

# Article VII.—SOME FISHES COLLECTED BY THE THIRD ASIATIC EXPEDITION IN CHINA<sup>1</sup>

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The fishes reported in this paper were sent to The American Museum of Natural History by its Third Asiatic Expedition. They are represented by several lots, chiefly from Hsing Lung Shan (Eastern Tombs region, Chihli Province, North China) and vicinity in August 1921 and Ningkwo in the Province of An-hwei Central China during September and October of the same year. All from these two localities were collected by Mr. Clifford H. Pope. Preliminary notices have been given of two new species.<sup>3</sup>

The specimens embraced in this study of the Third Asiatic Expedition's material number 1103, of which the majority are cyprinids. Descriptions are given of seventeen species of special interest, as imperfectly or little known. The other species are noticed with condensed computations of their variation, often supplemented with discussion. I have also included several notes on types or rare species in the Academy of Natural Sciences of Philadelphia and used several series in their collections of both Chinese and Japanese specimens in comparison. Figures illustrating two new cyprinids that I have previously described, a little-known loach, and some of the salient color-variants of the Chinese *Cobitis taenia* are given.

Acknowledgment is due to Mr. John T. Nichols and The American Museum of Natural History for the loan of this material for study and the reservation of a set of the duplicate specimens for the museum of the Academy of Natural Sciences of Philadelphia.

## ENGRAULIDÆ

### *Mystus nasus* (Schlegel)

Head contained  $6\frac{2}{3}$  to  $6\frac{1}{2}$  times in length to base of caudal; depth, 6 to  $6\frac{1}{4}$ . Dorsal III, 11, I; anal II, 92 to 107; pectoral VI, 11 or 12; ventral I, 6. Scales 72 to 76 in lateral line to caudal base, and 3 more on latter; 12 or 13 scales transversely between dorsal and ventral origins; 18 to 23 predorsal scales; abdominal scutes 19 or 20 to ventral origin, 28 to 33 following. Head width  $2\frac{2}{3}$  to 3 times in its length; snout  $4\frac{1}{2}$  to  $5\frac{1}{2}$ ; eye  $5\frac{1}{3}$  to 6; maxillary  $\frac{3}{8}$  to  $1\frac{1}{8}$ ; interorbital  $3\frac{1}{8}$  to  $3\frac{3}{8}$ ; first branched dorsal ray  $1\frac{1}{10}$  to  $1\frac{1}{8}$ ; length of caudal  $1\frac{1}{8}$  to  $1\frac{1}{2}$ ; pectoral  $1\frac{1}{8}$  to  $1\frac{1}{4}$ ; ventral  $2\frac{1}{8}$  to  $2\frac{1}{4}$ .

<sup>1</sup>Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 38.

<sup>2</sup>Of the Academy of Natural Sciences of Philadelphia.

<sup>3</sup>American Museum Novitates, No. 38, May 25, 1922, pp. 1-2; and No. 83, July 25, 1923, pp. 1-2.

Body strongly compressed, deepest at dorsal and ventral origins, predorsal edge convex and postdorsal with only slight median keel.

Head acuminate, strongly compressed, flattened sides but slightly approximate below. Snout protrudes rather obtusely, length  $\frac{3}{5}$  its width. Eye without distinct lid, adipose tissue covering over; center about first fourth in head, slightly more backward in smaller example. Mouth large, narrow, mandible tip midway in snout length. Maxillary very long, extends beyond angle of preopercle, though not quite to gill-opening in younger example and to below gill-opening and slightly beyond pectoral origin in larger example. Teeth in jaws or along maxillary its entire length, and in mandible edges uniserial; small patch each side of vomer and another moderate uniserial row on each palatine. Tongue small free knob, advanced, edentulous. Nostrils together, front one at last third in snout, and hind one much the larger. Interorbital broadly convex. Opercles smooth.

Gill-opening extends forward opposite hind eye edge, connecting membranes moderate. Gill-rakers 18 or 19+22, fine, lanceolate, equal in length to gill-filaments, which are as long as eye. Pseudobranchiæ  $\frac{1}{4}$  the length of gill-filaments. Isthmus a long, slender, trenchant keel.

Scales caducous, thin, rather narrowly imbricated, cycloid. Row of broad scales extends over greater part of anal basally, also some small scales on caudal base. Scaly flap in ventral axil  $\frac{2}{3}$  length of fin. Scales with 1 or 2 basal radiating striæ; circuli basally 114 to 120; apical striæ 9 or 10, fine, largely reticulate. Abdominal scutes sharply pointed.

Dorsal inserted slightly behind ventral origin, first branched ray longest and depressed backward farther than others. Anal low, mostly uniform, begins at first  $\frac{2}{3}$  in combined head and trunk, excluding caudal, slightly behind middle in smaller example. Caudal continuous with anal, median upper rays longest, forming a point. Pectoral without filaments, reaches slightly beyond ventral; longest filaments reach midway in combined head and trunk, without caudal, to a distance contained  $2\frac{1}{4}$  times in head and trunk, in smaller example, though in all cases at least to anal origin. Ventral reaches  $\frac{1}{4}$  the distance to anal, nearly  $\frac{1}{3}$  in young. Vent close before anal.

Color in alcohol, faded pale brown, sides and lower surface very pale. Slight neutral-brown tint at predorsal. Iris pale slaty (doubtless silvery white in life). Fins pale, slightly dotted with pale dusky on dorsal basally.

Length 283 to 310 mm.

Five examples from Ningkwo.

Kreyenberg and Pappenheim<sup>1</sup> discuss the variation of the length of the maxillary, contending for *Coilia brachygnathos* that "unsere sämtlichen Exemplare grosse wie kleine, zeigen nur das obige Verhalten." It seems quite likely, therefore, that smaller or younger examples usually, if not always, have shorter maxillaries.

### FLUTIDÆ

#### *Fluta alba* (Ziuew)

Eleven from Ningkwo, 335 to 533 mm. All gray-brown, paler below. Sides and above variously though finely reticulate, spotted or marbled

<sup>1</sup>1909, Abh. Ber. Mus. Magdeburg, II, Heft 1, p. 10.

with dusky-brown. Often a dark median lateral line more or less complete. In some examples dark mottling extends more or less completely over belly and under surface, sometimes only for short space behind gill-opening. Again, dark specks on back obsolete or absent and usually three dark median parallel lines down back. Some examples may have spots very fine or absent so back uniform grayish in appearance and belly pale.

### **MASTACEMBELIDÆ**

#### ***Mastacembelus sinensis* (Bleeker)**

Head contained 6 to  $6\frac{1}{2}$  times in length to base of caudal; depth  $10\frac{3}{8}$  to 12. Dorsal spines XXXIV, vary XXXI to XXXV; anal spines III. Snout  $3\frac{1}{2}$  to  $3\frac{3}{4}$  times in head; eye 8 to  $8\frac{1}{2}$ ; mouth cleft  $3\frac{3}{4}$  to  $4\frac{1}{4}$ ; interorbital 8 to 9.

Body well compressed, deepest just before vent. Head width 3 to  $3\frac{3}{4}$  times in its length. Snout conic, compressed, ends in a fleshy tip, width 2 to  $2\frac{1}{8}$  in its length. Eye center at about first third in head; diameter  $2\frac{1}{8}$  to  $2\frac{1}{2}$  in snout, little greater than interorbital. Jaws slender, lower shorter, inferior. Maxillary nearly reaches opposite eye. Teeth small, conic, in narrow bands in jaws. Lips fleshy, moderate. Nostrils appear as a pair of short fleshy tubes each side of snout tip; hind nostril a simple pore at last sixth in snout. Interorbital nearly level. Preorbital spine strong, below front of eye. Tail  $1\frac{1}{2}$  to  $1\frac{3}{4}$  times in combined head and trunk. Pectoral 4 times in head; caudal  $2\frac{1}{2}$  to 3.

Color in alcohol brownish generally, under surface of head and belly paler to creamy. Broad dark or dusky-brown lateral band, starting as line from snout tip across side of head, then broadening over greater part of side to caudal base. This band sometimes entirely uniform, speckled, dotted irregularly, or with 40 or more narrow pale vertical lines. Back with dusky reticulations, also lower side of abdomen. Some may extend well over basal portions of soft vertical fins. Often basal portions of last more or less dark or neutral and edges narrowly pale. Belly often immaculate white, sometimes finely reticulated with brownish. Some examples largely uniform or with markings very faint. Often a distinct pale streak runs along upper side of back delimiting upper border of dark lateral band and this with more or less regular indentures to form pale transverse lines.

Length 126 to 228 mm.

Seventeen from Ningkwo.

### **CATOSTOMIDÆ**

#### ***Myxocyprinus asiaticus* (Bleeker)**

Head contained  $4\frac{3}{4}$  times in length to base of caudal; depth  $2\frac{1}{2}$ . Dorsal v, 48, 1; anal iv, 10, 1; pectoral i, 17; ventral i, 10. Scales 50 in lateral line to caudal base and 3 more on latter; 13 scales above lateral line, 8 below; 19 predorsal scales. Head width  $1\frac{1}{2}$  times in its length; snout  $2\frac{1}{10}$ ; eye 6; least depth of caudal peduncle  $2\frac{1}{2}$ ; first branched dorsal ray  $2\frac{1}{2}$ ; first branched anal ray  $1\frac{1}{10}$ ; lower caudal lobe  $3\frac{3}{4}$ ; pectoral  $4\frac{1}{8}$ ; ventral  $4\frac{1}{2}$ .

Body strongly compressed; back greatly compressed, elevated and its front profile strongly inclined, edge but slightly keeled; greatest depth at origin of dorsal. Caudal peduncle strongly compressed, long as deep.

Head small, moderately compressed sides but little flattened and scarcely approximated below. Snout obtuse, convex over surface, length  $\frac{7}{8}$  its width. Eye small, midway in head length; diameter  $2\frac{1}{3}$  in snout, 3 in interorbital. Mouth small, inferior. Premaxillaries protractile downward. Lips moderately small, fleshy, plaited. Nostrils small, together; front one pore-like, with cutaneous rim, at last fourth in snout; hind one a crescentic slit. Interorbital broadly convex. Suborbitals rather narrow.

Gill-opening extends forward to opposite last fourth of head. Gill-rakers 13+19, flexible, lanceolate, contained  $2\frac{1}{2}$  times in gill-filaments, which equal eye in length. Pseudobranchiæ rather small, about  $\frac{1}{2}$  the length of gill-filaments.

Scales in even longitudinal series; breast and belly covered with small scales; row of smaller basal scales on anal and several rows on caudal; head naked and a narrow naked median predorsal strip; no scaly axillary flaps. Scales with 22 to 33 basal radiating striæ; basal circuli 61 to 66; apical radiating striæ 13 to 15. Lateral line complete, midway along side from suprascapula to caudal base; tubes slender, simple and well exposed over each scale exposure to its hind edge.

Dorsal very long basally, inserted slightly nearer pectoral origin than ventral; front lobe of fin  $1\frac{1}{3}$  its length, rounded. Anal begins well posteriorly, much nearer caudal base than ventral origin; depressed fin reaching about  $\frac{1}{3}$  in caudal; first branched ray longest. Caudal deeply forked, lower lobe a little the longer. Pectoral broad, not quite reaching ventral. Ventral like pectoral, reaches  $\frac{2}{3}$  to anal. Vent close before anal.

Color in alcohol, deep dusky-brown, center of each scale with darker shade to form slightly darker longitudinal streaks. Neutral-slaty on cheek and below eye, also upper hind side of head, and on all fins. Upper caudal lobe, lips, chin and under surface of head pale or whitish.

Length 288 mm.

One example, bought twenty miles from Ningkwo, in Ching Tsui Ho on way to Wuhu.

## CYPRINIDÆ

### Cyprininae

#### *Carassius auratus* (Linnæus)

Head contained  $2\frac{1}{2}$  to  $3\frac{1}{2}$  times in length to caudal base; depth  $2\frac{1}{4}$  to  $2\frac{1}{2}$ . Dorsal II, I, 16, 1 to 18, 1; anal II, I, 5, 1. Scales 26 to 28 in lateral line to caudal base and 2 or 3 more on latter; 7 scales above lateral line, 6 below; 13 predorsal scales. Snout  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times in head; eye  $3\frac{1}{2}$  to 5; maxillary  $3\frac{1}{3}$  to  $3\frac{2}{3}$ ; interorbital  $2\frac{1}{2}$  to  $2\frac{3}{4}$ .

Color in alcohol dull brownish generally above, below little paler. Fins grayish, sometimes ends of paired ones a little darker.

Length 115 to 153 mm.

From Hsing Lung Shan August 7, 1921, 93 examples; from twenty-six miles south of Hsing Lung Shan, August 12, 1921, 83 examples; Ningkwo, 3 examples.

**Barbinae*****Hemibarbus labeo* (Pallas)**

Head contained  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length to caudal base; depth 4 to 5. Dorsal III, 7, 1; anal III, 6, 1. Scales 40 to 48 in lateral line to caudal base, and 3 more on latter; 6 or 7 scales above lateral line, 5 or 6 below; 11 to 13 predorsal scales. Snout  $2\frac{1}{8}$  to  $2\frac{1}{2}$  times in head; eye  $3\frac{1}{4}$  to  $4\frac{1}{2}$ ; maxillary  $2\frac{3}{8}$  to 3; interorbital  $3\frac{1}{2}$  to 4; first branched dorsal ray  $1\frac{1}{10}$  to  $1\frac{1}{8}$ ; first branched anal ray  $1\frac{3}{8}$  to  $1\frac{1}{4}$ ; caudal  $1\frac{1}{8}$  to  $1\frac{1}{2}$ ; pectoral  $1\frac{1}{8}$  to  $1\frac{1}{2}$ ; ventral  $1\frac{1}{4}$  to 2. Pharyngeal teeth 1, 3, 5—5, 3, 1, hooked, compressed, with well-developed grinding surfaces. Scales with 15 to 19 obsolete weak apical striæ; circuli moderate, finer basally.

Color in alcohol with row of 8 or 9 deep brown spots close along and above lateral line, most distinct or contrasted in young. On back and sides base of each scale with dark spot. Dorsal and caudal with several rows of dusky spots on outer portions.

Length of largest 244 mm.

Two from Hsing Lung Shan, August 7, 1921; six from Ningkwo, September 15 to October 15, 1921.

For comparison only a few young examples in the Academy from the Iwai River at Ichinoseki, Japan, representing the nominal *Gobio barbatus* Schlegel, which appears in every way the same, as admitted by Berg. These examples show:

Head contained  $3\frac{1}{8}$  to  $3\frac{1}{2}$  times in length to base of caudal; depth 4 to  $4\frac{3}{4}$ . Dorsal I, 1, 7, 1; anal III, 6, 1, rarely III, 7, 1. Scales 40 to 42 in lateral line, occasionally 39 or 44, to caudal base and 2 or 3 more on latter; 8 scales, often 7, above lateral line; 6 scales below lateral line, seldom 5; 13 to 17 predorsal scales. Snout  $2\frac{1}{8}$  to  $2\frac{1}{2}$  times in head; eye  $2\frac{1}{8}$  to  $3\frac{1}{2}$ ; maxillary  $3\frac{1}{8}$  to  $3\frac{1}{2}$ ; interorbital 4 to  $4\frac{1}{2}$ . Pharyngeal teeth 1, 3, 5—5, 3, 1, seldom 1, 2, 5—5, 2, 1 or 1, 2, 5—5, 3, 1.

Length 54 to 62 mm.

Oshima says that *Hemibarbus maculatus*<sup>1</sup> from China differs only in color. In alcohol the nominal *Hemibarbus joitani* Jordan and Starks is said to be "pinkish yellow, with a longitudinal series of eight large spots above the lateral line; smaller spots irregularly placed on back and sides; dorsal and caudal with similar black spots; other fins without markings. Although faint dark spots are present in the young specimen of *Hemibarbus labeo*, they are not permanent; the color of the adult is always uniform grayish-brown." My examples show traces of all these markings, though now apparently greatly faded.

**Gobioninae*****Gobio gobio* (Linnæus)**

Head contained  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length to base of caudal; depth  $4\frac{1}{4}$  to  $4\frac{3}{4}$ . Dorsal II, 7, 1; anal II, 6, 1. Scales 38 in lateral line to caudal base and 2 more on latter; 6 scales above lateral line, 5 below; 14 to 18 predorsal scales. Snout  $2\frac{3}{8}$

<sup>1</sup>1919, Ann. Carnegie Mus., XII, Nos. 2-4, p. 212.

to  $2\frac{7}{8}$  in head length; eye  $3\frac{1}{5}$  to  $5\frac{1}{5}$ ; maxillary  $3\frac{1}{3}$  to  $3\frac{1}{2}$ ; interorbital  $3\frac{1}{2}$  to 4. Pharyngeal teeth, 3, 5—5, 3, hooked, with well-developed grinding-surfaces. Scales with 13 to 18 apical radiating striæ; superior and inferior circuli coarse, basal very fine.

Color in alcohol brownish-olive above, with row of 6 to 10 median lateral blackish blotches, usually closer behind, and lower whitish surface strongly contrasted. On back, following scale courses longitudinally, there are rows of dusky spots, mostly appearing as longitudinal lines. Dusky streak from side of snout below nostrils to eyes. Dorsal and caudal grayish with 5 to 7 transverse rows of blackish spots, on latter more as lines. Blackish blotch in pectoral axil. Lower fins and barbels whitish.

Length 48 to 100 mm.

Forty-three from Hsing Lung Shan, August 7, 1921; one from Ning-kwo with the depth of the body contained  $6\frac{1}{5}$  in the length to the caudal base, and lips and lower front surfaces of the barbels strongly papillose, sides also with five dark blotches.

A comparison of the European material in the Academy shows:

Head contained  $3\frac{1}{4}$  to 4 times in length to base of caudal; depth  $3\frac{3}{5}$  to  $4\frac{1}{5}$ . Dorsal III, 7, 1; anal III, 6, 1. Scales 34 to 40 in lateral line to caudal base and 2 or 3 more on latter; 5 to 7 scales above lateral line, usually 6; 4 or 5 scales below lateral line; 14 to 17 predorsal scales. Snout  $2\frac{1}{8}$  to  $2\frac{1}{5}$  times in length of head; eye  $3\frac{1}{5}$  to  $4\frac{1}{5}$ ; maxillary  $2\frac{7}{8}$  to  $3\frac{1}{2}$ ; interorbital  $3\frac{1}{5}$  to  $4\frac{1}{5}$ . Pharyngeal teeth 3, 5—5, 3.

Length 70 to 172 mm.

These examples from Nürnberg, Germany; Leyden, Holland; Lake Lucerne, Switzerland; Arno River, Italy.

Several little-known species have been described from China. *Gobio argentatus* Sauvage and De Thiersant<sup>1</sup> differs in many respects from *Gobio gobio*, as the presence of seven branched anal rays, two rows of scales between the lateral line and the base of the ventral fin; and the color-pattern and fins without spots, though a bluish lateral band is present. Kreyenberg and Pappenheim identify examples with *Gobio argentatus*,<sup>2</sup> but they give the head as contained 4 to  $4\frac{1}{5}$  times in the body and  $3\frac{1}{2}$  to 4 scales below the lateral line. In most every other way their specimens appear to agree with mine.

*Gobio nitens* Günther<sup>3</sup> is described with five scales below the lateral line, though with but two rows between the lateral line and the base of the ventral fin. It is, however, without barbels, in which it agrees with *Gobio imberbis* Sauvage and De Thiersant,<sup>4</sup> which in turn differs.

*Gobio nigripinnis* Günther<sup>5</sup> is another species without barbels but, as its specific name indicates, is with blackish fins.

<sup>1</sup>1875, Ann. Sci. Nat., (6) I, Zool., p. 9. Yang-tze Kiang.

<sup>2</sup>1908, Sitzs. Ges. Naturf. Freund. Berlin, 1908, p. 97. Tuntingsee, Hankau.

<sup>3</sup>1873, Ann. Mag. Nat. Hist., (4) XII, p. 246. Shanghai.

<sup>4</sup>1875, Ann. Sci. Nat., (6) I, Zool., p. 9. Yenkiatsoun (S. Shen-si).

<sup>5</sup>1873, Ann. Mag. Nat. Hist., (4) XII, p. 246. Shanghai.

*Gobio nummifer* Boulenger<sup>1</sup> does not seem to differ from *Gobio gobio*. It is described with six round black spots along the body and tail above the lateral line.

***Gobio wolterstorffi* Regan**

Head contained  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times in length to base of caudal; depth 4 to 5. Dorsal III, 7, 1; anal III, 6, 1. Scales 34 in lateral line to caudal base and 2 more on latter; 5 scales above lateral line, 4 below; 12 predorsal scales. Snout  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head; eye  $3\frac{1}{8}$  to  $3\frac{1}{6}$ ; maxillary 3 to  $3\frac{1}{4}$ ; interorbital 3 to  $3\frac{1}{6}$ . Pharyngeal teeth 2, 5—5, 3, hooked, some of upper broadly compressed, with broad grinding surfaces. Scales with 15 to 18 apical radiating striae; circuli above and below moderate, converging finely basally.

Color in alcohol pale brownish above, with olive tinge on back, which mottled coarsely with blackish spots very irregularly. Sides and under surface whitish, with silvery reflections on sides of head. Each tube of lateral line with black spot close above and below. Iris silvery. Fins all pale, lower whitish.

Length 20 to 93 mm.

From Hsing Lung Shan, August 7, 1921, 2 examples; from twenty-six miles south of Hsing Lung Shan, August 12, 1921, 25 examples.

***Pseudogobio rivularis* (Basilewsky)**

Head contained  $3\frac{2}{3}$  times in length to base of caudal; depth  $4\frac{1}{4}$  to  $5\frac{1}{4}$ . Dorsal II, 6, 1 or II, 7, 1; anal II, 5, 1. Scales 31 to 35 in lateral line to caudal base and 2 more on latter; 5 or 6 scales above lateral line, 4 below; 11 or 12 predorsal scales. Snout  $2\frac{1}{6}$  to  $2\frac{1}{2}$  times in length of head; eye  $3\frac{3}{8}$  to  $4\frac{1}{10}$ ; maxillary  $3\frac{3}{8}$  to  $3\frac{3}{4}$ ; interorbital  $3\frac{1}{2}$  to  $3\frac{1}{2}$ . Pharyngeal teeth 2, 4—4, 2, hooked, with narrow grinding-surfaces. Scales with 7 to 10 apical radiating striae; circuli coarse above and below, converging finely basally.

Color in alcohol pale brownish on back, mottled obscurely with darker. Back with 5 broad dark saddles, each a little narrower than interspaces. Sides with about 7 very pale or obscure round blotches made up of minute grayish dots, more or less uniform in size and about equal to eye-diameter, distributed along middle of side or on line of vertebral axis. Dusky line from side of snout to eye and narrower less defined line from snout tip to above nostrils. Fins pale. Dorsal with 4 series of dusky spots, each dark blotch on rays only. Caudal only with 4 transverse dark bands, each inclined backward, and a small conspicuous median black spot, much less in diameter than half of pupil, at caudal base. Other fins all pale to whitish, though each with pale to obscure dusky median blotch or shade.

Length 43 to 56 mm.

From twenty-six miles south of Hsing Lung Shan, August 7, 1921, 3 examples.

Günther notes under *Pseudogobio sinensis* that the black caudal spot disappears with age.<sup>2</sup>

<sup>1</sup>1901, Proc. Zool. Soc. London, I, p. 269, Pl. XXIII, fig. 2. Ningpo.

<sup>2</sup>1873, Ann. Mag. Nat. Hist., (4) XII, p. 247.

**Saurogobio dabryi** Bleeker

Head contained  $3\frac{3}{8}$  to  $4\frac{1}{8}$  times in length to base of caudal; depth  $4\frac{3}{8}$  to  $8\frac{1}{4}$ . Dorsal III, 8, I, once III, 7, I; anal III, 6, I. Scales 36 to 47 in lateral line to caudal base and 2 more on latter; 4 to 6 scales above lateral line, 3 or 4 below; 11 to 13 predorsal scales. Snout contained 2 to 3 times in length of head; eye  $3\frac{3}{8}$  to 5; maxillary  $3\frac{3}{8}$  to  $3\frac{1}{4}$ ; interorbital  $3\frac{1}{2}$  to  $4\frac{1}{8}$ .

Body moderately compressed, slender, long, deepest at dorsal origin. Caudal peduncle well compressed; its least depth contained  $2\frac{2}{3}$  to  $2\frac{5}{8}$  times in its length,  $2\frac{7}{8}$  to  $4\frac{1}{8}$  in head.

Head moderate, slightly compressed, with flattened sides scarcely constricted below, width  $1\frac{3}{4}$  to  $1\frac{1}{8}$  in its length. Snout conic, upper profile with a slight depression just behind its tip, as long as broad; with age its width is contained  $1\frac{1}{8}$  times in its length. Eye elevated, its center midway in length of head; its length contained  $1\frac{1}{8}$  to 2 times in length of snout,  $1\frac{1}{8}$  in interorbital, except that the latter is less than the eye in young. Mouth small, inferior, mandible depressed. Maxillary concealed, reaches front nostril, and with a fleshy barbel from subterminal outer face,  $1\frac{1}{2}$  to  $1\frac{1}{8}$  in eye. Lips narrow, soft, fleshy, coarsely papillose. Nostrils together, within last fourth of snout; hind one much the larger and mostly concealed by posterior cutaneous flap of front one. Interorbital broadly concave. Suborbitals narrow, preorbital longer than eye. Occipital fontanel as long as eye.

Gill-opening extends forward opposite hind eye edge. Gill-rakers 2+14, short, low, compressed papillæ, greatly less than gill-filaments, which contained  $1\frac{3}{4}$  in eye. Pseudobranchiæ  $\frac{2}{3}$  of gill-filaments. Inside of pharynx coarsely papillose. Pharyngeal teeth small, compressed, or pointed without terminal hooks or grinding-surfaces.

Scales with 8 to 56 slightly waved apical striæ, about 8 to 34 in young; apical circuli 35 to 38, imperfect. Scales firmly adherent, in even longitudinal rows, well exposed; few scales on caudal base; breast, anterior part of belly medially and head naked. Scaly pointed flap in ventral axil,  $2\frac{2}{5}$  in fin. Lateral line slopes a little low at first, then runs midway over ventral and along side of caudal peduncle to caudal base. Tubes in lateral line slender, simple, half way over each scale exposure.

Dorsal origin midway between snout tip and anal origin, upper fin edge slightly concave; depressed fin contained  $1\frac{3}{8}$  to  $1\frac{3}{4}$  in the distance to caudal base; first branched ray  $1\frac{1}{8}$  to  $1\frac{1}{2}$  in head. Anal origin a little nearer caudal base than last dorsal ray base; depressed fin contained  $1\frac{1}{8}$  to  $1\frac{3}{4}$  times in the distance to caudal base; first anal ray  $1\frac{1}{2}$  to  $2\frac{1}{8}$  in head. Caudal deeply forked, pointed lobes equal,  $4\frac{1}{4}$  to  $4\frac{3}{8}$  in combined head and trunk. Pectoral reaches  $1\frac{1}{8}$  to  $1\frac{1}{2}$  to ventral, length  $1\frac{1}{10}$  to  $1\frac{1}{4}$  in head. Ventral inserted below third to fifth dorsal ray bases, depressed fin contained 2 to  $2\frac{1}{8}$  times in distance to anal origin; fin contained  $1\frac{1}{4}$  to  $1\frac{3}{8}$  in head.

Color in alcohol pale olivaceous-brown, edge of each scale broadly and slightly darker. Grayish median lateral streak close along and above lateral line, with about 10 to 14 obscure darker spots. Dorsal and caudal grayish terminally, other fins whitish. Iris brownish.

Length 26 to 252 mm.

From Hsing Lung Shan, August 7, 1921, 6 examples; twenty-six miles south of Hsing Lung Shan, August 12, 1921, 8 examples; Ningkwo, An-hwei Province, 14 examples.



*Longurio athymius* Jordan and Starks<sup>1</sup> is synonymous. It is shown, apparently erroneously, with the breast and chest scaled.

***Paraleucogobio notacanthus* Berg**

Head contained  $3\frac{3}{8}$  to  $3\frac{3}{4}$  times in length to base of caudal; depth  $3\frac{1}{2}$  to  $3\frac{3}{4}$ . Dorsal III, 7, I; anal III, 6, I. Scales 35 to 36 in lateral line to caudal base and 2 or 3 more on latter; 5 scales above lateral line, 4 below; 12 or 13 predorsal scales. Snout  $3\frac{3}{8}$  to  $3\frac{3}{4}$  times in its length; eye 4 to  $4\frac{2}{5}$ ; maxillary  $3\frac{3}{8}$  to  $3\frac{3}{4}$ ; interorbital  $2\frac{3}{4}$  to  $2\frac{9}{10}$ . Pharyngeal teeth, 3, 4—5, 3, hooked, with grinding-surfaces. Scales with 10 to 20 basal radiating striae; circuli moderate, finely convergent basally.

Color in alcohol, back olivaceous, each row of scales marked with a longitudinal dusky band, made up of blackish dots. Along middle of side longitudinal blackish band, little less in width than eye. Dorsal grayish, with blackish blotch above forward. Caudal grayish, with dusky clouding basally in center. Other fins all more or less whitish.

Length 68 to 90 mm.

From Hsing Lung Shan, August 7, 1921, 27 examples.

***Sarcocheilichthys lacustris* (Dybowski)**

Head contained  $4\frac{1}{2}$  to  $4\frac{3}{4}$  times in length to base of caudal; depth  $3\frac{3}{8}$  to  $3\frac{3}{4}$ . Dorsal III, 7, I; anal III, 6, I. Scales 38 to 40 in lateral line to caudal base and 3 or 4 more on latter; 6 or 7 scales above lateral line, 5 or 6 below; 14 to 16 predorsal scales. Snout  $2\frac{3}{8}$  to  $2\frac{3}{4}$  in head length; eye  $4\frac{2}{5}$  to  $4\frac{1}{2}$ ; maxillary  $3\frac{3}{4}$  to  $4\frac{1}{4}$ ; interorbital  $2\frac{1}{2}$  to  $2\frac{1}{2}$ .

Body compressed, moderately robust, deepest at dorsal origin and edges all convexly rounded. Caudal peduncle well compressed, its least depth  $1\frac{1}{8}$  to  $1\frac{1}{2}$  in its length or  $1\frac{1}{2}$  to  $1\frac{1}{2}$  in length of head.

Head small, compressed, flattened sides not convergent especially above or below, lower profile a little more inclined; width  $1\frac{1}{8}$  to  $1\frac{1}{4}$  in its length. Snout obtusely convex, length  $\frac{3}{4}$  to  $\frac{1}{2}$  its width. Eye with hind pupil edge midway in length of head;  $1\frac{1}{8}$  to  $1\frac{1}{4}$  in snout, 2 to  $2\frac{1}{2}$  in interorbital. Mouth inferior, small. Maxillary concealed, reaches opposite hind nostril. Small barbel on maxillary above near end of expansion. Lips smooth, fleshy, not extending across mandible, folded deeply at each side. Mandible spatulate, horny, firm and firm bony median surface opposite in middle of upper jaw. Nostrils together, in last third of snout; front one a simple pore with broad marginal posterior flap, exposing hind one in a crescent. Interorbital broadly convex.

Gill-opening extends forward opposite last third of head, not to eye. Gill-rakers 2+4, short rudimentary tubercles. Gill-filaments as long as eye. Pseudobranchiae  $\frac{3}{8}$  the length of gill-filaments. Pharyngeal teeth, 2, 5—5, 2, compressed, hook at end of each and grinding-surfaces moderate.

Scales with 38 to 40 apical radiating striae; 48 basal circuli. Scales firmly adherent in even longitudinal rows, all well exposed; caudal base scaled; small scales cover breast; axillary ventral scale  $\frac{2}{5}$  the length of fin. Lateral line slopes slightly

<sup>1</sup>1905, Proc. U. S. Nat. Mus., XXVIII, p. 197, Fig. 3. Chemulpo.

at first until midway in depth; tubes simple, small, each one exposed over basal third of scale. Row of few tubercle scars around border of upper jaw above lip, also few below nostril and front of eye below.

Dorsal origin much nearer snout tip than caudal base, upper edge of fin concave; length of fin contained  $2\frac{1}{8}$  to  $2\frac{1}{2}$  times in the distance to caudal base; first branched dorsal ray 4 to  $4\frac{1}{2}$  in combined head and trunk. Anal inserted close behind depressed dorsal tip, or a little nearer caudal base than dorsal origin; length of depressed fin  $1\frac{1}{4}$  to  $1\frac{1}{2}$  in the distance to caudal base; first branched anal ray  $1\frac{1}{3}$  to  $1\frac{2}{3}$  in head. Caudal deeply forked, lobes broad, even; length of fin contained  $3\frac{1}{2}$  to  $3\frac{3}{4}$  times in combined head and trunk. Pectoral reaches  $\frac{3}{4}$  to  $\frac{1}{2}$  to ventral; length of fin 1 to  $1\frac{1}{2}$  in head. Ventral inserted slightly behind dorsal origin, depressed fin reaches  $\frac{3}{4}$  to  $\frac{1}{2}$  to anal; length of fin  $1\frac{1}{4}$  to  $1\frac{1}{2}$  in head.

Color in alcohol deep brown generally, each row of scales longitudinally with deeper or median dusky streak. Fins all with neutral-slaty or dusky, especially terminally and edges narrowly whitish. Bases of all fins narrowly whitish. Under surface of head and belly somewhat pale.

Length 150 to 179 mm.

Fifteen examples from Ningkwo.

#### ***Pseudorasbora parva* (Schlegel)**

Head contained  $3\frac{1}{4}$  to  $3\frac{3}{4}$  times in length to base of caudal; depth  $3\frac{1}{3}$  to  $4\frac{1}{3}$ . Dorsal III, 7, 1; anal III, 6, 1. Scales 33 to 35 in lateral line to caudal base and 2 more on latter; 5 or 6 scales above lateral line, 4 to 6 below; 13 to 15 predorsal scales. Snout 3 to  $3\frac{1}{2}$  in head; eye  $3\frac{1}{8}$  to 5; maxillary  $3\frac{3}{8}$  to 4; interorbital  $2\frac{1}{2}$  to  $2\frac{3}{4}$ . Pharyngeal teeth 5—5, hooked, with grinding-surfaces; bones quite small. Scales with 2, 3 or 4 apical radiating striæ; circuli moderate.

Color in alcohol brownish generally, on back and upper sides each scale as if with median brownish blotch. All fins with more or less grayish to dusky terminally. Sometimes dark pigment spots concentrated along lateral line to form median lateral dark streak, resolving in dark spot just before caudal base. One example shows terminal portions of all fins, caudal broadly bordered so behind, with dusky to blackish, also sort of transverse or horizontal basal blackish band, as if made up of black pigment dots. Length 28 to 91 mm.

Hsing Lung Shan, August 7, 1921, 110 examples, and south of Hsing Lung Shan, August 12, 27 examples.

In the very young the front dorsal edge is blackish and there is a narrow blackish lateral band from side of snout to caudal base. It also has the lateral line very incomplete, only on the first few anterior scales. One young example is without mandibles, its jaws abortive, though both nostrils still in front of the eyes; or in profile what remains of the snout is less than half the eye.

For comparison with the Japanese specimens in the Academy, there is a series represented by many specimens from Yodo River in Osaka, Lake Biwa at Matsubara, Iwai River at Ichinoseki and near Nagoya in Owara. These show the following.

Head contained  $3\frac{1}{8}$  to  $4\frac{1}{8}$  times in length to base of caudal; depth  $3\frac{1}{4}$  to 4. Dorsal III, 7, 1; anal III, 6, 1. Scales 29 to 36 in lateral line to caudal base and 2 or 3 more on latter; 5 or 6 scales above lateral line, 4 below; 12 to 15 predorsal scales. Snout  $3\frac{1}{10}$  to  $3\frac{1}{3}$  in head; eye  $3\frac{2}{3}$  to  $4\frac{3}{4}$ ; maxillary  $3\frac{1}{3}$  to  $4\frac{2}{3}$ ; interorbital  $2\frac{1}{4}$  to  $2\frac{1}{2}$ . Pharyngeal teeth 5—5, rarely 1, 5—6.

Length 38 to 90 mm.

### Rasborinæ

#### *Aphyocypris chinensis* Günther

##### Figure 1

Head contained  $3\frac{7}{8}$  times in length to base of caudal; depth  $3\frac{7}{8}$ . Dorsal III, 7, 1; anal III, 6, 1. Scales 33 in lateral line to caudal base and 2 more on latter; 6 scales above lateral line, 4 below; 13 predorsal scales. Snout 3 times in head measured from upper jaw tip; eye 4; mouth width  $3\frac{1}{3}$ ; interorbital  $2\frac{1}{3}$ .

Body compressed, fusiform, deepest at dorsal origin, edges convexly rounded. Caudal peduncle strongly compressed, least depth  $1\frac{1}{3}$  times in its length or 2 in total length of head.

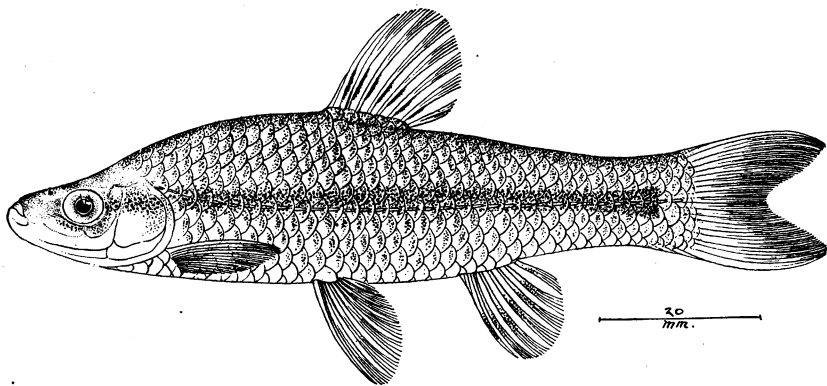


Fig. 1. *Aphyocypris chinensis* Günther. Ningkwo.

Head conic, upper profile slightly concave, flattened sides but little constricted below; width  $1\frac{1}{8}$  in its total length. Snout conic, little depressed above, length  $\frac{2}{3}$  its width. Eye with hind pupil edge midway in total head length;  $1\frac{1}{3}$  times in snout,  $1\frac{1}{4}$  in interorbital. Mouth superiorly terminal, greatly inclined, with short gape, mandible well protruded. Maxillary concealed, not reaching opposite nostril. Lips firmly coriaceous, lower broad and trenchant. Nostrils together, within last third of snout; front one a pore, with broad hind cutaneous flap exposing posterior nostril in crescent. Interorbital broadly convex. Suborbitals moderate, invade little over half of cheek to preopercle ridge. Opercle smooth.

Gill-opening extends forward to opposite last third of head. Gill-rakers 4+12, short points, rudimentary, greatly less than gill-filaments, which nearly equal eye. Pseudobranchiæ  $\frac{2}{3}$  of gill-filaments. Pharyngeal teeth 3, 5—5, 3, hooked and with broad grinding-surfaces.

Scales with 33 to 36 waved radiating striae apically; 32 to 36 basal circuli. Scales firmly adherent, in even longitudinal series, all well exposed, scarcely smaller on breast and caudal peduncle; axillary ventral scale  $\frac{1}{4}$  the length of fin. Head naked. Lateral line extends along middle of side, complete; tubes extend over half of each scale exposure, slender, simple.

Dorsal origin midway between snout tip and caudal base, upper edge of fin convex; depressed fin reaches half way to caudal base. Anal inserted a little behind dorsal base, lower edge of fin convex; depressed fin reaches a distance contained  $1\frac{1}{4}$  times in that to caudal base. Caudal deeply emarginate; lobes broad and pointed. Pectoral low, reaches  $\frac{5}{8}$  to ventral. Ventral inserted slightly before dorsal origin, reaches  $\frac{7}{8}$  to anal. Vent close before anal.

Color in alcohol, back dull olive-brown, each scale with darker submarginal blotch. Dusky streak from snout tip back from eye and along middle of side to caudal base, where expanded, much broader. Its entire course made up of dusky specks or dots. Lower surface of head and trunk whitish. Dorsal pale, a little below its middle, a short dusky bar close behind each ray. Median portion of each anal ray with slight gray-dusky shade. Caudal pale gray. Paired fins whitish. Iris silvery-white.

Length 100 mm.

One example from Ningkwo.

### **Xenocypridinæ**

#### **Xenocypris davidi** Bleeker

Head contained  $4\frac{1}{4}$  to  $4\frac{1}{2}$  times in length to base of caudal; depth  $3\frac{3}{8}$  to  $3\frac{5}{8}$ . Dorsal III, 7, 1; anal III, 10, 1 or 11, 1; pectoral I, 16 or 17; ventral I, 8. Scales 60 to 64 in lateral line to caudal base and 3 more on latter; 12 scales above lateral line, 7 below; 26 to 29 predorsal scales. Head width 2 to  $2\frac{1}{10}$  in its length; head depth  $1\frac{1}{8}$  to  $1\frac{3}{8}$ ; snout  $3\frac{3}{8}$  to  $3\frac{1}{2}$ ; eye  $3\frac{3}{8}$  to 4; maxillary  $4\frac{3}{8}$ ; interorbital  $2\frac{3}{4}$  to 3.

Body elongately ovoid, strongly compressed, deepest at dorsal origin, and edges all convexly rounded. Caudal peduncle strongly compressed, least depth  $1\frac{1}{8}$  in its length, or 2 to  $2\frac{1}{8}$  in head.

Head well compressed, flattened sides slightly approximated below, upper profile nearly straight to slightly convex, and lower profile similar to slightly more inclined. Snout convex, rather obtuse, length  $\frac{3}{4}$  to  $\frac{7}{8}$  its width. Eye moderate, hind edge slightly nearer gill-opening than snout tip;  $1\frac{1}{8}$  in snout,  $1\frac{1}{2}$  in interorbital. Mouth small, inferiorly terminal, width  $1\frac{1}{8}$  to  $1\frac{1}{4}$  in eye. Maxillary largely concealed by preorbital, at least its expansion, which 4 in eye, reaches opposite front nostril. Lips moderate, entire. Edge of upper jaw firmly coriaceous. Nostrils together, front one at about last third in snout, pore-like, and hind one a crescentic slit close behind, formed by cutaneous marginal flap of anterior. Interorbital broadly and evenly convex. Suborbital chain moderate; preorbital depth about  $\frac{4}{5}$  its length which  $1\frac{1}{4}$  in eye. Opercle finely striate.

Gill-opening extends forward to opposite hind eye edge. Gill-rakers 12+40, short, thin, compressed, triangular,  $\frac{1}{8}$  the length of gill-filaments, which  $1\frac{1}{8}$  in eye. No pseudobranchiæ. Pharyngeal teeth 2, 4, 6—6, 4, 2, strongly compressed, without hooks, and all with grinding-surfaces, outer quite broad. Some teeth deciduous, as several loose ones of outer set to each base.

Scales with 12 apical radiating striae, often 0 to 3 apical marginal auxiliaries; basal circuli 55 to 60. Scales in even longitudinal series parallel with lateral line, scarcely smaller on predorsal; slightly smaller scales on breast, belly and caudal base; pointed scaly flap in ventral axil  $\frac{2}{3}$  the length of fin. Head naked. Lateral line complete, well decurved, passes lower  $\frac{2}{3}$  in depth at ventrals and ascends along side of caudal peduncle to caudal base medially; tubes simple, extend over each scale about midway to  $\frac{3}{4}$  of exposure.

Dorsal origin midway between snout tip and caudal base, first 3 rays spine-like, osseous, compressed and third greatly longest; first branched dorsal ray  $1\frac{1}{2}$  to  $1\frac{1}{2}$  in head; depressed fin reaches a distance contained  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times in that to caudal base. Anal begins well behind depressed dorsal tip, first branched ray highest and forms apex of slight anterior lobe; first branched anal ray  $1\frac{1}{2}$  to 2 in head. Caudal strongly forked, lobes sharply pointed, slender, equal, little longer than head. Pectoral reaches a distance contained  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in that to ventral, contained  $1\frac{1}{4}$  in head. Ventral inserted opposite dorsal origin, reaches a distance contained  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times in that to anal;  $1\frac{1}{2}$  to  $1\frac{1}{2}$  in head. Vent close before anal.

Color in alcohol with back tinged with pale olive, sides and lower surface pale to whitish. Dorsal and caudal pale olivaceous, lower fins whitish. Iris slaty and whitish. Length 173 to 228 mm.

Six examples from Ningkwo.

### **Rhodeinæ**

#### ***Acanthorhodeus guichenoti* Bleeker**

Head contained  $3\frac{3}{4}$  to 4 times in length to base of caudal; depth 2 to  $2\frac{1}{2}$ . Dorsal III, 16, 1 to 18, 1; anal II, 11, 1 to 14, 1. Scales 34 or 35 in lateral line to caudal base and 3 or 4 more on latter; 6 or 7 scales above lateral line, 5 or 6 below; 14 or 15 predorsal scales. Snout  $3\frac{1}{2}$  to  $3\frac{1}{3}$  in head; eye  $3\frac{3}{4}$  to  $3\frac{1}{2}$ ; maxillary  $3\frac{3}{4}$  to 4; interorbital 3.

Body strongly compressed, deeply ovoid, predorsal scarcely trenchant and all other edges rounded convexly; greatest depth at dorsal origin. Caudal peduncle well compressed, its least depth 1 to  $1\frac{1}{8}$  in its length or 2 to  $2\frac{1}{10}$  in head.

Head small, strongly compressed, sides flattened and scarcely approximated below; profiles similar; head width 2 to  $2\frac{1}{8}$  in its length. Snout conic, short, obtuse, length  $\frac{2}{3}$  its width. Eye advanced, hind pupil edge slightly before center in head length; diameter equals snout,  $1\frac{1}{2}$  to  $1\frac{1}{2}$  in interorbital; very narrow border of adipose tissue all around eye. Mouth slightly inclined, lower jaw a little the shorter. Maxillary largely concealed, reaches opposite hind nostril, and with short terminal barbel, not over  $\frac{1}{2}$  of pupil in length. Edges of jaw firmly coriaceous and lips narrow. Nostrils together, within last fourth of snout; front one a simple pore, its hind cutaneous flap exposes hind nostril in crescent. Interorbital widely convex. Suborbital chain moderate; posterior infraorbital largely covering cheek.

Gill-opening extends forward to opposite hind edge of eye. Gill-rakers 2+5 short points, about  $\frac{1}{6}$  the length of gill-filaments, which  $1\frac{1}{4}$  in eye. Pseudobranchiæ  $1\frac{1}{2}$  in gill-filaments. Pharyngeal teeth 5—5, compressed, each with slight terminal hook and lower face with strong crenulations, these more or less obsolete in smaller examples; each also with broad entire inner grinding-surface.

Scales with 55 to 61 fine waved weak apical marginal striae; circuli fine, all basal. Scales closely adherent on trunk, thin, in longitudinal series, deepest medianly and

rows slightly convergent anteriorly and posteriorly; scales much smaller on breast. Basal scaly sheaths to dorsal and anal moderate and caudal base covered with moderate scales. Pointed axillary ventral scale  $2\frac{1}{2}$  in fin. Lateral line complete, curves slightly inferiorly along side to caudal base medianly; tubes slender, simple, well exposed or at least half way in scale exposure. Male with front half of snout before nostrils with thick-set pits, evidently tubercle scars and not present in female.

Dorsal origin little nearer snout tip than caudal base; first 3 rays strongly osseous, compressed, though third with flexible tip; length of first branched ray  $1\frac{1}{8}$  to  $1\frac{1}{4}$  in head. Anal origin midway between gill-opening and caudal base, in younger specimens, a little advanced or midway between hind eye edge and caudal base; first 2 rays similarly osseous to those of dorsal and last soft rays greatly shorter in both, than front ones; first branched anal ray  $1\frac{1}{8}$  to  $1\frac{1}{4}$  in head. Caudal deeply forked, lobes pointed, equal; lower lobe  $3\frac{1}{4}$  to  $3\frac{3}{4}$  in combined head and trunk. Pectoral low, nearly or quite reaching ventral,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  in head. Ventral inserted little before dorsal origin; depressed fin reaching  $\frac{4}{5}$  to  $\frac{7}{8}$  to anal; fin  $1\frac{1}{8}$  to  $1\frac{1}{2}$  in head. Vent opposite middle of depressed anal and anal papilla moderate in female, not extending beyond end of depressed ventral tips.

Color in alcohol pale brownish generally, back with slight grayish tinge. Close above lateral line about 4 to 6 scales each with an obsolete pale dusky spot, and along side of caudal peduncle a narrow slaty streak, also above lateral line and horizontally median in position. Fins all pale, dorsal, anal and caudal with 3 or 4 rows of obscure grayish spots. Pectoral and ventral uniform. Iris whitish.

Length 105 to 170 mm.

Fourteen examples from Ningkwo.

*Acanthorhodeus hypselonotus* Bleeker<sup>1</sup> apparently differs in its much deeper body, larger scales, fewer dorsal rays and the absence of barbels.

### Abramidinæ

#### *Chanodichthys bramula* (Valenciennes)

Head contained 4 times in body to caudal base; depth  $2\frac{1}{8}$ . Dorsal III, 7, 1; anal III, 28, 1. Scales 50 in lateral line to caudal base and 3 more on latter; 12 scales above lateral line, 9 below; 28 predorsal scales. Snout  $3\frac{1}{2}$  in head; eye  $4\frac{1}{2}$ ; maxillary  $3\frac{3}{4}$ ; interorbital  $2\frac{1}{4}$ .

Body strongly compressed, deeply ovate, predorsal slightly trenchant and post-ventral with distinct keel over which scales not passing; greatest depth at dorsal origin. Caudal peduncle strongly compressed, its length  $\frac{3}{4}$  its least depth, which 2 in head.

Head small, profiles alike, that of occiput curving up suddenly and convexly to dorsal fin; flattened sides but slightly constricted below; width of head 2 in its length. Snout broad, conic, its length  $\frac{2}{3}$  its width. Eye with center slightly behind first third of head; its diameter  $1\frac{1}{8}$  in snout, 2 in interorbital. Mouth broad, with short gape, and closed jaws even. Maxillary concealed, reaches opposite hind nostril. No barbels. Both jaws with strong, trenchant, cartilaginous edges. Lips firm. Nostrils together, within last third of snout; hind one twice size of front one and exposed in crescent, due to hind cutaneous flap of front one. Interorbital broadly convex. Suborbital

<sup>1</sup>1871, Verhandel. Kon. Akad. Wet. (Amsterdam), XII, (No. 2), p. 43, Pl. XI, fig. 2.

chain narrow, extends only over upper fourth of cheek. Opercle with finely radiating striæ.

Gill-opening extends forward opposite last  $\frac{2}{5}$  in head. Gill-rakers 5+10, slender points,  $\frac{1}{4}$  the length of gill-filaments, which  $1\frac{1}{2}$  in that of eye. Pseudobranchiæ half length of gill-filaments. Pharyngeal teeth, 2, 4, 4—5, 4, 2, compressed, tips slightly hooked, grinding-surfaces slight and entire.

Scales with 21 to 29 apical striæ; basal circuli fine, 67. Scales closely adherent, thin, in even longitudinal series all more or less well exposed, but slightly larger about body edges and on breast; caudal base with little smaller scales. Ventral with pointed axillary scale,  $\frac{1}{3}$  the length of fin. Lateral line slightly decurved, becomes median at caudal base; tubes simple, extend over half of each scale exposure.

Dorsal origin a little nearer caudal base than snout tip, first 3 rays osseous, entire, and third with flexible tip; depressed fin reaches a distance  $1\frac{1}{8}$  in that to caudal base; first branched dorsal ray  $1\frac{9}{10}$  in head. Anal origin opposite base of last dorsal ray, 3 times length of last; first branched ray  $1\frac{9}{10}$  in head. Caudal deeply forked, lower lobe slightly longer, or  $\frac{3}{4}$  in combined head and trunk. Pectoral low, not quite reaching ventral,  $1\frac{1}{4}$  in head. Ventral inserted well before dorsal origin, reaches vent, which close before anal; ventral  $1\frac{1}{2}$  in head.

Color in alcohol with back pale olivaceous, sides and below paler. Each row of scales with median white streak. Fins pale, all slightly grayish submarginally, vertical ones with slight dusky edges.

Length 185 mm.

One from Ningkwo.

### **Culter erythropterus** Basilewsky

Head contained  $3\frac{3}{4}$  to  $3\frac{1}{2}$  times in body to caudal base; depth  $3\frac{3}{4}$  to  $4\frac{1}{2}$ . Dorsal III, 7, 1; anal III, 20, 1 to 25, 1; pectoral I, 14 or 15; ventral I, 8. Scales 62 to 70 in lateral line to caudal base and 4 or 5 more on latter; 14 to 16 scales above lateral line, 8 or 9 below; 44 or 45 predorsal scales. Snout  $3\frac{3}{4}$  to 4 in head measured from upper jaw tip; eye  $4\frac{1}{2}$  to  $5\frac{3}{8}$ ; maxillary 3 to  $3\frac{1}{2}$ ; interorbital  $3\frac{1}{2}$  to  $4\frac{1}{8}$ .

Body elongately ovoid, strongly compressed, deepest at dorsal origin, edges all convexly rounded, except slight median postventral keel. Caudal peduncle strongly compressed, least depth  $1\frac{1}{4}$  to  $1\frac{1}{2}$  in its length or  $2\frac{1}{2}$  to  $2\frac{3}{4}$  in head.

Head well compressed, flattened sides sloping evenly above and below, upper profile slightly concave from snout to occiput; width of head  $2\frac{1}{4}$  to  $2\frac{3}{8}$  in its length, depth  $1\frac{1}{2}$  to  $1\frac{3}{4}$ . Snout convex, profile slightly convex in front, its length  $\frac{7}{8}$  its width. Eye moderate, hind edge about midway in total head length; diameter 1 to  $1\frac{1}{2}$  in snout,  $1\frac{1}{8}$  to  $1\frac{1}{4}$  in interorbital. Mouth moderate, well inclined, lower jaw well protruding. Maxillary largely concealed above by preorbital, reaches eye, expansion  $1\frac{2}{3}$  to  $1\frac{3}{4}$  in eye. Lips firm, fleshy, lower much broader laterally. Nostrils together; front one about at last third of snout, a simple pore; hind one a crescentic slit close behind, bounded by cutaneous marginal flap of front one. Interorbital broadly convex. Suborbital chain moderate; preorbital little deeper than long and its length slightly greater than eye.

Gill-opening extends forward opposite eye center. Gill-rakers 5+16, lanceolate, equal gill-filaments in length, or  $1\frac{1}{2}$  in that of eye. Pseudobranchiæ half length of gill-filaments. Pharyngeal teeth, 2, 4, 5—4, 4, 2, hooked and with slight narrow grinding-surfaces.

Scales with 6 to 8 apical radiating striæ and 10 or 11 marginal auxiliaries; basal circuli 91 to 96. Scales in even longitudinal series parallel with lateral line, slightly crowded and smaller on predorsal, belly, breast and caudal base. Pointed scaly flap in ventral axil about  $\frac{1}{4}$  the length of fin. Lateral line complete, decurved moderately, passes ventral at lowest third in body depth and ascends caudal base medianly; tubes simple, slender, extend over each scale about midway in its exposure.

Dorsal origin a little nearer caudal base than snout tip, first 2 rays spine-like, osseous, and third greatly longest; depressed fin  $2\frac{2}{3}$  in distance to caudal base; first branched ray  $1\frac{1}{4}$  to  $1\frac{1}{2}$  in head. Anal begins slightly before depressed dorsal tip, first branched ray highest and forms apex of moderate anterior lobe;  $2\frac{2}{10}$  to  $2\frac{2}{5}$  in head. Caudal strongly forked, lobes sharply pointed, slender and equal; lower lobe equals or little more than head. Pectoral reaches  $\frac{2}{3}$  to ventral,  $\frac{9}{10}$  in smaller examples; length  $1\frac{1}{4}$  to  $1\frac{1}{2}$  in head. Ventral inserted slightly before dorsal origin, reaches  $\frac{2}{3}$  to  $\frac{7}{8}$  to anal; length  $1\frac{1}{2}$  to  $1\frac{1}{8}$  in head. Vent close before anal.

Color in alcohol, back tinged with pale olive, sides and lower surface pale to whitish. Dorsal and caudal pale olivaceous, lower fins whitish. Iris slaty to whitish. Length 226 to 266 mm.

Two examples from Ningkwo.

### Leuciscinæ

#### *Leuciscus brandti* (Dybowski)

Head contained  $3\frac{1}{4}$  to  $3\frac{3}{4}$  times in length to base of caudal; depth  $4\frac{1}{2}$  to  $5\frac{1}{4}$ . Dorsal II, 7, 1; anal III, 7, 1. Scales 80 to 90 in lateral line to caudal base and 1 to 4 more on latter; 16 to 20 scales above lateral line, 10 to 16 below; 52 to 60 predorsal scales. Snout  $3\frac{1}{4}$  to  $3\frac{3}{4}$  in head; eye  $3\frac{3}{4}$  to 5; maxillary  $2\frac{1}{4}$  to  $3\frac{1}{2}$ ; interorbital 3 to  $3\frac{3}{4}$ . Pharyngeal teeth 2, 5—4, 2, latter rarely 5, 2, slender, slightly hooked, with grinding-surfaces.

Color in alcohol with back deep dusky brownish generally, with lower and under surfaces pale to whitish. An inconspicuous blackish horizontal line from just above origin of lateral line backward, but obsolete behind dorsal and marking dark color of back. Along middle of side, from about level with eye, broad band little narrower and becoming conspicuously black after dorsal and ventral to middle of caudal. Caudal base with conspicuous and prominent black blotch size of pupil, midway at caudal base and distinctly separated from dark lateral band. Whole side of body sprinkled with variably dusky to black dots, specks and spots. Dorsal and caudal pale brownish, also pectoral with slight tinge of same. Ventral and anal whitish. On head dark band as obsolete or slightly reflected.

Length 34 to 163 mm.

Sixty-five examples from Hsing Lung Shan, August 7, 1921. In three very young examples the lateral line is present only on a few anterior scales. Two also have the eye slightly greater in diameter than the snout length, while one has the breast finely scaled.

The short diagnosis of *Telestes brandtii*<sup>1</sup> Dybowski gives the developed anal rays as 8, a condition I find in only one specimen in my series.

<sup>1</sup>1912, Faune Russie, Pisc., III (1), p. 155, Fig. 6.



Berg shows an example from the lower Amur region. In his diagnosis of the species he repeats Dybowski's formula, though his figure shows certainly nine branched anal rays. It also does not show the dark median lateral band, the conspicuous detached black basal caudal spot and the speckled or dusted pattern of dark dots, so conspicuous in my examples.

### *Phoxinus lagowskii* Dybowski

Head contained  $3\frac{1}{2}$  to  $3\frac{3}{4}$  times in length to base of caudal; depth  $4\frac{1}{4}$  to  $4\frac{3}{4}$ . Dorsal II, 7, I; anal III, 7, I. Scales 71 to 73 in lateral line to caudal base and 3 or 4 more on latter; 16 to 19 scales above lateral line, 11 or 12 below; 46 or 47 predorsal scales. Snout  $3\frac{1}{2}$  to  $3\frac{3}{4}$  in head; eye 5 to  $5\frac{1}{2}$ ; maxillary 3 to  $3\frac{1}{2}$ ; interorbital  $3\frac{1}{10}$  to  $3\frac{3}{4}$ . Pharyngeal teeth 2, 5—4, 1, compressed, ends hooked and grinding-surfaces present. Scales with 30 radiating marginal striae, of which 18 or 19 basal; circuli coarse.

Color in alcohol dusky-brown on back and upper surfaces, finely speckled or mottled irregularly with dusky to blackish, though in no place forming a dark lateral band. Vertical blackish line, less than eye, at caudal base. Upper inner border of gill-opening blackish. Lips pale. Iris dull slaty. Dorsal and caudal grayish-brown, other fins paler to whitish.

Length 106 mm.

Two examples from Hsing Lung Shan, August 7, 1921.

My examples agree largely with the figure and account by Berg<sup>1</sup> as *Phoxinus lagowskii variegatus* (Günther). This Berg admitted to sub-specific rank as the southern and Chinese representative of *Phoxinus lagowskii*. I find nothing, aside from the alleged deeper caudal peduncle of *variegatus*, to distinguish it.

A comparison of the four types of *Leuciscus costatus* Fowler,<sup>2</sup> shows them to be synonymous. A further study of them shows the following details.

Head contained  $3\frac{3}{5}$  to  $3\frac{9}{10}$  times in length to base of caudal; depth  $4\frac{1}{10}$  to  $4\frac{1}{4}$ . Dorsal II, 7, I; anal III, 7, I. Scales 71 to 73 in lateral line to caudal base and 2 to 4 more on latter; 14 to 16 scales above lateral line, 8 or 9 below; 44 to 48 predorsal scales. Snout 3 to  $3\frac{3}{5}$  in head; eye  $3\frac{3}{5}$  to  $4\frac{1}{5}$ ; maxillary 3 to  $3\frac{1}{4}$ ; interorbital  $2\frac{2}{3}$  to  $2\frac{1}{2}$ . Pharyngeal teeth 2, 5—5, 2, grinding-surfaces little developed. In all, as in the Hsing Lung Shan specimens, the lateral line is complete. There is also a faint trace of the dark or blackish vertical basal caudal bar as in Berg's figure of *Phoxinus lagowskii*.<sup>3</sup>

### *Idus waleckii* Dybowski

Head contained  $3\frac{2}{3}$  to  $4\frac{1}{10}$  times in length to base of caudal; depth  $3\frac{3}{5}$  to 4. Dorsal III, 8, I; anal III, 10, I. Scales 44 to 47 in lateral line to caudal base and 2 or 3

<sup>1</sup>1912, Faune Russie, Pisc., III, (1), p. 231, Fig. 13.

<sup>2</sup>1899, Proc. Acad. Nat. Sci. Phila., 1899, p. 180. Tan Lan Ho, tributary Shu Lan Ho, Sungari Basin in Eastern Mongolia.

<sup>3</sup>1912, Faune Russ., Pisc., III, (1) p. 228, Pl. I, fig. 8.

more on latter; 9 or 10 scales above lateral line, 5 below; 23? to 26 predorsal scales. Snout  $3\frac{1}{2}$  in head; eye  $4\frac{1}{2}$  to 5; maxillary 3 to  $3\frac{3}{4}$ ; interorbital 3 to  $3\frac{1}{2}$ .

Body elongate, rather slender. Head width 2 in its length, scarcely constricted below. Snout rather short, convex, length  $\frac{3}{8}$  its width. Eye at first  $\frac{3}{8}$  of head. Mouth very oblique. Maxillary greatly inclined, reaches about to eye. Interorbital broadly crescentic. Gill-rakers 3+6 short points, about  $\frac{1}{4}$  of gill-filaments, which  $1\frac{1}{2}$  in eye. Pharyngeal teeth 3, 5—5, 3, hooked, with narrow grinding-surfaces. Scales with 4 or 5 apical radiating striæ; circuli fine, though doubly so basally. Scales on breast and preventral but little smaller than others. Lateral line complete, well decurved. Dorsal origin midway between eye center and caudal base. Anal origin well behind base of last dorsal ray. Caudal emarginate. Pectoral contained  $1\frac{1}{2}$  times in head. Ventral inserted a trifle before dorsal origin; fin  $1\frac{1}{4}$  in head.

Color in alcohol faded dull dusky-brown on back, with olive tinge. Sides and lower surface dull brassy. Under surface more or less uniform. Iris brownish, also fins.

Length 168 to 215 mm.

Described from the type of *Leuciscus farnumi* Fowler, in the Acad. Nat. Sci. Philadelphia from the Tore River, and two paratypes from Dalai Nor, all obtained in 1897.<sup>1</sup>

### ***Opsariichthys uncirostris* (Schlegel)**

Head contained  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length to caudal base; depth 4 to  $4\frac{1}{2}$ . Dorsal III, 7, 1; anal III, 9, 1. Scales 41 to 45 in lateral line to caudal base and 3 more on latter; 9 scales above lateral line, 5 below; 20 or 21 predorsal scales. Snout  $3\frac{1}{2}$  to  $3\frac{3}{4}$  in head; eye 3 to 5; maxillary 2 to  $2\frac{1}{4}$ ; interorbital 3 to  $3\frac{3}{4}$ . Pharyngeal teeth with broad grinding-surfaces and small terminal hooks. Scales with 5 to 12 apical radiating striæ; circuli moderate, fine apically. Lateral line only on about 7 anterior scales in young.

Color in alcohol silvery white. Dorsal and caudal grayish, lower fins whitish. Jaws and lower side of head pale, like belly.

Length 32 to 134 mm.

Fifteen examples, from twenty-six miles south of the Hsing Lung Shan, August 12, 1921.

For comparison there are in the Academy two from the Tore River in Eastern Mongolia, and a series of Japanese specimens from the Yodo River in Osaka. They show:

Head contained  $3\frac{1}{2}$  to  $3\frac{1}{3}$  times in length to caudal base; depth 4 to 5. Dorsal III, 7, 1; anal III, 9, 1. Scales 40 to 48 in lateral line to caudal base and 2 or 3 more on latter; 8 to 10 scales above lateral line, 4 or 5 below; snout  $3\frac{1}{8}$  to 4 in head; eye  $3\frac{1}{2}$  to 4; maxillary 2 to  $2\frac{1}{2}$ ; interorbital  $3\frac{1}{8}$  to  $4\frac{1}{8}$ ; pharyngeal teeth 2, 3, 5—5, 3, 2, vary 2, 3, 5—4, 3, 2 or 1, 4, 4—5, 4, 1 or 1, 4, 4—4, 4, 1.

Length 50 to 135 mm.

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<sup>1</sup>1899, Proc. Acad. Nat. Sci., Phila., 1899, p. 179.

***Zacco platypus* (Schlegel)**

Head contained  $3\frac{1}{4}$  to  $3\frac{5}{8}$  times in length to caudal base; depth 4 to 5. Dorsal II, 7, 1; anal III, 9, 1. Scales 41 to 43 in lateral line to caudal base and 3 more on latter; 7 or 8 scales above lateral line, 3 or 4 below; 16 to 18 predorsal scales. Snout 3 to  $3\frac{3}{8}$  in head; eye 3 to 4; maxillary  $2\frac{1}{8}$  to 3; interorbital  $2\frac{1}{2}$  to 3. Pharyngeal teeth 2, 4, 4—4, 4, 2, hooked, with grinding-surfaces. Scales with 11 to 20 apical radiating striae; circuli largely coarse apically, become fine basally. Pearl organs of male, a row of small ones from nostrils to antero-supraorbital; row around front edge of snout, slightly doubled on each side; then a continuous series of 4 horizontally on preorbital; on suborbital chain, a row close below eye to postorbital inferiorly; a series of 7 on lower ridge of preopercle; scattered tubercles on upper part of opercle and along its front edge vertically; a double row along lower side of each mandibular; second, third and fourth anal rays each with row of small tubercles along outer face.

Color in alcohol largely dull olivaceous above, edge of each scale slightly darker. Muzzle, upper surface of head and chin largely with dusky-slate to blackish, pale in female or non-ornamented male. Male with dusky-slate broad lateral band, interrupted by a number of pale lines or bars extending up and intersecting with whitish color of belly. Membranes of dorsal and anal dusky to blackish. Caudal largely with dusky tinge, especially on outer median portion. Other examples, tuberculate, and with but slight dusky on fins, show pale or orange tinge on middle of front dorsal edge and upper part of pectoral medianly. Same on ventral fin and front half of anal.

Length 34 to 130 mm.

From Hsing Lung Shan, August 7, 1921, 114 examples; twenty-six miles to south of Hsing Lung Shan, August 12, 1921, 105 examples.

For comparison I examined the following series of Japanese examples in the Academy: Kinu River at Utsonomiya, Yodo River in Osaka, Chilongo River in Kurume, Yabe River at Funayado, Kawatana near Nagasaki and Tsuruga. They show:

Head contained  $3\frac{1}{2}$  to 4 times in length to caudal base; depth  $3\frac{1}{2}$  to  $4\frac{1}{4}$ . Dorsal II, 7, 1; anal III, 8, 1 to 10, 1. Scales 36 to 46 in lateral line to caudal base, and 2 or more on latter; 8 scales above lateral line, rarely 7, 4 below; 15 to 17 predorsal scales. Snout 3 to  $3\frac{1}{2}$  in head; eye  $2\frac{3}{4}$  to  $4\frac{1}{2}$ ; maxillary  $2\frac{1}{2}$  to  $2\frac{7}{8}$ ; interorbital  $2\frac{3}{4}$  to  $3\frac{1}{8}$ . Pharyngeal teeth 2, 4, 5—5, 4, 2, vary 1, 4, 5—5, 4, 1 or 2, 4, 4—5, 4, 2 or 2, 4, 5—4, 4, 2 or 1, 4, 5—4, 4, 1 or 2, 4, 4—4, 3, 1.

Length 57 to 144 mm.

*Zacco platypus* has not before been reported from Northeast Mongolia. In the American Museum series another more progressively ornamented male shows the series of lateral snout pearl-organs and those on the lower preopercle ridge fused as a ridge. The latter are greatly similar to Boulenger's figure of *Opsariichthys acanthogenys*. Further, there are small scattered pearl-organs on the scales along the anal base and under surface of the caudal peduncle. The lower rudimentary caudal rays are much covered with adipose tissue, abruptly ending forward and like basal portions of lower caudal rays also finely studded with tubercles.

Tubercles on the anal fin are present on the anterior or rudimentary rays, basal tubercle of fourth, fifth and sixth anal rays enlarged and at tips of fifth, sixth and seventh two or three small terminal tubercles on each side.

***Pseudaspius leptocephalus* (Pallas)**

Head contained  $3\frac{1}{2}$  times in length to caudal base; depth  $4\frac{3}{4}$ . Dorsal III, 7, 1; anal III, 9, 1. Scales 91 in lateral line to caudal base and 6 more on latter; 16 scales above lateral line, 10 below; 52 predorsal scales. Snout  $3\frac{1}{2}$  in head measured from upper jaw tip; eye  $6\frac{1}{2}$ ; maxillary  $3\frac{1}{2}$ ; interorbital  $4\frac{1}{2}$ .

Body elongate, well compressed, edges rounded, deepest at dorsal origin. Caudal peduncle compressed, least depth 3 in total head length. Head attenuate, compressed, flattened sides not convergent; width  $2\frac{3}{4}$  in its length. Snout broadly convex, depressed, a trifle longer than wide. Eye slightly before first third in head length. Premaxillaries protractile forward. Maxillary not quite reaching to eye or but a trifle behind posterior nostril. Mandible depressed, protrudes,  $2\frac{1}{2}$  in total head length. Nostrils at last third of snout, superior. Interorbital broadly convex. Preorbital  $1\frac{1}{2}$  in snout, width  $1\frac{1}{2}$  its length. Postorbital equals eye. Gill-rakers 3+6, short strong firm points,  $2\frac{1}{4}$  in length of gill-filaments, latter  $1\frac{1}{2}$  in eye. Pharyngeal teeth 2, 5—?, ?, with slight grinding-surfaces. Scales small, reduced and crowded on median preventral and breast, little smaller on median predorsal and caudal base. Pointed adnate scaly flap in ventral axil. Lateral line well decurved.

Dorsal origin midway between hind eye edge and caudal base, fin reaches half way to caudal base, first branched dorsal ray longest,  $1\frac{1}{2}$  in head. Anal a little behind dorsal base, first branched ray 2 in head. Caudal deeply forked, pointed lobes evidently subequal, upper lobe  $1\frac{1}{4}$  in head. Pectoral 3 in head. Ventral inserted a little before dorsal, nearer anal origin than pectoral origin, 2 in head.

Color in alcohol, dull uniform brownish, paler below. Fins and iris plain brown. Length 247 mm.

Described above from an example in the Academy obtained in the Tore River, a tributary of the Sungari.

***Chela nicholsi* Fowler**

Figure 2

Head contained  $4\frac{1}{2}$  times in length to caudal base; depth  $4\frac{1}{2}$ . Dorsal III, 7, 1; anal III, 22, 1; pectoral I, 14; ventral I, 8. Scales 58 in lateral line to caudal base and 4 more on latter; 10 scales above lateral line, 3 below; 40 predorsal scales. Snout  $3\frac{1}{2}$  in head measured from upper jaw tip; eye  $3\frac{1}{2}$ ; maxillary 3; interorbital  $4\frac{1}{2}$ .

Length 152 mm.

Type in the American Museum and paratype noted above in the Acad. Nat. Sci. Philadelphia. These are the only examples known.

***Pseudobrama dumerili* Bleeker**

Head contained  $4\frac{1}{2}$  times in length to caudal base; depth  $3\frac{1}{4}$ . Dorsal III, 7, 1; anal III, 9, 1; pectoral I, 14; ventral I, 8. Scales 44 in lateral line to caudal base and 3 more on latter; 9 scales above lateral line, 4 below to ventral origin, 6 below to anal origin; 20 predorsal scales. Snout 4 in head; eye  $3\frac{1}{2}$ ; maxillary  $5\frac{1}{2}$ ; interorbital  $2\frac{1}{2}$ .

Body moderately ovoid, strongly compressed, deepest at dorsal origin, post-ventral with slight median keel over which scales not passing and other edges all convexly rounded. Caudal peduncle strongly compressed, least depth  $1\frac{1}{8}$  in its length or  $1\frac{1}{8}$  in head.

Head well compressed, flattened sides slightly approximated below, upper profile slightly convex, lower more so; width 2 in its length, depth  $1\frac{1}{4}$ . Snout convex, rather obtuse, length  $\frac{3}{8}$  its width. Eye rather large, hind edge midway in head length, diameter 1 in snout,  $1\frac{1}{4}$  in interorbital. Mouth small, inferiorly terminal, width  $1\frac{1}{8}$  in eye. Maxillary largely concealed by preorbital, at least its expansion, which  $3\frac{1}{8}$  in eye, or reaches opposite front nostril. Lips moderate, entire. Edges of jaws firmly coriaceous. Nostrils together, front one at last third in snout, pore-like, and hind one a crescentic slit close behind, formed by cutaneous marginal flap of anterior. Interorbital broadly and evenly convex. Suborbital chain moderate, preorbital depth  $\frac{3}{8}$  its length, which  $1\frac{1}{8}$  in eye. Opercle smooth.

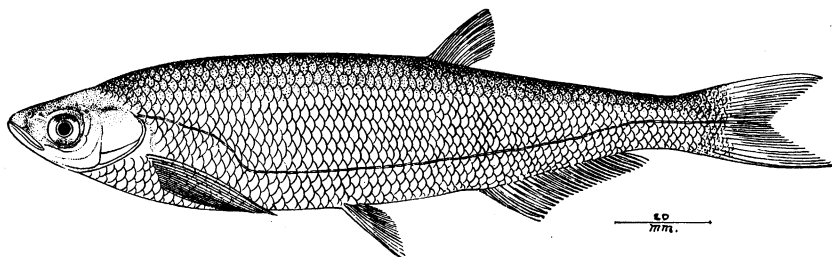


Fig. 2. *Chela nicholsi* Fowler. Type.

Gill-opening extends forward about opposite hind edge of eye. Gill-rakers 38+91, short, fine, slender, close-set,  $2\frac{1}{8}$  in length of gill-filaments, which  $1\frac{1}{2}$  in eye. No pseudobranchiae. Pharyngeal teeth 6—7, strongly compressed, all with broad grinding-surfaces, and pointed but without hooks.

Scales with 16 to 19 apical radiating striae, also 7 or 8 auxiliary marginals; basal circuli 45 to 60. Scales in even longitudinal series parallel with lateral line, scarcely smaller on breast and caudal base. Pointed scaly flap in ventral axil, about  $\frac{3}{8}$  length of fin. Lateral line complete, deeply decurved, passes lower  $\frac{2}{8}$  in body length at ventrals and ascends along side of caudal peduncle to caudal base medianly. Tubes simple, extend over each scale about midway of exposure.

Dorsal origin midway between snout tip and caudal base, first 3 rays spine-like, osseous, compressed, third greatly longest; first branched dorsal ray 1 in head. Anal begins well behind depressed dorsal, first branched ray highest and forms apex of slight anterior lobe, 2 in head. Caudal strongly forked, lobes sharply pointed, slender, equal, little longer than head. Pectoral reaches a distance contained  $1\frac{1}{4}$  in that to ventral,  $1\frac{1}{8}$  in head. Ventral inserted slightly before dorsal origin, reaches a distance contained  $1\frac{1}{8}$  in that to anal,  $1\frac{1}{8}$  in head. Vent close before anal.

Color in alcohol with back tinged pale olive, sides and lower surface pale to whitish. Dorsal and caudal pale olivaceous, lower fins whitish. Iris slaty and whitish. Length 170 mm.

One from Ningkwo.

**Ochetobius elongatus** (Kner)

Head contained  $4\frac{3}{5}$  to  $4\frac{7}{8}$  times in length to caudal base; depth  $5\frac{1}{2}$  to  $6\frac{1}{2}$ . Dorsal III, 9, 1; anal III, 9, 1. Scales 63 to 65 in lateral line to caudal base and 3 more on latter; 10 or 11 scales above lateral line, 5 or 6 below; 28 to 30 predorsal scales. Snout  $3\frac{3}{8}$  in head; eye  $5\frac{1}{4}$  to 6; maxillary  $3\frac{3}{5}$  to  $3\frac{3}{4}$ ; interorbital  $3\frac{1}{4}$  to  $3\frac{3}{5}$ .

Body greatly elongate, fusiform, compressed, deepest at dorsal origin, edges all convexly rounded. Caudal peduncle well compressed, its least depth 2 to  $2\frac{1}{5}$  in its length or  $2\frac{7}{8}$  to  $3\frac{1}{10}$  in head.

Head small, compressed, its flattened sides slightly approximated below, upper profile nearly straight and much less inclined than lower; width of head  $2\frac{1}{8}$  to  $2\frac{1}{4}$  in its length. Snout conic, its length  $\frac{7}{8}$  to 1 in its width. Eye center at first third in head; eye diameter  $1\frac{1}{5}$  to  $1\frac{1}{3}$  in snout,  $1\frac{1}{4}$  in interorbital; adipose-lid moderate, invades a little more of eye behind than in front. Mouth oblique, closed jaws even in front. Maxillary reaches opposite hind nostril, largely concealed. Jaws firm and their edges rather trenchant. Nostrils together, within last fourth of snout; front one a pore, with hind cutaneous flap exposing posterior nostril in crescent. Interorbital broadly convex. Suborbitals narrow, cover but little of cheek, less than  $\frac{1}{2}$  to preopercle ridge.

Gill-opening extends forward opposite hind eye edge. Gill-rakers 8+25, lanceolate, slender, contained  $1\frac{1}{4}$  in the length of gill-filaments, or  $1\frac{1}{5}$  in eye. Pseudo-branchiæ about half the length of gill-filaments. Pharyngeal teeth 2, 3, 5—5, 3, 2, with broad smooth grinding-surfaces but without terminal hooks.

Scales with 23 to 30 apical slightly waved radiating striæ; basal circuli fine. Scales largely adherent, thin, in even longitudinal series, largely uniform; scales a little smaller on breast and but slightly smaller on caudal base than on body. Ventral axillary scale  $2\frac{1}{4}$  in the length of the fin. Lateral line complete, decurved slightly along side, and becomes median at caudal base. Tubes simple and extend about half way over scale exposure.

Dorsal origin slightly nearer snout tip than caudal base, first branched ray depressed reaches a little beyond tip of others, or is contained  $1\frac{1}{5}$  to  $1\frac{1}{2}$  in head; length of depressed fin contained  $3\frac{1}{8}$  to  $3\frac{1}{3}$  times in length to caudal base. Anal origin a little nearer last dorsal ray base than caudal base, first branched ray tip shorter than last when depressed, or  $2\frac{1}{8}$  to  $2\frac{1}{4}$  in head; depressed fin  $1\frac{1}{5}$  to  $1\frac{1}{8}$  times in distance to caudal base. Caudal deeply forked, lobes sharply pointed, alike,  $4\frac{2}{5}$  to  $4\frac{3}{4}$  in combined head and trunk. Pectoral reaches a distance contained  $1\frac{1}{10}$  to  $2\frac{1}{5}$  in that to ventral,  $1\frac{1}{2}$  to  $1\frac{3}{5}$  in head. Ventral inserted slightly before dorsal origin,  $2\frac{1}{4}$  to  $2\frac{1}{5}$  in distance to anal origin,  $1\frac{2}{3}$  to  $1\frac{1}{4}$  in head.

Color in alcohol with back olivaceous, sides and below pale brownish, with traces of whitish. Eye and under surface of head silvery-white. Dorsal and caudal pale brownish, paired fins and anal whitish.

Length 235 to 270 mm.

Five from Ningkwo.

**COBITIDÆ****Misgurnus anguillicaudatus** (Cantor)

Head contained 5 to  $6\frac{1}{3}$  times in length to caudal base; depth  $7\frac{3}{4}$  to 9. Dorsal II, 7, 1; anal II, 6, 1. Scales 138 to 170 in lateral line to caudal base. Snout  $2\frac{2}{3}$  to

$2\frac{7}{8}$  in head; eye  $5\frac{1}{5}$  to  $7\frac{1}{5}$ ; maxillary  $3\frac{3}{4}$  to 4; interorbital  $4\frac{7}{8}$  to  $5\frac{1}{4}$ . Scales with 36 to 38 radiating striæ in young, adult with 68 to 70; circuli fine.

Color in alcohol dull brownish, back darker and color of upper surface rather abruptly distinct from that of lower surface. Back and upper surface more or less distinctly spotted with darker everywhere, though spots more pronounced posteriorly, or above anal and on caudal peduncle. Spots on back and sides often arranged as 2 longitudinal dark lines. Dorsal pale brown, with about 4 horizontal bands of dusky spots. Caudal with about 10 transverse vertical dusky spots and black blotch at base above nearly large as eye. Anal pale, also with few dusky spots.

Length 66 to 206 mm.

Eighty examples from Hsing Lung Shan and two from twenty-six miles south of Hsing Lung Shan, latter August 12, 1921. Besides these I have also included three from Tan lan Ho, in the Academy.

The color is variable, though always with a black spot at the bases of the upper caudal rays. Head and trunk always with scattered spots, specks or dots, variously close-set or more or less scattered. Sometimes only large scattered blotches to several times size of eye present, or larger blotches may occur only above lateral line. None show so great development of adipose-like rudimentary caudal rays as in the next species.

### ***Misgurnus decemcirrosus* (Basilewsky)**

Figure 3

Head contained 5 to  $5\frac{3}{4}$  times in length to base of caudal; depth 6 to  $6\frac{7}{8}$ . Dorsal II, 7, I, sometimes 8, I; anal II, 6, I, sometimes 5, I. Scales 95 to 127 in lateral line to caudal base. Snout  $2\frac{1}{2}$  to  $2\frac{3}{5}$  in head; eye 5 to  $7\frac{1}{4}$ ; maxillary 4 to  $4\frac{1}{3}$ ; interorbital  $3\frac{3}{4}$  to  $6\frac{3}{4}$ . Scales with 36 to 44 radiating striæ in young, with circuli about 70 rows; adults with 77 to 80 radiating striæ.

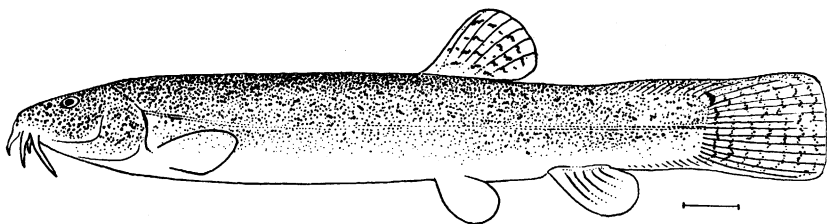


Fig. 3. *Misgurnus decemcirrosus* (Basilewsky). Tien Tsen.

Color in alcohol dull brown, finely speckled or dotted with dusky on back and upper surface. Obscure dusky or blackish spot at bases of upper caudal rays not much larger than pupil.

Length 132 to 196 mm.

Six from Ningkwo. Also twenty-one from the Pietto River at Tien Tsen collected by N. F. Drake, in the Academy.

The Ningkwo examples are all with very great development of the rudimentary caudal rays, starting close behind the dorsal base in most cases and joining behind with the caudal. Lower rudimentary caudal rays likewise greatly developed, begin close behind anal base and fused posteriorly with caudal.

Color pattern also very variable, as some with large scattered dusky to blackish spots on head and trunk, though none much larger than eye. Body similarly finely sprinkled with dark dots, specks or small spots as in *Misgurnus anguillicaudatus*.

*Misgurnus crossochilus* Sauvage is doubtless a synonym. The details set forth in the original description do not show any characters worthy of specific value and agree so far as given with my materials of the present species.

#### ***Nemacheilus toni* (Dybowski)**

Head contained 4 to  $4\frac{1}{2}$  times in length to caudal base; depth  $6\frac{7}{8}$  to  $8\frac{3}{4}$ . Dorsal II, 7, I or 8, I; anal II, 5. Scales quite minute, about half a millimeter in size and 128 to 140 estimated in lateral count; each with 30 radiating marginal striae; circuli moderately fine. Snout  $2\frac{1}{2}$  to  $2\frac{3}{4}$  in head; eye  $5\frac{5}{8}$  to  $6\frac{1}{8}$ ; maxillary  $3\frac{1}{4}$  to  $4\frac{1}{8}$ ; interorbital  $4\frac{1}{2}$  to  $5\frac{3}{4}$ .

Color in alcohol pale olive-gray on back to paler or whitish below, side and back with many large dull dusky blotches, rather irregular and most much larger than eye. Obscure dusky streak from side of snout to nostrils. Dorsal with about 4 and caudal with 5 or 6 cross bands made up of dusky blotches, fins otherwise pale to whitish. Several grayish blotches on pectoral medianly and anal terminally. In young example color-pattern much more contrasted. The markings appear variable in preserved examples as in the one in best condition they are as a row of large blackish blotches above and another below lateral line.

Length 60 to 99 mm.

Three from Hsing Lung Shan.

The type of *Nemacheilus pechiliensis* Fowler, in the Academy, is now in such poor preservation that it is useless for examination. The original description, however, shows that it is clearly a synonym.

*Orthrias oreas* Jordan and Fowler<sup>1</sup> is also in agreement and is another synonym.

#### ***Lefua andrewsi* Fowler**

Figure 4

Known only from the type in the American Museum.

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<sup>1</sup>1903, Proc. U. S. Nat. Mus., XXVI, p. 796, Fig. 2.



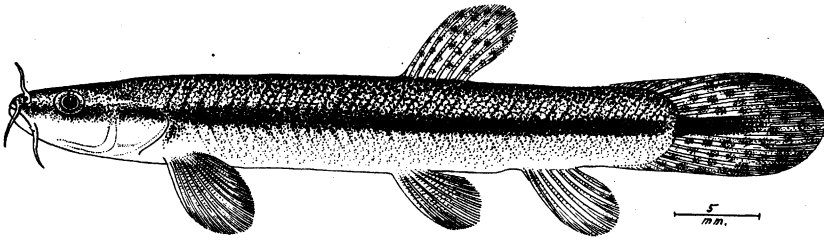


Fig. 4. *Lefua andrewsi* Fowler. Type.

***Lefua costata* (Kessler)**

Head contained 4 to  $4\frac{1}{2}$  times in length to caudal base; depth  $6\frac{1}{6}$  to  $6\frac{1}{2}$ . Dorsal II, 6, 1; anal II, 5, 1. Scales 93 to 102 in median lateral series. Snout  $2\frac{1}{2}$  to  $3\frac{1}{2}$  in head; eye  $4\frac{1}{6}$  to  $6\frac{1}{4}$ ; maxillary  $3\frac{3}{4}$  to  $4\frac{1}{2}$ ; interorbital 3 to  $3\frac{1}{2}$ . Scales with 38 to 43 radiating marginal striae (30 to 36 in type of *Nemachilus dixonii*); circuli rather fine, moderate.

Color in alcohol brownish generally, with slight olive tint. Back and sides with very obscure scattered moderate spots of small size. Dorsal and caudal finely and obscurely spotted with gray-brown, though latter fin always with distinct round black spot at middle of base, not larger than pupil. Iris dull slaty, lips and jaws all pale or dull. Dark median lateral streak not very distinct and largely evident only after ventral.

Length 40 to 73 mm.

Six from Hsing Lung Shan.

In the Academy the type of *Nemachilus dixonii*, a synonym of the present species, is included above.

*Elxis nikkonis* Jordan and Fowler<sup>1</sup> is certainly closely related, though the alleged larger scales, given as about fifty-six, would seem to warrant specific distinction. It is, however, otherwise closely related, as the black basal caudal spot suggests.

*Lefua echigonia* Jordan and Richardson<sup>2</sup> is based on three young examples only 38 to 45 mm. long. It is represented with four barbels in profile, showing it doubtless had eight. Its coloration greatly suggests *Misgurnus decemcirrosus* (Basilewsky).

*Nemachilus variegatus* (Dabry) Sauvage and de Thiersant<sup>3</sup> is probably a *Lefua*. It is described as having large brownish cloudings formed into a series of somewhat undulate bands and a black band at caudal and dorsal base.

<sup>1</sup>1903, Proc. U. S. Nat. Mus., XXVI, p. 768, Fig. 1.

<sup>2</sup>1908, Proc. U. S. Nat. Mus., XXXIII, p. 263, Fig. 1.

<sup>3</sup>1874, Ann. Sci. Nat. Zool., I (2), p. 14.

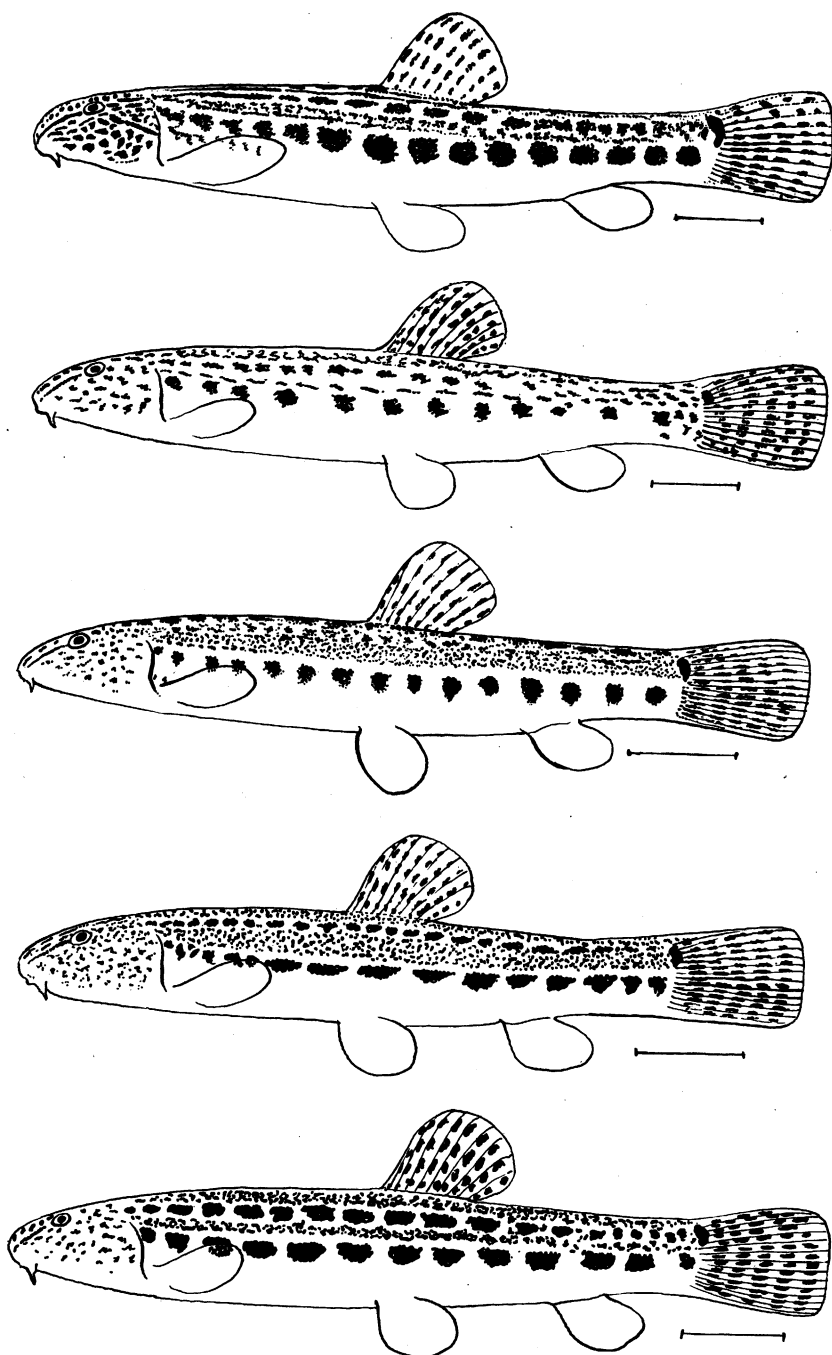


Fig. 5. *Cobitis taenia* Linnæus. Variation in color-pattern.

**Cobitis tænia** Linnæus

## Figure 5

Head contained  $4\frac{3}{4}$  to  $5\frac{1}{8}$  times in length to caudal base; depth  $6\frac{1}{8}$  to  $7\frac{1}{4}$ . Dorsal II, 6, I to 8, I; anal III, 4, I to 6, I. Snout  $2\frac{1}{4}$  to  $2\frac{3}{8}$  in head; eye  $5\frac{1}{8}$  to  $6\frac{1}{8}$ ; maxillary  $3\frac{3}{8}$  to  $4\frac{1}{8}$ ; interorbital 8 to  $8\frac{3}{8}$ .

Length 55 to 98 mm.

From Hsing Lung Shan, August 7, 1921, 83 examples.

In the Academy a series of 20 examples from Europe, the Italian Lakes and Sweden. These show the following.

Head contained  $4\frac{3}{4}$  to  $5\frac{1}{8}$  times in length to caudal base; depth  $5\frac{1}{8}$  to  $7\frac{1}{4}$ . Dorsal II, 7, I; anal III, 5, I or 6, I. Snout  $2\frac{1}{4}$  to  $2\frac{3}{4}$  in head; eye  $4\frac{3}{4}$  to 6; maxillary  $3\frac{7}{8}$  to  $4\frac{1}{4}$ ; interorbital  $7\frac{3}{4}$  to 9.

Length 48 to 95 mm.

The scales are most striate in the largest European examples, the radiating marginal striæ showing 38 to 48 and circuli in the largest in about 25 series. In a Japanese example, representative of the nominal *Cobitis biwæ* Jordan and Snyder, from Kiroshina, and in all the above Chinese examples examined, besides one I reported from the Academy collection as the nominal *Cobitis sinensis* Sauvage and De Thiersant taken in the Tan Lan Ho, the marginal radiating striæ are 28 to 31. In no way do they differ from the other Chinese examples examined.

Considerable variation in the color-pattern is noticed in this species, and for comparison I have placed a drawing of the largest European example at the top of the accompanying figure, the others representing the extremes found in the Hsing Lung Shan series.

From the description of *Cobitis dolichorhynchus* Nichols<sup>1</sup> I am inclined to consider it a variant. It is said to be more elongate than *Cobitis tænia*, though its depth is given as only 5.8. From the above details this depth is within the range of my European examples. The alleged longer snout also appears variable. I fail to find any other characters on which to separate the Futsing specimens.

Four examples also obtained at Ningkwo, 137 to 165 mm.

**SILURIDÆ****Parasilurus asotus** (Pallas)

Head contained  $3\frac{1}{5}$  to  $4\frac{3}{4}$  times in length to caudal base; depth  $5\frac{1}{5}$  to  $6\frac{1}{5}$ . Dorsal I, 5; anal II to V, 68 to 77. Snout  $2\frac{7}{8}$  to  $3\frac{1}{5}$  in head measured from tip of upper jaw; eye  $4\frac{1}{2}$  to 9; maxillary  $2\frac{1}{2}$  to  $3\frac{1}{8}$ ; interorbital  $2\frac{1}{5}$  to  $2\frac{1}{4}$ . Lower jaw well protruded. In young maxillary barbel extends back to middle of depressed dorsal, or well beyond depressed pectoral.

<sup>1</sup>1916, Proc. Biol. Soc. Wash., XXXI, p. 16. Futsing, Fu-kien.

Color in alcohol nearly deep mouse-gray above, becoming deep olive-buff on under surface of head and belly, sides below all with pale smutty dusted appearance. About 17 or 18 vertical rows of very inconspicuous pale small spots on back, transversely down till level with lateral line. Also few similar pale spots on upper surface of head. Pectoral and ventral pale. Iris slaty. Maxillary barbel dusky above, pale below. Mental barbels pale, like chin.

Length 58 to 332 mm.

Eleven from Hsing Lung Shan, August 7, 1921 and two from Ningkwo.

### PORCIDÆ

#### *Pseudobagrus macropterus* (Bleeker)

Head contained  $4\frac{1}{2}$  times in length to caudal base; depth 8%. Dorsal I, 7; anal v, 10; pectoral I, 9; ventral I, 5. Snout  $2\frac{3}{4}$  in head; eye 7; maxillary 3; interorbital  $3\frac{3}{8}$ ; mouth width  $2\frac{1}{2}$ .

Body slender, depressed forward, strongly compressed behind, deepest about middle of depressed pectoral. Caudal peduncle little free, strongly compressed, least depth about  $2\frac{1}{4}$  in its length or  $2\frac{1}{2}$  in head.

Head broadly depressed, flattened medianly above, sides convex, width  $1\frac{1}{2}$  in its length, depth  $2\frac{1}{2}$ . Snout broadly depressed, length  $\frac{3}{8}$  its width as measured across at front of eyes. Eye center falls about first  $\frac{1}{8}$  in length of head, elevated, lids free;  $2\frac{3}{8}$  in snout, 2 in interorbital. Mouth broadly transverse, lower jaw much the shorter. Teeth in broad villiform bands in jaws and continuous across vomer and palatines. Lips thick, fleshy, plicated. Maxillary barbel long, reaches dorsal origin; hind nasal barbel longer than eye,  $1\frac{1}{8}$  in snout; outer mental barbel reaches gill-opening or  $\frac{3}{4}$  to pectoral origin; inner mental 3 in head. Nostrils separated; front one with low cutaneous rim, closer to hind one than to snout edge; hind nostril about  $\frac{1}{2}$  in snout profile. Interorbital level.

Gill-opening extends forward opposite eye center. Gill-rakers 8+13, lanceolate,  $1\frac{1}{8}$  in gill-filaments, which  $1\frac{1}{8}$  in eye. Isthmus wide, depressed, broadly triangular.

Skin smooth. Lateral line distinct, midway along side.

Dorsal origin about first third in combined head and trunk, third ray longest and edges of membranes slightly emarginate. Dorsal spine 2 in head. Adipose dorsal very long  $2\frac{1}{2}$  in combined head and trunk. Anal small, first branched ray highest, inserted a little nearer caudal base than pectoral origin; first branched ray  $2\frac{1}{2}$  in head. Caudal deeply forked, lobes rounded, hind edge deeply emarginate and lower lobe  $1\frac{1}{8}$  in upper; length  $1\frac{1}{16}$  in head. Pectoral rounded, reaches a distance contained  $1\frac{1}{8}$  in that to ventral; spine  $1\frac{1}{8}$  in head, flattened, 14 teeth along hind edge. Ventral insertion nearer snout tip than caudal base or close behind base of last dorsal ray, fin reaches a distance contained  $1\frac{1}{2}$  in that to anal, length  $1\frac{1}{8}$  in head.

Color in alcohol pale slaty-gray above, with obscure slightly darker slaty dots scattered about, also on dorsals and caudal. Under surface of body pale to whitish. Maxillary and nasal barbels slaty, others whitish. Iris slaty.

Length 345 mm.

One from Ningkwo.

***Pseudobagrus fulvi-draco* (Richardson)**

Head contained  $2\frac{3}{4}$  to  $3\frac{3}{4}$  times in length to caudal base; depth 3 to  $3\frac{3}{4}$ . Dorsal I, 7, 1; anal, v, 15 or 16. Snout 3 in head; eye 4 to 7; maxillary  $2\frac{3}{4}$  to 3; interorbital  $2\frac{1}{2}$  to  $2\frac{1}{2}$ . Maxillary barbel extends back but little beyond head, though sometimes quite a little shorter. Serræ on hind edge of pectoral spine 14 to 16 and much more developed than the fine and more numerous even small denticles along front edge of spine. Dorsal spine often with very obsolete similar armature, or the denticles or spinules absent.

Color in alcohol slaty-brown above, with about 3 large obsolete blotches on side, well contrasted from same color of back above. In many color faded more or less brownish. All fins with more or less blackish blotch terminally, though on caudal in middle of each lobe. In young color-pattern greatly contrasted as blackish and very pale brownish.

Length 27 to 170 mm.

Ten from Hsing Lung Shan, August 7.

*Pseudobagrus emarginatus* Sowerby<sup>1</sup> is based on an example 413 mm. long without caudal. Sowerby says it is very much more elongate than *Pseudobagrus ussuriensis* (Dybowski), and closely resembles it except in its emarginate caudal. *Pseudobagrus ussuriensis* is said in the original description to reach 1000 mm., and to have a rounded caudal. Possibly this may be a condition with advanced age.

**OPHICEPHALIDÆ*****Ophicephalus argus* Cantor**

Head contained  $2\frac{2}{3}$  to 3 times in length to caudal base; depth 5 to  $5\frac{1}{2}$ . Dorsal 48 to 51; anal 32 or 33. Scales 59 to 62 in lateral line to caudal base and 3 or 4 more on latter; 8 to 10 scales above lateral line, 13 to 15 below; 29 to 30 predorsal scales. Snout  $5\frac{1}{8}$  to 6 in head measured from upper jaw tip; eye  $5\frac{1}{2}$  to  $7\frac{1}{2}$ ; maxillary  $2\frac{2}{3}$  to  $2\frac{2}{3}$ ; interorbital  $4\frac{1}{2}$  to  $5\frac{1}{2}$ .

Body moderately long, compressed. Least depth of caudal peduncle  $3\frac{2}{3}$  to  $3\frac{2}{3}$  in total head length.

Head width  $2\frac{1}{2}$  to  $2\frac{1}{2}$  in its length. Hind pupil edge at first fourth in head; hind eye edge about first third in head in young; diameter 1 to  $1\frac{1}{4}$  in snout,  $1\frac{1}{2}$  to  $1\frac{1}{2}$  in interorbital. Mouth large, lower jaw protruding. Maxillary extends well beyond eye, but slightly beyond in young. Teeth finely conic, in narrow bands in jaws; inner row along each side of mandible and row on vomer and palatines enlarged. Front nostril in short tube at first  $\frac{2}{3}$  in snout; hind one a simple pore close above and before front eye edge. Interorbital depressed, level.

Gill-rakers 3+6, short low tubercles, largest slightly less than gill-filaments, which 2 in eye.

Scales with 9 to 18 basal marginal radiating striæ, 12 to 15 apical circuli, other circuli fine. Head with muzzle and jaws naked; 12 to 15 scales on cheek to preopercle edge; occipital scales scarcely larger than those on sides of head; small scales on

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<sup>1</sup>1921, Proc. U. S. Nat. Mus., LX, p. 1, Yalu River, Southern Manchuria.

breast and caudal basally. Lateral line a little high at first, drops 2 scales a little behind pectoral, then median to caudal base; tubes narrow and simple.

Median dorsal rays  $3\frac{3}{8}$  to  $3\frac{3}{8}$  in head; median anal rays  $3\frac{3}{4}$  to  $3\frac{3}{4}$ ; caudal rounded,  $1\frac{1}{8}$  to  $1\frac{1}{8}$ ; pectoral  $2\frac{1}{2}$  to  $3\frac{1}{2}$  (?); ventral  $3\frac{3}{8}$  to  $3\frac{3}{8}$ .

Color in alcohol brown, paler below to whitish on under surface of head. Brown streak from side of snout to eye, then back along upper side of head to shoulder; another parallel from lower eye edge to pectoral base. Jaws and lower side of head with some pale brown spots. Pores along preopercle flange and mandible dusky. Trunk with row of 11 dark large rings, beginning at shoulder and continued above median axis to caudal base. Below median axis nearly equal number of less regular dark blotches, some angular or giving off slight oblique bars below, but all similarly with more or less dark bordering line. Vertical fins dusky terminally, with dark blotches. Pectoral pale brown, with dusky spot less than eye at bases of upper rays. Ventral whitish. Iris brown.

Length 98 to 222 mm.

Seven from Ningkwo.

#### ***Channa ocellata* Peters**

Head contained  $3\frac{1}{6}$  to  $3\frac{1}{3}$  times in length to caudal base; depth  $4\frac{2}{3}$  to  $5\frac{1}{6}$ . Dorsal 43 to 48; anal 27 to 32. Scales 55 to 60 in lateral line to caudal base; 7 or 8 scales above lateral line, 14 or 15 below; 20 to 28 predorsal scales. Snout  $3\frac{3}{4}$  to  $4\frac{1}{4}$  in head measured from upper jaw tip; eye  $5\frac{1}{3}$  to  $7\frac{1}{6}$ ; maxillary  $2\frac{1}{4}$  to  $2\frac{1}{2}$ ; interorbital  $3\frac{3}{4}$  to  $3\frac{3}{4}$ .

Body elongate, compressed. Least depth of caudal peduncle  $2\frac{3}{4}$  to 3 in total head length.

Head width  $1\frac{3}{5}$  to  $1\frac{1}{5}$  in its length. Snout depressed, its length  $\frac{2}{5}$  to  $\frac{1}{2}$  its width. Eye center at first fourth in head, a little backward in young; diameter 1 to  $1\frac{1}{2}$  in snout,  $1\frac{1}{3}$  to  $2\frac{1}{5}$  in interorbital. Mouth large, lower jaw slightly protruding. Mouth extends a little beyond eye, to hind eye edge in young. Teeth fine, simple, conic, in bands in jaws and on vomer and palatine; inner series of teeth in lower jaw enlarged, widely spaced. Lips fleshy, rather narrow. Front nostril in short tube on side of snout,  $1\frac{1}{4}$  in eye; hind nostril elevated, opposite upper front eye edge. Interorbital broadly convex.

Gill-rakers as 5 tubercles, lower longer, all much shorter than gill-filaments, which  $1\frac{1}{3}$  in eye.

Scales with 19 to 30 basal parallel striae; apical circuli 10, giving place with age to about 35 irregular marginal striae. Front half of snout, mandible and branchiostegal region naked, and scales on top of head largest, much larger than those on cheek; 9 rows of scales across cheek to preopercle edge. Most of pectoral and caudal finely scaled. Lateral line high anteriorly, after seventeenth scale dropping 2 scales, when midway to caudal base; tubes simple, small and with small pore.

Median dorsal rays 2 to  $2\frac{1}{2}$  in total head length; median anal rays  $2\frac{7}{8}$  to  $3\frac{1}{2}$ ; caudal rounded behind,  $1\frac{1}{8}$  to  $1\frac{1}{4}$ ; pectoral  $1\frac{1}{8}$  to  $1\frac{3}{4}$ , reaches a distance contained  $1\frac{1}{2}$  to  $1\frac{1}{3}$  in that to vent.

Color in alcohol brown on back, paler to livid whitish on under surface of head and trunk. Dark streak from upper hind eye edge back toward middle of opercle, lower one from lower hind eye edge back toward pectoral base. Lower jaw neutral tint, with dusky line on and along upper maxillary edge and another on side of

mandible close along edge of lower lip. In young, lower side of head more or less distinctly spotted with brown. Trunk with 10 dusky to blackish large median blotches. First as large black round spot above pectoral axil and last as larger round black spot at caudal base, which mostly above lateral line and its edge narrowly pale. With age most of entire body finely spotted with pale or whitish, sometimes 2 spots on 1 scale. Dorsal and anal neutral-dusky, former usually with scattered small whitish spots. Pectoral and caudal brownish.

Length 93 to 255 mm.

Thirteen from Ningkwo.

### SERRANIDÆ

#### *Siniperca chuatsi* (Basilewsky)

Head contained  $2\frac{1}{4}$  to  $2\frac{2}{3}$  times in length to caudal base; depth  $2\frac{7}{8}$  to  $3\frac{1}{8}$ . Dorsal XII, 12 to 14; anal III, 8 to 10. Scales 128 to 130 counted along lateral line to caudal base; pores 115 in lateral line to caudal base; 20 scales above highest arch of lateral line to spinous dorsal base, 38 below to spinous anal origin; 33 ? predorsal scales. Snout  $3\frac{3}{8}$  to 4 in head measured from upper jaw tip; eye 5 to  $5\frac{1}{2}$ ; maxillary 2 to  $2\frac{1}{2}$ ; interorbital  $5\frac{2}{3}$  to 7.

Body elongately fusiform, well compressed. Least depth of caudal peduncle  $1\frac{1}{2}$  to  $1\frac{1}{3}$  in its length to  $3\frac{1}{2}$  to  $4\frac{1}{2}$  in total head length.

Head width  $2\frac{1}{2}$  to  $3\frac{1}{4}$  in its length, much more attenuated in young. Snout conic, width  $1\frac{1}{8}$  to  $1\frac{1}{2}$  in its length. Hind edge of eye midway in length of head, diameter  $1\frac{1}{8}$  to  $1\frac{1}{3}$  in snout,  $\frac{3}{5}$  to 1 in interorbital. Mouth moderate, mandible protruding, greatly so in young. Maxillary extends slightly beyond hind eye edge, opposite hind pupil edge in young; expansion  $1\frac{1}{2}$  in eye. Teeth moderately fine, conic, 4 or 5 series in front above narrowing in 1 series on side posteriorly, 2 or 3 innermost each side of median line largest and directed inward; mandibulars 5 or 6 rows in front, narrowing to single outer low series with large inner row of 4 on each side; patch of small conic teeth on vomer and each palatine, none on tongue. Nostrils together, within last fourth of snout. Interorbital broadly depressed, level in young. Hind preopercle edge denticulate and 3 large denticles at angle, much larger in young.

Gill-rakers 1+3, lanceolate,  $1\frac{1}{3}$  in gill-filaments, which  $1\frac{1}{2}$  in eye.

Scales with 9 basal parallel striæ marginally; circuli 7 to 14 apically.

Fifth dorsal spine  $2\frac{2}{3}$  to 4 in total length of head; eighth dorsal ray  $2\frac{3}{4}$  to 3; second anal spine  $3\frac{1}{6}$  to  $3\frac{7}{8}$ ; second anal ray  $2\frac{2}{3}$  to 3; caudal rounded behind,  $1\frac{9}{10}$  to 2; pectoral  $2\frac{1}{8}$  to  $2\frac{2}{5}$ ; ventral  $2\frac{1}{8}$  to  $2\frac{1}{5}$ .

Color in alcohol brown generally, little paler below. Trunk and head with more or less rounded close-set darker to dusky blotches or spots, some ring-like and small spots, dots, bars or short lines in paler areas. On head usually dark underlaid streak from behind eye back across postocular and another from lower hind eye edge. Jaws usually with obscure brownish blotches. In young markings on trunk usually reduced to large dark blotches, in very young forming about 6 dark vertical transverse bands, much wider than pale interspaces. Vertical fins pale, finely spotted with dark brown, spots fewer and larger in young, absent or little evident in very young. Pectoral pale. Ventral pale basally, little dusky sub-terminally.

Length 72 to 225 mm.

Nine from Ningkwo.

## GOBIIDÆ

*Eleotris potamophila* Günther

Head contained  $2\frac{2}{5}$  times in length to caudal base; depth  $4\frac{1}{8}$  to  $4\frac{3}{8}$ . Dorsal VI to VIII—I, 8, 1 or 9, 1; anal I, 7, 1. Scales 40 to 45 in median lateral series to caudal base and 4 or 5 more on latter; transversely at soft dorsal origin 13 to 15 scales; 30 to 35 predorsal scales. Snout  $3\frac{3}{4}$  to  $4\frac{1}{4}$  in head measured from upper jaw tip; eye  $5\frac{5}{8}$  to  $7\frac{7}{8}$ ; maxillary  $2\frac{1}{8}$  to  $2\frac{1}{2}$ ; interorbital  $3\frac{3}{8}$  to  $5\frac{1}{8}$ .

Body robust, subcylindrical, trunk more or less compressed posteriorly, deepest about dorsal origin. Caudal peduncle well compressed, least depth  $1\frac{1}{4}$  to  $1\frac{1}{2}$  its length or  $3\frac{1}{10}$  to  $3\frac{1}{4}$  in total head length.

Head robust, depressed, width  $1\frac{1}{8}$  to 2 in its length. Snout broad, surface convex, length  $\frac{3}{8}$  to  $\frac{3}{4}$  its width. Eye slightly impinging on upper profile, center at first third in head; front pupil edge about first third in young; diameter  $1\frac{1}{3}$  to 2 in snout, 1 to  $2\frac{1}{2}$  in interorbital. Mouth large, wide, mandible well protruded. Maxillary reaches opposite hind pupil edge, about to eye center in young; expansion  $1\frac{1}{4}$  to 2 in eye. Lips firm. Teeth simple, conic, moderate, large, in bands of 3 or 4 irregular series in jaws; none on vomer, palatines or tongue. Tongue broad, slightly convex along entire front edge. Front nostril in small short tube, at last  $\frac{2}{5}$  in snout; hind nostril a simple pore, midway between front nostril and eye. Interorbital broadly and slightly depressed concavely. Preopercle entire, without spine.

Gill-rakers 3+8 or 9, spinose tubercles, greatly shorter than gill-filaments, which equal eye.

Scales with 10 to 25 basal radiating striæ; apical denticles 65 to 70, and 2 or 3 series transversely; circuli fine. Jaws, snout, preorbital and under surface of head naked. Supraorbital with row of fine papillæ and above short series opposite nostrils; another row from close below eye up over postocular and suprascapula; double row along preopercle edge and continued forward along lower face of mandible to symphysis; small cluster of papillæ above maxillary on snout edge, also above front of supraorbital row; another cluster just below nostrils; infraorbital row begins just below hind nostril, slopes down toward maxillary, then abruptly up toward hind eye edge, where forking sends horizontal row back across cheek; below and parallel another midway on cheek, also small bar between posteriorly and anteriorly downward extension above upper maxillary edge; row down along front part of opercle closely parallel with preopercle edge. Breast and belly covered with small cycloid scales; about 17 scales across cheek to preopercle edge; caudal and pectoral bases finely scaly.

Third dorsal spine  $2\frac{1}{2}$  to 3 in total length of head; third dorsal ray  $2\frac{1}{4}$  to  $2\frac{3}{4}$ ; second anal ray  $2\frac{1}{2}$  to  $2\frac{3}{4}$ ; caudal rounded behind,  $1\frac{1}{8}$  to  $1\frac{1}{2}$ ; pectoral  $1\frac{1}{2}$  to  $1\frac{3}{4}$ ; ventral  $2\frac{1}{10}$  to  $2\frac{1}{5}$ . Anal papilla moderate.

Color in alcohol with back largely burnt umber, with 3 dark to blackish saddles, broadening as blotches above median lateral axis. First saddle includes most of spinous dorsal, second from hind half of soft dorsal base and third not crossing caudal peduncle, but invading caudal base. Dusky loup across occiput. Under surface of head and belly pale, with dusky or smutty-brown spots. Dusky blotch before, below and behind eye. Soft dorsal and caudal gray-brown, with 6 or more blackish cross-lines. Pectoral pale brownish, with 6 transverse lines of deep brown. Two dusky-black spots at pectoral base, both externally and in axil. Ventral whitish, with median dusky blotches.

Length 72 to 165 mm.

Twelve from Ningkwo.



**TETRODONTIDÆ*****Spheroides rubripes* (Schlegel)**

Head contained  $3\frac{1}{8}$  times in length to caudal base; depth  $2\frac{3}{4}$ . Dorsal iv, 12 to 15; anal iv, 8 to 10; pectoral i, 17 or 18. Snout  $2\frac{1}{4}$  to  $2\frac{1}{2}$  in head; eye 6 to 7; mouth width  $3\frac{3}{8}$  to 4; interorbital  $1\frac{1}{8}$  to  $2\frac{1}{8}$ .

Body robust, moderately long, deepest about pectoral base and back broadly convex. Caudal peduncle conic, least depth  $1\frac{1}{8}$  its length or  $3\frac{3}{4}$  in head.

Head about as wide as deep, upper profile evenly convex; width  $1\frac{1}{8}$  to  $1\frac{1}{2}$  in its length. Snout broad, convex over surface and in profile, length  $\frac{2}{3}$  to  $\frac{3}{4}$  its width at front of eyes. Eye small, elevated, hind edge midway in head; diameter  $2\frac{1}{8}$  in snout,  $3\frac{3}{8}$  to  $4\frac{1}{8}$  in interorbital. Mouth moderately wide, terminally inferior. Lips thick, fleshy, with striate papillæ, which also extend over most of lower jaw or mandible. Teeth with entire edges, median groove well defined above and below. Nostrils lateral in oval cutaneous sac, outer slit much the larger; falls just before last fourth in snout profile. Interorbital widely convex.

Gill-opening 4 to  $4\frac{1}{4}$  in head. Line of lateral mucous system encircles eyes, then follows along upper side of back well above pectoral back to middle of caudal base; branch below nasal sac, another above pectoral origin upward and finally one from junction behind eye downward. Predorsal, interorbital, postorbital, breast and abdomen with prickles, slightly larger on abdomen, variably more or less meeting behind depressed pectoral.

Dorsal begins a little nearer caudal base than pectoral origin, rounded or median rays longest; fourth ray  $2\frac{1}{8}$  to  $2\frac{1}{2}$  in head. Anal similar and opposite dorsal; fourth ray 2 to  $2\frac{1}{10}$  in head. Caudal convex behind,  $1\frac{1}{8}$  to  $1\frac{1}{4}$  in head. Pectoral broad, hind edge convex, reaches  $\frac{2}{3}$  to  $\frac{1}{2}$  to anal, 2 to  $2\frac{1}{2}$  in head.

Color in alcohol dark neutral-gray on back, below whitish. Blackish blotch opposite hind half of depressed pectoral and another at dorsal base both with line of pale to whitish boundary. Four or 5 similar pale lines cross back, often broken or variably incomplete. Fins pale, often dark spot at pectoral base. Iris pale slaty.

Length 116 to 143 mm.

Eleven from Ningkwo.

A very interesting species, quite strikingly marked and not rare in China and Japan. Not previously reported from Chinese fresh-waters.



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