

Fig. 1. *Nemacheilus nicholsi*. Pak Jong, Eastern Siam

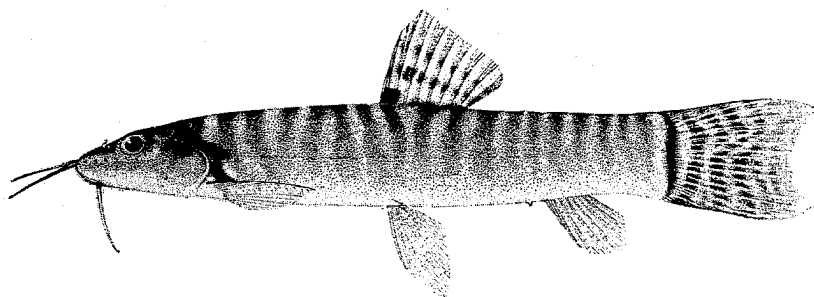


Fig. 2. *Nemacheilus kohchangensis*. Koh Chang, Gulf of Siam

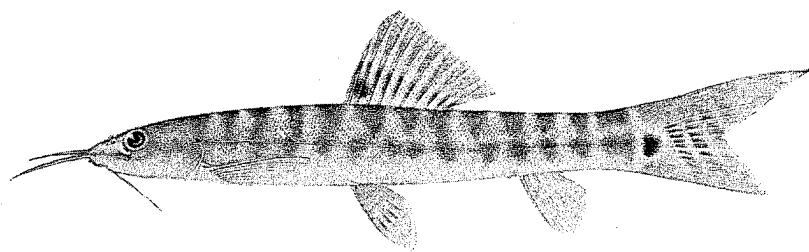


Fig. 3. *Nemacheilus masyae*. Nakon Sritamarat, Peninsular Siam

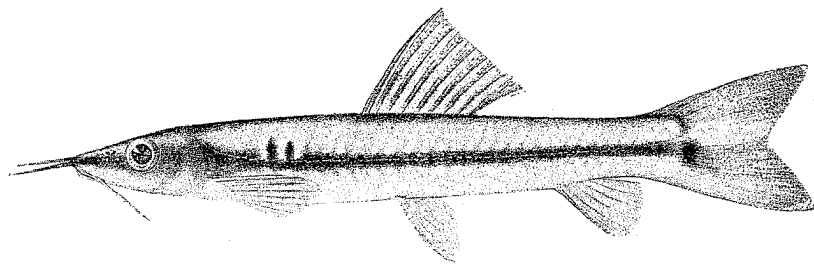


Fig. 4. *Nemacheilus binotatus*. Mekhan, Northern Siam

NEW SPECIES OF SIAMESE LOACHES

From drawings by Luang Masya Chitrakarn

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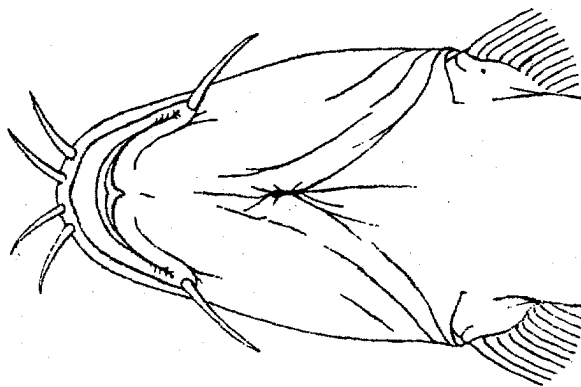
CONTRIBUTIONS TO THE ICHTHYOLOGY OF SIAM.

By HUGH M. SMITH.

II. NEW SPECIES OF LOACHES OF THE GENUS NEMACHEILUS.

Nemacheilus nicholsi, new species. (Plate 1, fig. 1.)

Description.—Form comparatively stout, body slightly compressed posteriorly, nearly cylindrical anteriorly; depth 5.25 in standard length, greatest width of body more than .8 depth, least depth of caudal peduncle .75 depth of body and equal to its own length; head moderately depressed, its length greater than depth of body and contained 4.2 times in standard length, greatest depth of head equal to its length less snout; eye invisible from below, rather nearer to tip of snout than to posterior margin of head, its diameter



Text fig. 1. *Nemacheilus nicholsi*. Under side of head.
Enlarged 6 times.

contained 1.5 in snout and 1 in flat interorbital space; nostrils close together, nearer to eye than to tip of snout, anterior nostril in a short tube which is split to the base in front and when folded back does not reach anterior margin of eye; mouth small, placed close behind tip of snout, lips thick, smooth except for weak crenulations at angles, and continuous around corners of mouth, lower lip with a median sulcus, posterior angle of lips under nostrils; barbels short and slender, inner rostral pair not reaching corner of mouth, outer

pair longer and not reaching eye, maxillary pair longest and slightly greater than diameter of eye; scales very small, not imbricated, imbedded; lateral line complete to a point over anterior part of anal, practically deficient posteriorly.

(Fins: Dorsal rays iii,8, origin of fin slightly in advance of ventrals, somewhat nearer base of caudal than to tip of snout, longest rays much less than depth of body; caudal slightly emarginate, shorter than head, lobes bluntly pointed; anal rays ii,5, longest ray not quite as high as dorsal, origin of fin midway between base of ventrals and base of caudal; ventrals shorter than pectorals, reaching ventral aperture; pectorals shorter than head.

Coloration (in formalin): General color of back and sides light brown; under parts mostly whitish; back and sides with 7 dark brown cross-bands which meet dorsally, the bands broader than interspaces; 2 bands before dorsal, the first separated from head by a narrow light band terminating at upper end of gill opening, 1 band partly in front of and partly under dorsal, 1 band under middle of dorsal, 3 bands posterior to dorsal, the last 2 meeting on median ventral line; a narrow black vertical bar at base of caudal, with an orange band before and behind; top of head from nape to tip of snout finely and distinctly vermiculated or marbled with brown, under side of head like belly; a small round blackish spot on body just behind upper part of gill opening; dorsal with 2 dark spots at base, the anterior spot black and involving the simple rays and the first and second branched rays and first two membranes, the other spot brown and involving fourth and fifth membranes and third to fifth branched rays, the dark spots separated by a bright orange area somewhat smaller than eye; each dorsal ray with elongate blackish mark forming a diffuse band across middle of fin; caudal pale green, unmarked; anal and ventrals with several lines of elongate blackish spots; pectorals plain.

Type.—A specimen 5.0 cm. long taken on May 12, 1925, in a small mountain stream near Pak Jong, circle of Nakon Rajasima, Eastern Siam, by Layang Gaddi, a collector for the United States National Museum.

Remarks.—Only the type specimen of this species is as yet known.

The species is characterized essentially by its rather robust form, rather short barbels, incomplete lateral line, reduced number of dorsal rays, inclusion of the anterior nostrils in a short tube which is split to the base anteriorly, divided lower lip, and peculiar coloration.

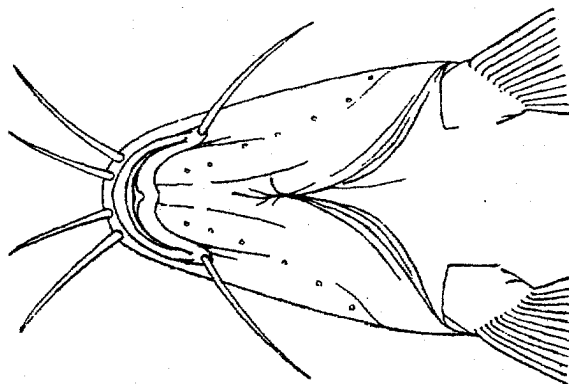
Dr. S. L. Hora, of the Indian Museum, Calcutta, whose acquaintance with the genus *Nemacheilus* is more extensive than that of any other person, has kindly examined this specimen and pointed out its resemblance to *N. cincticauda* (Blyth), from Lower Burma, remarking that the Siamese fish appears to represent a distinct variety of that species. A careful comparison, based on Dr. Hora's very full description and excellent figures of *N. cincticauda*,¹ indicates a number of differences which taken together appear to warrant the separation of the two forms: *N. nicholsi* is a stouter fish, with the depth 5.25 in length, while in *N. cincticauda* the depth is 6.1 to 7 in length; the lateral line in the former extends to a point over anal fin, in the latter it terminates over the pectoral; the inner rostral barbel in *nicholsi* reaches only as far as the nostrils while in *cincticauda* it extends to eye, and the outer barbel, instead of reaching middle of eye, does not extend beyond the nostrils; the lips, which in *cincticauda* are fully crenulated throughout, in *nicholsi* are weakly crenulated only at the angles of the mouth; the dorsal fin, which in *cincticauda* arises slightly posterior to the origin of the ventrals, has its longest rays exceeding depth of body, while in *nicholsi* the dorsal origin is in advance of the ventrals and the longest ray is only .75 the depth of the body; the diffuse dark cross-bands on the body which in *cincticauda* number 9, in *nicholsi* number only 7; and there are various other minor differences.

Named for Mr. John T. Nichols, curator of fishes in the American Museum of Natural History in New York, in appreciation of his extensive contributions to the ichthyology of China in general and of the Cobitidae of that country in particular.

¹ Loaches of the genus *Nemachilus* from Burma. Records of the Indian Museum, vol. XXXI, part IV, 1929.

Nemacheilus kohchangensis, new species. (Plate 1, fig. 2.)

Description.—Body very slightly compressed, elongate, dorsal profile gently and regularly convex from snout to dorsal fin; depth at dorsal origin 5.7 in standard length; caudal peduncle broad, its depth slightly less than its length and equal to snout plus eye; head long, depressed, its length less than 5 times in standard length, its greatest width .75 its length and greater than its depth; mouth lunate, less than half an eye diameter from tip of snout, its width 1.5 times diameter of eye, lower lip slightly crenulated and showing a superficial median division; inner rostral barbels extend to middle of eye, outer rostral barbels reach to posterior margin of eye, maxillary barbels extend beyond eye; nostrils nearer to eye than to tip of



Text fig. 2. *Nemacheilus kohchangensis*. Under side of head.
Enlarged 4 times.

snout, anterior nostril in a tube with a posterior flap which nearly reaches front margin of eye; eyes lateral, invisible from below, much nearer to tip of snout than to gill opening, 4.5 in head, 1.5 in snout, and 2 in the flat interorbital space; body covered with minute imbricated scales; lateral line terminating in advance of anal; top, sides, and under part of head with lines of conspicuous pores.

Fins: Dorsal rays ii,8; origin slightly in advance of origin of ventrals and slightly nearer to base of caudal than to tip of snout, longest ray about equal to depth of body at dorsal origin and contained 1.5 times in length of head; caudal broad, about as long as head, slightly emarginate, lobes pointed; anal rays iii,6; origin of

anal posterior to dorsal a distance nearly equal to length of dorsal base; flexed anal rays not reaching caudal; ventrals somewhat shorter than pectorals, median rays elongated but not reaching anal opening; pectorals shorter than head.

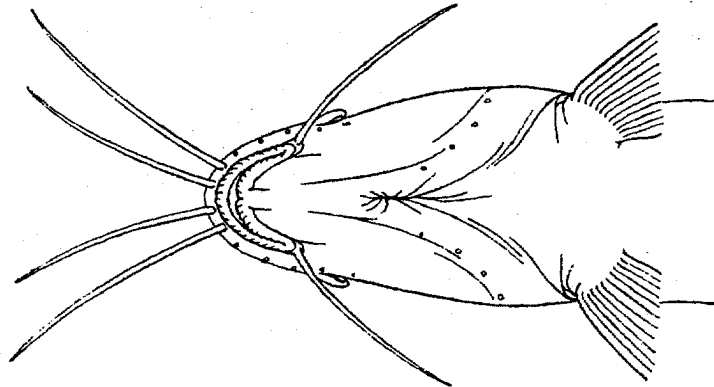
Coloration (in preservative): General color light brown, belly and under side of head whitish; back and sides with 18 or 19 narrow somewhat irregular dark brown cross-bands, the bands of one side meeting or not meeting those of the other side; entire upper surface of head to tip of snout covered with rounded or elongated blackish spots; a diffuse brownish stripe extending under eye to angle of mouth; a diffuse dark brown area on opercle; rostral barbels blackish, maxillary barbels with a black spot on base; a black area at the beginning of the lateral line, and a conspicuous downward extension therefrom into the axil of the pectoral; a vertical, slightly curved black bar across base of the caudal rays, with an orange area behind; dorsal fin pale yellow, with a small, jet-black spot at base of unbranched and first branched dorsal rays and first membrane; several dark brown spots along remainder of dorsal base; a small black spot near middle of second dorsal membrane in line with a series of small brown spots extending across fin, and a second series of such spots across distal part of fin; caudal greenish-yellow, with about 5 irregular transverse rows of brown spots; anal and ventral fins plain; inner surface of pectoral orange at base and outer rays partly dusky.

Type.—The type and only known specimen is 7.0 cm. long over all, 5.7 cm. to base of caudal, and was taken on March 11, 1930, in a waterfall stream on Koh Chang, Gulf of Siam.

Remarks.—This is a rather strongly marked species, bearing some resemblance to *N. nicholsi* and *N. cincticauda*. It obviously belongs in that section of this variable genus of which Blyth's *cincticauda* may be taken as typical, that is, the lateral line is incomplete posteriorly, the dorsal origin is nearer to the base of caudal than to the tip of snout, there is no black ocellus at upper base of caudal, and there is a black vertical bar extending across the caudal peduncle at the caudal fin.

Nemacheilus masyae, new species. (Plate 1, fig. 3.)

Description.—Elongate, slender; body moderately compressed, depth at dorsal origin 7 times in standard length, 9 times in length to tip of upper caudal lobe; caudal peduncle rather slender, its least depth 1.5 times in its length and two-thirds depth of body; head slightly depressed, 5 times in standard length, its depth somewhat less than its greatest width; eye invisible from below, 3.8 in head, less than snout, and equal to the flat interorbital space; mouth small, lunate, very near tip of snout, its width equal to diameter of eye; lips crenulated, lower lip with a median fissure; outer pair of rostral barbels the longer, extending behind eye; inner pair reaching beyond pupil, maxillary barbels less than .5 length of head, extending beyond



Text fig. 3. *Nemacheilus masyae*. Under side of head.
Enlarged about 5 times.

eye; anterior nostril about midway between tip of snout and margin of eye, contained in a tube with a short posterior flap; a conspicuous hook-line process extending backward from preorbital under anterior margin of eye, scales imbricated over most of body, well separated on the predorsal region; lateral line complete.

Fins: The high dorsal fin placed well forward, its origin slightly in advance of ventrals and nearer to tip of snout than to base of caudal by half length of head; dorsal rays ii,9, longest rays nearly equal to head and equal to length of dorsal base; caudal long, deeply forked, the lobes acute, the upper lobe much the longer, its length from mid-base of fin 1.5 times length of head; anal rays ii,5,

origin of fin much nearer to base of caudal than to base of ventrals; ventrals shorter than pectorals, not reaching anal opening, their origin much nearer to pectorals than to anal.

Coloration: General color light brown; back with 14 dark brown saddles which do not extend downward as far as the lateral line and are about as wide as interspaces; a series of dark brown spots of irregular shape, about 14 in number, along the lateral line from head nearly to base of caudal fin; a small round jet black spot at base of caudal rays, this spot in a pale yellow area on caudal peduncle and rays; top of head with a dark brown blotch at nape, another between eyes, and another posterior to nostrils; a brown area on opercle, and dorsal surface of base of rostral barbels brown; all fine pale salmon; a round black spot near base of first branched dorsal ray and on adjacent parts of first and second membranes, a conspicuous line of elongated blackish radial spots extending across the lower half of fin and a dusky band across outer half of dorsal rays; caudal with obscure oblique, narrow, brownish bands; anal and ventrals plain; pectorals with a longitudinal dark brown stripe along anterior half of inner surface.

Type.—A male specimen 6.8 cm. long over all, 5.2 cm. to base of caudal, taken at Ban Ta Yai, in Tadi Stream, Nakon Sritamarat, Peninsular Siam, July 15, 1928.

Remarks.—The essential characters of this species are the comparatively slender form, long barbels, high dorsal fin, long, forked caudal fin with upper lobe much longer than lower, and distinctive pattern of coloration. This combination of features makes species quite distinct from any previously described forms.

There is attached to the preorbital a conspicuous cartilaginous hook which extends backwards and slightly upwards, the tip reaching a vertical from the anterior margin of the pupil. This process, according to Boulenger (in his description of *Nemacheilus brevis*), is borne only by the male.

Tadi Stream, flowing eastward from the high mountains of the Siam-Burmese frontier through the town of Nakon Sritamarat and thence into the Gulf of Siam, is in its upper course a clear, cool

rivulet, with ripples separated by large or small deep, still pools with sandy bottom. Cobitid fishes abound, and at Ban Ta Yai in the early morning of July 15, 1928, a half-grown boy using only his hands collected many specimens in the course of half an hour, including *Acanthopsis* (locally called *plu kluey*), *Lepidocephalus* (called *pla sai*), and a single example of the present fish (called *pla kaw*) which was said by the local people to represent nearly the full size attained.

The species is widely distributed and is represented by numerous specimens, as follows:

Two specimens were taken at Pong Raed waterfall, Kao Sabap, Monthon of Chantabun, Southeastern Siam, on April 26, 1927, by Luang Masya Chitrakarn. One is 8.0 cm. long, and is a female with eggs. The caudal fin, forked for two-thirds of its length, is 1.5 times the length of the head, and the sharply pointed upper lobe exceeds the length of the pointed lower lobe by twice the diameter of the eye. The other fins are relatively smaller than in the type. There is no process extending backward from the preorbital. The coloration is similar to but paler than that of the type. The second specimen is 5 cm. long.

Two specimens were obtained by Luang Masya Chitrakarn and Nai Chote Suvatti from a ditch near the town of Chantabun July 10, 1928; they are 3.2 and 3.4 cm. in length and the markings are pale.

A single specimen was taken in Klong Thalerng, Ronpibun, Peninsular Siam, in January, 1927, by Mr. R. Havmöller and by him presented to the Department of Fisheries; it is 4.6 cm. long and comparatively pale.

Two other specimens obtained by Mr. Havmöller from a pond in Ronpibun in January, 1927, are 5 cm. long, and show about 19 dorsal blotches and the same number of spots along the side. The dorsal, anal, ventral, and pectoral fins have a fimbriated appearance from the projection of the rays well beyond the membranes, this feature being most marked in the pectorals in which the produced tips of the rays may equal half the diameter of the eye.

The species is named for Luang Masya Chitrakarn, of the Siamese Department of Fisheries, in recognition of his interest and zeal in the study of Siamese fishes and his skill in portraying them with pen and brush.

Nemacheilus binotatus, new species. (Plate 1, fig. 4.)

Description.—Form long, slender, dorsal and ventral profiles similar; body slightly compressed anteriorly, much compressed on caudal peduncle; depth at origin of dorsal fin 7 in standard length; least depth of caudal peduncle 1.3 in its length and equal to post-orbital part of head; head long, conical, its length 4.25 in standard length, its greatest depth equal to its width and about .5 its length; snout long, bluntly pointed, 2.6 in head, overhanging the small, lunate mouth with crenulated lips; outer rostral barbels extending beyond eye, inner rostral barbels reaching front margin of eye, maxillary barbels extending beyond eye; eye large, in mid-length of head, 4.5 in head, in 1.5 is snout, interorbital space nearly flat, as wide as eye; nostrils close together, without tube or flap, nearer to eye than to tip of snout; scales minute, closely imbricated; lateral line complete but becoming less distinct posteriorly.

Fins: Dorsal fin comparatively high; dorsal rays iii,8; longest rays less than length of head and 1.5 times depth of body; margin of fin straight; origin of dorsal well in advance of ventrals and much nearer to tip of snout than to base of caudal; caudal as long as head, forked for about one-third its length, the lobes acute; anal rays ii,5, much shorter than dorsal, origin of fin much nearer to mid-caudal base than to base of ventrals, when depressed barely reaching base of short rays of lower caudal lobe; ventrals much shorter than pectorals, inserted under third dorsal membrane, much nearer to anal than to base of pectorals and extending .6 of distance to anal; pectorals shorter than head, their bases separated by a space equal to diameter of eye.

Coloration (in life): General color light yellowish-green, with a sharply defined black stripe narrower than diameter of eye extending from head to base of caudal; over distal half of pectoral fin the

black lateral stripe sends dorsally 2 short vertical bars which extend about half way to median line of back, are separated by a space less than .5 diameter of eye, and occupy a bright yellow area about 1.5 times diameter of eye; posterior to the two lateral bars the black lateral band is joined by 24 or 25 narrow, dark, indistinct parallel stripes which above the band extend upward and backward and below the band downward and backward; median part of back from head to caudal blackish, a narrow curved black line extending along upper base of caudal fin; a broad diffused black area extends from gill opening to eye, and this is continued as a narrow, well defined stripe from eye to tip of snout, the stripes of the two sides meeting and extending on the dorsal surface of the 4 rostral barbels which otherwise are pale yellow; top of snout between the black stripes orange; dorsal surface of head with median blackish areas; belly and lower half of head white; dorsal hyaline, the rays greenish, dusted with black on their basal half; caudal dusky green, a large round black spot on base of central rays, and a pale yellowish area extending from base of fin above the black spot to posterior margin of fin; anal and ventrals hyaline; pectorals pale yellowish-green.

Type and cotype.—The type, 5.2 cm. long over all, 4.2 cm. to base of caudal, was taken in the Mekhan, a tributary of the Meping, at a point southwest of Doi Sutep, Northern Siam, February 7, 1932. A second specimen 4.5 cm. long over all and agreeing with the type in all respects was taken at the same place and time.

Remarks.—In form and pattern of coloration this fish appears to be quite different from any described species of *Nemacheilus*. Dr. S. L. Hora, of the Indian Museum, Calcutta, has kindly suggested its resemblance to a species, *N. monilis*, described by him from the Nilgiri Hills, India, in having the black lateral band; in *monilis*, however, as its name implies, the band is made up of a series of connected spots, there are other marked color differences, the head is less pointed, the dorsal origin is nearer to base of caudal than to tip of snout, etc.

III.

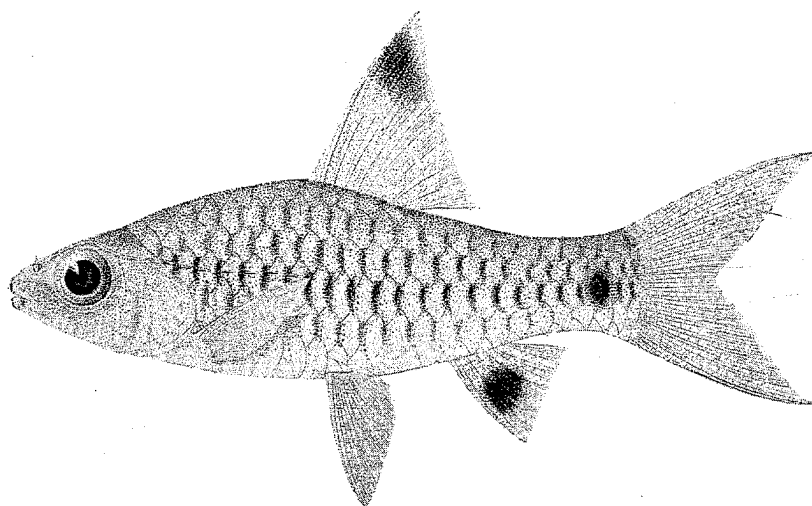


Fig. 1. *Oreichthys parvus*, new genus and species. Kao Sabap, Southeastern Siam

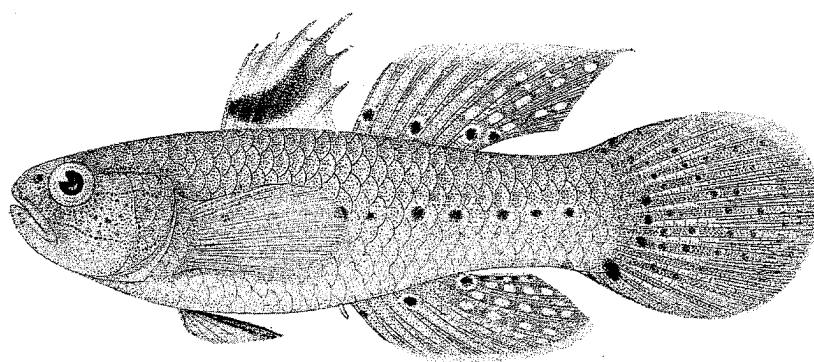


Fig. 2. *Vaimosa spilopleura*, new species. Chantabun, Southeastern Siam

NEW SIAMESE FISHES

From drawings by Luang Masya Chitrakarn

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III. A NEW GENUS AND NEW SPECIES OF CYPRINOID FISHES.

Oreichthys, new genus (Cyprinidae).

Size small; similar to *Cyclocheilichthys*, but with the fourth spinous dorsal ray non-osseous and non-denticulated, the origin of the dorsal fin well in advance of the ventral base, the scales very large, and the lateral-line tubes simple and confined to a few scales (6 or 7) anteriorly. The mouth is terminal, slightly oblique, the lips are smooth, the post-labial groove is continuous. There are no barbels. The anterior nostril is in a tube, with the posterior nostril at its base. The head is conspicuously marked by numerous fine lines of pores, mostly parallel in groups, on opercles, cheeks, snout, and interorbital space. The scales are firm, with numerous fine circuli and a few radiating striae; the number of scales in lateral-line series is 23 and in transverse series 7, being much fewer than in any known species of *Cyclocheilichthys*. All fins are well developed.

This genus has the general appearance of *Cyclocheilichthys*, and may be regarded as a degenerate form of that genus. The large fins suggest its adaptation for a free-swimming existence in mountain streams.

(*Oreichthys*, mountain fish.)

Oreichthys parvus, new species. (Plate 2, fig. 1.)

Description.—Moderately elongate, body strongly compressed, back elevated; depth 3.2 times in standard length, somewhat greater than length of head; least depth of caudal peduncle 1.5 times in its length and 2 times in head; head rather pointed, 3.4 times in standard length; snout less than eye, 4.5 times in head; eye large, 3.25 times in head, its diameter greater than the flat interorbital space; nostrils close together, midway between eye and tip of snout, anterior nostril in a short tube; mouth small, terminal, strongly arched, somewhat oblique, jaws not extending backward as far as front of eye; gill membranes joined to isthmus at a point opposite posterior border of preopercle; scales large, firm, non-deciduous, and not closely imbricated, a large part of each scale being exposed; scales in lateral line 23, including smaller scales at base of caudal; scales in transverse series 7; scales before dorsal 8; scales around narrowest part of

caudal peduncle 10; tubes of the lateral line long, straight, simple, and confined to the first 7 scales; head thickly beset with groups of fine parallel lines of pores, a series of about 13 vertical lines below eye and extending on snout, a series of 5 or 6 short horizontal lines posterior to eye, about 4 curved vertical lines on the opercle, 4 or 5 short lines across subopercle, about 5 lines across anterior part of interorbital space; tubes of lateral line continued forward as a low ridge above eye; very minute lines of pores extending vertically downward from lateral-line scales of anterior half of body.

Fins: All fins comparatively large; dorsal high, its origin over 7th scale of lateral line, well in advance of ventral base and much nearer to tip of snout than to base of caudal; dorsal formula iv, 8, the fourth spine slender, smooth, its length equal to depth of body and somewhat exceeding length of head; margin of fin nearly straight, the rays gradually decreasing in length, length of last ray about one-third that of first branched ray; caudal longer than head, broad, deeply emarginate, the central rays one-third the length of the outer, the lobes pointed; anal rays iii, 5, origin of fin under 13th scale of lateral line, length of first branched ray somewhat more than .5 that of first branched dorsal ray, the margin of fin straight; ventral origin under 8th scale of lateral line, length of fin equal to head less snout, somewhat longer than pectoral and reaching to first branched anal ray; pectorals pointed, 1.5 times in length of head, reaching nearly to ventral.

Coloration: General color of head and body pale greenish-yellow, each scale of the back and side with a terminal black vertical bar, the spots forming horizontal and oblique lines, the spots most intense along the lateral line; a large black rounded spot smaller than eye on caudal peduncle near base of caudal; nape brown; all fins hyaline; dorsal fin with a somewhat diffuse black spot larger than eye on the distal part of the anterior rays, the spot involving the fourth simple ray and the first three branched rays with membranes; anal with a round, well-defined black spot smaller than eye on the median part of the first three branched rays and first four membranes.

Type, cotypes, and additional specimens.—The type is 3 cm. long, taken at Ban Ang in a small mountain brook on Kao Sabap, an isolated peak in Southeast Siam, December 5, 1927, and there are 22 cotypes ranging in size from 2.5 to 3.1 cm. A single specimen 3 cm. long was taken in the same stream at Nong Or on November 2, 1927, and 2 specimens 3.4 cm. long at Ban Ang on January 12, 1929. The collections were made by Luang Masya Chitrakarn, of the Siamese Department of Fisheries.

Remarks.—There is individual variation in minor points: the tube-bearing scales of the lateral line may number 6 or 7, the black area at the tip of the dorsal fin may be intense or diffuse, and the black spot on the anal fin may involve slightly more or less of the fin than in the type.

The maximum size attained by this fish is not known. The local people say it gets little or no larger than the type. The possibility that larger examples than those in hand would show an ossified, denticulated fourth dorsal spine has been considered. As bearing on this point it may be noted that in several local species of *Cyclocheilichthys* the spine is fully ossified and denticulated in individuals only slightly larger than *Oreichthys*.

IV. A NEW GOBY OF THE GENUS VAIMOSA.

Vaimosa spilopleura, new species. (Plate 2, fig. 2.)

Description.—Moderately elongate; body much compressed, its depth 3.4 in standard length; caudal peduncle broad, its depth 1.5 in its length and in head; head moderately compressed, its length 3.3 in standard length, its greatest breadth 1.5 in its length; snout broad, rounded, blunt, less than eye; eye in anterior half of head, 3.5 in length of head; interorbital broad, nearly flat, its bony part 1.5 times diameter of eye; mouth very oblique, the jaws extending backward to a point under anterior part of pupil; tubular anterior nostril extending over upper lip; teeth small, pluriserial in both jaws, those of outer and inner rows of lower jaw enlarged; tongue slightly emarginate; scales ctenoid, large and of uniform size over entire body, 28 or 29 in lateral series (excluding several on base of caudal rays), 9 in transverse series between origins of second dorsal and anal, 12 around caudal peduncle, 8 in front of dorsal, scales on top of head extending forward to a point opposite anterior part of eyes; opercle covered with large, thin scales; several rows of mucous pores on side of head, many lines of pores radiating from eye, a deep poral furrow on each side above nostrils and anterior part of eye, a large pore at each side of the enlarged anterior supraorbital scale; anal papilla long and slender.

Fins: All fins well developed; dorsal formula VI-I,8, the two fins separated by a space equal to .5 diameter of eye; dorsal spines long, third and fourth longest, fourth nearly as long as head and when depressed reaching third branched ray of second dorsal; branched dorsal rays becoming successively longer to the sixth, which is produced, much longer than head, and when depressed extending on caudal; caudal broad, rounded, longer than head; anal I,8, similar to second dorsal but smaller, origin directly under that of second dorsal, the longest rays when depressed barely reaching caudal; ventrals pointed, not reaching anal papilla, their length 1.4 in head, frenum thick and extending about .25 length of fin; pectorals broadly rounded, as long as head and reaching to opposite origins of second dorsal and anal.

Coloration (in life): General color of body and head dull green, scales of back with darker center; belly light green to whitish, slightly reddish in advance of ventral base; a series of 9 small, round, purplish-black spots in a straight line between axil of pectoral and base of caudal, the spots unequally spaced, somewhat variable in size, and surrounded by pale area; a few very faint dark spots on side above and below the regular series; a small black spot on lower edge of the caudal peduncle; opercles and cheeks with numerous small, roundish dark spots; under side of head bluish-green; first dorsal fin with a large black blotch extending across its middle from its anterior margin to the tips of the 3rd and 4th spines, base of fin light green, distal part pure white, with a dull green margin; second dorsal rich olive green, its margin pale, a basal series of 4 round black spots each surrounded by a narrow whitish ring, one spot on first membrane, one on fourth membrane, and two spots on seventh and eighth membranes; distal part of fifth to last membranes with elongate, dark-edged white spots, numbering one to five on each membrane; caudal membranes green, rays purplish-green, with numerous small, round black spots like those on side, spots smallest distally and tending to form transverse lines, a large irregular black spot on lower part of caudal base; anal similar to second dorsal, with 3 round, black, light-edged spots at base of first, fourth, and eighth membranes, sixth to last membranes distally with elliptical white spots which on last membrane are separated by black blotches; narrow, sharply-defined margin of fin white; ventrals conspicuously marked, with central part black, lateral parts bright orange-red, becoming whitish on edges, frenum translucent mauve; pectoral membranes greenish, rays pale purplish.

Type.—The type is a male, 6.3 cm. long, taken June 25, 1931, in the estuary of the Chantabun River, Southeastern Siam.

Remarks.—This fish is fairly common in the Menam Chao Phya at Bangkok; in the lower Bangpakong River; and in the estuary of the Chantabun River; it is known also from the Tachin River, in the vicinity of Tachalom. The collection of the Department of Fisheries contains 22 specimens from six different localities.

It shares with other gobies the vernacular name of *pla bu*. It is adapted for both fresh and brackish water, but attains its largest size and greatest development of color in specimens from the brackish water of the estuary of the Chantabun River. Examples taken in Bangkok lived and thrived for several months in a small jar of fresh water, and increased much in size on a diet consisting largely of mosquito larvae.

This strikingly marked species is easily recognizable from the general green color of the body and the lateral series of black spots. There is some variation in color in specimens of different sizes, but so far as the collection goes fishes of all sizes (down to 2.5 cm. in length, the smallest obtained) show the line of lateral spots, the number of which may be 8 to 10, and the large black spot on the lower side of the base of the caudal fin.

A series of 7 specimens collected in July, 1931, in the estuary of the Chantabun River had the following total lengths: 6.7, 6.5, 5.3, 4.7, 4.7, 4.6, and 4.6 cm. The two fish 4.7 cm. long were adult females, easily distinguished by the short, broad anal papilla, the absence of the central black area on the ventral fins, and less development of the dorsal and anal fins than in the males. The body and general fin colors of these females were practically the same as in the males.

In specimens, apparently of both sexes, 2.5 to 3.5 cm. long, from the Chao Phya and Bangpakong rivers, the dorsal fin shows at its base a large black blotch which may extend on the back, the caudal has small black spots on its basal half, and second dorsal and anal fins have the basal black spots but these are non-ocellated and there is little or no development of the white spots on the membranes. In some of the specimens the lower jaw projects slightly, while in the adults the jaws are always equal.

Remarks on the Genus Vaimosa.—This species falls within the genus *Vaimosa* established by Jordan and Seale in 1906 (Fishes of Samoa). Within rather narrow limits the genus is variable as to certain features (teeth, tongue, degree of squamation of opercle and top of head), but the essential characters are: Rather large

ctenoid scales covering body, presence of large scales on opercle, absence of scales on preopercle, presence of scales on nape at least as far forward as eyes; small, pluriserial teeth in both jaws, with some of the teeth in some species enlarged but never canine; 6 to 9 branched rays in the second dorsal and 6 to 8 branched rays in the anal; gill openings rather restricted, isthmus broad.

Some confusion regarding the genus has arisen from an unfortunate contradiction in the original description of the genus and type species. The authors say: "This genus differs from *Gnatholepis* and *Rhinogobius* in having the cheeks naked and the opercles covered with large scales," but in the description of *fontinalis*, the type, they say: "No scales on cheeks or opercles." In a letter from Dr. David Starr Jordan dated April 24, 1925, he stated: "I decided at one time that *Vaimosa* was not distinct from *Mugilogobius* of Japan. Later study convinces me I was mistaken. In the description of *Vaimosa fontinalis*, the statement 'no scales on cheeks and opercles' is a slip. There are no scales on the cheeks and large scales on the opercles, as is stated in the generic account and as the figure plainly shows." This confusion was further complicated by Koumans in 1931 (A Preliminary Revision of the Genera of the Gobioid Fishes with United Ventral Fins) when, in his generic diagnosis of *Vaimosa*, he says: "Operculum with large scales?" and, following the statement that he has seen *Vaimosa fontinalis*, the type of the genus, he asserts: "In the species I have seen, preoperculum and operculum both were naked."

V. A NEW GENUS AND NEW SPECIES OF GLYPTOSTERNOID CATFISHES.

Oreoglanis, new genus (Sisoridae).

Elongate; head and anterior part of body greatly depressed; no thoracic adhesive apparatus; mouth well behind tip of snout with broad, thin lips; groove behind lower lip uninterrupted; teeth in upper jaw pointed, forming a broad band with rounded ends and a slight median incision on anterior edge; anterior teeth in lower jaw long, with slender base and expanded end which is truncate and slightly hollowed on inner surface; posterior teeth in lower jaw like those in upper jaw; eyes minute; 4 mandibular and 2 maxillary barbels; each pair of nostrils with a long barbel; gill openings narrow, restricted to upper side of body and not extending to base of pectoral spine; skin smooth and loose; lateral line complete; dorsal fin without on osseous spine; adipose dorsal long and low; first ray of paired fins enlarged, with the under surface striated to form an adhesive apparatus.

Genotype.—*Oreoglanis siamensis*, new species.

(*Oreoglanis*, mountain catfish.)

This genus has points of resemblance to all the genera which have been formed out of the composite genus Glyptosternon. The splitting up has been based primarily on differences in dentition, with the nature of the postlabial groove of the lower jaw, the extent of the branchial aperture, and the development of the pectoral fins figuring as subordinate characters.

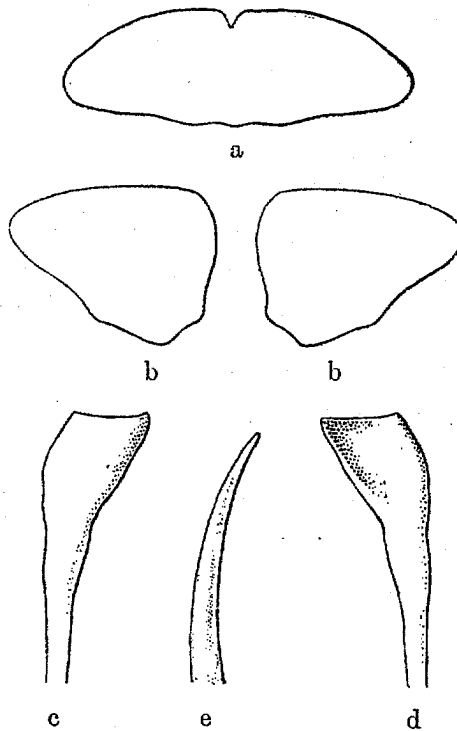
If, as assumed by Regan, Norman, and others, the hereinafter noted differences in dentition among the fishes of this group are sufficient to warrant their separation into distinct genera, then *Oreoglanis* is entitled to rank coordinate with Glyptosternon (*Parexostoma*), *Euchiloglanis*, *Glaridoglanis*, and *Exostoma*. While it has features (extent of branchial aperture, extent of postlabial groove, etc.) which are shared by one or more of those genera, in the shape of its teeth and teeth-bands it agrees with none of them. The interrelationships of these genera may be seen from the following synoptical key:

KEY TO THE GENERA OF GLYPTOSTERNOID CATFISHES.

- A. All teeth in both jaws pointed.
- a. Teeth of upper jaw forming a transverse band which is produced backwards at the sides; postlabial groove of lower jaw broadly interrupted; pectorals with 11 branched rays; gill openings wide and extending to lower surface of body. Kashmir, Turkestan, Tibet..... GLYPTOSTERNON McClelland (PAREXOSTOMA Regan).
 - aa. Teeth of upper jaw forming a band which is not produced backwards at the sides; postlabial fold of lower jaw continuous or interrupted; pectorals with 13 to 19 branched rays; gill openings narrow and restricted to upper surface of body. India, Burma, China, Tonkin..... EUCHILOGLANIS Regan.
- AA. All teeth in both jaws not pointed.
- a. Postlabial groove of lower jaw broadly interrupted. Teeth in both jaws greatly compressed, with broad truncate, emarginate, or notched apices; teeth in upper jaw forming a single broad transverse band; branched pectoral rays 10 or 11. Yunnan..... GLAREDOGLANIS Norman.
 - aa. Postlabial groove of lower jaw continuous.
 - b. Teeth in both jaws oar-shaped, flattened distally, depressed and directed backwards; teeth in each jaw in two well-separated patches; branched pectoral rays 10 to 12. Burma.... EXOSTOMA Blyth.
 - bb. Teeth in upper jaw straight, sharp, in broad elliptical band; teeth in lower jaw of two distinct types, the posterior like those in upper jaw, the anterior much larger, the base slender, the free end expanded into a truncate-spatulate shape with inner surface slightly hollowed; teeth in lower jaw in two well-separated patches; branched pectoral rays 17 or 18. Siam..... OREOGLANIS Smith.

Oreoglanis siamensis, new species. (Plate 3, figs. 1 and 2.)

Description.—Elongate, slender, head and anterior part of body depressed, posterior part of body compressed; depth at origin of dorsal fin 8.4 times in standard length, 9.75 in length with caudal; least depth of caudal peduncle 2.5 times in its length to mid-caudal base; head above evenly rounded from side to side, 4.5 in standard



Text fig. 4. Dentition of *Oreoglanis siamensis*.

a Outline of tooth band of upper jaw (enlarged 9 times). *bb* Outlines of tooth patches of lower jaw (enlarged 9 times). *cd* Outer and inner surfaces of a typical anterior tooth of lower jaw (enlarged 30 times). *e* Typical tooth of upper jaw and of posterior part of patches of lower jaw (enlarged 90 times).

length, its width equal to its length posterior to nostrils, greatest depth less than .5 its length; eyes minute, subcutaneous, in posterior half of head, on dorsal profile, interorbital width 4 in length of head; snout .6 length of head; nasal barbels long, slender, not reaching eye; mandibular barbels short, subequal, less than .5 length of nasal barbels, base of inner pair covered by lip, maxillary barbels not

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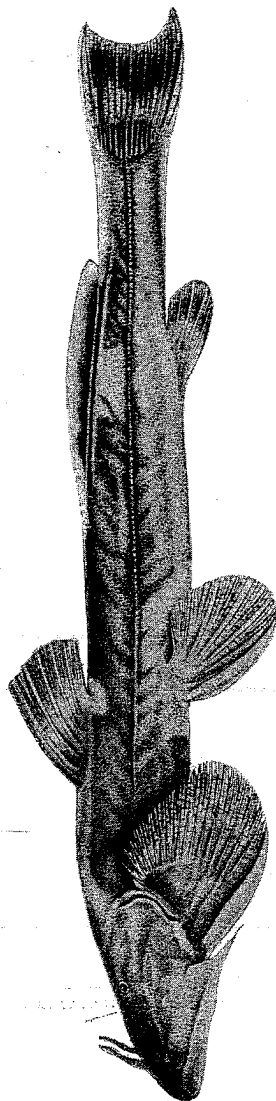


Fig. 1. Lateral view of type. 1.5 times natural size.

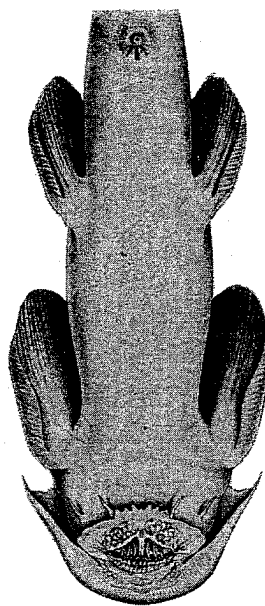


Fig. 2. View of under side of head and body. 1.5 times natural size.

OREOGLANIS SIAMENSIS, new genus and new species.

reaching gill openings but extending to base of first pectoral ray; mouth rather small, its width less than one-third length of head; lips broad, thin, feebly papillated, posterior margin of lower lip fringed, fold of lower lip uninterrupted; teeth in upper jaw long, pointed, in a broad elliptical band, which has a median incision on anterior margin; posterior teeth in lower jaw like those in upper jaw, anterior teeth in lower jaw truncate-spatulate, with the inner surface slightly hollowed, teeth of lower jaw in two well separated patches of roughly triangular shape; gill openings extending to middle of base of pectoral fin.

Fins: Dorsal rays i,6, origin of fin midway between upper end of branchial opening and base of ventral fins; height of fin greater than depth of body and equal to preorbital part of head; adipose fin long and low, its base nearly 3 times as long as base of rayed fin and equal to distance between origin of the two fins, its distance from mid-caudal base 1.5 times depth of caudal peduncle; caudal as long as postnarial length of head, margin lunate, lobes pointed, lower lobe somewhat the longer; anal rays i,4, origin of fin under midbase of adipose dorsal; ventral rays i,5, not quite reaching vent, origin of fin slightly in advance of posterior end of dorsal base; pectoral rays i,18, fin shorter than head, extending beyond origin of dorsal and .8 distance from its anterior base to ventrals; pectoral interradiation membranes deficient distally, the rays projecting and giving a fringed appearance to edge of fin.

Coloration (in life): Back and top of head rich brown, with irregular darker and lighter areas; a pale elliptical spot on each side of dorsal fin posteriorly; under side pale salmon-yellow; dorsal pale, with a dull brown band at base and another at margin; adipose dorsal with a brown base and pale edge; caudal with a subterminal dark brown band and another at base; anal faintly banded with brown; ventrals and pectorals brown above, pale yellow below.

Type and topotype.—The type is 9.9 cm. long and was taken in the Kang River, near the base of Doi Angka, Northern Siam, December 3, 1928. A second specimen of same size, taken at same place and date, is similar to the type but shows slight color differences.

Remarks.—This species is known only from the Mekang, a swift, clear, cold stream on Doi Angka, the highest mountain in Siam. The two specimens collected were taken by a Karen with a cast net, in company with small serpentheads (*Ophicephalus gachua*). The topotype, which has been deposited in the Indian Museum, showed in life a pale yellow round spot on the back in front of the dorsal and an elliptical spot of the same color on either side of the dorsal fin posteriorly, and the adipose fin was whitish throughout.

Dr. S. L. Hora, of the Indian Museum, Calcutta, has kindly examined the specimens and compared them with related Indian species. He also had the accompanying drawings made by an artist at the Indian Museum. Dr. Hora's cooperation has been invaluable.

VI. FISHES NOT PREVIOUSLY RECORDED FROM SIAM.

CATFISHES.

Wallago miostoma Vaillant. This large catfish has heretofore been recorded only from rivers of Sumatra and Borneo. It frequents the large rivers of Central Siam, and is well known to the fishermen who give it names that are borne by no other species, namely, *pla tuk*, perhaps also *ituk* or *itok*, (*tuk*, said in allusion to its somber color), *pla itub* (*itub*, to beat, of no obvious application, but perhaps referring to the splash made by the fish when it strikes the surface of the water after having leaped out in its pursuit of small fish), and *pla khao dam* (black *khao*, to distinguish it from *Wallago attu* which is called *pla khao*). It is not a very common fish. A few reach the Bangkok market from Lopburi, and two specimens in the collection of the Department of Fisheries 23 and 26 cm. long came from the Lopburi River in November, 1924. The largest fish have been observed in the neighborhood of Paknampo, where, on January 6, 1924, a specimen 75.5 cm. long was collected and a fish 88.0 cm. was examined. It was reported in 1924 that during the months of December and January five or six fish might be taken to the Paknampo market daily, being caught in seines operated in the deeper parts of the river. At Paknampo fish 1 meter long and weighing 50 kilograms are known. Weber and Beaufort¹ say: "Length about 450 mm."

Kryptopterus apogon (Bleeker) and **Kryptopterus limpok** (Bleeker). Of the numerous species of *Kryptopterus* occurring in Siam, all bearing the vernacular name of *pla nua on*, two forms inhabiting Sumatra have not been previously recorded. *K. apogon* is a rather common fish in various parts of the Menam Chao Phya and connected streams, and *K. limpok* has been found in the Pasak River at Dha Luang (August 20, 1923) and in the Menam Chao Phya at Bang Sorn, Bangkok (September 12, 1924).

Gymnothorax dorsalis Vinciguerra. In 1890 Dr. Vinciguerra described as a new species *Gymnothorax dorsalis*, based on a single specimen, 75 mm. long, from Meetan, Tenasserim, which is southeast

¹ Indo-Australian Fishes, II, 202.

of Moulmein and very close to the Siamese frontier. The fish is known also from the headwaters of the Irrawadi River and the Manipur Valley is Assam. Among a collection of fishes obtained by Mr. R. Havmøller, during October to December, 1929, in Klong Sok, a tributary of the Tapi River at Ban Sok, in the changwad of Bandon, Peninsular Siam, and by him presented to the Siamese Department of Fisheries, was a fine specimen of a *Glytothorax* which is closer to *dorsalis* than to any other described species and is provisionally thus identified. The specimen was courteously examined by Dr. Sunder Lal Hora of the Indian Museum, Calcutta, and its similarity to *dorsalis* was pointed out by him. It is 9.6 cm. long, and in general appearance agrees with Vinciguerra's description and figure. The thoracic adhesive apparatus is longer than wide, and the pectoral and ventral rays are not plaited. The entire back and sides and the top of the head are thickly covered with small round or elliptical flattened tubercles of several sizes which are most conspicuous on the back and head. Extending forward from the adipose dorsal fin is a low keel which does not reach the rayed dorsal and is divided into six sections of equal length. The occipital process is about three times as long as broad and does not quite reach the inter-spinous bone of the dorsal. The maxillary barbels extend on to the base of the pectoral spine. The vent is nearer to origin of pectoral spine than to base of caudal. The caudal peduncle is long and slender, its least depth about one-third its length. Dorsal rays I,5, the longest not exceeding depth of body; adipose dorsal separated from the rayed dorsal by a space twice the length of the base of the former; caudal longer than head, deeply forked, the lobes pointed; anal rays iii,9, the two final rays being joined at their base and counted as one; ventrals inserted under last dorsal ray, short, extending beyond vent but not reaching anal, their length equal to snout and eye; pectorals shorter than head and not reaching to ventrals, the radial formula being I,10. General color rich reddish brown, yellowish-white below; dorsal, anal, ventral, and pectoral fins black at base, black or blackish distally, with a light intervening transverse band which is orange in life; tip of pectorals white; caudal brown,

tips blackish with a narrow white edge. The chief point of dissimilarity from the published descriptions of *G. dorsalis* is that the dermal tubercles are not arranged in regular longitudinal rows or lines but are disposed promiscuously and cover the body and head uniformly.

Silurodes hypophthalmus (Bleeker). Fresh waters of Borneo, Java, and Sumatra are the only previously assigned habitat of this catfish. Its range, however, extends to the mainland of Asia, as shown by Siamese specimens in the Department of Fisheries as follows: Pattani River, Peninsular Siam, October 15, 1923; Tale Noi, Peninsular Siam, July 6, 1929, where it is a common fish; and Pasak River, Central Siam, February 26, 1925. The length of the largest local specimen is 17.5 cm., but in the Dutch islands it attains a length of 30 cm.

Silurichthys phaiosoma (Bleeker). Heretofore known from rivers of Borneo, Sumatra, Singapore, and Malacca, this species is entitled to a place in the fauna of Siam from having been found in the Chantabun River, Southeastern Siam, where Luang Masya Chitrakarn took 5 specimens, the largest 7.0 cm. long, on February 7, 1927. The local name is *pla chu-on hin*.

LOACHES AND HOMALOPTERIDS.

Eucirrichthys doriae Perugia. This diminutive eel-like loach has heretofore been recorded only from Sarawak, Borneo. It was first met with in Siam in a ditch near Chantabun, July 10, 1925, when a single specimen 33 mm. was collected by Luang Masya Chitrakarn and Nai Chote Suvatti. In 1932 the fish was found to be very common in Bung Borapet, Central Siam, by Nai Boon Chuay, who collected specimens in September and sent them alive to Bangkok where (to May 1, 1933) they have lived and thrived in a small jar of still water, apparently subsisting on minute plants growing on the gravel which covers the bottom of the jar. The fish is common in the Meping at Chiengmai, and specimens were collected there in December, 1932. These widely separated localities indicate a general distribution, but the fish is easily overlooked on account of its small size and secretive habits. When placed in an aquarium jar with the bottom covered with sand and gravel the fish quickly disappear.

completely concealing themselves and remaining for long periods without moving. If disturbed, they swim on or near the bottom for a few seconds with extremely rapid eel-like movements and then hide again. Fish viewed through the side of the jar have at times exhibited very rapid respiratory movements which caused the whole head to quiver or vibrate. When the fish are resting quietly, respiration is often suspended for 5 to 10 seconds, then resumed with 5 to 15 movements, then suspended again. When the fish are at rest, the pectoral fins are motionless, closely applied to the abdomen.

Acanthophtalmus kuhli (Cuvier and Valenciennes). As this little loach inhabits Malacca and Singapore as well as Sumatra, Java, and Borneo, its occurrence in Siam was to be expected, although as yet it is known only from Southeast Siam. It was first collected at Nong Khor, February 11, 1927, by Layang Gaddi, who took 11 specimens 4.8 to 7.5 cm. long. On April 26, 1927, Luang Masya Chitrakarn obtained 2 specimen 5.8 and 7.5 cm. long from a waterfall stream on Kao Sabab; and on January 12, 1929, a single specimen 6.5 cm. long was caught in another stream on the same mountain. The last specimen has its right maxillary barbel bifid. On Kao Sabap the fish is known as *pla prong oy* (sugarcane-joint fish).

Homaloptera modesta (Vinciguerra). Originally described from Burma, this species has now been taken at three widely separated localities in Siam: Ronpibun, Peninsular Siam, January, 1927; waterfall stream on Kao Sabap, Southeastern Siam, April 18, 1930; and Pran River at Pak Thavan, Western Siam, April 1, 1931. All these specimens have been examined and thus identified by Dr. S. I. Hora, of the Indian Museum, Calcutta. It may be noted that the British Museum contains Siamese specimens of *H. zollingeri* Bleeker, including one specimen from the upper Bangpakong River received from the Siamese Museum. A third local species, very common in Tadi Stream, Ban Kiriwong, Nakon Sritamarat, Peninsular Siam, has recently been described by Dr. Hora¹ as *H. smithi* from specimens collected by the writer in July, 1928.

¹ Classification, Bionomics and Evolution of Homalopterid Fishes, Calcutta, 1932.

CYPRINID FISHES.

Scaphiodonichthys burmanicus Vinciguerra. This strongly marked fish, described from Burma in 1890, is rare in collections and does not appear to have been the subject of any published note since Dr. Vinciguerra's very full description, with excellent figure, appeared. Recently, however, the fish has been met with in various mountain streams in northern and northwestern Siam. In April and May, 1931, Layang Gaddi, collecting for the United States National Museum, obtained 9 specimens up to 14.0 cm. long in the Meton, a tributary of the Meping, on Doi Nangka, northeast of Chiangmai, northern Siam. In the Melao, a tributary of the Meping northwest of Chiangmai, 6 specimens were taken with a cast net at an elevation of 725 meters on December 23, 1932. In the Mepai, at Muang Pai, northwestern Siam, 3 specimens were caught on December 27, 1932. Additional specimens were obtained in northwestern Siam from Mekong Noi, a tributary of the Salwin north of Me Hong Sorn, on January 1, 1933; from a rocky brook tributary to the Mepai, below Me Hong Sorn, January 10, 1933; and from a little stream in the Khon Ka Valley, east of Mesarieng, January 19, 1933. The fish is everywhere known as *pla mum*, a name applied to no other species.

Mystacoleucus argenteus (Day). As already suggested by the present writer,¹ Day's *Matsya argentea* is in reality a *Mystacoleucus*, which name antedates *Matsya* by more than twenty years. Day recorded the fish as common in streams in Tenasserim, but no one appears to have recorded it or met with it in the ensuing forty-five years. During a visit to northwestern Siam and adjacent parts of Burma along the Salwin River, from December, 1932, to February, 1933, this fish was frequently seen and numerous specimens were preserved from the following waters, all in the Salwin watershed: Mepai, at Muang Pai, December 27, 1932; Melang, at Bang Mae Pa, December 31, 1932; Me Hong Sorn River at Me Hong Sorn, January 6, 1933; Mepai, at Ban Un, Burma, January 11, 1933; Salwin River, at Ta Ta-fang, Siam, January 17, 1933; and Meyuam, at Mesarieng,

¹ Journal Siam Society, Natural History Supplement, Vol. VIII, No. 3, 1931, p. 185.

January 22 and 23, 1933. The usual local (Lao) name for this fish is *pla ki york*, but at Me Hong Sorn and several other places the name *pla hang leuang* is in use. This species differs from *M. marginatus*, the common Siamese species in waters tributary to the Gulf of Siam, in having no barbels, no black margin to the caudal fin, and a rich reddish-orange color to the dorsal fin (instead of pale greenish-yellow).

Dangila. Numerous species of *Dangila* occur in the fresh waters of Siam, but only one, *D. siamensis* Bleeker, appears to have a published record. The following are represented in the collections of the British Museum and the Siamese Department of Fisheries:

Dangila burmanica Day. Pattani River. Local name, *ikan tubu*.

Dangila kuhli Cuvier and Valenciennes. Menam Chao Phya at Bangkok; Menam Nan; Bung Borapet. Local names, *pla muli luey*, *pla soi nok khao*.

Dangila lineata Sauvage. Tapi River, Peninsular Siam; Chantabun River. Local names, *pla lao tong*, *pla sa*.

Dangila leptocheila Van Hasselt. Menam Chao Phya at Bangkok, Nontaburi, and Ayudhia; Talo Sap (inner lake); Chantabun River; Pattani River (British Museum, recorded as *D. cuvieri* which name appears to be antedated by *leptocheila*). Local name, *pla soi nok khao*.

GOBIES.

Oligolepis moloanus (Herre). Heretofore known only from the Philippine Islands. Eight specimens that agree fairly well with Herre's description and figure of *Aparrius moloanus* were taken in the estuary of the Chantabun River, Southeastern Siam, in July, 1931. They are 5.5 to 6.6 cm. long. Dr. Koumans¹, after having examined the type (*acutipinnis*) of *Aparrius* Jordan & Richardson and the type (*melanostigma*) of *Oligolepis* Bleeker, reaches the conclusion that the two genera are identical.

¹ A Preliminary Revision of the Genera of Gobioid Fishes with United Ventral Fins, 1931.

Macgregorella moroana Seale. This species, previously known only from the Philippine Islands, is represented in the Department of Fisheries collection by 2 specimens, 38 and 48 mm. long, taken in the estuary of the Chantabun River, Southeastern Siam, August 3, 1931. The differences from the type in form and color shown by these specimens may probably be ascribed to intraspecific variation but may possibly represent a local race which may be entitled to subspecific rank. The genus *Macgregorella*, created by Seale in 1909, is described as having the body covered with cycloid scales, a character which is reaffirmed by Herre (*Gobies of the Philippines and the China Sea*, 1927) for the type species (*moroana*) and for a new form (*intonsa*). The specimens in hand, however, show the body from about the middle of anal fin backward to base of caudal to be covered with rather large, strongly developed ctenoid scales, while anteriorly the scales are smaller and cycloid. The predorsal region is completely covered with minute scales which extend to a transverse ridge immediately behind the eyes. The presence of minute embedded scales on the opercles is scarcely appreciable.

The coloration of this species presents sharp contrasts. The yellowish-white color of the body and head is marked by irregular mottlings and spots of dark brown and blackish which are absent on the abdomen, breast, and central part of lower side of head. The body has three very conspicuous broad, irregular cross-bands: One, involving most of the spinous dorsal fin, extends to the back and bends forward on the side behind the pectoral fin; another, extending from the anterior upper part of the soft dorsal obliquely backward and downward to its posterior base, goes obliquely across the body to the anterior part of the caudal peduncle, and continues downward and forward across the anal fin; the third crosses the caudal peduncle some distance anterior to the caudal fin, with its angular band directed forward. The soft dorsal fin has a short oblique band its base anteriorly and a broad band extending obliquely backward from the tip of the fourth ray across distal part of the other rays. The anal has a second bar, parallel with the one already mentioned, across the posterior rays. The caudal is irregularly barred. On the upper

part of the pectoral a sharply defined black band extends from base to tip. A black bar extends downward and backward from the eye, and another bar, involving the tip of the lower jaw, extends along snout to eye and is continued as a curved band on the nape, meeting its fellow of the opposite side and forming a conspicuous shield-shaped area on the top of the head. The numerous fleshy ridges and appendages on the head are for the most part heavily pigmented with black or dark brown.

Amblygobius phalaena (Cuvier and Valenciennes). It is not surprising that this marine goby, which has a wide distribution in the Pacific, should be found in the Gulf of Siam, more especially as it is common in the Philippines. Two specimens, 6.3 and 9.2 cm. long, were obtained at Koh Sichang June 14 and June 20, 1920; and a third specimen, 6.0 cm. long, was taken at Koh Pa-ngan May 16, 1931, by Luang Masya Chitrakarn and Nai Boon Chuay, of the Department of Fisheries.

Cryptocentrus gymnocephalus (Bleeker). Described from Java in 1853 and recorded by Bleeker from Hongkong in 1873, this species appears to be rare. Day (Fishes of India, Supplement, 1888) cites the fish as occurring from "Madras to Malay Archipelago", but mentions only Jerdon's drawing of a single specimen, presumably from Madras. It is of interest to record that a goby 12.1 cm. long collected at Koh Sichang June 17, 1930, represents this species. The specimen was kindly examined by Dr. F. P. Koumans of the Royal Natural History Museum in Leiden, Holland, and found to agree with Bleeker's type.

Gobiodon rivulatus (Rüppell). The finding in Siam of this widely distributed species (Red Sea and Madagascar to Australia, Polynesia, and China) was to be expected. At Koh Tao, Gulf of Siam, 8 specimens 2 to 4 cm. were collected in coral heads September 22 and 24, 1928. Two specimens were removed from a coral head that had been snagged from a depth of 30 meters. Their extremely small ventral fins function as a sucking-disc, and in a bottle of sea water one fish adhered to the glass with its head downward. Further south in the Gulf of Siam, at Koh Kahten, 3

specimens, the largest 4 cm. long, were taken among corals May 13, 1931.

Gobiodon verticalis Alleyne and Macleay. Originally described from New Guinea, this species has since been recorded from Australia and Polynesia. In Siam it has been found in the same localities where the preceding species was collected. Thus, at Koh Tao, 4 specimens 2.5 to 4.0 cm. long were taken in coral heads on September 24, 1928; the two largest ones, 3.5 and 4.0 cm. long, were uniformly green, with red stripes on head and body, while the other two, 2.5 and 2.8 cm. long, possibly females, were uniformly green without red stripes. At Koh Kahten, Luang Masya Chitrakarn and Nai Boon Chuay collected 7 specimens 3.5 to 4.0 cm. long among corals on May 13, 1931, all of these showing red stripes on head and body.

SOLES.

Besides *Cynoglossus xiphoideus* Günther and *C. lingua* Hamilton, both of which are common, the former in the Menam Chao Phya, the latter in the Gulf of Siam and estuaries, the following species, represented in the collection of the Department of Fisheries, do not appear to have been previously listed as occurring in Siamese waters; all these forms are known locally as *pla lin ma*:

Cynoglossus borneensis Bleeker. Specimens from the Gulf of Siam off Banghia and off Bandon, and from the Nam Cheo River at Krat, agree very closely with the descriptions of this species, heretofore known only from Borneo, except that the three longitudinal stripes are not obvious. These may disappear with age. The type was 21 cm. long, while specimens from Siam are 34 cm. long. If the local fish are not *borneensis*, they are undescribed.

Cynoglossus lida (Bleeker). One specimen from the Gulf of Siam off mouth of the Tachin River. The ascribed range of the species is from the Dutch East Indies to India and Africa, in the sea.

Cynoglossus microlepis (Bleeker). This river species is represented in the local collection by specimens from the Menam Chao Phya at Paknampo and the Lopburi River at Lopburi. The previously assigned range was Sumatra and Borneo.

Cynoglossus monopus (Bleeker). This marine species has been recorded from China, Dutch East Indies, and Bay of Bengal. The inclusion of Siam within its range is based on specimens from the Gulf of Siam off Pakpoon, Nakon Sritamarat, and from the Menam Chao Phya off Paknam. At Paknam this species shares with *C. lingua* the reputation of being the best of the soles from the edible viewpoint.

Cynoglossus puncticeps (Richardson). Many specimens have been obtained from various parts of the Gulf of Siam, from the inner lake of the Tale Sap at Pakpoon (where the fish is called *pla chong chum* in allusion to its resemblance to the shape of a needle used in mending nets), and from the mouths of the Menam Chao Phya and Tachiu rivers. The known range of the species includes the Dutch East Indies, Philippines, Calcutta, Moulmein, and Ceylon, in salt and brackish waters.

Pardachirus pavonius (Lacépède). This strongly marked and easily recognized sole, with a wide range in the Pacific and Indian oceans, has been taken at Sriracha and Koh Chang in the Gulf of Siam.

PIPEFISHES.

Ichthyocampus carce (Hamilton). The recorded range includes India, Assam, Ceylon, Nicobar Islands, Malay Peninsula, Sumatra, Java, and Celebes, in the sea, in brackish estuaries, and in fresh-water streams. The local collection contains a male specimen 13.5 cm. long, with young in the brood pouch, from the lower Meklong River June 12, 1927, and an immature male specimen 11.0 cm. long from a pongpang net in the Bangpakong River June 4, 1928. On the Meklong the fish is called *ma nam* (water horse).

Syngnathus spicifer (Rüppell). Although Siam is within the range of this widely-distributed pipefish, there are no published local records. A specimen 13.4 cm. long taken in the Gulf of Siam at Sriracha June 14, 1927, was a male with the brood pouch full of young. Another specimen 16.0 cm. long was taken in the Chantabun River at the town of Chantabun on August 4, 1927.

MISCELLANEOUS FISHES.

Corica soborna Hamilton. This diminutive herring, with two anal fins, is known from the east coast of India (Bengal, Orissa). If, as assumed by Day (Fishes of India), *Corica pseudopterus* (Bleeker) is a synonym of *C. soborna*, the species occurs also on the coast of Borneo. The only Siamese record is for the Bangpakong River where, on June 4, 1928, numerous specimens were obtained from pongpang nets in the lower river. The largest fish were 5.8 cm. long, many being females with greatly enlarged ovaries. This is a prettily marked species, and the published descriptions and figures fail to do it justice. The general color is bright silvery, with a broad diaphanous lateral band which becomes very distinct in preservative; a bright yellow spot on nape, a yellow area on belly behind pectorals, muzzle yellow mixed with black; dorsal fin pale yellow, anal and ventrals hyaline; two middle caudal rays with intervening membrane hyaline, remainder of caudal fin bright yellow with a blackish posterior margin.

Promicrops itaiara (Lichtenstein). This extremely large serranoid fish is known from the Atlantic coast of America from Florida to Brazil, from the Pacific coast of America from Mexico to Panama, and from Australia where it is reported to occur in New South Wales and Queensland. The existence of the species in Siamese waters is established by the examination and identification of two specimens taken on the southeast coast of Siam and by the circumstance that the fish is well-known to the fishermen of that section. It was purely accidental that in each case a representative of the Department of Fisheries was on the spot when a fish happened to be caught. In the estuary of the Chantabun River, near Lem Sing, a specimen taken in a rua saiman on June 14, 1926, was 190 cm. long and required the efforts of four men to lift it out of a boat and carry it ashore. Its girth at the ventral fins was 158. cm., the length of the head was 61 cm., the diameter of the eye was 4.5 cm. (3 times in snout and over 13 times in head), and the width of the posterior end of the maxillary was 7 cm. Dorsal rays XI, 14, anal rays III, 8; lateral line about 85; gill-rakers 10, short, knob-shaped;

teeth villiform, on the vomer in a broad triangular patch, on the palate in elongate, divergent bands. Color, uniform dark brown, all fins with some black spots. The local fishermen call the fish *pla mor* and state that larger individuals have been taken. The second recorded specimen captured in a bamboo trap in the Gulf of Siam off Koh Chik, on January 14, 1932, was examined and photographed by Luang Masya Chitrakarn and Nai Boon Chuay Indrambarya, of the Department of Fisheries. The fish was 180 cm. in total length, 159 cm. to base of caudal, and weighed 216 kilograms. Dorsal rays XI,14, anal rays III,8; lateral line 83, scales in transverse series 50. Local name, *pla mor tule*.

Istiophorus sp. At least one species of sailfish or spearfish inhabits the Gulf of Siam, but no specimens have come into the hands of ichthyologists and identification from the accounts of fishermen and from the "spears" has been impossible. The following notes refer to the capture of spearfish of which the writer has obtained accounts: (1) In July, 1923, a fishermen of twenty-eight years' experience in the Gulf of Siam then fishing an offshore bamboo stake-trap (poh) off the Menam Chao Phya reported that spearfish were occasionally met with at the head of the gulf, the largest observed being 1.5 m. long. (2) In a Chinese shrine at Lem Sing, at the mouth of the estuary of the Chantabun River, there is a "spear" 50 cm. long from a fish about 2 m. long caught off Lem Sing by trolling about the year 1920. This spear is not strongly flattened like the "sword" of the swordfish *Xiphias gladius* but is only moderately depressed, with the upper surface smooth and the lower surface and sides spiniferous. In September, 1924, a policeman got a spearfish 2 m. long by trolling off Lem Sing. The local fishermen, who are afraid of this fish, as it is reputed to attack and sink small boats, call it *pla tong tang*. (3) At Tachalom, in July, 1923, the fishermen reported spearfish as sometimes not rare off the Tachin River and caught in offshore traps. Most fish were taken in October and November. One 1.5 m. long wedged its spear between bamboo stakes in an offshore trap in 1922, after playing havoc with the bailing net. All the fish are small. The meat has

little sale, being tough. The local name is *pla katung tang*. (4) The late Dr. Yai S. Sanitwongse informed the writer that he had seen at Koh Kong, Cambodia, a spearfish that had been caught in a trap and broke off its spear after driving it through a two-inch plank of a boat. (5) On January 20, 1926, the steamer "Nibha" when running through a glassy sea some miles off the Chantabun coast came upon a spearfish lying quietly at the surface; the fish was a little less than 2 m. long.

Bregmaceros maclellandi Thompson. This curious little gadoid fish, with a range extending from Australia and Arabian Sea to India, East Indies, Philippines, China Sea, and west coast of South America, has not heretofore been recorded from Siamese waters. The collection of the Department of Fisheries contains 28 specimens, as follows: 2 from a pongpang shrimp net in Menam Chao Phya at Paknam on May 21, 1925; the others from rua saiman nets in the estuary of the Chantabun River near Lem Sing, 13 on June 13, 1926, 11 on August 1, 1927, 2 on July 20, 1928, and 10 on June 27, 1931. The fish may be said to be fairly common in the broad, shallow estuary of the Chantabun River; is caught daily during June, July, and August in the fine-mesh bag nets operated at ebb tide, and doubtless occurs also in other months. The specimens in hand are from 5.2 to 8.1 cm. in length, and most of them are conspicuously marked with black dorsal, caudal, and pectoral fins (*Bregmaceros atripinnis* of Tickell). The younger specimens (under 6 cm. long) show little or no black on the fins, as pointed out by Day (Fishes of India).

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