spinous knobs, rounded and covered with adipose-like tissue, though at least 5 or 6 still distinguishable in profile. Anal inserted a little before origin of adipose dorsal or a little nearer base of last dorsal ray than base of caudal, and radii graduated down from first branched ray which is longest. Pectoral inserted nearer origin of dorsal than tip of snout, spine reaching about opposite base of first dorsal ray, with a cutaneous point almost as long as first or longest ray, and inner margin of spine with about 9 long antrorse spines. Ventral inserted opposite posterior edge of base of dorsal, and reaching $\frac{3}{4}$ of space of anal. Genital aperture and vent well separated, near last third in space between origin of ventral and anal.

Color in alcohol brown, belly, breast and lower surface of head paler. Caudal and dorsal with pale brown or whitish, otherwise dusky, and other fins also marked with brownish. Maxillary barbel brown above, pale or whitish below, and lower mental barbels, like lower surface of head. Iris slaty.

Length $4\frac{1}{2}$ inches.

Twenty-four examples, most of which represent a large series of young. Two of the larger ones agree exactly with Dr. Steindachner's excellent figure,[25] though they have the laminæ on the thorax rather

[25] *Glyptosternum kükenthali* Steindachner, *Abhand. Senck. Nat. Ges.* Frankfurt, XXV (2), 1901, p. 448, Pl. 18, figs. 5, 5*a*. Aus dem Baram-Flusse, Borneo. (Herr Prof. Kükenthal.)

indistinct. I am unable on comparison with Sumatran examples to find any differences except such as may be due to individual variation. The Borneo examples, which may be considered topotypical of *kükenthali*, seem to leave little chance for doubt that Dr. Steindachner's example is simply the adult. All my Sumatran examples show at least traces of the interdorsal spinous knobs or processes, and their coloration evidently was somewhat purplish-tinted, according to my original notes, when first received in arrack.

24. Akysis baramensis sp. nov.

Head $3\frac{1}{2}$; depth $5\frac{1}{2}$; D. I, I, 5; A. II, 6, II; P. I, 5, II; V. I, 5; width

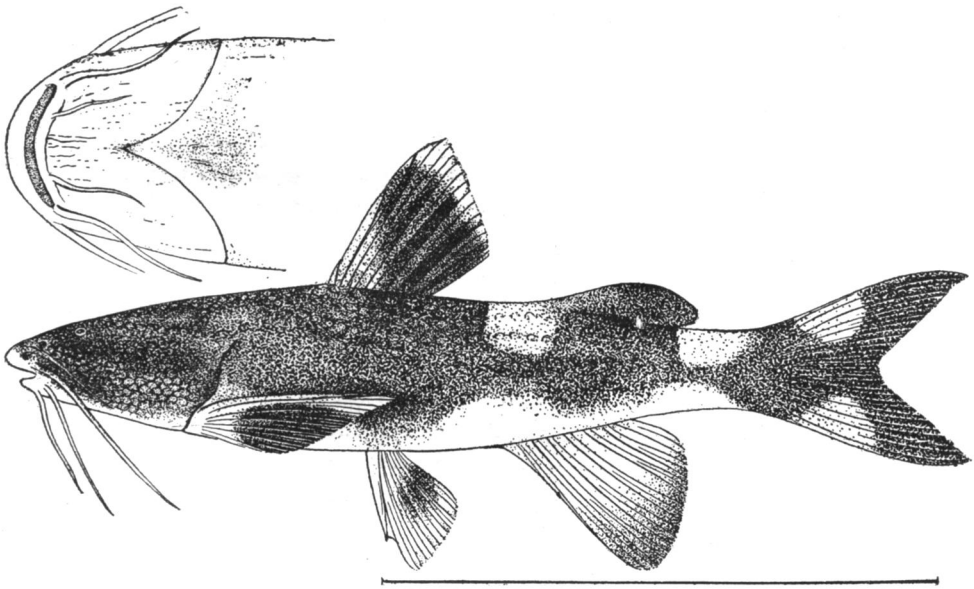

Fig. 4.—*Akysis baramensis* Fowler.

of head $1\frac{1}{4}$ in its length; depth of head $1\frac{2}{3}$; width of mouth 2; length of snout $2\frac{3}{4}$; interorbital space 3; length of depressed dorsal $1\frac{1}{6}$; of lower caudal lobe 1; of pectoral $1\frac{1}{10}$; ventral $1\frac{2}{3}$; least depth of caudal peduncle $2\frac{4}{5}$.

Body elongate, slender, depressed, and greatest depth about opposite middle of depressed pectoral. Caudal peduncle compressed, its least depth about $1\frac{2}{3}$ in its length from posterior base of adipose dorsal fin.

Head broad, depressed, evenly convex above, and lower portion more or less flattened. Breast flattened. Snout produced, broad and

rounded convexly in profile when viewed from above. Eye small, superior, anterior, and eyelid not developed. Mouth broadly convex inferior, and in profile tip of mandible would fall in first $\frac{2}{5}$ of space between tip of snout and front of eye. A band of fine teeth in each jaw, none on roof of mouth or on tongue. Tongue broad, smooth and little free in mouth. Two large nasal cavities on side of snout in front of eye near together, and nasal barbel originating on frenum between. Nasal barbel about equal to ventral or reaching for about first $\frac{2}{3}$ of length of head. Maxillary barbel rather thick at first and reaching about first third of depressed pectoral. Outer mental barbel nearly as long. Inner mental barbel a little over half length of outer. Interorbital space flattened. Occipital process not forming a complete bony bridge to spinous process of dorsal.

Gill-openings inferior, well separated by a broad isthmus, and extending forward about opposite to eye. Rakers about 1+7, slender, pointed, moderately long, and much shorter than filaments. Branchiostegals 7, upper clavate.

Skin smooth, on head and along lateral line more or less papillate, especially former anteriorly. Lateral line complete and median in depth of body along side.

First dorsal inserted about first third of total length of fish, spine robust and about $\frac{3}{5}$ of its own length when combined with adipose-like prolongation, and smooth. When depressed it reaches about $\frac{3}{4}$ of space to origin of adipose fin. Adipose fin large, rather high, and its base about $1\frac{3}{5}$ in head. Anal high, its origin a trifle in advance of that of adipose fin and when depressed its length a little more than that of dorsal. Pectoral a little longer than dorsal, and spine robust with posterior margin coarsely serrate, with an adipose-like prolongation. When depressed not quite reaching opposite posterior basal margin of dorsal, though beyond origin of ventral. Ventral not quite reaching origin of anal. Vent well forward or close behind roots of ventrals.

Color in arrack dusky-brown, forming about five blotches transversely on body, and mostly above. First included in head, second below dorsal, third below adipose fin, fourth on caudal peduncle at base of caudal and fifth on caudal distally. These all connected along middle of side of body by isthmi of same color. Dorsal dusky-brown. Adipose fin largely dusky-brown. Caudal except as noted whitish, and tip of each lobe same. Ventral and anal whitish, except a small dusky blotch on each medianly. Pectoral with spine whitish, fin otherwise dusky. Lower surface of body, including head and abdomen principally, whitish. Paler areas on upper surface of body brownish-white.

Iris slaty. Nasal and maxillary barbels whitish mostly, brownish above, and mental barbels entirely white.

Length $1\frac{7}{8}$ inches.

Type No. 14,149, W. I. A. P. Baram river, Borneo. 1898. Dr. W. H. Furness. Also 25 paratypes with same data.

From *Akysis armatus* Vaillant[26] it differs in the coloration, that species having round pale spots.

This species shows great color variation in alcohol, some examples are almost black, the contrast between the coloration above and below being very pronounced, while in others this is rather obscure. Other examples have the blotches on the body distinct, and also those on the fins, while others are more or less unicolored. The amount of blackish or brownish on the ventrals also varies, in some examples these fins are noticeably dark, while those of others are pale. The largest example measures a little over 2 inches.

(Named for the Baram river in British Borneo.)

COBITIDIDÆ.

COBITIDINÆ.[27]

25. Botia macracantha (Bleeker).

The oblique dark brown band on head not so pronounced as in Bleeker's figure.[28] Anterior margins of pectoral, ventral and anal pale like belly. Color of smaller examples agrees best. Three from the Kapuas river. Harrison and Hiller.

---

[26] *Notes Leyd. Mus.*, XXIV, November, 1902, p. 64, fig. 10.

[27] Prof. Vaillant has recently given an exposition of the differential characters of the fishes of this family. He divides them into two groups based on the presence and absence of the preorbital spine. This appears certainly to be of subfamily value. His *Enopla* will then correspond to the *Cobitidinæ* as proposed above which may be typified by *Cobitis* Linnæus [type *Cobitis tænia* Linnæus]. This group has the erectile spine on the side of the head. The other Loaches, or *Anopla*, may be known as subfamily:

MISGURNINÆ.

No erectile spine on side of head. Typified by *Misgurnus* Lacépède. A species belonging in this group has recently been described by Prof. Vaillant. It appears to differ from *Nemacheilus* Van Hasselt, and may be indicated as a new genus.

VAILLANTELLA gen. nov.

Type *Nemacheilus euepipterus* Vaillant.

It is closely related to *Nemacheilus*, differing at once in the long dorsal basis, the radii numbering about 64.

(Named for Prof. Léon Vaillant, the distinguished ichthyologist of the Museum of Natural History of Paris, and well known for his researches in East Indian ichthyology.)

[28] *Atlas Ichth.*, III, 1863, Pl. (1) 102, fig. 2.

HOMALOPTERIDÆ.

HOMALOPTERINÆ.[29]

Ventrals separate, not united to form a disk.

26. Homaloptera orthogoniata Vaillant.

Head 5; depth $4\frac{7}{8}$; D. III, 8; A. III, 6; P. V, 10, I; V. II, 8; scales 63 in lateral line to base of caudal; 20 scales before dorsal; 11 scales obliquely back from origin of dorsal to lateral line; 12 scales obliquely forward from origin of ventral to lateral line, and same of anal; width of head $1\frac{1}{4}$ in its length; depth of head over eye $2\frac{1}{6}$; snout $1\frac{5}{6}$; width of mouth 4; interorbital space $2\frac{4}{5}$; first developed dorsal ray 1; first developed anal ray $1\frac{2}{7}$; length of ventral 1; least depth of caudal peduncle $2\frac{1}{8}$.

Body elongate, somewhat compressed, rounded in middle, lower or ventral region of head and abdomen flattened, and trunk posteriorly well compressed. Upper profile anterior to dorsal more or less evenly convex. Greatest depth about origin of dorsal fin. Caudal peduncle compressed, and its least depth about half its length.

Head flattened below, more or less evenly convex above, and upper profile nearly straight or only very shallowly convex. Snout long, tip rounded and produced well beyond mouth. Eye small, high, directed rather laterally, near first $\frac{3}{5}$ in length of head, and with free eyelid. Mouth inferior, rather small, and lips thick and fleshy. Jaws rather soft, especially upper. Lower lip formed into three thick fleshy folds. A short thick conical cirrus at each corner of mouth, and 4 more along front edge of snout just above upper lip. Tongue not distinct. Nostrils adjoining, frenum between narrow, posterior much the larger and about in last third of length of snout. Interorbital space rather broad, a little convex and greater than internasal space.

Gill-opening lateral, not quite reaching forward till opposite posterior margin of eye. Rakers short points, much shorter than filaments, and not numerous. Isthmus broad, its width equal in length to gill-opening.

Scales rather small, especially those on lower costal region where they crowd out and completely cover abdomen. Breast, head and fins, except a few small scales on base of caudal, entirely naked. Scales on post-ventral region large like those on side of body. Inner basal regions of pectoral and ventral also naked. Lateral line of simple

[29] I have not consulted the original account of *Homaloptera* Van Hasselt. The earliest one I have seen is in *Bull. Sci. Nat. Geol.* Paris, II, 1824, p. 377. I accept the name in accordance with Bleeker's restriction of *Homaloptera javanica* Van Hasselt as the type.

tubes, nearly median in depth of body and continuous. A number of small pores on head.

Dorsal inserted a little nearer tip of snout than base of caudal or a little before origin of ventral, and first developed ray highest, though not reaching as far posteriorly as tip of last ray when fin is depressed. Anal well posterior, inserted about midway between origin of ventral and base of caudal, and first developed ray, which is longest, reaching well beyond last ray, when fin is depressed. Caudal damaged, evidently little if any emarginate. Pectoral with first simple rays robust, fin broad, rounded and reaching about $\frac{5}{6}$ of space to origin of dorsal. Ventral similar, only with first two rays simple and enlarged, and when depressed reaching posteriorly about as far as tip of last dorsal ray or almost to vent. Vent near tip of ventral well before origin of anal.

Color in alcohol brown, clouded with large distinct blotches or areas of deep brown, irregular though one distinct between dorsal and ventral. Ventral surface a little paler brown than upper surface. A brown streak from tip of snout to eye, and continued behind up to occiput, and another down across side of head. These streaks all with narrow pale brownish margins. Dorsal and anal brownish-white clouded with dull blackish or blackish-brown. Anal similar, also pectoral and ventral, though these fins all have more white and the dark colors more diffuse. Iris slaty.

Length $4\frac{1}{3}$ inches.

Eight examples.

These beautiful fish all vary in the markings, some having the pale areas most pronounced, while in others the dark markings predominate. In the young they appear best defined, some having the ventrals with much black.

HOMALOPTEROIDES gen. nov.

Type *Homaloptera wassinkii* Bleeker.

Dorsal inserted well behind ventral, while in *Homaloptera* it begins in advance.

(*Ὁμαλός*, level; *πτερόν*, wing or fin; *εἶδος*, appearance.)

27. Homalopteroides wassinkii (Bleeker).

Head 4; depth 7; D. III, 7, 1; A. II, 5, 1; P. V, 9; V. II, 7, 1; scales in lateral line about 38 from gill-opening to base of caudal; 18 scales before dorsal; about 7 scales in an oblique series from origin of dorsal to lateral line; about 5 scales obliquely forward from origin of anal to lateral line; about 15 scales between dorsal and caudal on middle of back; width of head $1\frac{1}{3}$ in its length; depth of head over posterior margin of orbit 2; length of snout $2\frac{1}{10}$; eye $3\frac{1}{2}$; width of mouth about 4; interorbital space $3\frac{2}{5}$; length of depressed dorsal $1\frac{1}{6}$; of caudal about

same; of anal $1\frac{4}{5}$; of pectoral $3\frac{2}{5}$ in head and trunk; of ventral $4\frac{2}{5}$; least depth of caudal peduncle 3.

Body slender, depressed, elongate, convexly rounded above and flattened below, only caudal region of trunk compressed. Greatest depth about origin of dorsal. Least depth of caudal peduncle about $1\frac{2}{5}$ in its length.

Head triangular when viewed above, tip rounded, convex above and flattened below. Snout more or less depressed above. Eye large, superior, rounded, and a trifle posterior in head. Mouth convex, rather small, and jaws cartilaginous. Four superior barbels on upper lip, and one at each corner of mouth which is a little the longer. Tongue not free or distinct. Interorbital space slightly convex. Nostrils close together, posterior much larger, and close to front of eye.

Gill-opening lateral, a little less than width of broad isthmus.

Scales moderately small, those on anterior part of body smaller than elsewhere. Breast naked and scales on costal region not altogether extending over median ventral line. Head and fins naked. Lateral line of simple tubes, and continuous to base of caudal midway on side.

Origin of dorsal a little behind origin of ventral or a little nearer base of caudal than tip of snout. Origin of anal a little nearer base of caudal than origin of ventral, and reaching about $\frac{2}{3}$ of distance to former. Caudal emarginate. Pectoral large, reaching ventral. Ventral reaching for $\frac{2}{3}$ of distance to anal.

Color in arrack brown with about 5 diffuse brown blotches on back. Lower surface whitish. Fins whitish, dorsal and caudal slightly darker, and all with several brown blotches. Iris slaty.

Length $1\frac{7}{8}$ inches.

Fifteen examples.

GASTROMYZONINÆ.

Ventral fins united to form a disk.

28. Gastromyzon borneensis Günther.[30]

Head $4\frac{5}{6}$; depth at origin of dorsal 6; greatest width of body $3\frac{1}{2}$;

[30] *Ann. Mag. Nat. Hist.* Lond., XIV (4), 1874, p. 454. Mountain torrents of the interior of Borneo. "These specimens come from the sources of the Mingalong river." (British Museum.)——Steindachner, *Abhand. Senck. Nat. Ges.* Frankfurt, XXV (2) 1901, p. 455. Aus dem Baram-Flusse auf Borneo. (Herr Prof. Kükenthal.)——Vaillant, *Notes Leyd. Mus.*, XXIV, November, 1902, pp. 18, 23. Haut Sibau. (Kapoeas supérieur—Bassin du Sibau.) Bloeoe. (Mahakan ou Koetei supérieur.)

Lepidoglanis monticola Vaillant, *Congr. Int. Zool. Paris*, Compt. Rend., 1889 (1890), p. 82. La montagne de Kina Balu. Borneo. (M. Whitehead.)

Gastromyzon monticola Vaillant, *Bull. Soc. Philomathique*, Paris, Compt. Rend., III (8), 1890–91 (1891), p. 6. [Remark.]——Vaillant, *Nouv. Arch. Mus. Hist. Nat.* Paris, V (3), 1893, p. 94, Pl. 1, figs. 3–3*e*. Kina-Balou. (M. Whitehead.)

D. III, 6, II; A. I, I, 4, I; P. 28; V. 16, IV; scales about 63 in lateral line to base of caudal, and tubes in about same number; about 36 small scales before dorsal; about 15 scales in a vertical series between origin of dorsal and lateral line; 8 scales obliquely back from origin of anal to lateral line; about 28 scales between last dorsal ray and first rudimentary caudal ray; head, to occiput, $1\frac{1}{5}$ in its greatest width; length of snout about $1\frac{1}{2}$ in length of head to gill-opening; width of mouth only a trifle less; interorbital space 2; internasal space $3\frac{1}{2}$; greatest width of breast between bases of pectorals ventrally equal to greatest width of head, and same of ventrals $1\frac{3}{5}$ in latter; length of depressed dorsal a little less than length of head; caudal 1; length of depressed anal $1\frac{1}{3}$; least depth of caudal peduncle $2\frac{1}{2}$.

Body depressed, broad, narrow in profile with greatest depth at origin of dorsal. Greatest width of body that of head opposite gill-openings. Ventral surface flattened, and with a small cutaneous or fleshy flap on costal region between pectoral and ventral. Caudal peduncle small, compressed, and its length about equal to its least depth.

Head large, convex above, flattened below and separated from breast by a thin cutaneous fold. When viewed from above profile is truncate in front. Snout pronounced, though not beyond margin of disk. Cheek not convex. Mouth very broad, without teeth, osseous jaws smooth, and lips thin, upper broader. Tongue not developed. A small, short, fleshy papilla at each corner of mouth, and four others along upper lip. Eye small, circular, superior, directed laterally, and near last fourth in length of head. Eyelid free. Nostrils conspicuous, adjoining or only separated by a thin frenum, and near last third in length of snout. Interorbital space broad, a trifle convex, or rather flattened.

Gill-opening small, its length a little more than orbit, and nearly midway in depth of head above base of pectoral.

Scales small, striate, and those on anterior part of body minute and crowded. Head naked and also entire lower surface within disk. Fins scaleless. Scales extending on post-ventral region. Head with a number of small pores above. Lateral line of simple tubes, continuous, and about midway in depth of body.

First branched dorsal ray highest, and origin of fin midway in body without caudal. Anal well posterior, first ray spine-like, first branched ray longest, origin of fin nearer base of caudal than base of last dorsal ray, and depressed fin reaching past latter. Caudal oblong, expanded and truncate with rounded corners. Pectoral and ventral arranged to form an abdominal disk, and both with long bases. Radii of both

fins also graduated so that posterior are longest. Ventral fins united posteriorly by a membrane, though both bases are distinct.

Color in alcohol blackish-brown generally, disk pale brownish or whitish. Narrow vermiculating lines of pale brownish on head above. Upper surface of body with irregular, pale and somewhat vermiculating diffuse lines, leaving possibly eight or nine blotches medianly. Three laterally entire length of trunk. Dorsal and caudal brownish-white, with about three broad blackish-brown transverse bands. Pectoral and ventral dusky above, edges narrowly pale and upper surface mottled with dark brown more or less diffusely. Ventral paler. Both fins tinted with a little brownish below. Anal pale with a submarginal and basal tinge of brownish. Iris slaty.

Length 4 inches.

A large series of 193 examples of all ages. Individual variation in color is very noticeable. The larger or adult examples all have the pale vermiculating lines on the head pronounced, though in some they are more numerous. In a number of young examples $1\frac{3}{4}$ inches long they are fewer, like the specimen described. The markings on the fins and body also vary greatly, and sometimes the latter form vertical bands. Some small examples are nearly uniform brown above in alcohol. Others have the upper surface of the head marked with very numerous small brown spots, due to the equally numerous pale reticulating lines. Young examples also differ in their relatively shorter body and rounded profile of front of head when viewed from above.

CYPRINIDÆ.

LABEONINÆ.

29. Dangila cuvieri Valenciennes.

Head $4\frac{2}{3}$; depth $3\frac{3}{4}$; D. IV, 26; A. III, 6; scales 35 in lateral line to base of caudal and 2 more on latter; snout $2\frac{2}{3}$ in head; eye $3\frac{1}{6}$; interorbital space $2\frac{2}{5}$; pectoral $1\frac{1}{10}$; ventral $1\frac{1}{8}$; least depth of caudal peduncle $2\frac{1}{10}$. Length $5\frac{1}{16}$ inches.

30. Osteochilus melanopleurus (Bleeker).[31]

Four examples. One from the Kapuas river in western Borneo,

[31] OSTEOCHILUS VITTATUS (Valenciennes).

Three small examples in the Academy from the Paris Museum. Bleeker's figure evidently represents the adult in which the lateral band is lost. The two small examples before me have this very distinct, and above and below with traces of indistinct series of pale spots longitudinally or parallel. Just before root of caudal appears a dark spot, another at latter, and both in dark lateral band. Traces of this are seen in the larger example, though its colors are paler. It measures about $2\frac{7}{8}$ inches (72 mm.) in length. Bleeker's figure occurs in *Atlas Ichth.*, III, 1863, Pl. (16) 117, fig. 2, not plate 17 or 118 as referred to in the text.

taken by Harrison and Hiller in 1897, has: Head $3\frac{2}{5}$; depth $2\frac{2}{5}$; D. II, 18; A. III, 6; scales 50 to base of caudal, 2 more on latter; length $7\frac{1}{4}$ inches. It agrees well with Bleeker's figure in the color pattern. Three other examples from the Baram river, one, taken by Dr. Furness in November, 1898, measures $20\frac{1}{2}$ inches, while the others, secured by Harrison and Hiller, measure 19 and 24 inches respectively. They show: Head $3\frac{2}{3}$; depth $2\frac{3}{5}$ to 3; D. IV, 16 to 18; A. III, 6; scales 41 to 44 in lateral line to base of caudal, and 5 or 6 more on latter; 10 scales between origin of dorsal and lateral line and 8 obliquely forward from origin of anal to latter; width of head $1\frac{4}{7}$ to $1\frac{3}{5}$ in its length; snout $2\frac{2}{3}$ to $2\frac{3}{5}$; eye $5\frac{1}{3}$ to $5\frac{7}{8}$; interorbital space about 2; least depth of caudal peduncle $1\frac{4}{5}$ to 2. Dr. Furness's example shows the bases of all the fins, at present in alcohol, pale buff with a slight pinkish tint. The silvery spots of the smaller example from the Kapuas are not evident. Also another example, $10\frac{1}{4}$ inches long, from Dr. Furness. It was taken in the Baram river in 1897.

31. Osteochilus kappenii (Bleeker).

Head $3\frac{7}{8}$; depth $2\frac{1}{2}$; D. IV, 17; A. III, 6; scales 29 in lateral line to base of caudal, 3 more on latter; $5\frac{1}{2}$ scales between origin of dorsal and lateral line, and $4\frac{1}{2}$ between latter and origin of ventral; width of head $1\frac{1}{2}$ in its length; snout 3; eye 4; interorbital space 2. Snout short and broad, obtuse, and its length in profile but little more than diameter of eye. Back well elevated, nape well convex, and upper anterior profile steep and straight. Pectoral long, nearly reaching origin of ventral. Along each series of scales longitudinally a well-defined brown band. On caudal peduncle at base of caudal traces of a brown spot. One example $3\frac{7}{8}$ inches (about 98 mm.) in length.

This example seems to agree somewhat with the notes under *Osteochilus kahajanensis* of Dr. Steindachner from the Baram river. In Bleeker's original account[32] the depth will be seen to be a little over 4 in what is presumably the total length, while the head is given as $5\frac{1}{2}$. Bleeker's figure,[33] published later, agrees except that the head is a little larger. Dr. Steindachner gives the depth[34] as $2\frac{2}{5}$ to $2\frac{2}{3}$, which is certainly not in agreement with *kahajanensis*.

32. Osteochilus harrisoni sp. nov.

Head $3\frac{3}{4}$; depth $2\frac{4}{5}$; D. II, 16; A. III, 5, 1; P. 1, 15; V. 1, 8; scales 33 in lateral line to base of caudal, and 2 more on latter; 6 scales be-

[32] *Rohita kahajanensis* Bleeker, *Act. Soc. Sci. Ind. Neerl.* (Tiend. Bijd. Ich. Born.), II, 1857, p. 18. In flumine Kahajan, Borneo meridionalis.
[33] *Atlas Ichth.*, III, 1863, Pl. (8) 109, fig. 1.
[34] *Abhand. Senck. Nat. Ges.* Frankfurt, XXV (2), 1901, p. 452.

tween origin of dorsal and lateral line obliquely back, uppermost scale very small; 5 scales between lateral line and origin of ventral, lowest scale very small; 10 scales before dorsal; width of head $1\frac{1}{2}$ in its length; depth of head $1\frac{1}{3}$; snout $2\frac{2}{5}$; eye $4\frac{1}{2}$; width of mouth $4\frac{1}{2}$; interorbital space 2; second simple dorsal ray $1\frac{1}{10}$; second simple anal ray $1\frac{1}{3}$; pectoral $1\frac{1}{5}$; ventral $1\frac{1}{6}$; least depth of caudal peduncle $1\frac{3}{4}$; lower caudal lobe $3\frac{1}{10}$ in head and trunk; base of dorsal $2\frac{7}{8}$.

Body elongate, compressed though robust, greatest depth at origin of dorsal, and profiles more or less similarly convex. Back but little elevated and its profile convex from occiput to dorsal. Caudal peduncle robust, compressed, and its least depth about equal to its length.

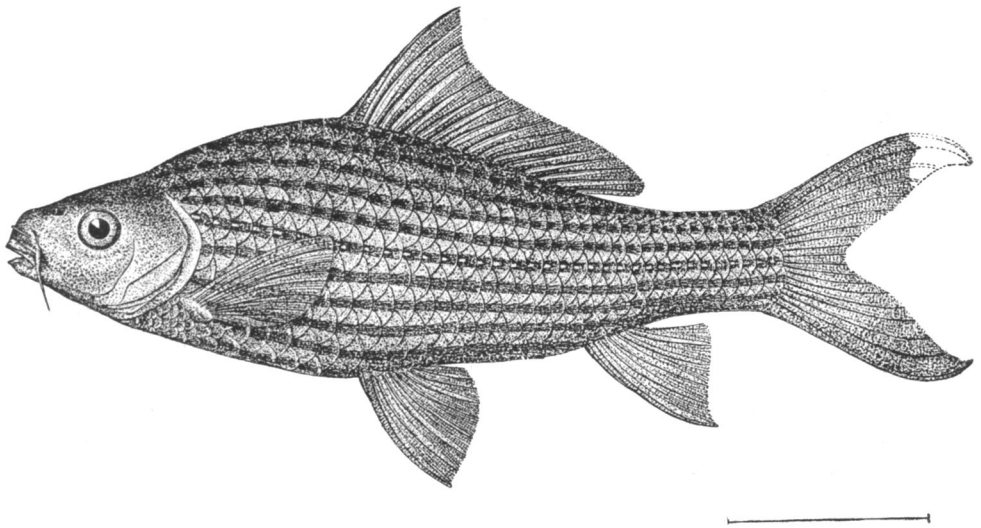

Fig. 5.—*Osteochilus harrisoni* Fowler.

Head rather small, compressed, broad, robust, and both upper and lower profiles inclined similarly, also nearly straight. Snout long, broad, convex, obtuse above, and somewhat declivous in front. Eye rather small, a little posterior to middle of length of head, circular, and not much above middle of depth of head. Pupil large and circular. Mouth inferiorly terminal, broad, the gape not extending far laterally. Lips rather thick, fleshy and plicate. Jaws horny and with a rather sharp edge. Premaxillaries protractile. Four upper mental barbels, upper lateral near edge of snout, and lower at corner of mouth, also much longer or about reaching opposite middle of orbit. Nostrils adjoining anterior in a short cutaneous tube, lateral, much nearer eye

than tip of snout and level with upper margin of eye. Preorbital not distinct, and together with cheek covered with skin. Interorbital space elevated a little convexly and flattened medianly.

Gill-opening lateral, extending forward about opposite posterior margin of preopercle. Rakers in form of a low fringe of fine or minute filaments. Filaments long, about equal to orbit. No pseudobranchiæ. Width of isthmus where gill-membranes join about equal to orbit.

Scales large, cycloid, and well exposed, also of more or less even size. Scales on breast small, especially anteriorly. Small scales along bases of dorsal and anal. A pointed scaly ventral flap in axil of fin about $\frac{2}{5}$ its length. Head and fins naked, except base of caudal. Lateral line of short exposed single tubes, and continuous even on base of caudal.

Origin of dorsal about opposite tip of depressed pectoral or a little before origin of ventral, second simple ray highest, next three graduated down, after which they are all more or less of one size. Anal beginning a trifle before base of last dorsal ray, and second simple ray also longest. Caudal forked, lobes rather pointed. Pectoral small, and inserted low. Ventral not quite reaching vent or about $\frac{2}{3}$ of space to anal.

Color in alcohol dull olivaceous-brown, paler below and on sides of head. Fins pale brownish, dorsal and caudal scarcely darker. Each series of scales marked by a bar, making about ten longitudinal dark lines or bands less in width than pupil of eye, and dusky or most distinct above lateral line. Iris olivaceous, pupil slaty. Peritoneum silvery. Length 9 inches.

Type No. 2,392, W. I. A. P. Baram river, Borneo. 1897. Mr. Alfred C. Harrison, Jr., and Dr. H. M. Hiller. Also No. 13,897, W. I. A. P. Paratype. Same data.

This species is close to *Osteochilus kahajanensis* (Bleeker), which has been reported from the Baram river by Dr. Steindachner, but differs apparently in the distinct longitudinal narrow brown stripes. My examples also have no blue spot on the shoulder-girdle, though in alcohol the other color markings are fairly distinct.

(Named for Mr. Alfred C. Harrison, Jr., of Philadelphia, explorer of Borneo and Sumatra, who collected the type.)

33. Garra borneensis (Vaillant).

Head $5\frac{1}{2}$; depth $5\frac{1}{2}$; D. III, 8, 1; A. II, 5, 1; scales 26 in lateral line to base of caudal, and 2 more on latter; width of head $1\frac{1}{4}$ in its length; snout 2; eye 4; width of mouth $2\frac{3}{5}$; interorbital space $2\frac{1}{4}$. Color in alcohol deep brown above, side paler, and lower surface pale brown. A broad deep slaty-dusky band enclosing lateral line from eye to base of caudal and running out on caudal in lower caudal lobe. A brownish

streak at bases of upper rays of upper caudal lobe. Dorsal dusky, and with a median longitudinal pale line. Pectoral and ventral brownish, a little paler than caudal, and latter with a broad diffuse pale tint transversely and medianly. Anal pale brownish. Iris slaty with a narrow inner pale circle adjoining pupil. Length $3\frac{1}{8}$ inches.

Six examples. The five other examples show the following: Head $4\frac{1}{3}$ to 5; depth $4\frac{1}{2}$ to 5; scales 26 or 27 in lateral line to base of caudal, usually 2 more on latter; snout about 2, seldom a little more; eye $3\frac{3}{4}$ to 4; total length $2\frac{1}{2}$ to $2\frac{7}{8}$ inches (54 to 73 mm.).

34. Lobocheilos hispidus (Valenciennes).

Head $4\frac{4}{5}$; depth 4; D. IV, 8, 1; A. IV, 5, 1; scales 34 in lateral line to base of caudal, and 2 more on latter; width of head $1\frac{1}{2}$ in its length; depth of head, at anterior margin of orbit, 2; snout $2\frac{1}{6}$; eye $4\frac{3}{4}$; interorbital space 2; width of mouth $2\frac{1}{3}$; least depth of caudal peduncle $1\frac{4}{5}$; length of depressed dorsal $3\frac{1}{3}$ in head and trunk; length of lower caudal lobe $2\frac{2}{3}$; length of pectoral 4; length of ventral $3\frac{9}{10}$; length of anal, $3\frac{5}{6}$. Length $7\frac{3}{4}$ inches.

A single example which agrees with Bleeker's figure,[35] though there are more pores on the snout than he represents.

MYSTINÆ.[36]

35. Labeobarbus douronensis (Valenciennes).[37]

Head $3\frac{1}{2}$; depth 3; D. III, I, 8, 1; A. III, 5, 1; scales 19 in lateral line to base of caudal, and 2 more on latter; 8 scales before dorsal; width of head 2 in its length; snout 3; eye 4; interorbital space $3\frac{1}{10}$; mouth $3\frac{1}{4}$; least depth of caudal peduncle $2\frac{1}{3}$; pectoral $1\frac{1}{6}$; ventral $1\frac{1}{3}$. Length $6\frac{3}{4}$ inches.

A single example which agrees with Bleeker's figure.[38] It will be seen to differ in the deeper body and higher back. There are no dark dots on the upper surface of the body, which is darker brown than the lower, in my example.

36. Cyclocheilichthys megalops sp. nov.

Head 3; depth 3; D. III, I, 8; A. III, 6; P. I, 18; V. I, 9; scales 32 in lateral line to base of caudal, and 3 more on latter; 12 scales before

---

[35] *Atlas Ichth.*, III, 1863, Pl. (7) 108, fig. 2.

[36] This name is proposed in place of *Barbinæ* for the Barbels, as *Mystus* Klein, in Walbaum, *Pet. Arted. Pisc.*, III, 1792, p. 586, is much older than *Barbus*. Walbaum's name is considered typified by *Cyprinus barbus* Linnæus.

[37] SIAJA MICROLEPIS (Bleeker).

One in the Academy from the Paris Museum. Bleeker's figure does not indicate the striæ on the head which are well displayed in this example. The upper margin of the dorsal is also dusky. Borneo.

[38] *Atlas Ichth.*, III, 1863, Pl. (21) 122, fig. 2.

dorsal; 7 scales obliquely back from origin of spinous dorsal to lateral line; 5 scales obliquely forward from origin of spinous anal to lateral line; width of head $2\frac{1}{8}$ in its length; depth of head, over middle of orbit, $1\frac{4}{7}$; snout $2\frac{3}{4}$; eye 3; maxillary $3\frac{1}{2}$; interorbital space $3\frac{1}{2}$; length of depressed spinous dorsal a trifle more than head; of anal $1\frac{1}{6}$; of pectoral $1\frac{1}{3}$; of ventral $1\frac{1}{4}$; least depth of caudal peduncle $2\frac{1}{2}$.

Body moderately elongate, well compressed, and greatest depth about origin of dorsal, so that back is a little elevated. Upper profile nearly straight from tip of snout to origin of dorsal. Caudal peduncle compressed, its least depth about $1\frac{1}{8}$ in its length.

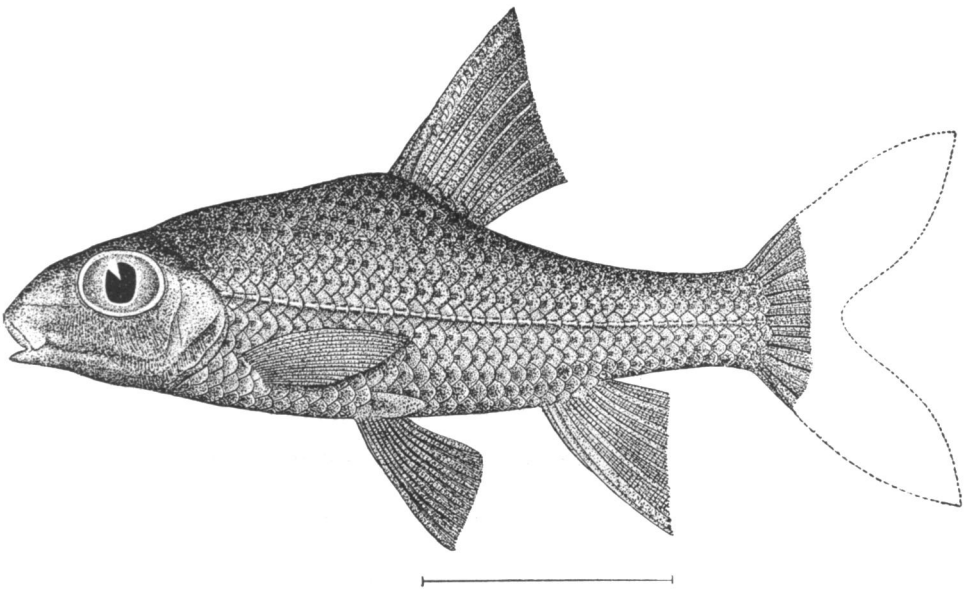

Fig. 6.—*Cyclocheilichthys megalops* Fowler.

Head compressed, moderately long, and upper profile horizontally oblique and straight. Snout rather long and obtuse. Eye large, longer than deep, a little anterior and high. Pupil large, vertical. Mouth inferior and terminal, upper jaw about even with tip of snout. Lips rather thin and transversely plicate. Tongue little free or distinct. Mandible inferior, not extending forward opposite tip of upper jaw. Upper jaw protractile. A small pointed maxillary barbel at corner of mouth. Nostrils adjoining, close in front of upper orbital rim. Preorbital long, about $\frac{7}{8}$ of length of horizontal orbital diameter. Interorbital space flattened, a trifle concave medianly.

Gill-opening lateral, not extending quite as far forward as posterior margin of orbit. Rakers 3+5, soft fleshy slender processes, much shorter than filaments, which are about equal to horizontal diameter of pupil. Isthmus broad.

Scales large, arranged in parallel horizontal series, and cycloid. A row of scales along base of dorsal and anal, each forming an adnate sheath. Base of caudal scaly. A scaly pointed flap at inner base of pectoral. Head and fins with these exceptions naked. Skin of head with numerous parallel striæ or plications, transverse above and vertical laterally. Lateral line of single tubes continuous, a little decurved at first till horizontal.

Origin of dorsal about opposite that of ventral, nearer base of caudal than tip of snout, fourth ray spine-like with posterior edge becoming coarsely serrated above, and when depressed first branched ray reaches well beyond others or about $\frac{2}{3}$ of distance to base of caudal. Anal inserted about midway between origin of dorsal and base of caudal, third ray enlarged but with flexible tip, and depressed fin reaching opposite base of caudal. Caudal damaged. Pectoral low, small, and reaching back for about first fifth of length of ventral. Ventral with first branched ray longest and reaching anal.

Color in alcohol brown, lower surface paler and with traces of silvery. Each scale on back with a dusky-brown spot, regular in disposition, so that longitudinal series are formed, and several persisting even below lateral line, but lowest much paler than those above. Lower surface of head pale like abdomen. Fins same color, dorsal more or less tinted with dusky, and caudal and anal with brownish. Iris pale brassy-brown.

Length $3\frac{3}{8}$ inches (caudal damaged).

Type No. 13,928, W. I. A. P. Borneo. 1898. Dr. W. H. Furness.

One example, the type. It agrees with Bleeker's description of *Capœta enoplos*, but his figure[39] agrees with Sumatran examples of *Cyclocheilichthys siaja*, which may be distinguished by the smaller eye, always less than a third of the length of the head. In *Cyclocheilichthys megalops* the eye is large, about 3 in the head, and the body is comparatively deeper.

(*Μέγας*, great; *ὤψ*, eye.)

37. Puntius schwanenfeldii (Bleeker).[40]

Head $3\frac{1}{2}$; depth 2; D. III, I, 8, 1; A. II, I, 5, 1; scales 33 in lateral

[39] *Atlas Ichth.*, III, 1863, p. 82, Pl. (27) 128, fig. 2.

[40] Species of this genus in the Academy from the Paris Museum are:
PUNTIUS BULU (Bleeker).
Fins all with brownish shades anteriorly.
One example.

line to base of caudal, and 3 more on latter; 8 scales between origin of dorsal and lateral line, and 6 between latter and origin of anal; width of head $1\frac{7}{8}$ in its length; snout $3\frac{1}{4}$; eye 3; mouth $3\frac{1}{2}$; interorbital space $2\frac{1}{4}$; least depth of caudal peduncle $1\frac{2}{3}$; pectoral $1\frac{1}{6}$; ventral $1\frac{1}{10}$. Dorsal with upper anterior lobe blackish, and this color extending along upper margin of fin nearly to end of last ray. One example $5\frac{1}{4}$ inches long. Kapuas river. Harrison and Hiller.

Bleeker's figure[41] agrees, though the Sumatran examples all show the caudal more forked and the lobes very long. Head 3 to $3\frac{1}{3}$ and depth $2\frac{1}{3}$ to $2\frac{1}{2}$.

38. Hampala macrolepidota (Valenciennes).

Two large examples 10 inches long do not show any blotches on the side. Baram. Harrison and Hiller.

A small example collected by Dr. Furness has a large diffuse dark blotch below dorsal and another on caudal peduncle before base of caudal.

39. Leptobarbus hoevenii (Bleeker).

One example.

40. Rasbora dusonensis (Bleeker).

Margin of caudal dusky or blackish. Two examples, larger $7\frac{11}{16}$ inches.

41. Rasbora leptosoma (Bleeker).[42]

Head 4; depth $4\frac{2}{3}$; D. II, 7, 1; A. III, 5, 1; scales (pockets) about 27 to base of caudal; snout $3\frac{1}{2}$ in head; eye 3; interorbital space $2\frac{7}{8}$. A lateral band tinted with silvery, rather faded, but still most distinct on caudal peduncle. Fins all plain colored, the dorsal and caudal without darker margins. Length $3\frac{1}{2}$ inches.

PUNTIUS BINOTATUS (Valenciennes).

A small example. Marked a little differently than the one figured by Prof. Vaillant in *Nouv. Arch. Mus. Hist. Nat.* Paris, V (3), 1893, p. 79, Pl. 1, figs. 1–1*b*.

PUNTIUS ANCHISPORUS (Vaillant).

Scales 21 in lateral line to base of caudal and 2 more on latter. Lateral line not continued on base of caudal. Second transverse dusky band across belly just in front of ventral fins. Third transverse band extends along bases of last dorsal rays and slopes obliquely backward at first. A small example originally identified as *Barbus sumatranus*.

[41] *Atlas Ichth.*, III, 1863, Pl. (35) 136, fig. 3. Wrongly identified as *Cyclocheilichthys* (*Siaja*) *macropus*, which is evidently fig. 2.

[42] RASBORICHTHYS HELFRICHII (Bleeker).

Head $3\frac{1}{2}$; depth 5; D. II, 8; A. III, 20, 1; scales about 55? (squamation injured); snout $3\frac{1}{2}$ in head; orbit $3\frac{1}{5}$; maxillary about $3\frac{1}{2}$; interorbital space 4; pectoral $1\frac{1}{5}$; ventral $1\frac{1}{2}$. Length $2\frac{7}{16}$ inches. Two in the Academy from the Paris Museum. They show no trace of the adipose eyelids like those indicated in Bleeker's figure, *Atlas Ichth.*, III, 1863, Pl. (22) 123, fig. 3.

CHELINÆ.

42. Macrochirichthys snyderi sp. nov.

Head $4\frac{5}{6}$; depth, at lower base of pectoral, $5\frac{1}{5}$; at middle of trunk $5\frac{2}{3}$; D. III, 7; A. III, 25, I; P. II, 14; V. II, 7; scales about 96 in lateral line to base of caudal and several more on latter: about 18 scales in a vertical series between origin of dorsal and lateral line; 11 scales in a vertical series between lateral line and origin of anal; about 150? scales before dorsal; width of head $3\frac{1}{4}$ in its length; depth of head, opposite middle of orbit, $1\frac{2}{3}$; mandible $1\frac{2}{3}$; length of depressed dorsal $1\frac{9}{10}$; least depth of caudal peduncle $3\frac{1}{10}$; length of depressed ventral 2; snout $3\frac{2}{5}$ in head, from its own tip; eye $4\frac{1}{10}$; mouth $2\frac{1}{5}$; interorbital space $4\frac{1}{4}$; length of pectoral $3\frac{2}{7}$ in body without caudal; base of anal $5\frac{1}{5}$.

Body strongly compressed, upper profile evenly though slightly convex from neck to caudal, and lower not so much so though sharply

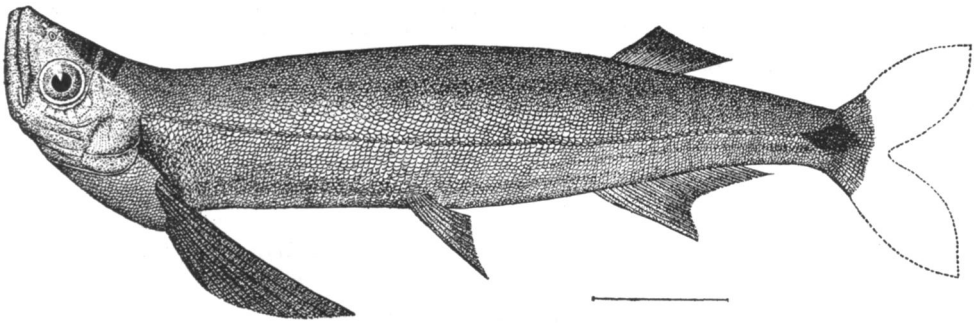

Fig. 7.—*Macrochirichthys snyderi* Fowler.

trenchant. Greatest depth of trunk near root of ventral Chest trenchant and produced below abdomen at lower root of ventral. Least depth of caudal peduncle about equal to its length.

Head well compressed, trenchant above and below, and directed upward. Upper profile nearly straight from tip of snout to nape, and sloping obliquely down posteriorly. Snout obliquely vertical. Upper jaw forms a slight protuberance above. Eye circular, anterior and rather high in head. Infraorbital (here preorbital in position) narrow, and about $\frac{1}{5}$ of pupil. Mouth vertical, gape reaching down till opposite lower margin of orbit. Lips thin. Mandible convex in profile, anterior to upper jaw. Jaws edentulous, trenchant, mandible with a large bluntish tooth-like process at symphysis, fitting in cavity of upper jaw. Tongue not free from floor of mouth. Nostrils above eye near its margin. Interorbital space elevated and trenchant, narrow.

Gill-opening extending forward nearly opposite front rim of preorbi-

tal, membrane forming a rather broad fold across isthmus. Rakers very short, about 25? hard denticles, much shorter than filaments. Filaments $\frac{1}{2}$ of orbit. Isthmus compressed narrowly and rounded. Three branchiostegal rays.

Scales small, cycloid, in series directed obliquely forward on middle of side above and below lateral line. Scales on back and on ventral region very much smaller and crowded. Ventral region of body strongly compressed and forming a cutaneous keel. Head naked except occiput, scaly region beginning over middle of orbit and much smaller than on rest of body. Fins naked, except base of caudal which is scaly. Lateral line of rather large simple tubes, continuous, sloping down till over ventral, then more or less straight to base of caudal.

Dorsal fin small, posterior, and its origin about last $\frac{1}{1}\frac{5}{8}$ in space between front end of mandible and base of caudal or a trifle posterior to origin of anal. Anal with anterior rays elevated and base elongate, last ray reaching nearly half way to base of caudal. Caudal damaged. Pectoral inferior, upper rays enlarged, and first developed ray longest and reaching nearly to origin of ventral, other rays graduated down. Origin of ventral about opposite posterior margin of opercle. Ventral about midway in its insertion between anterior margin of eye and base of caudal, and reaching about half way to origin of anal.

Color in alcohol with more or less silvery everywhere, and back pale brownish. Snout dusky. Iris brassy. A dusky blotch at base of caudal. An interorbital band of deeper brown than body color, with two lines of deeper color. Also a similar postocular band extending down till close to posterior rim of orbit where it ends abruptly. Fins pale brownish-white, dorsal and caudal a shade darker than others. Pectoral axil dusky.

Length $6\frac{1}{1}\frac{1}{6}$ inches.

Type No. 13,931, W. I. A. P. Borneo. 1898. Dr. W. H. Furness.

Only the type is known to me.

This species is closely related to *Macrochirichthys macrochir* (Valenciennes), but differs at once in the postocular transverse dark cranial bands. *Macrochirichthys uranoscopus* Bleeker has been united with *M. macrochir*, and it also lacks these bands.

(Named for my friend Prof. John O. Snyder, of the Leland Stanford Junior University, well known as a writer on Japanese fishes.)

MONOPTERIDÆ.

43. Monopterus albus (Zuiew).

("Lunong" of the Dyaks.)

Six examples from Marudi, a swamp at the mouth of the Baram,

other localities in the Baram district, and the Kapuas river. Those from the latter place collected by Harrison and Hiller. Largest specimen 19 inches long.

CLUPEIDÆ.

44. Sardinella brachysoma Bleeker.[43]

Head $3\frac{1}{2}$; depth $2\frac{2}{3}$; D. IV, 13, I; A. III, 16, I; scales about 40 in a lateral series to base of caudal, and about 4 more on latter; mandible 2 in head; pectoral $1\frac{1}{3}$; ventral $2\frac{1}{5}$; least depth of caudal peduncle $2\frac{2}{5}$; snout $4\frac{1}{2}$ in head, from its own tip; eye $4\frac{1}{2}$; maxillary $2\frac{1}{5}$; interorbital space $4\frac{1}{2}$. Adipose eyelid well developed. Abdominal serratures 29. Each scale on back with a brown spot. Vertical striæ on cheek. One example 8 inches long.

NOTOPTERIDÆ.

45. Notopterus borneensis Bleeker.

Head $4\frac{1}{12}$; depth $3\frac{2}{3}$; D. II, 7; A. about 122. Length $17\frac{1}{4}$ inches. One example.

Bleeker gives a good figure[44] of this species, but my example differs in having the spots more numerous, smaller, extending the whole length of the anal and also above the lateral line on the end of the trunk. The spots on the trunk are also a little larger than those on the anal. The upper profile of the head is a little more concave and the end of the maxillary a little more posterior.

MASTACEMBELIDÆ.

46. Mastacembelus unicolor Valenciennes.

Head (without rostral appendage) $5\frac{2}{3}$; depth $7\frac{3}{4}$; D. XXXIII, 70?; A. III, 65?; P. 24; scales about 340 in a lateral series below lateral line to base of caudal; width of head $4\frac{1}{2}$ in its length (without rostral appendage); depth of head $2\frac{2}{5}$; snout 3; eye $9\frac{1}{2}$; mouth $4\frac{4}{5}$; maxillary $3\frac{3}{4}$; pectoral 3; caudal $2\frac{3}{5}$; interorbital space $1\frac{1}{2}$ in eye; eye 3 in snout.

Body elongate, deep, compressed, and tail rather broad posteriorly. Greatest depth at vent. Anterior part of body more tapering than posterior part.

Head long, triangular, rather slender, attenuated and greatly compressed. Snout long, attenuated, convex above, and its tip while projecting beyond tip of mandible extended into a long pointed fleshy rostral flap, perfectly smooth below, and equal to eye in length. Eye

[43] *Sardinella brachysoma* Fowler, *Journ. Acad. Nat. Sci. Phila.*, XII (2), 1904, p. 501 = *Sardinella hypselosoma* (Bleeker).

[44] *Atlas Ichth.*, VI, 1869–72, Pl. (17) 275, fig. 1.

small, anterior or its anterior margin nearly at first third in total length of head, a little longer than deep, and high. A small sharp spine on preorbital below anterior rim of orbit and directed anteriorly. Maxillary reaching below nostril, but not front of orbit. Mouth small, narrow, inferior and mandible included. Lips rather thin. Teeth small, in rather broad bands which are distinct though approximated in front of each jaw, conic, and directed a little backward. Buccal folds broad. No teeth on roof of mouth or on tongue. Tongue slender or elongate and not evidently free. Nostrils lateral, directly in front of eye, and in form of a rather long horizontal slit. Interorbital space narrow and convex.

Gill-opening inferior, forming a narrow triangle on chest below and extending forward for about last $\frac{2}{5}$ of head. Rakers absent. Filaments about equal to vertical diameter of orbit. No pseudobranchiæ. Isthmus rather short and narrowly compressed.

Scales small, elongate, crowded in appearance or close together, adherent and in a regular oblique series. Lateral line continuous, extending at first superiorly and then median after anal spines to caudal. Tubes simple and rather pronounced. Smaller scales crowded along bases of vertical fins and pectorals. Head, except snout, branchiostegal region and mandible, covered with small scales.

Vertical fins continuous. Spinous dorsal longer than soft dorsal, though at first low where it originates over middle of pectoral, then each spine increasing gradually in height to last, which is highest. Soft dorsal and anal of about equal height, latter originating a little nearer tip of caudal than gill-opening. Caudal small, rounded, of about 16? rays, and last rays of soft dorsal and anal extending on it basally for at least half its length. Pectoral broad, short, rounded and a little low in its insertion. Second anal spine much largest, similar to last dorsal spine through placed a little anterior to its base. Vent close in front of spinous anal or a little nearer base of caudal than orbit.

Color in alcohol deep wood-brown, lower surface paler or inclining to very pale or dirty-brown, especially on abdomen, thorax and under surface of head. Dorsals and anals with more or less dark color medianly, and becoming more or less blackish submarginally, margins of these fins rather conspicuously creamy-whitish. Caudal and pectoral creamy or pale brownish, each with two rather variable cross blotches of deep or blackish-brown joined somewhat medianly by a bar of same color. Snout brownish and rostral appendage deep brown. Iris slaty.

Length $10\frac{1}{4}$ inches.

One example. This agrees somewhat with eight examples I recorded

from Sumatra,[45] taken at Batu Sangkar in Padangsche Bovenland, and collected by Harrison and Hiller. The smallest of these differs in the color markings which are very pronounced. The vertical fins also have blackish bases with distinct margins and their edges with whitish blotches. The spots on the sides are distinct and the lower surface of the body is decidedly paler. The largest Sumatran example also shows the following: Head (without rostral appendage) $5\frac{9}{10}$; depth $8\frac{3}{4}$; D. XXXVI, 80?; A. II, 72?; P. 22; scales about 285 in a lateral series to base of caudal; width of head $3\frac{2}{3}$ in its length; depth of head $2\frac{2}{3}$; snout $3\frac{1}{10}$; eye 8; mouth $4\frac{2}{3}$; pectoral $2\frac{3}{5}$; caudal $3\frac{1}{8}$; interorbital space $1\frac{1}{2}$ in eye; eye $2\frac{7}{8}$ in snout. My figure also shows the caudal confluent almost entirely with the rayed dorsal and anal. This is in entire agreement with my largest Sumatran example which it was supposed to represent. However, the others, especially the smaller ones, have it distinct and with the ends of the caudal rays free. They also show the margins of these fins whitish. Surely Day's figure and account of *Mastacembelus unicolor*[46] represents a distinct species.

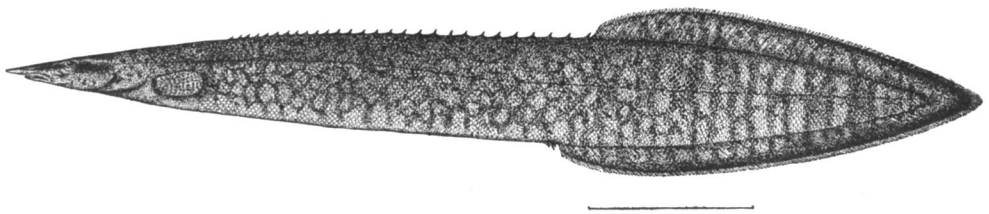

Fig. 8.—*Mastacembelus vaillanti* Fowler.

47. Mastacembelus vaillanti sp. nov.

Head (without rostral appendage) 7; depth 9; D. XXVIII, 58?; A. III, 65?; caudal 14?; P. 22; scales about 164 in a lateral series below lateral line to caudal; width of head 4 in its length (without rostral appendage); depth of head $2\frac{3}{4}$; snout $3\frac{1}{2}$; eye 8; mouth $5\frac{3}{4}$; maxillary 4; pectoral 3; caudal about 2; interorbital space about $1\frac{3}{8}$ in eye; eye 2 in snout.

Body long, strongly compressed, deep, especially posterior half or tail, and anterior half tapering more narrowly forward to tip of snout. Greatest depth at vent. Caudal peduncle not evident, its width would be about $6\frac{1}{8}$ in head without rostral appendage.

Head small, long, well attenuated and greatly compressed. Profiles

[45] *Journ. Acad. Nat. Sci. Phila.*, XII (2), 1904, p. 501, Pl. 8, upper figure.
[46] *Fishes of India*, II, 1876, p. 339, Pl. 72, fig. 3.

similar and nearly straight. Snout long, pointed, and its tip, while extended beyond tip of mandible, produced into a trifid fleshy rostral flap, which is perfectly smooth below and about equal to horizontal orbital diameter. Eye small, high, anterior or much nearer tip of rostral appendage than posterior edge of opercle, and a little longer than deep. A small sharp spine directed backward in front of eye below on preorbital region. Maxillary reaching till opposite anterior margin of posterior nostril. Mouth small, narrow, inferior and mandible narrow. Lips rather thin. Teeth rather large, conic, directed somewhat backward, and in rather broad approximated bands in jaws. No teeth on roof of mouth or on tongue. Buccal folds broad. Tongue little free and rather narrow. Anterior nostril in each short lateral tip or fleshy tube of rostral appendage. Posterior nostril an elongate slit directly in front of eye and about equal to diameter of pupil. Interorbital space narrow and convex.

Gill-opening inferior, forming a narrow triangle on chest below and extending forward for about last $\frac{2}{5}$ of entire length of head. Rakers absent. Filaments short, about equal to vertical diameter of pupil. No pseudobranchiæ. Isthmus short and narrowly compressed.

Scales close together, elongate, with more or less scalloped edges in places, in oblique crossing series, and adherent. Present on most all of body except pectoral, margins of other fins, snout, jaws, rostral appendage and branchiostegal region. Scales at base of pectoral and on other fins reduced in size. Lateral line rather high, continuous, only becoming median on posterior portion of tail or trunk and of simple tubes.

Vertical fins entirely continuous. Spinous dorsal a little longer than rayed dorsal, though at first low at its origin which is a little behind tip of pectoral, and then increasing gradually in height a short distance when spines become more or less subequal, and last spine highest. Soft dorsal inserted at a point about last $\frac{2}{5}$ in total length of body. Rayed anal similar in height, and both fins joined to pointed caudal so that it ends in a point with median rays longest. Origin of rayed anal well in advance of that of soft dorsal or at a point about midway between tip of pectoral and base of caudal. Anal spines strong, second much larger. Pectoral small, rounded, rather broad, low and median rays longest. Vent close in front of spinous anal.

Color in alcohol with ground-color more or less uniform brownish, a trifle paler or soiled brownish on lower surface of head and abdomen. Body most everywhere beautifully variegated with darker mottlings which form pale spots or blotches of variable size and pattern. On

tail they form posteriorly into several broad indistinctly defined transverse bars. Rayed dorsal, anal and caudal with whitish margins, adjoining which is a blackish submarginal shade becoming diffuse toward middle of fins. Bases of these fins pale variegated with fine brownish mottlings on former and large whitish obliquely inclined forward blotches on anal. Caudal more or less finely barred, less distinctly so basally. Pectoral with many fine wavy transverse bars. A deep brown streak along side of snout to eye and continued behind latter to edge of preopercle. A number of variable brownish bars on side and under surface of head. Iris slaty.

Length 6 inches.

Type No. 14,150, W. I. A. P. Borneo. 1898. Dr. W. H. Furness. One example.

This species is evidently closely related to *Mastacembelus guentheri* Day[47] which has been recorded from Borneo by Prof. Vaillant.[48] The Indian fish appears to differ somewhat in coloration according to Day's account, especially as there is no black bar at the base of the caudal. His figure[49] fails to indicate this. Margins of the vertical fins of *Mastacembelus vaillanti* well edged with white, the color pattern different, presenting a beautiful blotched or spotted appearance, and the pectorals finely barred.

(Named for Prof. Léon Vaillant.)

MASTACEMBELIDÆ.

48. Tylosurus leiuroides (Bleeker).

Depth in trunk, without head, about 11; D. III, 16; A. III, 22; eye $3\frac{3}{5}$ in postocular region of head; interorbital space $2\frac{1}{2}$; least depth of caudal peduncle $3\frac{1}{2}$. One example, $12\frac{1}{2}$ inches (jaws and caudal damaged).

HEMIRAMPHIDÆ.

HEMIRAMPHINÆ.

Mandible produced far beyond upper jaw in a long slender beak or point.

LABIDORHAMPHUS subgen. nov.

Type *Hemirhamphus amblyurus* Bleeker.

Upper jaw twice as long as broad.

(Λάβις, pincers; ῥάμφος, beak.)

---

[47] *Proc. Zool. Soc.* Lond., 1865, p. 37. In paddy-fields and the Trichoor backwater [Cochin, on the Malabar or western coast of India].

[48] *Nouv. Arch. Mus.* Paris, V (3), 1893, p. 106. Kina-Balou. (M. Whitehead.)

[49] *Fishes of India*, II, 1876, Pl. 73, fig. 2.

49. Zenarchopterus amblyurus (Bleeker).

One example.

Subgenus ZENARCHOPTERUS Gill.

Upper jaw about equal in length and in width.

50. Zenarchopterus buffonis (Valenciennes).

Head, with beak, $2\frac{1}{10}$; from tip of upper jaw 4; depth $6\frac{1}{3}$; D. I, 12; A. II, 8; about 37 scales in a lateral series to base of caudal; width of upper jaw about equal to its length. Length 6 inches.

EXOCŒTIDÆ.

51. Parexocœtus mento (Valenciennes).

Head $3\frac{5}{6}$; depth $4\frac{2}{5}$; D. I, 10; A. I, 10; scales 35 in a lateral series to base of caudal; snout $3\frac{4}{5}$ in head, from tip of upper jaw; eye $2\frac{3}{4}$; interorbital space 3. Length 5 inches.

A single example. It agrees with Bleeker's figure,[50] except that there is a brown band from along base of upper caudal lobe down across middle of lower lobe toward its distal portion which is also more or less brownish. The ventrals are almost all whitish, without the large dark blotch Bleeker shows, though the anal is dusky basally. The black on the pectoral and ventral is also more deep than Bleeker indicates.

MUGILIDÆ.

52. Mugil belanak Bleeker.

Head $3\frac{2}{3}$; depth $3\frac{3}{4}$; D. IV–I, 8; A. III, 9; P. II, 14; V. I, 5; scales 35 in a lateral series to base of caudal; about 10 scales in an oblique series from origin of spinous dorsal to middle of belly; 20? (pockets) scales before spinous dorsal; width of head $1\frac{1}{2}$ in its length; depth of head $1\frac{2}{5}$; snout $3\frac{3}{4}$; eye 4; maxillary 4; interorbital space $2\frac{1}{2}$; width of mouth 3; mandible 4; first dorsal spine $1\frac{1}{2}$; first dorsal ray $1\frac{1}{3}$; third anal spine $3\frac{1}{2}$; first anal ray $1\frac{3}{4}$; least depth of caudal peduncle 2; pectoral $1\frac{1}{2}$; ventral $1\frac{1}{2}$.

Body rather fusiform, well compressed, and greatest depth about middle of depressed spinous dorsal. Profiles rather evenly convex to greatest depth, and similar. Caudal peduncle compressed, and about as long as broad.

Head robust, a little constricted below, and profiles similarly convex. Snout broad, a little convex above, and upper jaw a little produced. Eye circular, its posterior margin a little anterior in middle of length of

[50] *Atlas Ichth.*, VI, 1869, Pl. (5) —, fig. 6.

head, and adipose eyelids well developed. Mouth a little inferior, and corner falling about opposite posterior nostril. Mandibular angle broad, and obtuse, symphysis forming a process fitting a depression in front of upper jaw. Teeth very minute, uniserial in upper jaw, and scarcely evident or absent on mandible. Lips rather fleshy. Roof of mouth and tongue edentulous. Tongue fleshy, not free, and forming a median longitudinal trenchant keel. Maxillary exposed, and reaching about opposite front rim of orbit. Lower edge of preorbital denticulate. Anterior nostril with a small cutaneous rim, near edge of snout, and space between it and posterior much greater than space between latter and front of eye. Posterior nostril vertical and slit-like. Interorbital space broad, flattened or but slightly convex.

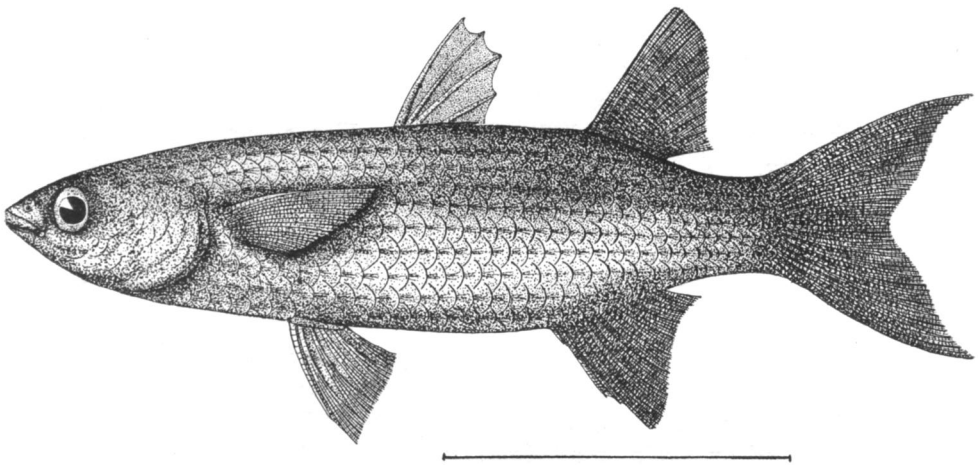

Fig. 9.—*Mugil belanak* Bleeker.

Gill-opening extending forward about opposite middle of orbit. Rakers about 62?, slender, fine, and equal to about $\frac{3}{5}$ of longest filaments. Filaments numerous, longest but little less than orbital diameter. Pseudobranchiæ about $\frac{2}{3}$ of orbital diameter. Isthmus narrow, with a depression.

Stomach gizzard-like, muscular, and rather large. Intestine rather long and convoluted. Peritoneum black. Vent close to origin of anal fin.

Scales rather large, and arranged in more or less even longitudinal series. Head scaly. Scales, according to pockets, extending down to edge of snout, small. A slender pointed scaly flap along base of spinous dorsal about equal in length to $\frac{2}{3}$ length of first spine. Scaly flap in

axil of pectoral, possibly damaged, about $\frac{2}{7}$ length of fin. Ventral with a similar scaly flap which is about half length of fin, and a broad one between base of each which is a little over half of ventral, possibly damaged. Greater portions of rayed dorsal, anal and caudal densely scaled, those basally larger.

Spinous dorsal inserted a little nearer tip of snout than base of caudal, first spine longest and fourth shortest. Soft dorsal inserted nearer base of caudal than origin of spinous fin, and first ray longest. Anal similar to soft dorsal, spines slender, graduated to third which is longest, second but little shorter, and first hardly $\frac{1}{3}$ length of second. Origin of rayed anal well in advance of that of rayed dorsal. Caudal emarginate, lobes distinct and pointed. Pectoral small, not quite reaching opposite origin of spinous dorsal, and its origin a little above middle of vertical orbital diameter. Ventral inserted about opposite middle of pectoral and its spine about $\frac{2}{3}$ in length of fin.

Color in alcohol pale brownish with more or less silvery reflections. Back and upper surface darker brownish. Fins all pale brownish. Iris brassy.

Length $4\frac{1}{4}$ inches (caudal damaged).

One example.

Mugil belanak Bleeker[51] is the first name available for the present species. *Bontah* Russell[52] is not available, but it forms the basis of *Mugil bontah* Bleeker[53] which is its first introduction in a binomial sense. Later Bleeker identified other specimens[54] under the same name which appear to be different, and which have been referred to *M. belanak* by Dr. Günther. However, Russell's figure of *Bontah* had been named by Swainson as *Mugil gymnocephalus*.[55] This, according to Day, would lead to its identification with *Mugil our* Forskål. The discrepancies between my account and that by Day[56] are probably due to age.

53. Liza oligolepis (Bleeker).

Head $3\frac{1}{3}$; depth $2\frac{3}{4}$; D. IV–I, 8; A. III, 9, 1; P. II, 13; V. I, 5; scales 24 in a lateral series to base of caudal; about 11 scales in an oblique series from origin of spinous dorsal to middle of belly; 20? (pockets

[51] *Nat. Tijds. Ned. Ind.*, XIII, 1857, p. 337. Batavia, in mari.
[52] *Fishes of Coromandel*, II, 1803, p. 64, Pl. 180. Vizagapatam.
[53] *Verh. Bat. Genoot.* (Nalez. Ich. Beng. Hind.), XXV, 1853, p. 48. (Based on Russell.)
[54] *Nat. Tijds. Ned. Ind.*, XIII, 1857, p. 336. Batavia, in mari.——*L. c.*, XVI, 1858–59, p. 278.——*Act. Soc. Sci. Ind. Neerl.* (Diert. Bijd. Visch. Borneo), VIII, 1860, p. 49. [Not consulted.]
[55] *Lardner's Cabinet Cyclopædia Nat. Hist.*, II, 1839, p. 234.
[56] *Fishes of India*, II, 1876, p. 351, Pl. 74, fig. 5. Bombay.

mostly) scales before spinous dorsal; width of head $1\frac{2}{5}$ in its length; depth of head $1\frac{1}{4}$; mandible $2\frac{7}{8}$; first dorsal spine $1\frac{1}{4}$; first dorsal ray $1\frac{3}{4}$; third anal spine 2; first anal ray $1\frac{1}{2}$; lower caudal lobe 1; least depth of caudal peduncle 2; pectoral $1\frac{1}{4}$; ventral $1\frac{1}{3}$; snout $3\frac{3}{4}$ in head, measured from tip of upper jaw; eye $3\frac{3}{4}$; maxillary 4; width of mouth 3; interorbital space $2\frac{1}{4}$.

Body deep, compressed, and greatest depth about origin of spinous dorsal. Lower profile a little more convex than upper. Caudal peduncle compressed, deep, and its length about half its depth.

Head robust, a little large, well constricted below and convex above.

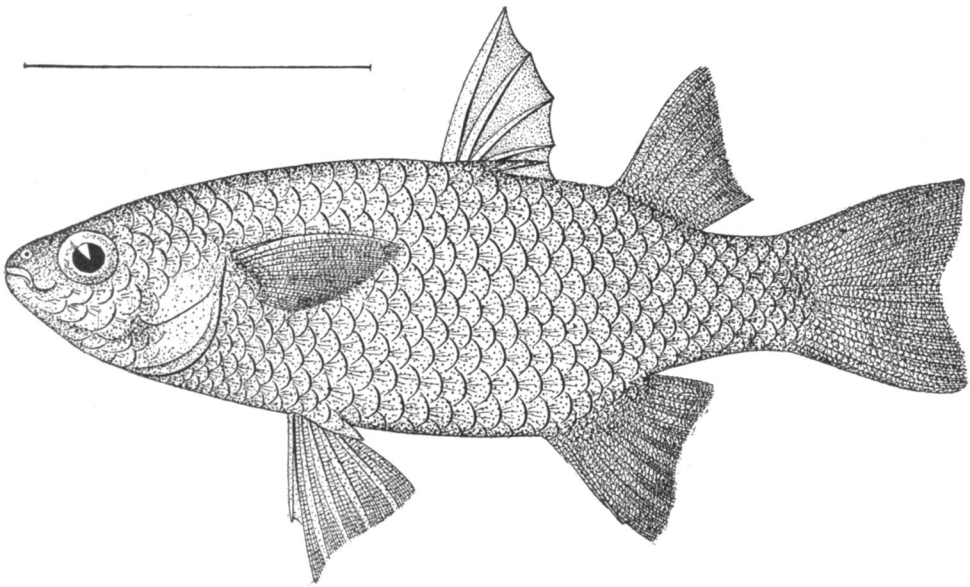

Fig. 10.—*Liza oligolepis* (Bleeker).

Lower profile a little more convex and inclined than upper which is a trifle concave just in front of eye above. Snout broad, convex above, and upper jaw not produced. Eye circular, close to upper profile, without adipose eyelids, and its posterior margin a trifle posterior in length of head. Mouth broad, gape small, reaching opposite anterior nostril. Mandibular angle broad and obtuse, symphysis forming a process fitting in a depression in front of upper jaw. Lips rather fleshy, though thin. Teeth very minute and apparently only evident in a series along margin of upper jaw. A small patch of minute teeth on each palatine. Tongue fleshy, not free from floor of mouth. Lower preorbital margin serrate. Anterior nostril with a slight cutaneous

rim and placed about midway in snout in profile view. Posterior nostril larger, high, somewhat slit-like and about opposite upper anterior orbital margin. Interorbital space broad and flattened, or but slightly convex.

Gill-opening extending forward till nearly opposite first $\frac{2}{5}$ of orbit. Rakers 40??, slender, fine, rather short, or about half length of filaments. Filaments long, about $\frac{7}{8}$ of orbital diameter. Pseudobranchiæ about $\frac{4}{7}$ of orbit. Isthmus narrow, with a median groove.

Stomach gizzard-like, muscular, about equal to orbit in size. Intestine rather long and convoluted. Peritoneum black. Vent close in front of insertion of anal fin.

Scales large, with finely ciliated edges, and in more or less even longitudinal series. Head scaly. Opercles at present naked. Scales on snout small. A pointed scaly flap at base of spinous dorsal equals about $\frac{4}{7}$ length of first spine. A similar scaly flap in axil of pectoral equal to about $\frac{1}{4}$ length of fin. Ventral also with a similar flap equal to about $\frac{2}{5}$ length of fin, and a broad one between bases of fins which is damaged. Greater portions of soft dorsal, anal and caudal covered with minute scales, those about bases of fins larger.

Spinous dorsal inserted much nearer base of caudal than tip of snout, first spine enlarged and longest, and others graduated down. Soft dorsal inserted well behind origin of anal or much nearer base of caudal than origin of spinous dorsal, and first ray highest. Anal similar, first spine short, third longest and second but little shorter than third. First anal ray longest. Caudal small, broad, and a little emarginate. Pectoral small, and its insertion a little above middle in vertical orbital diameter. Ventral inserted a little before middle of depressed pectoral, and spine about equal to $\frac{2}{3}$ length of fin.

Color in alcohol brownish, and everywhere more or less silvery. Back and upper surface brownish. Fins all pale brownish, dorsals and caudal a trifle darker. Eye brassy-white.

Length about 3 inches.

Six examples, the one described above largest. Day's figure[57] shows a higher spine to second dorsal than that found on any of my examples.

SCOMBRIDÆ.

54. Scomberomorus guttatus (Schneider).

Differs but little from Sumatran examples. Teeth about 31 in upper jaw and about 34? in lower. Color faded so that spots are diffuse and indistinct. Caudal whitish. One example, $11\frac{3}{4}$ inches.

[57] *Fishes of India*, II, 1876, p. 358, Pl. 76, fig. 2. Sunderbunds near Calcutta.

TRICHIURIDÆ.

55. Trichiurus savala Cuvier.

Head $8\frac{4}{5}$; depth $17\frac{3}{4}$; D. about 137; A. I, XCVI?; P. I, 10; snout a little less than 3 in head from its own tip; tip of snout to end of maxillary $2\frac{1}{6}$; orbit $8\frac{1}{3}$; interorbital space 7. Tip of mandible ending in a fleshy point and laterally compressed. Fangs 3, alternate and barbed in front of upper jaw. A single enlarged barbed fang in front of mandible. Tongue elongate, pointed and free. Rakers consist of several small pointed rudiments at angle of first branchial arch. Anal spine pointed. Color in arrack silvery, edge of back above brownish. Fins pale, margin of dorsal brownish and edge of pectoral dusky. Tail dusky-brown. Edge of preorbital brownish. Iris dull brassy. Length 26 inches.

CARANGIDÆ.

56. Scomberoides toloo (Cuvier).

One example, $6\frac{7}{8}$ inches long.

57. Megalaspis cordyla (Linnæus).

Three examples.

58. Alepes scitula Fowler.

Three examples, agreeing with the type except paler in color. Largest $4\frac{1}{8}$ inches long.

59. Citula atropos (Schneider).[58]

A single small example, about 2 inches long.

STROMATEIDÆ.

60. Pampus cinereus (Bloch).

Head $3\frac{3}{4}$; depth $1\frac{1}{3}$; D. I, VIII, 5, 34; A. VI, 5, 33; snout $3\frac{3}{5}$ in head; eye $3\frac{1}{10}$; width of mouth $3\frac{1}{2}$; least depth of caudal peduncle $2\frac{3}{4}$; pectoral $2\frac{2}{5}$ in head and trunk. Color in alcohol with silvery more or less everywhere. Back pale brown. Marginal portions of dorsals and caudal only slightly dusky. Pectoral whitish like caudal. Anal almost entirely silvery-white. Iris brassy. One example, $5\frac{1}{2}$ inches long.

Day's figure of *Stromateus cinereus*[59] shows the anal lobe much longer and the snout not so produced as in my example.

---

[58] *Citula atropos* Fowler, *Journ. Acad. Nat. Sci. Phila.*, XII (2), 1904, p. 513, Pl. 14, lower figure to left is the young of *Citula armata* (Forskål).

[59] *Fishes of India*, II, 1876, Pl. 53, fig. 3.

LEIOGNATHIDÆ.

61. Leiognathus edentulus (Bloch).

One example.

CHANDIDÆ.[60]

62. Ambassis wolffii Bleeker.

One example. It agrees with Bleeker's figure,[61] except that the membranes of spinous dorsal and ventral fins are more dusky or blackish.

63. Ambassis ambassis (Lacépède).

Head $2\frac{1}{2}$; depth $2\frac{1}{2}$; D. I, VII, I, 10; A. III, 9, I; scales about 28 in lateral line to base of caudal; 4 scales obliquely back from origin of spinous dorsal to lateral line; about 8 scales obliquely up from origin of spinous anal to lateral line; about 12 scales before dorsal; snout $4\frac{1}{2}$ in head from tip of upper jaw; eye $3\frac{1}{2}$; maxillary $2\frac{1}{3}$; interorbital space $4\frac{1}{3}$. Rakers slender, a little longer than filaments or about equal to diameter of pupil, and 8+17 in number. Color faded a plain pale or nearly uniform brownish, all fins whitish. One example, 4 inches long.

---

[60] *Chanda* is another of Hamilton's composite genera. Its elimination is as follows:

setifer = *Gerres* Cuvier, 1829.
ruconius = *Leiognathus* Lacépède, 1803.
nalua = *Ambassis* Cuvier, 1828.
nama = *Hamiltonia* Swainson, 1839.
phula = *Hamiltonia*, Swainson, 1839.
bogoda = *Hamiltonia* Swainson, 1839.
baculis = *Hamiltonia* Swainson, 1839.
ranga = *Hamiltonia* Swainson, 1839.
lala = *Pseudambassis* Bleeker, 1870.

The first species affected is *ruconius*, which cannot belong to my own genus *Deveximentum* if the original account and figure of Hamilton is correct. The latter certainly represents a *Leiognathus*, and the description is equally applicable. The second case is *nalua* which is an *Ambassis*. The third case is *setifer* which is a *Gerres*. *Hamiltonia* was next proposed for *ovata*, which is based on Hamilton's figure of *nama*, by Swainson, who follows with another name, *lata*, for the same figure! The remaining species appear to belong to this genus with the exception of *lala*, for which Bleeker proposed *Pseudambassis* in 1874. As this is the last name used generically *Chanda* must supersede it with *lala* as the type.

Provisionally the genera may be distinguished by the following key:

a.—Preorbital entire; D. long, 14 to 17 radii; A. long, 16 to 18 radii; scales small or minute, ... *Hamiltonia*.

aa—Preorbital denticulate.

b.—Strong teeth in jaws, at least some of them enlarged and almost canine-like.

c.—D. radii 12 to 14; A. radii 14 to 17; strong external series of premaxillary teeth, ... *Chanda*.

cc.—D. radii 10 or 11; A. radii 9 to 11; outer series of teeth in part canine-like, ... *Parambassis*.

bb.—Teeth small, equal or subequal; D. and A. radii 8 to 11; scales large, *Ambassis*.

PARAMBASSIS MACROLEPIS (Bleeker).

One example in the Academy from the Paris Museum. The black on the edge of the soft dorsal is very distinct.

[61] *Atlas Ichth.*, VIII, 1876–77, Pl. (47) 325, fig. 2.

64. Ambassis gymnocephalus (Lacépède).

Head $2\frac{3}{4}$; depth $2\frac{2}{3}$; D. I, VII, I, 9; A. III, 9; scales 27 in a lateral series to base of caudal; 14 tubes in first part of lateral line, and 14 in lower or caudal portion; 4 scales between origin of spinous dorsal and lateral line obliquely back; 8 scales obliquely forward from origin of spinous anal to lateral line; about 13 scales before spinous dorsal; snout $4\frac{1}{2}$ in head, from tip of upper jaw; eye 3; maxillary $2\frac{4}{5}$; interorbital space $3\frac{4}{5}$. Rakers small, thin, longer than filaments and numerous. Color faded plain or uniform brownish, fins whitish. Length $2\frac{1}{2}$ inches. Two examples.

SCIÆNIDÆ.[62]

65. Sciæna novæ-hollandiæ Steindachner.

Head $3\frac{1}{3}$; depth $3\frac{7}{8}$; D. X, 26, I; A. II, 6, I; scales 45 in lateral line to base of caudal; snout $3\frac{2}{5}$ in head; eye $5\frac{1}{3}$; end of maxillary to tip of snout 2; interorbital space $3\frac{2}{5}$; pectoral $1\frac{1}{4}$; ventral $1\frac{1}{4}$; least depth of caudal peduncle 4. One example, $4\frac{1}{4}$ inches, agreeing with Bleeker's figure.[63]

POLYNEMIDÆ.

TRICHIDIONTINÆ.[64]

Rayed dorsal and anal of equal size. Preopercle serrated.

66. Trichidion indicus (Shaw).

Head $3\frac{1}{4}$; depth $4\frac{2}{3}$; D. VIII–I, 13; A. III, 12; P. II, 11; pectoral filaments 5; V. I, 5; scales 70 in lateral line to base of caudal; about 36? scales (squamation damaged) before spinous dorsal; 7 scales between origin of spinous dorsal and lateral line; 8 scales between origin of soft dorsal and lateral line; 10 scales between origin of anal and lateral line; width of head $1\frac{7}{8}$ in its length; depth of head $1\frac{3}{5}$; snout $4\frac{2}{3}$; eye 8; maxillary $2\frac{1}{2\,0}$; mandible $2\frac{1}{3}$; width of mouth $2\frac{2}{3}$; interorbital space 4; first dorsal spine $1\frac{4}{7}$; first dorsal ray $1\frac{2}{3}$; first anal ray 2; third anal spine $3\frac{4}{7}$; upper caudal lobe a little less than head; least depth of caudal peduncle $3\frac{1}{8}$; pectoral $1\frac{1}{2}$; ventral about $2\frac{1}{3}$. Uppermost pectoral filament reaching origin of anal. Length $21\frac{1}{2}$ inches. One example from the mouth of the Baram.

---

[62] *Sciæna macroptera* Fowler, *Journ. Acad. Nat. Sci. Phila.*, XII (2), 1904, p. 530, is an *Umbrina*.

[63] *Atlas Ichth.*, IX, 1877, Pl. (4) 387, fig. 2.

[64] This is opposed to the POLYNEMINÆ or those species with the anal basis about twice the length of the second dorsal and an entire preopercle. Typified by *Polynemus* Linnæus. *Trichidion* Klein, in Walbaum, *Pet. Arted. Pisc.*, III, 1792, p. 585, is the earliest reference for that genus, thus having priority over *Polydactylus* Lacépède.

67. Trichidion hilleri sp. nov.

Head $3\frac{3}{4}$; depth $4\frac{1}{6}$; D. VII–IV, 16; A. III, 12; P. II, 15, with 6 filaments below; V. I, 5; scales about 68 in lateral line to base of caudal, and 11 more on caudal basally; 6 scales between middle of base of spinous dorsal and lateral line; 7 scales between middle of base of soft dorsal and lateral line; 9 scales obliquely up and back to lateral line; width of head $1\frac{4}{5}$ in its length; depth of head $1\frac{3}{7}$; snout 4; eye 9; maxillary 2; interorbital space 3; second dorsal spine $1\frac{1}{3}$; first developed dorsal ray about $1\frac{2}{3}$; first developed anal ray $1\frac{4}{5}$; ventral $1\frac{1}{2}$; least depth of caudal peduncle $2\frac{2}{5}$; second simple pectoral ray $2\frac{7}{8}$ in head and trunk; length of upper caudal lobe about $2\frac{3}{5}$.

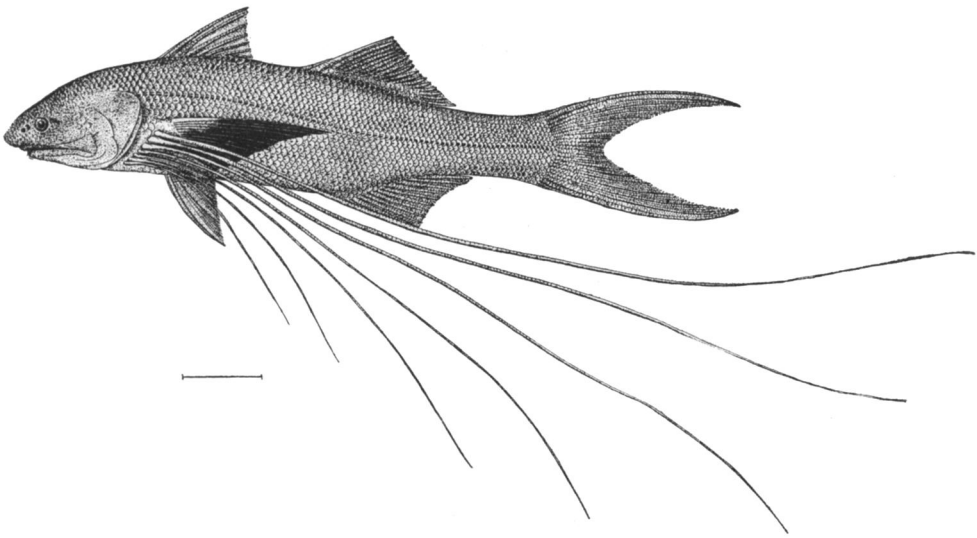

Fig. 11.—*Trichidion hilleri* Fowler.

Body long, compressed, greatest depth about middle of depressed ventral or spinous dorsal, and upper profile a little more convex than lower. Caudal peduncle a little long, and its least depth a trifle more than half its length.

Head obtuse, compressed, rather broad, and profiles similar with upper a little more convex, especially posteriorly. Snout broad, blunt, convex, and well protruded. Eye small, circular, a little low and lateral in position, and also placed a trifle behind first fourth of length of head. Adipose tissue well developed and extending over eye. Mouth inferior, large, gape curved in profile and upper jaw extending forward beyond symphysis of mandible. Maxillary expanded distally till about

¼ more than diameter of orbit. Teeth in jaws minute asperities in rather broad band-like patches which are not confluent anteriorly. Similar patches on palatines. Vomer edentulous. Tongue large, thick, rounded and a little free in front but without asperities. Nostrils moderately large, rounded, similar, together, lateral and posterior on snout and directly in front of eye. Interorbital space broad, convex, and posteriorly to occipital region becoming more convex.

Gill-opening extending forward till below posterior portion of orbit. Gill-rakers small, slender, somewhat clavate, 13+18, and longest a little longer than longest filaments and a trifle more than distal expanded maxillary extremity. Pseudobranchiæ small. Isthmus broad and convex.

Scales rather small, mostly finely ctenoid and small ones extending over most of fins and head. On spinous dorsal, pectoral and ventral they are present only on basal regions, and other fins almost completely covered. Those on head small about and on snout. Head scaly with exception of lips and branchial flaps. Axil of pectoral with a fleshy flap and a thin pointed scale above. Axil of ventral with a grooved scaly flap. Lateral line continuous, of simple tubes, a little high at first and then running down along middle of side of caudal peduncle and well out on caudal.

Spinous dorsal inserted about midway between tip of snout and middle of base of soft dorsal or a trifle behind origin of ventral, spines slender, and second spine a little longest. Soft dorsal inserted a little nearer base of caudal than eye, and first branched ray highest. Anal similar to soft dorsal, inserted behind origin of same fin and a little nearer that of pectoral than base of caudal, and first branched ray highest. Caudal large, forked and lobes pointed. Pectoral long, second simple ray longest and reaching origin of anal. Pectoral filaments very long, first and third longest, and latter longer than entire length of fish. Lowest and shortest pectoral filament about equal to head without snout. Ventral with first ray longest and reaching about ⅝ of space to anal. Insertion of ventral a little behind origin of pectoral. Vent close before tip of depressed ventral.

Color in alcohol mostly very pale brownish-white or pale brownish. Back darker brown with minute pale dusky dots on side of head and above pectoral. Dorsals and caudal sprinkled with similar pale dusky or gray dots and also slightly darker than other fins. Upper margins of dorsals slightly darker. Other fins like abdomen, except pectoral which is deep livid black on outer ⅔. Pectoral filaments pale, like fin at base, soon becoming gradually browner till colored like back. Side

and lower surface of head and snout whitish like abdomen. Iris pale slaty.

Length $8\frac{7}{8}$ inches.

Type No. 2,400, W. I. A. P. Baram river, Borneo. 1897. Alfred C. Harrison, Jr., and Dr. H. M. Hiller.

One example. This species may be distinguished principally by the black outer $\frac{2}{3}$ of the pectoral fin.

(Named for Dr. H. M. Hiller, explorer of Borneo and Sumatra with Mr. Alfred C. Harrison, Jr.)

COIIDÆ.

Body deep and elevated. Premaxillaries protractile and spines extending back to occiput. Teeth in jaws villiform and none on roof of mouth or on tongue. Maxillary slipping below lower edge of preorbital for most of its length. Preorbital narrow. Lower pharyngeal bones separate. Branchiostegals 6. Pseudobranchiæ present. Appendices pylorices few. Air-vessel simple. Dorsal fins continuous, spines XII and stout. Anal spines similar, III. Caudal rounded. Rivers and estuaries of India and the East Indies.

These fishes approach the *Gerridæ* in the spines of the premaxillary, but differ at once in the numerous stout dorsal spines. *Coius* Hamilton[65] (=*Datnioides* Bleeker) is the typical form.

68. Coius quadrifasciatus (Sevastianoff).

Four examples, largest $3\frac{7}{8}$ inches in length.

OSPHRONEMIDÆ.

69. Betta pugnax (Cantor).

One example from the Baram. Harrison and Hiller.

Bleeker's *Betta anabatoides*[66] appears to differ a little from *B. pugnax*, according to the accounts of Valenciennes and Cantor. *Panchax pic-*

---

[65] This genus is also one of Hamilton's composite groups. Its elimination is as follows:

vacti = *Lates* Cuvier, 1828.
datnia = *Chrysophrys* Valenciennes, 1830.
catus = *Lutianus* Bloch, 1797.
trivittatus = *Therapon* Cuvier, 1829.
gudgutia = *Pomadasis* Lacépède, 1803.
polota = *Datnioides* Bleeker, 1857.
nandus = *Nandus* Valenciennes, 1831.
cobojius = *Anabas* Cuvier, 1829.
chatareus = *Toxotes* Cuvier, 1817.

It is thus evident that *Datnioides* Bleeker is the last name proposed and therefore gives precedence to *Coius*. *Datnioides* first occurs in *Nat. Tijds. Ned. Ind.*, III, 1853, p. 440. Type *Datnioides quadrifasciatus* Bleeker = *Coius polota* Hamilton.

[66] *Nat. Tijds. Ned. Ind.*, I, 1850 (1851) p. 269. Bandjermassing, in fluviis. (Mr. J. Wolff.)

tum Valenciennes[67] is said to have 20 anal rays. Cantor's figure of *Macropodus pugnax* differs in showing a pale margined anal and uniform caudal, or without black undulating lines. Bleeker's figure[68] does not indicate any markings on the head or trunk and the rays are spotted.

70. Osphronemus goramy Lacépède.

One example from the Kapuas. Harrison and Hiller. It has depth of body $1\frac{2}{3}$ in its length. Total length of fish $7\frac{5}{8}$ inches.

ANABANTIDÆ.

71. Anabas scandens (Daldorff).

Three examples.

OPHICEPHALIDÆ.

72. Ophicephalus baramensis (Steindachner).

Head $3\frac{1}{4}$; depth $6\frac{2}{3}$; D. 36; A. 22; P. 1, 13, 1; V. 1, 5; 53 scales in lateral line to base of caudal and 4 more on latter; about 15 osseous scales before dorsal; 5 scales between origin of dorsal and lateral line, and 8 between latter and origin of ventral; width of head $1\frac{2}{3}$ in its length; depth of head $2\frac{1}{4}$; mandible $2\frac{1}{10}$; thirtieth dorsal ray $2\frac{1}{6}$; seventeenth anal ray $2\frac{1}{2}$; pectoral $1\frac{2}{3}$; ventral $2\frac{9}{10}$; caudal $1\frac{2}{7}$; least depth of caudal peduncle $3\frac{3}{5}$; snout $4\frac{1}{5}$, from tip of upper jaw; eye 7; mouth $2\frac{1}{4}$; maxillary $2\frac{1}{6}$; interorbital space $3\frac{1}{4}$.

Body elongate, rather slender, and greatest depth about middle of depressed ventral. Tail long and well compressed.

Head rather large, elongate, broad, much depressed and sides rounded, presenting a somewhat swollen appearance. Snout short, broad and rather acutely rounded when viewed from above. Eye rather small, circular, superior, and placed a little before first third in length of head. Pupil circular and large. Mouth large, broad, oblique, and maxillary reaching well behind posterior margin of orbit. Posterior end of maxillary dilated till about equal to diameter of orbit and received in a deep infraorbital groove. Mandible large, flattened below, and well protruding beyond snout. Teeth in jaws minute, sharp pointed, numerous, and in broad bands which are continuous in front. Along sides of mandible a series of a few enlarged or erect canine-like teeth. Vomerine teeth minute, sharp pointed, uniserial and connecting with those on palatines. Palatine teeth large, depressible, irregular in size and position and rather numerous. Tongue a little long, rounded in front, and free. Lips rather broad and a little fleshy. Anterior

[67] *Hist. Nat. Poiss.*, XVIII, 1846, p. 285.
[68] *Atlas Ichth.*, IX, 1878, Pl. (1) 395, fig. 3.

nostrils far apart near edge of snout and each in a fleshy tube equal to about half of orbit. Posterior nostril small, lateral, close in front of eye and nearly level with upper margin of pupil. Interorbital space broad, flattened, and a trifle elevated. Opercle with a somewhat narrow fleshy gill-flap. Top of head broad and more or less flattened.

Gill-opening large, extending forward till about an eye-diameter posterior to posterior rim of orbit, and branchiostegal membrane forming a broad fold over isthmus. Gill-rakers small short broad asperous tubercles, and about 7 in number on first arch. Filaments small, nearly equal to pupil. Accessory branchial cavity large.

Scales rather small, cycloid, striate, and those on bases of caudal and pectoral fins small. On top of head scales more or less osseous and cemented together. Same on opercular region and on cheek. Scales on costal region a trifle larger than elsewhere. Lateral line a little high or superior at first, then dropping one or two scales till over vent, after which it continues medianly to caudal. Tubes simple.

Dorsal of nearly uniform height, long, and beginning about over first third of pectoral. Origin of anal about midway between tip of maxillary posteriorly and base of caudal, and similar to dorsal. Caudal rounded and middle rays longest. Pectoral long, rounded, reaching about $\frac{2}{3}$ of distance to anal, and middle rays longest. Ventral inserted just behind base of pectoral or a little before origin of dorsal, small or reaching about half way to vent. Vent close to origin of anal. Caudal peduncle compressed, and its least depth about $\frac{4}{5}$ its length.

Color in alcohol a livid plumbeous-brown, ventral but little paler or somewhat dirty white. Each scale on side marked with a slaty or dusky spot. Fins more or less slaty-brown, ventrals whitish. Tip of each dorsal and anal ray whitish. Indistinct oblique dusky bars or bands on dorsal and anal, and most distinct on last rays. Traces of many indistinct transverse narrow or wavy dusky cross-bars on caudal. Margin of pectoral narrowly pale. Lower surface of head pale livid slaty with round whitish blotches or spots. Iris slaty.

Length 8 inches.

Three examples. Baram, Borneo. Harrison and Hiller.

Dr. Steindachner's figure differs a little in the absence of the blackish oblique bars on the dorsal which are very distinct in one of my examples.

73. Ophicephalus pleurophthalmus Bleeker.

One example from Kapuas. Harrison and Hiller.

74. Ophicephalus lucius Cuvier.

Two examples from Baram. Harrison and Hiller.

TOXOTIDÆ.

75. Toxotes microlepis Günther.

One example. It differs a little in coloration from Bleeker's figure,[69] though purely individual.

EPHIPPIDÆ.

76. Ephippus argus (Linnæus).

Two examples, larger 3 inches long. The spots are not nearly so numerous as those shown in Day's figure.[70] Those on my smaller specimen are about 5 in number along the lateral line.

TRIACANTHIDÆ.

77. Triacanthus oxycephalus Bleeker.

Head $3\frac{1}{8}$; depth $2\frac{2}{5}$; D. V–23; A. 19; snout $1\frac{1}{2}$ in head; eye $3\frac{3}{4}$; dorsal spine $2\frac{1}{2}$ in head and trunk; anal spine $3\frac{3}{4}$; pelvic process $4\frac{1}{2}$; base of rayed dorsal $3\frac{4}{5}$; base of anal 6; length of caudal peduncle $4\frac{1}{6}$; length of pectoral equal to space between front margin of anterior nostril and posterior margin of orbit; interorbital space about equal to orbit. Upper edge of occipital crest nearly straight. Space between posterior margin of orbit and origin of spinous dorsal about equals $1\frac{3}{4}$ eye-diameters. Spinous dorsal pale brown, without markings. Length (caudal damaged) about 5 inches. A small example is much deeper, otherwise agreeing.

TETRAODONTIDÆ.

78. Tetraodon palembangensis Bleeker.

Two examples, largest 8 inches long from the Kapuas.

SCORPÆNIDÆ.

SYNANCEINÆ.

79. Leptosynanceia greenmani sp. nov.

Head $2\frac{7}{8}$; depth $3\frac{1}{4}$; D. XVI, 5; A. V, 5; P. 14; V. I, 4; width of head $2\frac{2}{3}$ in head and trunk; depth of head $1\frac{1}{4}$ in its length; seventh dorsal spine $3\frac{1}{2}$; last dorsal spine about 3; first dorsal ray about $2\frac{3}{5}$; fourth anal spine $3\frac{1}{2}$; third anal ray $2\frac{1}{3}$; caudal $1\frac{1}{2}$; length of pectoral $1\frac{3}{4}$; ventral $1\frac{3}{4}$; least depth of caudal peduncle $3\frac{7}{8}$; mandible 2; snout 4 in head, measured from tip of upper jaw medianly; eye 11; maxillary 2; distal expanded extremity of maxillary 5; interorbital space $3\frac{1}{4}$.

Body elongate, broadly depressed anteriorly, trunk compressed, so that when viewed from above tapering to caudal. Profiles more or

[69] *Atlas Ichth.*, IX, 1877, Pl. (1) 363.
[70] *Fishes of India*, I, 1875, Pl. 29, fig. 3.

less similar. Caudal peduncle compressed, its least depth about equal to its length from base of anal membrane.

Head large, very broad, robust, broader posteriorly, and upper profile a trifle concave. Upper surface of head more or less flattened medianly, lower surface more or less convex. Snout short, very broad, flattened or only a trifle convex, when viewed from above both its margin and that of upper jaw, which is closely parallel, emarginate. Eyes small, a trifle longer than broad, rounded, superior though well separated and

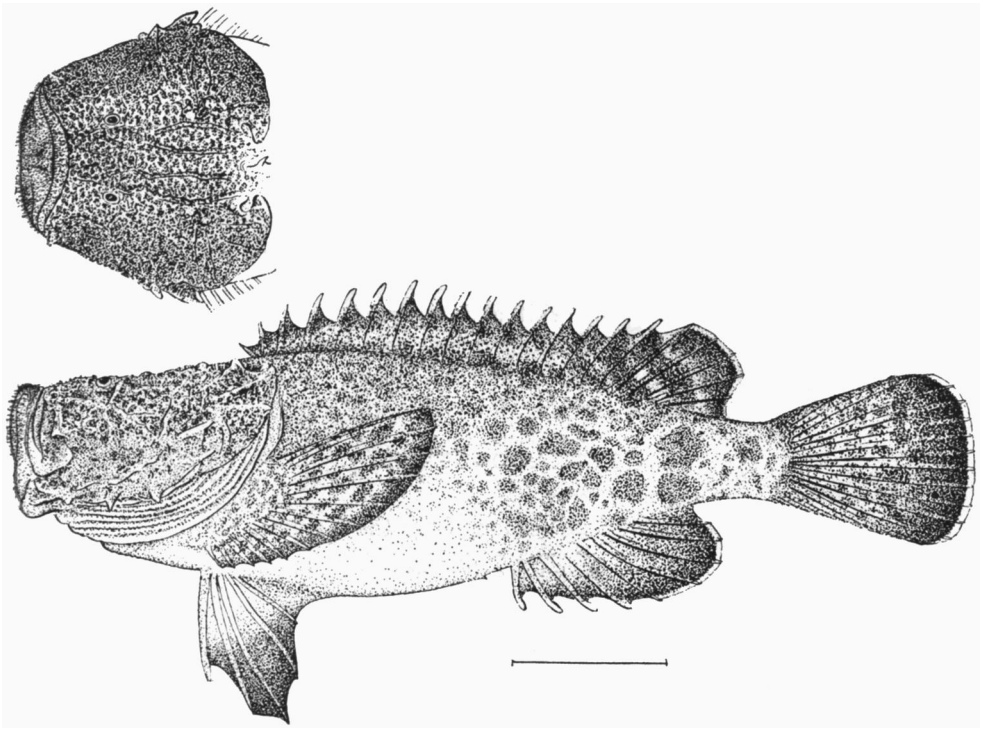

Fig. 12.—*Leptosynanceia greenmani* Fowler.

placed near first third of length in head. Maxillary nearly vertical, distally well expanded, so that its posterior margin is about level with anterior nostril. Mandible thick, heavy, nearly vertical, convex, and well protruded. Teeth minute, in rather broad bands which do not meet anteriorly though approaching close. No teeth on roof of mouth anteriorly or on tongue. Tongue very large, broad, thick, and only free around edges. Anterior nostrils each in a short tube about as far apart as interorbital space and close to edge of snout. Posterior nos-

trils same distance apart, each with a cutaneous margin and directly in front of eye. Interorbital space rather broad and flattened. Ridges on top of head distinct, especially parietal. Nuchal bony knob-like processes, one on each side of each parietal ridge large and distinct. Just anterior to nuchal knob a smaller parietal knob on each side. Tympanic knob small and inconspicuous. Two preorbital spines, lower much larger. Five spinous processes along margin of preopercle, upper 2, which are near its angle, enlarged and conspicuous. On ridge of preopercle 2 small blunt spinous processes and another on cheek just below eye. Opercular spines 2 and superior. Articular portion of mandible large.

Gill-opening lateral, large, and carried forward about an eye-diameter posterior to posterior margin of eye. Rakers about 10 small rounded knobs, low, and much less than eye, on first arch. Filaments about half of interorbital space. Pseudobranchiæ of several filaments. Width of isthmus a trifle more than interorbital space.

Body scaleless, and skin smooth, anteriorly and above, and together with most of head, covered with minute papillæ. In a lateral series close to and concurrent with upper profile a series of 10 short bony pricks following course of lateral line. Small papillæ also on spinous dorsal where they form oblique crossing series.

Spinous dorsal with long base, spines pungent, heteracanthous and, with exception of first two, of more or less equal height. Origin of spinous dorsal a little before base of uppermost pectoral ray. Each dorsal spine with a more or less cutaneous or adipose-like flexible tip. Anal spines similar, fourth longest. Origin of spinous anal about midway between base of lowest pectoral ray and base of caudal. Membranes of both spinous dorsal and anal emarginate. Rayed vertical fins with simple rays. Origin of soft dorsal about last fourth in length of head and trunk. Origin of rayed anal slightly before. Third dorsal ray longest and others graduated down, edge of fin rounded. Third anal ray longest, others more or less subequal. Caudal rounded and rather oblong. Pectoral large, broadly expanded, of simple rays, and base of lowest ray about last third in length of head. Ventral with broad base united by membrane with belly, and base of spine opposite to base of lowest pectoral ray. Spine robust and with fleshy end. Second ventral ray longest. Vent close in front of anal.

Color in alcohol pale brown, lower surface scarcely paler. Head finely mottled or marbled with darker brown, and back and sides with numerous large deep brownish blotches. Fins also similarly marked and colored. Soft dorsal, anal and caudal with conspicuous white and

rather broad margins, color adjoining almost blackish but fading out to brownish ground-color soon, though on caudal distally more darker than on other fins. Pectoral mottled with brownish, becoming distally blackish, and without white margin. Ventral pale blotched with dusky distally. Iris slaty.

Length $6\frac{1}{4}$ inches.

Type No. 2,349, W. I. A. P. Baram, Borneo. 1897. Mr. Alfred C. Harrison, Jr., and Dr. H. M. Hiller. Also paratypes No. 2,381, W. I. A. P., with same data, and No. 2,509, W. I. A. P., from the mouth of the Baram river, collected by Dr. W. H. Furness in 1898.

This species is closely related to *Leptosynanceia asteroblepa* (Richardson),[71] but differs at once in coloration, the edges of all the fins in that species being blackish, while in *Leptosynanceia greenmani* they are margined with whitish on the rayed dorsals and anal, and caudal. Bleeker's figure[72] shows a more marbled appearance, but the edges of these fins are also dark. Further, the dark and pale markings on the trunk are exactly negative to *L. greenmani*.

(Named for Dr. M. J. Greenman, Director of the Wistar Institute of Anatomy in Philadelphia.)

GOBIIDÆ.

ELEOTRIDINÆ.

80. Ophiocara porocephala (Valenciennes).

Head $2\frac{3}{4}$; depth $4\frac{1}{6}$; D. VI–I, 8; A. I, 6; scales 37 in a lateral series to base of caudal; about 15 series of scales from origin of spinous dorsal to middle of dorsal transversely; depth of head about $1\frac{5}{6}$ in its length; width of head $1\frac{1}{2}$; mandible 2; length of depressed spinous dorsal 2; base of second dorsal $2\frac{1}{4}$; sixth dorsal ray $2\frac{1}{10}$; base of anal $2\frac{1}{10}$; fifth anal ray $2\frac{1}{2}$; length of caudal about $1\frac{2}{3}$; pectoral $1\frac{9}{10}$; ventral $1\frac{15}{16}$; snout $3\frac{3}{5}$ in head measured from tip of upper jaw; eye $6\frac{3}{4}$; maxillary $2\frac{4}{7}$; width of mouth $3\frac{1}{6}$; interorbital space $2\frac{2}{3}$. Cleft of mouth extending but little beyond anterior margin of eye. Series of pearl-colored spots along lower part of sides more or less regular and persistent in alcohol. Traces of a whitish margin to soft dorsal and anal. Ventral dark like back with light margin. Length $6\frac{5}{8}$ inches. Three examples. Baram. Harrison and Hiller. All dark or blackish-brown with whitish spots on side, though the eye appears to be a little smaller than in Day's figure.[73]

---

[71] *Synanceia asteroblepa* Richardson, *Voyage of the Sulphur*, Fish, I, 1844, p. 69, Pl. 39, figs. 1–3. Coast of New Guinea.

[72] *Atlas Ichth.*, IX, 1877, Pl. (6) 416, fig. 6.

[73] *Fishes of India*, II, 1876, Pl. 67, fig. 1.

GIGANTOGOBIUS gen. nov.

Type *Gigantogobius jordani* sp. nov.

Scales small, about 88. Body depressed, especially head. Snout broad and depressed. Dorsal spines not elevated. Ventrals separate. Eyes small and superior. Largest of the Gobies. Rivers of Borneo.

(*Γιγανταῖος*, gigantic; *κωβιὸς*, the ancient name of the Goby.)

81. Gigantogobius jordani sp. nov.

Head $2\frac{5}{6}$; depth 4; D. VI–I, 9, I; A. I, 8, I; P. 17; V. I, 5; scales 88 to base of caudal, and about 6 more on latter; scales about 32 in a transverse series at origin of anal; depth of head about 2 in its length; width of head $1\frac{2}{5}$; mandible 2; second dorsal spine $3\frac{2}{5}$; third branched dorsal ray $2\frac{2}{3}$; base of spinous dorsal $2\frac{3}{4}$; base of rayed dorsal 2; first branched anal ray $4\frac{1}{5}$; sixth anal ray $2\frac{1}{2}$; base of anal $2\frac{3}{5}$; length of caudal $1\frac{3}{5}$; least depth of caudal peduncle $2\frac{3}{7}$; pectoral 2; ventral $2\frac{1}{6}$;

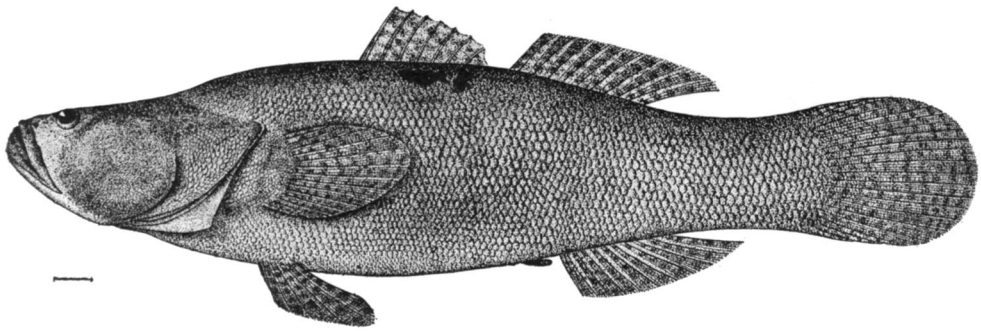

Fig. 13.—*Gigantogobius jordani* Fowler.

greatest width of trunk $1\frac{3}{7}$; snout $3\frac{3}{4}$ in head from tip of upper jaw; eye $11\frac{3}{5}$; maxillary $2\frac{1}{4}$; interorbital space $3\frac{2}{5}$; internasal space 4; width of mouth 2.

Body elongate, very robust and solid, depressed anteriorly, sides rather convex and tail well compressed. Greatest depth at origin of spinous dorsal. Profiles of trunk a little convex and similar. Caudal peduncle strongly compressed and its least depth about $1\frac{1}{6}$ in its length.

Head very large, depressed, more or less flattened above and more convex below. Upper profile concave from snout in front to occiput. Lower profile convex. Snout obtuse, broad, and a little convex above. Upper jaw broad and well produced in front. Eye small, circular, laterally superior, and placed about first third in total length of head. Mandible large, convex and well produced. Mouth large, superior, oblique, and gape curved in profile. Maxillary oblique and reaching

about opposite posterior margin of pupil. Lips thick and fleshy, edges papillose. Teeth short, conic, powerful, erect, and irregular in at least outer series of each jaw. Only an inner adjoining broad band in upper jaw of minute ones. Roof of mouth and tongue edentulous. Tongue broad, rounded in front, and free. Nostrils superior, anterior ones each in a short tube near margin of snout, though well separated, distance between being equal to that of posterior pair, which are close in front of eye in form of simple pores. Interorbital space broad and flattened. Opercle ending in a triangular point above and with narrow cutaneous flap.

Gill-opening large, extending forward a little before middle in length of head, though falling a little behind posterior margin of orbit. Rakers about 10 knob-like bony processes on first arch, rounded, much shorter than filaments though large. Filaments about equal to orbit. Isthmus narrow.

Scales small, cycloid, striate, thin and rather narrowly imbricated. Head scaled except most of snout, jaws, mandible and branchiostegal regions which are naked. Both dorsals, pectoral, except base, and ventral also naked. Greater part of caudal scaly, also base of pectoral. Scales before spinous dorsal, and on head above, on base of caudal, and on breast, especially reduced or crowded. No lateral line.

Dorsal spines a little flexible, membranes emarginate, and second longest. Fin small, its origin about over middle of depressed pectoral or about midway between tip of snout and middle of last dorsal ray when depressed, and not reaching rayed dorsal. Rayed dorsal well developed, posteriorly higher or fifth ray about longest, and origin of fin a little nearer base of caudal than posterior margin of preopercle. Anal similar to rayed dorsal and inserted a little posterior to its origin Caudal large, rounded, median rays a little longest. Pectoral rather small, lower rays more expanded and branched, base of fin a little fleshy, and when depressed tip of fin reaches about opposite middle of length of depressed spinous dorsal. Ventrals separate, anteriorly with base fleshy, inserted a little in advance of base of lowest pectoral ray, rays graduated to fourth which is longest and tip of depressed fin reaching a little more than half way to anal. Anal papilla large and fleshy. Vent at a point about last $\frac{2}{5}$ in space between tip of depressed ventral and origin of anal.

Color in alcohol deep blackish-brown, a slaty hue due doubtless to the precipitate, and more or less nebulous. Belly, lower surface of head and breast scarcely paler, or dirty-brownish. Lower surface of head with paler blotches, some of which are more or less confluent. Fins all

dusky brownish variegated with darker or blackish-brown spots, giving them a somewhat barred appearance. Eyes slaty.

Length 26 inches.

Type No. 2,387, W. I. A. P. Baram, Borneo. 1897. Mr. Alfred C. Harrison, Jr., and Dr. H. M. Hiller. Also paratype No. 2,763, W. I. A. P. Same data. It is smaller.

(I take pleasure in dedicating this interesting species to Dr. David Starr Jordan, of the Leland Stanford Junior University, my most able preceptor in Ichthyology.)

82. Butis butis (Hamilton).

Head $2\frac{7}{8}$; depth $4\frac{2}{3}$; D. VI–I, 8; A. I, 8; scales 29 in lateral series to base of caudal, and 2 more on latter; 13 scales obliquely between origin of spinous dorsal and that of anal. Each scale of body with a smaller one, or more, usually at its base. This agrees fairly well with Day's figure of *Eleotris butis*,[74] though there are four or five brownish lines radiating from the eye. Sides of head marked sparsely with brownish specks. Four examples.

PERIOPHTHALMINÆ.[75]

83. Periophthalmodon schlosseri (Pallas).

Head $3\frac{1}{5}$; depth $4\frac{2}{3}$; D. VII–I, 12; A. I, 12; scales 51 in a lateral series to base of caudal, and 4 or 5 more on latter; about 14 scales in a transverse oblique series from origin of soft dorsal to anal; width of head $1\frac{3}{5}$ in its length; depth of head $1\frac{1}{2}$; snout 3; eye $6\frac{1}{4}$; maxillary $2\frac{3}{4}$; width of mouth $2\frac{3}{4}$; least depth of caudal peduncle $2\frac{3}{5}$; width of base of pectoral 3; length of pectoral $1\frac{1}{3}$; ventral 2; caudal $1\frac{1}{3}$; second dorsal spine $1\frac{2}{3}$; sixth dorsal ray $2\frac{7}{8}$; tenth anal ray $3\frac{2}{5}$. Lower surface of head and breast naked. In alcohol brownish, under surface of body paler or whitish, and ventrals and anal similar. Spinous dorsal blackish-brown with upper margin conspicuously white. Soft dorsal brownish with a broad median dusky or blackish-brown band. A dusky band from eye to shoulder. Iris slaty and outer lid white. Length $8\frac{1}{4}$ inches. Four examples.

84. Periophthalmus argentilineatus Valenciennes.

Head 4; depth $5\frac{1}{2}$; D. XIII–13; A. 11; P. I, 14; V. I, 5; scales about 80? in a lateral series from above gill-opening posteriorly to base of

[74] *Fishes of India*, II, 1876, Pl. 67, fig. 3.

[75] *Boleophthalmus* Valenciennes may be distinguished from *Scartelaos* Swainson by the filamentous dorsal spines. As I have only examined examples of *Boleophthalmus chinensis* (Osbeck), *B. boddærti* Schlegel, the type of *Boleophthalmus* Valenciennes, may be different. Also I have only seen *Scartelaos aucupatorius* (Richardson) from China, which may be different from *S. viridis* (Swainson), the type of the latter's genus.

caudal, and about 4 more on latter; about 23 scales in a transverse series from origin of soft dorsal to base of anal; width of head $1\frac{4}{7}$ in its length; depth of head $1\frac{1}{2}$; snout $3\frac{1}{4}$; eye $3\frac{3}{5}$; width of mouth $2\frac{4}{5}$; first dorsal spine $1\frac{2}{5}$; first dorsal ray about $2\frac{1}{8}$; last anal ray about $3\frac{1}{2}$; caudal (damaged) $1\frac{1}{3}$; pectoral, to scaly base, about $1\frac{1}{2}$; length of ventral nearly 2; least depth of caudal peduncle 3.

Body elongate, somewhat compressed, tapering to caudal so that greatest depth exclusive of head is just behind it. Profiles even and similar. Caudal peduncle rather long, its least depth a trifle over half its length.

Head robust, a little oblong, widest below, upper surface little constricted, but little deeper posteriorly, and anterior profile steep. Snout broader than long, and with both anterior profile and surface convex.

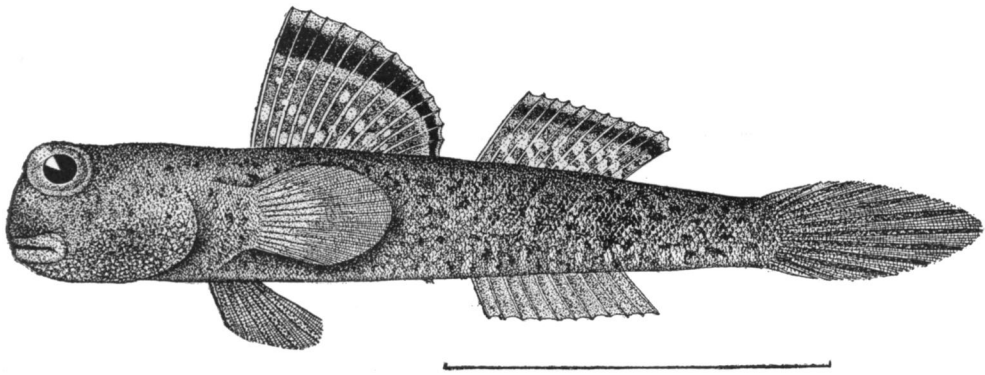

Fig. 14.—*Periophthalmus argentilineatus* Valenciennes.

Eye high, large, a little longer than deep and anterior. Mouth broad, with large jaws, and lower a little inferior. Lips fleshy, broad, and forming a broad fold at each corner of mouth. Teeth large, about 20? in each jaw, conic, pointed, and uniserial. Roof of mouth and tongue apparently smooth. Tongue large, thick, rounded and not free. Nostrils well separated, on each side of snout just below front margin of eye. Interorbital space hardly defined, eyes approximated.

Gill-opening lateral, its length about $3\frac{3}{4}$ in head. Gill-rakers a few small weak fleshy processes. First arch with lower anterior part more or less adnate to pharynx by membrane. Gill-filaments rather short. Isthmus broad.

Scales small, present on occiput or on top of head behind eyes, and on sides of head. In these regions and on back about spinous dorsal, and also on belly and chest they are small or crowded. On posterior

side of body enlarged. Small scales only on bases of pectoral and caudal. No lateral line.

Spinous dorsal beginning behind base of pectoral, margin of fin entire, spines graduated down from first which are longest, and height of fin a little more than greatest depth of body. Soft dorsal inserted over that of anal, first ray highest and others graduated down. Origin of anal about opposite that of soft dorsal, and graduated to last rays which are longest. Margins of both rayed dorsal and anal entire. Caudal damaged, elongate, and median rays longest. Pectoral broad, with long scaled fleshy base and not quite reaching opposite vent. Ventrals separate, small, spine short and reaching about half way to anal. Vent well before anal and with an anal papilla.

Color in alcohol deep brown, back darker, and lower surface a more livid or soiled brownish, on abdomen and lower surface of head somewhat whitish. On lower side of head a number of small whitish round spots, and on lower side of trunk a number of short indistinctly defined vertical bars of same color. Trunk and head also more or less mottled with a darker shade of brown than general body-color, sprinkled with various irregular blackish spots. Dorsals brownish, margins whitish, below which is a broad blackish submarginal band, most distinct on spinous fin. Below dark bands another pale or whitish one, similar to margins. Basal portions of dorsals brownish marked with a number of rather large whitish spots of irregular distribution. Other fins brownish, pectoral and caudal darker and anal pale. Iris slaty.

Length $2\frac{1}{4}$ inches (caudal damaged).

Three examples.

GOBIINÆ.

85. Glossogobius giurus (Hamilton).

Head 3; depth $5\frac{1}{5}$; D. VI–I, 9; A. I, 8; scales 32 in lateral line to base of caudal, and 3 more on latter; 14 scales between origin of dorsal and that of anal; snout $3\frac{1}{3}$ in head from tip of upper jaw; eye $4\frac{1}{3}$. In alcohol body shows traces of about 8 pale longitudinal narrow lines which are continuous. Side with 5 nebulous or brownish blotches. Opercle with a dusky-brown blotch. Several short deep brown bars on base of pectoral. In several of these latter points it will thus be seen to differ a little from Day's figure of *Gobius giurus*.[76] Length $4\frac{3}{4}$ inches. Five examples.

[76] *Fishes of India*, II, 1876, Pl. 66, fig. 1.

86. Chænogobius megacephalus sp. nov.

Head 3; depth about 6?; D. VI–I, 11; A. I, 10; P. 16; V. I, 5 (I, 5); scales about 75? (squamation injured) to base of caudal; scales about 14? (squamation injured) in a transverse series at origin of anal; depth of head about $2\frac{1}{3}$ in its length; width of head $1\frac{7}{8}$; snout $3\frac{1}{2}$; eye 5; width of mouth $2\frac{2}{3}$; maxillary 2; pectoral $1\frac{3}{7}$; ventral $2\frac{1}{3}$; third dorsal spine $2\frac{1}{3}$; second developed dorsal ray $2\frac{1}{4}$; last 3; first developed anal ray 3; last 3; caudal about $1\frac{1}{2}$; least depth of caudal peduncle $3\frac{4}{7}$; interorbital space $2\frac{1}{3}$ in horizontal orbital diameter.

Body elongate, depressed anteriorly, and sides and tail well compressed. Greatest depth apparently about belly. Caudal peduncle rather long, its least depth about $1\frac{3}{5}$ in its length.

Head large, depressed, below more or less flattened, and upper sur-

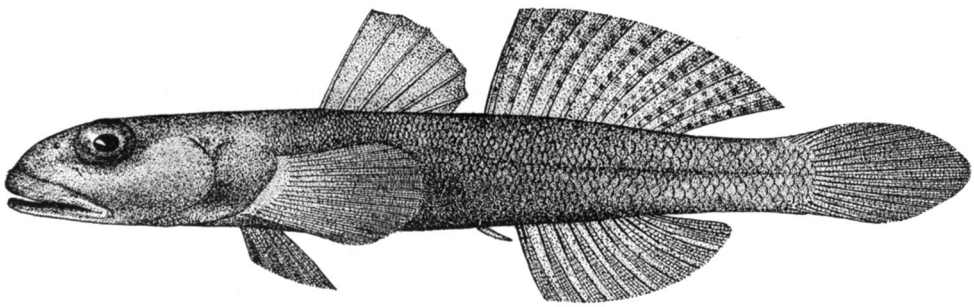

Fig. 15.—*Chænogobius megacephalus* Fowler.

face convex. Upper profile steep and convex, or obtuse to eye, then more or less shallowly convex. Snout large, broad, convexly rounded, and well developed upper jaw produced. Eye rather small, high, somewhat directed upward, a little longer than deep, and posterior margin a little in advance of middle of length of head. Jaws rather large and powerful and upper slightly protruding. Mouth large, broad, and maxillary reaching a trifle past posterior margin of orbit. Lips rather thin, fleshy, and with lateral margins papillose. Teeth in broad bands in jaws, not connected in front, and outer ones not forming a pronounced outer series, though a little larger than inner. No vomerine or palatine teeth. Upper buccal flap broad. Tongue broad, smooth, thick, truncated, with a median groove or emargination and little free in front. Nostrils lateral, in front of eye, anterior a little nearer front margin of eye than tip of upper jaw, and posterior close in front of eye. Interorbital space narrow and flattened.

Gill-opening lateral, slightly oblique, and its length about $2\frac{1}{2}$ in head. Rakers about 3+5 short rounded tubercles. Filaments short, about equal to horizontal diameter of pupil.

Scales small, finely ctenoid. Body mostly scaly, almost all fallen in this example. Scales on back before and below spinous dorsal greatly reduced and crowded. Posteriorly on trunk larger scales. Fins, except base of caudal and traces of minute scales at base of pectoral, scaleless. Breast and median line of belly scaleless and without traces of pockets. No lateral line.

Dorsal spines a little pungent, third a trifle longest, and others graduated. Origin of spinous dorsal about midway between tip of upper jaw and penultimate dorsal ray. Second dorsal inserted a trifle in advance of anal, a little nearer base of caudal than posterior margin of eye, and fin rays mostly uniform in height. Anal similar. Caudal elongate, median rays longest and edges above and below rounded. Pectoral long, broad, radii similar, none silky but all joined by membranes and those about and just below median longest. Ventrals united and with a rather broad frenum in front. Vent close in front of anal. Anal papilla but little shorter than eye.

Color in alcohol dull pale brown, lower surface not paler. Spinous dorsal pale brown. Soft dorsal and caudal similar with series of indistinct brownish blotches, those on former oblique and those on latter transverse. Anal, ventral and pectoral brown, latter darker. Iris brownish.

Length $3\frac{5}{8}$ inches.

Type No. 13,900, W. I. A. P. Borneo. 1898. Dr. W. H. Furness. One example.

This species is related to *Gobius melanocephalus* Bleeker,[77] *G. personatus* Bleeker[78] and *G. grammepomus* Bleeker.[79] From all of these it differs at once in the larger head which is equal to $3\frac{1}{2}$ in the entire length of the fish, inclusive of caudal.

(*Μέγας*, great or large; *κεφαλή*, head.)

SOLEIDÆ.

87. Brachirus panoides (Bleeker).

One example.

88. Paraplagusia marmorata (Bleeker).

Head 4; depth $3\frac{3}{7}$; D. 100; A. 80; scales 100 in a median lateral

[77] *Verh. Bat. Genoot.* (Bijd. Blenn. Gob. Soend. Moluk. Arch.), XXII, 1849, p. 33. Purworedjo in flumine Bogowonto.

[78] *L. c.*, p. 34. Banjumas, in flumine Seraiju.

[79] *L. c.* Purworedjo in flumine Bogowonto

series from gill-opening below lateral line to base of caudal; in greatest width of body 26 series of scales between ventral profile of body and lateral line, and between latter and upper lateral line 16; snout $2\frac{1}{10}$ in head; eye equal to interorbital space. Length $7\frac{5}{8}$ inches. Two examples.

89. Cynoglossus borneensis (Bleeker).

Head $4\frac{1}{3}$; depth $3\frac{3}{4}$; D. 100; A. about 4, 82; caudal about 10; space between tip of snout and upper eye $2\frac{4}{7}$ in head; mouth cleft 5; upper eye $4\frac{1}{4}$ in space to tip of snout; interorbital space $4\frac{1}{4}$; about 81 scales in lateral line, beginning count above posterior edge of gill-opening, to base of caudal (squamation injured); below and in a median series nearly 85 scales within same limits; 40 scales in a transverse series in greatest width of body or 6 between upper profile and upper branch of lateral line, 14 between latter and median branch, and 20 below.

Body long, greatly compressed, sinistral and greatest depth falling about first $\frac{2}{5}$ in length. Tail tapering rather narrowly posteriorly.

Head moderate, upper profile a little more convex, though both evenly rounded. Snout a little long, well compressed and profile strongly convex. Eyes rather small, close together, and upper with only $\frac{1}{3}$ of its length in advance of anterior margin of lower. Posterior margin of lower eye much further from posterior edge of gill-opening than anterior margin of upper eye is from tip of snout. Mouth large, cleft nearly horizontal. Teeth fine, small, sharp pointed, and in bands only in dextral side of jaws. Sinistral side of jaws with a labial fringe of rather small ragged cutaneous flaps. Tongue thick and inconspicuous. Upper nostril just about opposite anterior margin of lower eye in interorbital space, but nearer upper eye than lower. Lower nostril just a trifle in advance of anterior edge of upper eye, close to gape of mouth and in a short fleshy tube. Interorbital space narrow, flattened medianly, otherwise slightly concave.

Gill-opening small, ascending about level with middle of lower eye, and membrane forming a broad fold over narrow compressed isthmus. Rakers none. Filaments about $\frac{3}{5}$ length of mouth cleft.

Scales ctenoid, small and crowded on anterior half of body and around its profiles, but becoming enlarged on posterior half, especially medianly. Lateral system of mucous pores double along trunk, median series begins near tip of snout and runs direct to base of caudal, while upper one is confluent at its origin with this, and again well behind eye, by means of a downward or nearly vertical series. Upper series then continues near and concurrent with upper profile-line till below fifth ray of caudal, counting from caudal where it ascends on

dorsal. A system or series of mucous pores continues lateral system close to lower profile of snout to mouth, and giving off horizontally a series which extends toward upper nostril. A series of pores extends down irregularly from intersecting series between eyes and gill-opening, and also another small series on lower side of head anterior to former. A similar pattern of lateral system on dextral side of body.

Dorsal and caudal confluent with anal, margins of first and last more or less scalloped or incised, while caudal is pointed. First 4 rays of anal united by a broad membrane with rest of fin.

Color in alcohol uniform dull brown on sinistral side. Dextral side pale brownish-white. Fins brownish, darker than sinistral side. Traces of 3 median longitudinal darker lines on side of trunk, median one on median branch of lateral system. Inside gill-opening brownish. Iris pale slaty.

Length $7\frac{1}{4}$ inches.

One example.

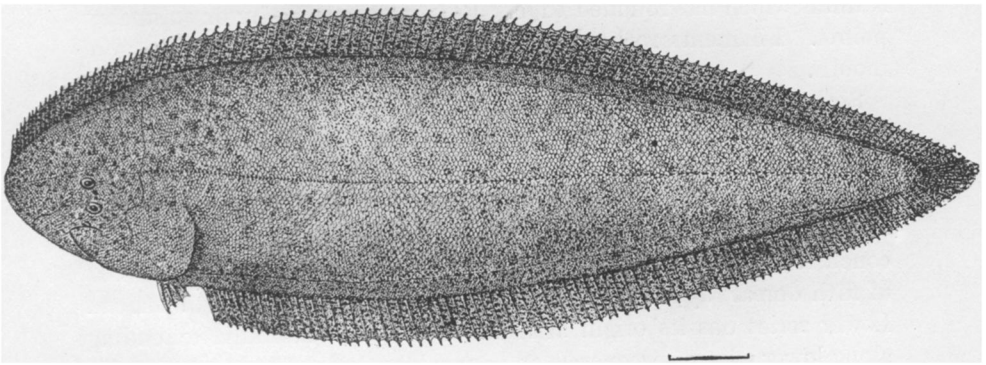

Fig. 16.—*Cynoglossus kapuasensis* Fowler.

90. Cynoglossus kapuasensis sp. nov.

Head 5; depth $3\frac{4}{5}$; D. 109; A. 4–87; caudal 10; space between tip of snout and upper eye $2\frac{1}{6}$ in head; mouth cleft $5\frac{2}{5}$; upper eye $5\frac{1}{2}$ in space to tip of snout; interorbital space 5; about 124 scales in lateral line, beginning count above posterior edge of gill-opening, to base of caudal; below and in a median series about same number within same limits; 67 scales in a transverse series in greatest width of body, or 9 between upper profile and upper branch of lateral line, 21 between latter and median branch, 29 between latter and lower branch and 8 between latter and lower profile-line.

Body elongate, greatly compressed, sinistral and greatest depth fall-

ing about first third in length. Tail tapering posteriorly and its profiles nearly straight. Head small, upper profile a little more convex than lower and both rounded. Snout rather long, compressed and profile strongly convex. Eyes small, close together, and upper with about $\frac{1}{2}$ its diameter in advance of anterior margin of lower. Posterior margin of lower eye about same distance from gill-opening as anterior margin of upper eye is from tip of snout. Mouth cleft large, a little curved upward in middle and nearly horizontal in position. Teeth very minute, merely an asperous edge to each jaw on dextral side, those of sinistral side perfectly smooth. Dextral side with a broad fleshy labial fold finely or minutely fringed. Tongue thick and fleshy. Upper nostril midway in interorbital space and just below posterior margin of upper eye. Lower nostril a little behind anterior margin of upper eye, close to gape of mouth and in a short fleshy tube. Interorbital space narrow and a little concave.

Gill-opening small, ascending about level with lower margin of upper eye, and membrane forming a broad fold over rather narrow compressed isthmus which has rounded edge. Rakers minute fleshy or cutaneous points. Filaments rather long, longest about $\frac{7}{8}$ of length of gape of mouth.

Scales rather finely ctenoid, small, and crowded on anterior third of body and around its profiles, but becoming enlarged on median portion of trunk posteriorly and tail. Lateral system of mucous pores triple. Median series begins near tip of snout and extends to base of caudal direct. Upper series confluent at its origin with middle series, runs concurrent with dorsal profile but a short distance below till below base of fifth dorsal ray, counting from caudal, where it ascends dorsal fin. Lower series has its origin at front of mandible laterally, extending along lower edge of preopercle and down lower side of head, and finally concurrent and near lower profile of body till above base of fifth anal ray, also counting from caudal, where it descends on the anal fin. Intersecting series connect occipital region of upper series with median series and is then continued below to lower series. Along lower anterior margin of snout upper series is continued some distance, after which it ascends obliquely toward upper eye.

Dorsal, anal and caudal confluent, margins of former two fins scalloped or a little emarginate between each ray. Caudal rather rounded. Anal with first 4 rays apparently a little separate from rest of fin.

Color in alcohol rather dark brown on sinistral side, with traces of darker brown mottlings and blotches. Fins brownish, marginally whitish, and mottled more or less basally with darker brownish. Dex-

tral side whitish or brownish-white, also same color extending on fins. Iris dull slaty. Inside gill-opening pale or whitish.

Length $11\frac{13}{16}$ inches.

Type No. 2,402, W. I. A. P. Kapuas river, western Borneo. 1898. Mr. Alfred C. Harrison, Jr., and Dr. H. M. Hiller. One example.

This species approaches *Cynoglossus microlepis* (Bleeker)[80] in the posterior position of the upper nostril which is below the posterior portion of the eye, but it differs from that species in the fewer fin rays and scales. It also resembles *Cynoglossus potous* (Cuvier)[81] in coloration, traces of blotches being evident, but differs in the nostrils and fin radii. From *Cynoglossus borneensis* (Bleeker) it differs in the absence of the three median longitudinal dark lines, etc.

(Named for the Kapuas river, in western Dutch Borneo.)

Faunal Works.

Bleeker, Pieter van.

1851. Bijdrage tot de kennis der ichthyologische fauna van Borneo, met beschrijving van 16 nieuwe soorten van zoetwatervisschen. *Nat. Tijds. Ned. Ind.* Batavia, I, 1850 (1851), pp. 1–16. (March, 1850.)

Visschen van Borneo. *L. c.*, pp. 161–162.

Nieuwe bijdrage tot de kennis der ichthyologische fauna van Borneo met beschrijving van eenige nieuwe soorten van zoetwatervisschen. *L. c.*, pp. 259–275. (November, 1850.)

Derde bijdrage tot de kennis der ichthyologische fauna van Borneo, met beschrijving van eenige nieuwe soorten van zoetwatervisschen. *L. c.*, II, 1851, pp. 57–70. (February, 1851.)

Vierde bijdrage tot de kennis der ichthyologische fauna van Borneo, met beschrijving van eenige nieuwe soorten van zoetwatervisschen. *L. c.*, pp. 193–208. (May, 1851.)

Vijfde bijdrage tot de kennis der ichthyologische fauna van Borneo, met beschrijving van eenige nieuwe soorten van zoetwatervisschen. *L. c.*, pp. 415–442. (August, 1851.)

1852. Zesde bijdrage tot de kennis der ichthyologische fauna van Borneo. Visschen van Pamangkat, Bandjermassing, Praboekarta en Sampit. *L. c.*, III, 1852, pp. 407–442. (June, 1852.)

1853. Zevende bijdrage tot de kennis der ichthyologische fauna van Borneo. Zoetwatervisschen van Sambas, Pontianak en Pangaron. *L. c.*, V (II), pp. 427–462. (January–August, 1853.)

1855. Achtste bijdrage tot de kennis der ichthyologische fauna van Borneo. Zoetwatervisschen van Bandjermasin. *L. c.*, VIII (V), pp. 151–168. (November, 1854.)

Negende bijdrage tot de kennis der ichthijologische fauna van Borneo. Zoetwatervisschen van Pontianak en Bandjermasin. *L. c.*, IX (VI), pp. 415–430. (July, 1855.)

1857. Tiende bijdrage tot de kennis der ichthyologische fauna van Borneo (1). Visschen van de rivieren Barito, Kahajan en Kapoeas. *Act. Soc. Sci. Ind. Neerl.*, II, pp. 1–21. (September, 1856.)

---

[80] *Plagusia microlepis* Bleeker, *Nat. Tijds. Ned. Ind.*, I, 1850 (1851), p. 413. Bandjermassing, Borneo austro-orientalis, in fluviis. (J. Wolff.)

[81] *Pleuronectes potous* Cuvier, *Règne Animal*, Ed. II, II, 1829, p. 344. (Based on *Jerree potoo* Russell, *Fishes of Coromandel*, I, 1803, p. 58, Pl. 74. Vizagapatam. Madras.)

Elfde bijdrage tot de kennis der ichthyologische fauna van Borneo. Visschen van Sinkawang. *L. c.*, III, pp. 1–4. (May, 1857.)

1858. Twaalfde bijdrage tot de kennis der vischfauna van Borneo. Visschen van Sinkawang. *L. c.*, V, pp. 1–10. (October, 1857–March, 1858.)

[82]Vischsoorten van Sinkawang, verzameld door J. H. A. B. Sonnemann Rebentisch. *Nat. Tijds. Ned. Ind.*, XVI (II), 1858–59, pp. 195, 196. (March, 1858.)

[82]Slangen en visschen uit de omstreken van Montrado, verzameld door G. J. Filet. *L. c.*, pp. 196, 197. (March, 1858.)

[82]Slangen en visschen van Koetei, verzameld door J. Wolff. *L. c.*, p. 206. (April, 1858.)

1859. Verslag van eene verzameling Reptiliën en Visschen van Westelijk Borneo, aangeboden door J. H. A. Sonnemann Rebentisch. *L. c.*, pp. 433–441. (January, 1859.)

Zoetwatervisschen van Sintang (verzameld door den heer A. Thepass). *L. c.*, XX (VI), 1858–59, pp. 199–200. (July, 1859.)

1860. Dertiende bijdrage tot de kennis der vischfauna van Borneo. *Act. Soc. Sci. Ind. Neerl.*, VIII, pp. 1–64. (September, 1859.) [Not consulted.]

MARTENS, EDUARD VON.

1864. Süsswasser Fische von Borneo. *Sitz. Gescll. Nat. Fr Berlin*, 1863–64, p. 5. [Verbal communication.]

GÜNTHER, ALBERT.

1868. Description of two new Gobioid Fishes from Sarawak. *Ann. Mag. Nat. Hist.* London, I, (4) pp. 264–266, Pl. 12.

VINCIGUERRA, DOCIO.

1880. Appunti ittiologici sulle collezioni del Museo Civico di Genova. Prima contribuzione alla Fauna Ittiologica dell' Isola di Borneo. Siluroidei raccolti durante il viaggio dei Signori M.^{se} G. Doria e D^{r}. O. Beccari. *Ann. Mus. Civ. Stor. Nat. Genova*, XVI, 1880–81, pp. 161–182, with 7 text figures.

JANOS, KÁROLI.

1882. Prodromus piscium Asiæ orientalis a domine Joanne Xantus annis 1868–70 collectorum. *Természetrajźi Füzetek Kiadja a Magyar Nemzeti Múzeum*, Budapest, 1881, pp. 147–187.

VAILLANT, LÉON.

1890. Sur les Poissons des eaux douces de Bornéo. *Congr. Int. Zool. Paris*, 1889, Compt. Rend., pp. 81–82.

1891. [Note on Lepidoglanis.] *Bull. Soc. Philomath.* Paris, III (8), 1890–91, Compt. Rend., No. 2, p. 6.

1893. Contribution a l'étude de la faune ichthyologique de Borneo. *Nouv. Arch. Mus.* Paris, V (3), pp. 23–114, Pls. 1–2.

1894. Sur la faune ichthyologique des eaux douces de Bornéo. *Compt. Rend. Acad. Sci.* Paris, CXVIII, pp. 209–211.

1902. Résultats zoologiques de l'expédition scientifique néerlandaise au Bornéo central. Poissons. *Notes from the Leyden Museum*, XXIV (I–III). January–July (November), 1902, pp. 1–166, figs. 1–47, Pls. 1, 2.

BOULENGER, GEORGE A.

1894. Descriptions of new Freshwater Fishes from Borneo. *Ann. Mag. Nat. Hist.* London, XIII (6), pp. 245–251.

1895. List of the Freshwater Fishes Collected by Mr. A. Everett on Palawan and Balabac. *L. c.*, XV (6), pp. 185–187.

Descriptions of Two New Fishes Obtained by Mr. C. Hose in Sarawak. *L. c.*, p. 247.

BARTLETT. ——.

1896. *Sarawak Gazette.* [An account of the fishes, both in this and the following. Neither consulted.]

Notebook of Sarawak, No. 2.

---

[82]These titles are from "Lijst der geschriften van Dr. P. Bleeker over Ichthyologie in chronologische volgorde" in *Nat. Tijds. Ned. Ind.* Batavia, XL, 1881, pp. 49–89.

STEINDACHNER, FRANZ.

1901. Ergebnisse einer zoologischen Forschungsreise in den Molukken und Borneo, im Auftrage der Senckenbergischen naturforschenden Gesellschaft ausgeführt von Dr. Willy Kükenthal, ordentl. Professor der Zoologie an der Universität Breslau. Zweiter Teil: Wissenschaftliche Reiseergebnisse. Band III, Heft II. Mit 8 Tafeln, einer Abbildung im Text und einer Kartenskizze. Fische. *Abhand. Senck. Nat. Ges.*, Frankfurt, XXV (2), 1901, pp. 408–464, Pls. 17, 18.

POPTA, MLLE. C. M. L.

1904. Descriptions préliminaires des nouvelles espèces de Poissons recueillies au Bornéo central par M. le Dr. A. W. Nieuwenhuis en 1898 et en 1900. *Notes from the Leyden Museum*, XXVI (IV), October, 1902 (July 15th, 1904), pp. 179–202.