Notes on Malayan fishes in the collection of the Raffles Museum, Singapore

I. Catfishes of the families Siluridæ, Bagridæ, Amblycepidæ, Akysidæ, Sisoridæ, Chacidæ, Schilbeidæ and Clariidæ.

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As the small collection of fish from Perak dealt with in the preceding article proved extremely interesting, especially for the study of the zoogeographical relations of the countries comprised in the Oriental Region, one of us (S.L.H.) expressed a wish to examine the entire collection of freshwater fishes preserved in the Raffles Museum, Singapore. This was generously acceded to and Mr. M. W. F. Tweedie, Curator of the Museum, at the request of Dr. Hora sent the Siluroid fishes with a systematic annotated list of the species in February 1940. From time to time further Siluroid material was received and our notes on it are also incorporated in this article.

In writing up our account an attempt has been made to list all the species hitherto known from the Malay Peninsula and to give synoptic tables and keys to distinguish them. This work has been greatly facilitated by the publication of Fowler's "A List of Fishes known from Malaya" (*Fisheries Bull. Singapore*, No. 1, 1938), Herre and Myers'[1] and Herre's[2] papers on Malayan Fishes. The recent contributions to the ichthyology of the Malay Peninsula have very materially added to our knowledge of the fish fauna of this region and the present series of articles clearly indicates that even now much more still remains to be discovered.

We take this opportunity to express our deep gratitude to the Director of the Raffles Museum for his kindness in placing this valuable material at our disposal for study. We are especially indebted to Mr. M. W. F. Tweedie for his help, kindness and courtesies in attending to our varied enquiries in connection with the present work.

1. Herre, A. W. C. T. and Myers, G. S.—A contribution to the Ichthyology of Malay Peninsula. Part II. Freshwater Fishes. *Bull. Raffles Mus. Singapore*, No. 13, pp. 53–74 (1937).

2. Herre, A. W. C. T.—New species of fishes from the Malay Peninsula and Borneo. *Bull. Raffles Mus. Singapore*, No. 16, pp. 5–26 (1940); Additions to the fish fauna of Malaya and Notes on rare or little known Malayan and Bornean fishes. *ibid.*, pp. 27–61 (1940).

Family SILURIDÆ

The family Siluridæ is represented by seven genera, comprising thirteen species, in the fauna of the Malay Peninsula. Of the 13 species, 4 are recorded here for the first time from this region and one is described as new.

The family Siluridæ is characterised by the possession of a very short, spineless dorsal, which is sometimes rudimentary or absent. We have found it rather difficult to use the key to the genera of the Siluridæ given by Weber and de Beaufort[1], in which the main divisions are based on the nature of the dorsal fin. The Malayan genera may, however, be distinguished by the following key:—

Key to the Malayan genera of Siluridæ

A. Eyes with free orbital margins. [Eyes above angle of mouth] .. .. .. *Wallagonia* Myers.

B. Eyes subcutaneous—

I. Teeth long and widely set. [Eyes above angle of mouth] .. .. .. *Wallago* Bleeker.

II. Teeth villiform forming bands—

a. Caudal broadly confluent with anal. [Eyes above angle of mouth] .. *Silurichthys* Bleeker.

b. Caudal free from or slightly united with anal—

i. Eyes mostly above angle of mouth; generally not visible from below—

α. Cleft of mouth not extending beyond front border of eyes; dorsal fin well-defined with at least 4 rays .. .. *Callichrous* Hamilton.

β. Cleft of mouth extending beyond front border of eye; dorsal fin rudimentary or absent .. *Silurus* Linnaeus.

ii. Eyes lateral, partly below angle of mouth; generally visible from below—

α. Dorsal short, but well-defined, with at least 3–4 rays .. .. *Silurodes* Bleeker.

β. Dorsal rudimentary or absent; when present, consisting of 1–2 rays .. *Kryptopterus* Bleeker.

1. Weber, M. and de Beaufort, L. F.—*The Fishes of the Indo-Australian Archipelago*, II, p. 195 (Leiden: 1913).

Of the genera enumerated above, we have not examined any specimen of *Wallago*[1] (=*Belodontichthys* Bleeker) from this region; it is a monotypic genus known from Sumatra, Borneo, Malaya and Siam. From the Malay Peninsula it has been recorded from Kuala Lipis, Pahang and Mr. M. W. F. Tweedie, Curator of the Raffles Museum, informs us that he recently collected a specimen at Kuala Tahan, Pahang.

From among the Silurid fishes known from this region, we have not examined any specimens of the following: *Kryptopterus micronema* (Bleeker) recorded by Herre and Myers[2] from several localities in the Malay Peninsula, *Kryptopterus cryptopterus* (Bleeker) stated to have been collected at Kampong Johore[3] and *Callichrous leiacanthus* Bleeker recorded by Herre[4] from Singapore. Notes on the remaining ten species studied by us are given below.

Callichrous bimaculatus (Bloch)

1913. *Callichrous bimaculatus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 209.
1936. *Callichrous pabda*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Ompok bimaculatus*, Herre and Myers, *ibid.*, No. 13, p. 67.
1938. *Ompok pabda*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 45, 248.

Callichrous bimaculatus is the most widely distributed species of the genus; its range extends from Java, Sumatra, Borneo through the Malay Peninsula to Siam, Burma, Chusan, Yunnan, India and Ceylon. We have examined 7 specimens from Singapore, Kelantan, Perlis and Pahang; they vary in length from 96 mm. to 205 mm. In certain specimens, the anterior border of the eye is somewhat behind the corner of the mouth, otherwise all the specimens agree with the examples from India.

One of us[5] has shown that the generic designation *Callichrous* is quite valid and has adduced evidence to show that *C. pabda*

1. Myers, G. S.—Notes on *Ansorgia*, *Clarisilurus*, *Wallago*, and *Ceratoglanis*, four genera of African and Indo-Malayan Catfishes. *Copeia*, No. 2, p. 98 (1938).
2. Herre, W. C. T. and Myers, G. S.—A contribution to the Ichthyology of Malay Peninsula. Part II. Freshwater Fishes. *Bull. Raffles Mus. Singapore*, No. 13, p. 67 (1937).
3. Fowler, H. W.—A List of the Fishes known from Malaya. *Fisheries Bull. Singapore*, No. 1, p. 46 (1938).
4. Herre, W. C. T.—Additions to the Fish Fauna of Malaya and Notes on rare or little known Malayan and Bornean Fishes. *Bull. Raffles Mus. Singapore*, No. 16, p. 35 (1940).
5. Hora, S. L.—Siluroid Fishes of India, Burma and Ceylon. VIII. Fishes of the genus *Callichrous* Hamilton. *Rec. Ind. Mus.*, XXXVIII, pp. 356–361 (1936).

is synonymous with *C. bimaculatus*. The differences which separate the two species are of the nature of individual variations.

Kryptopterus bicirrhis (Cuvier & Valenciennes)

1913. *Cryptopterus bicirrhis*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 217.

We have examined two specimens of *Kryptopterus bicirrhis* collected by Mr. E. O. Shebbeare from the King George V National Park in 1939; they are 120 mm. and 146 mm. in length respectively. In both the specimens the dorsal fin is composed of two rays instead of one. The mandibular barbels are absent in the larger specimen, while in the other they are very rudimentary.

K. bicirrhis has hitherto been known from Java, Sumatra, Borneo and Siam. Its occurrence in the Malay Peninsula, which is recorded here for the first time, helps to bridge the gap in its distribution.

Kryptopterus limpok (Bleeker)

1913. *Cryptopterus limpok*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 219.
1936. *Cryptopterus limpok*, Suvatti, *Index Fishes Siam*, p. 71.

We refer a specimen from Sungai Bera, Pahang, collected by Mr. H. J. Kitchener in 1937, to *Kryptopterus limpok;* it is about 160 mm. in length. It differs from Weber and de Beaufort's description of the species in having somewhat smaller eyes (diameter of eye is contained 4 times in length of head instead of 3, and 1·5 times in length of snout instead of equal to snout).

K. limpok has hitherto been known from Sumatra, Borneo and Siam. It is recorded here for the first time from the Malay Peninsula.

Kryptopterus macrocephalus (Bleeker)

1913. *Cryptopterus macrocephalus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 217.
1937. *Kryptopterus macrocephalus*, Herre and Myers, *Bull. Raffles Mus. Singapore*, No. 13, p. 67.
1940. *Kryptopterus macrocephalus*, Herre, *ibid.*, No. 16, p. 35.

Herre and Myers recorded *Kryptopterus macrocephalus* for the first time from the Malay Peninsula (Bukit Merah, Perak); they had a single specimen, 66 mm. long. Later Herre recorded the species from Kota Tinggi, Johore. We have examined 3 specimens; two from Kota Tinggi, Johore, 64 and 73 mm. in length respectively and one from Bukit Merah, Perak, about 77 mm. in length. It would thus appear that the species is not uncommon in the Malayan Waters.

K. macrocephalus is now known from Sumatra, Borneo and the Malay Peninsula.

Silurichthys phaiosoma (Bleeker)

1913. *Silurichthys phaiosoma*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 197.
1936. *Silurichthys phaiosoma*, Suvatti, *Index Fishes Siam*, p. 72.
1936. *Silurichthys phaiosoma*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Silurichthys phaiosoma*, Herre and Myers, *ibid.*, No. 13, p. 66.
1938. *Silurichthys phaiosoma*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 46, 248.

We have examined two specimens of *Silurichthys phaiosoma* from Johore and Singapore; they are 98 mm. and 114 mm. in total length respectively. The species has been recorded from several other localities in the Malay Peninsula and its range extends from Sumatra, Banka, Biliton, Borneo, Malay Peninsula to Siam.

Silurichthys schneideri Volz. (Plate II, fig. 1)

1913. *Silurichthys schneideri*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 198.

Weber and de Beaufort regarded *Silurichthys schneideri* as a doubtful species, and stated that "The only differences from *S. phaiosoma* seem to be: A. 64 instead of A. 53–58 and that the gape of mouth only reaches below front border of eye and not to its middle." Weber and de Beaufort did not examine any specimen of this species, and relied for their description on the account given by Volz[1]. We have examined specimens of both the species referred to above and find that, though they are very closely allied, the differences noted above are constant and enable them to be distinguished from each other.

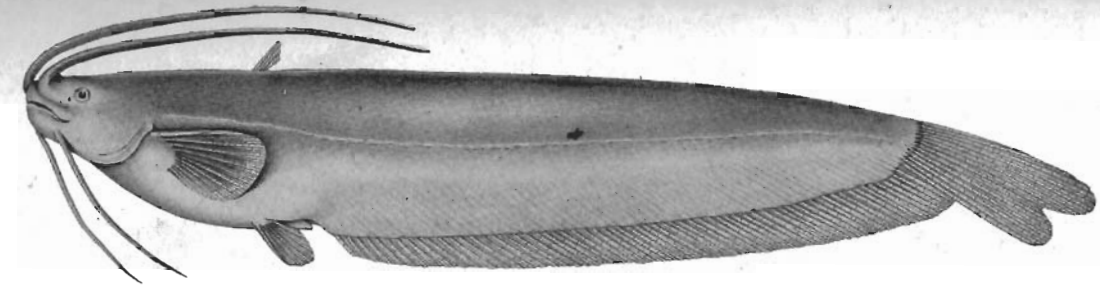
We have examined 5 specimens of *S. schneideri* from Jalong, Perak, ranging in length from 117 mm. to 178 mm. Four of these specimens are of a somewhat slender build, and in them the height of the body is contained from 2 to 2½ times (instead of 1½) in the distance between the tip of the snout and the commencement of the anal fin. In other respects, the Malayan specimens agree with Volz's description of the species.

S. schneideri has hitherto been known only from Sumatra; it is recorded here for the first time from the Malay Peninsula.

Silurodes hypophthalmus (Bleeker)

1913. *Silurodes hypophthalmus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 205.
1936. *Silurodes hypophthalmus*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Silurodes hypophthalmus*, Herre and Myers, *ibid.*, No. 13, p. 67.
1938. *Silurodes hypophthalmus*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 248.

1. Volz, W.—Fische von Sumatra gesammelt von Herrn G. Schneider. *Revue Suisse Zool.*, XII, p. 463 (1904).



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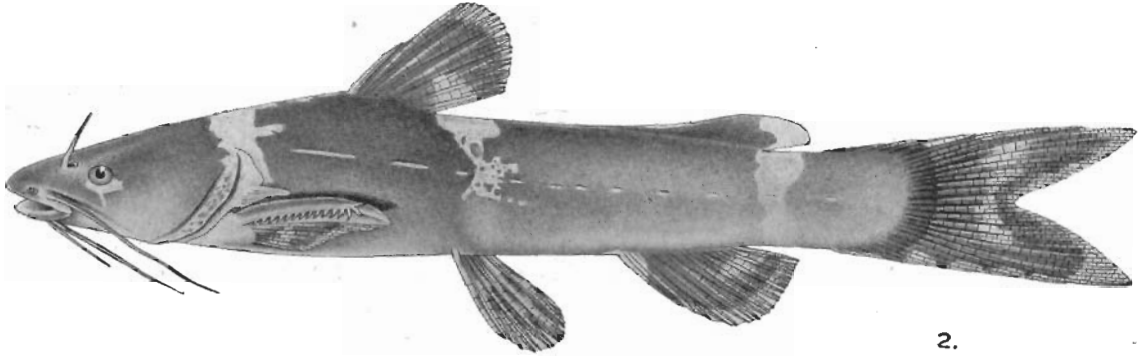

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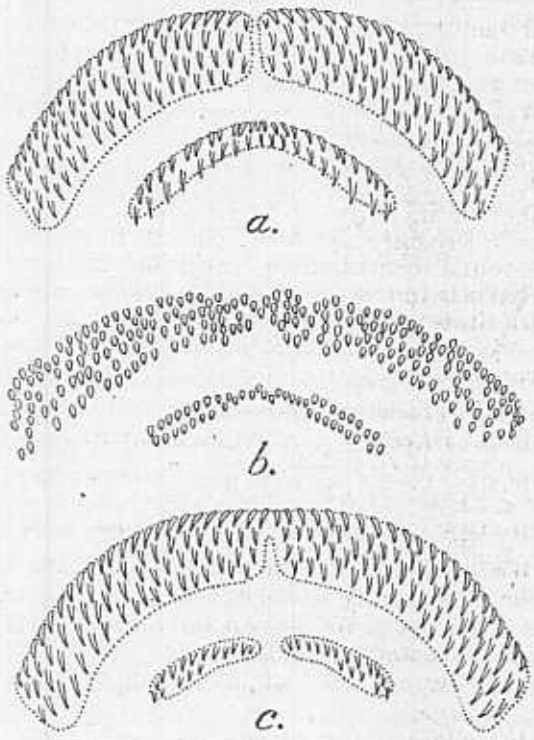
Siluroid Fishes from the Malay Peninsula.

We have examined two specimens of *Silurodes hypophthalmus* from Pahang (195 mm. in total length) and Perak (180 mm. in standard length). According to Weber and de Beaufort, the vomerine teeth in this genus form a single continuous patch, but we have found that in the example from Pahang the vomerine dentition is greatly reduced and the teeth are arranged in two patches separated by a short space. On the other hand, in the specimen from Perak the continuous vomerine patch is well-developed and possesses two rows of teeth throughout its



Text-fig. 1.—Upper dentition of three specimens of *Silurodes hypophthalmus* (Bleeker) showing variation in the form of the vomerine patches.
a. From a specimen collected in Perak. × 4½; *b*. After Weber and de Beaufort (vol. II, fig. 81); *c*. From a specimen collected in Pahang. × 4½.

extent. The condition figured by Weber and de Beaufort (text-fig. 81, p. 206) is intermediate between the two types of dentition represented in the Malayan specimens studied by us. In our opinion the differences in dentition noted above are not even of

specific importance[1] though Weber and de Beaufort have used this character to separate *Callichrous* from *Silurodes*. In all other respects the two specimens agree with the description of the species as given by Weber and de Beaufort.

S. hypophthalmus is found in Java, Sumatra, Borneo, Malay Peninsula and Siam.

Silurus cochinchinensis Cuvier & Valenciennes.

1936. *Silurus cochinchinensis*, Hora, *Rec. Ind. Mus.* XXXVIII, pp. 351–356.

Silurus cochinchinensis is represented by a single specimen, 109 mm. in length; it was obtained from Baling, Kedah in December, 1938. This species has hitherto been found in Cochin-China, Upper and Lower Burma, and the Eastern Himalayas up to the Tista River System. It is here recorded for the first time from the Malay Peninsula.

Hora (*loc. cit.*) separated the two Indian species of the genus, *S. wynaadensis* Day and *S. cochinchinensis* Cuv. & Val., on the number of mandibular barbels—4 in the former and 2 in the latter. Recently Prof. A. Subba Rau and Mr. B. S. Bhimachar[2] found considerable variation in the number of mandibular barbels in the specimens of *Silurus* collected by them in the Mysore State, and their conclusion, which Hora supports, is that the two Indian species are identical. Their findings extend the range of *S. cochinchinensis* to Peninsular India.

Wallagonia leerii (Bleeker)

1913. *Wallago leerii*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 202.
1936. *Wallago leeri*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1938. *Wallago leerii*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 248.
1938. *Wallagonia leerii*, Myers, *Copeia*, No. 2, p. 98.

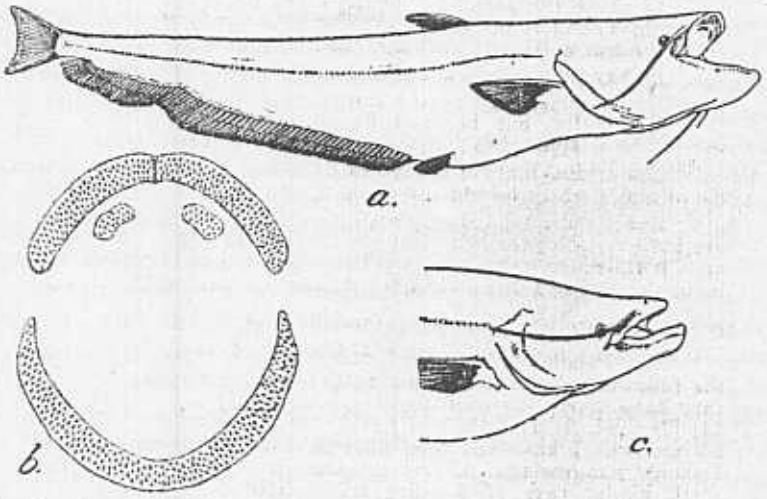
Myers in establishing his genus *Wallagonia* designated *W. leerii* as the genotype. We have examined one specimen, 250 mm. in length, collected at Telok Anson, Perak. The range of distribution of the species extends to Sumatra, Banka and Borneo.

Wallagonia tweediei, sp. nov., Hora & Misra[3].

In May, 1940, Mr. Tweedie sent the right anterior gill arch of a giant Silurid fish collected by him at Kuala Tahan, Pahang,

1. *See* Hora's notes on the dentition of *Clarias* and *Silurus* in *Rec. Ind. Mus.* XXXVIII, pp. 347–356 (1936).
2. The paper, in which Prof. A. Subba Rau and Mr. B. S. Bhimachar discuss the systematic position of *S. wynaadensis* is not yet published, but one of us (S. L. H.) had an opportunity to see the type-script and the specimens.
3. Mr. K. S. Misra very kindly helped me in elucidating the relationships of the new species which is now jointly described by us. *S. L. Hora.*

and supplemented it with photographs and notes in order to facilitate the identification of the species. A sketch of its dentition was also supplied. The specimen was too bulky to be



Text-fig. 2.—*Wallagonia tweediei*, sp. nov. Hora and Misra.
a. Lateral view of type-specimen; *b*. Upper and lower dentition; *c*. Lateral view of head and anterior part of body showing position of eye in relation to angle of mouth. All diagrammatic.
The drawings were made from photographs, sketches and data supplied by Mr. M. W. F. Tweedie.

preserved *in toto*, so a plaster mould was taken and its fins and one gill arch were preserved. Mr. Tweedie's note is as follows:—

"Length: 4 ft. 9" (with caudal).
Depth: (at dorsal) 1 ft.
Dorsal: 1.4.
Pectoral: 1.14.
Ventral: 1.7.
Anal: 70—the 43 anterior rays with a fleshy extension covering more than half their length and shortening suddenly at the 44th.

"Colour dark greyish brown with light longitudinal streaks; belly, back to ventrals, and underside of head white. The caudal is truncate, not forked. There is one pair of long maxillary and one pair of small mental barbels, each maxillary barbel being between 12 and 13 inches long."

In accordance with the data supplied by Mr. Tweedie, the fish was provisionally referred to the genus *Wallagonia* Myers in spite of its truncate caudal fin and short pelvic fins (with 8

instead of 10 to 11 rays). On an enquiry, the following further particulars were supplied by Mr. Tweedie:—

> "The caudal fin is slightly emarginate, perhaps more so than the photo shows, as the tips of the rays were damaged by being dragged along the ground. On the other hand I asked the Malays at Kuala Tahan if the tail is normally forked in the 'Tapah' (they know the fish well) and they said 'no'.
>
> "The anal and the caudal fins are positively not confluent.
>
> "The anterior ray of the dorsal fin is unbranched, thick and stiff proximally, but becomes flexible distally, and so cannot be said to be a spine.
>
> "The orbital margin is free and the eye is situated considerably above and slightly behind the angle of the mouth.
>
> "Exact data regarding the number of the branchiostegal rays are not available; the head was cut off in front of the branchiostegals and I failed to count them. The plaster mould shows external indications of 8–9 and I should estimate the total number as 12–15."

In a subsequent letter, Mr. Tweedie[1] wrote as follows:—

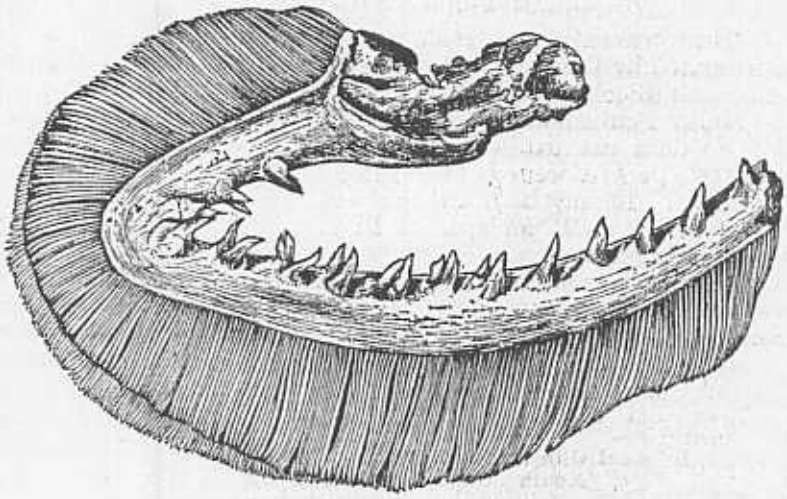
> "Mr. Pendlebury of the Kuala Lumpur Museum has sent me the following observations on a stuffed specimen of the 'Ikan Tapah' they have there, provisionally determined as *Wallago leeri:* Pectoral, 14; Ventral, 9; Dorsal, 5; Caudal, 17; Anal, 72–74. Total length 1·1 metres. I have not been able to check these observations, but I should imagine that, if any are inaccurate it would be due to the small hinder rays of the fins being difficult to discern in a dry skin, and so the figures would be too low rather than too high."

Mr. E. O. Shebbeare also supplied particulars of an "Ikan Tapah", 3 ft. 8 inches in length, and noted V. 1/9. The caudal fin is stated to be bluntly lobed.

Owing to the larger number of rays in the pelvic fins of the specimen of 'Ikan Tapah' in the Kuala Lumpur Museum, and the one examined by Mr. E. O. Shebbeare it is probable that they belong to *Wallagonia leeri.* Besides the smaller number of rays in the pelvic fin, the new species differs from the other

1. Mr. M. W. F. Tweedie also directed our attention to F. G. Sounter's note entitled "A Formidable Fish from Malay" published on June 24, 1933, in *The Field* (The Country Newspaper). In this article the author gives a brief account of an "Ikan Tapah" caught by him in Perak and states that "It is called 'Ikan Tapah' by the Malays, and *Wallago Leerii* in the Selangor Museum, the curator of which tells me it is grouped with the freshwater sharks. It was 5 ft. 6 in. in length, 43 in. at its greatest girth, and weighed 102 lb. It was a hen fish, and a mass of ova was evidently discharged from the vent while the fight was on, as some was protruding when it was lifted into the boat, and small fish were making feeding rings close to it when it was pumped to the surface. Its weight when hooked was therefore probably more than that recorded out of the water." The author points out that the head of the fish is now preserved at the museum in Kuala Lumpur.

From the data given above, it is not possible to determine the fish specifically, but it could certainly be *Wallagonia leeri* (Bleeker), which is known to grow to a large size.



Text-fig. 3.—Right anterior gill-arch of *Wallagonia tweediei*, sp. nov. Hora and Misra, showing the number, disposition and nature of gill-rakers. × ⅗.

four members of this genus in having 3+12 gill-rakers, which are fairly well-developed, hard, conical and pointed. *Wallagonia krattensis* (Fowler)[1] also possesses 8 rays in the pelvic fin but its anal fin contains only 56 rays.

The vomerine teeth of *W. tweediei* consist of two small, widely set, rounded patches.

Type-specimen:—Plaster cast in the Raffles Museum, Singapore, and the right anterior gill-arch in the collection of the Zoological Survey of India, Indian Museum, Calcutta, (No. F. 13365/1).

Remarks:—*Wallagonia tweediei* is distinguished from its congeners mainly on the following two characters:—

1. The caudal fin is only slightly emarginate (*versus* forked).
2. Twelve gill-rakers (*versus* 21 or more in *W. attu*, 9 in *W. leeri*, *W. miostoma* and *W. krattensis*).

The new species of *Wallagonia* is named after Mr. M. W. F. Tweedie in slight recognition of the help received from him in the study of the Malayan fishes.

1. Fowler, H. W.—Zoological Results of the Third De Schauensee Siamese Expedition, Part V. Additional Fishes. *Proc. Acad. Nat. Sci. Philadelphia* LXXXVI, p. 335, fig. 1 (1934).

Family BAGRIDÆ

The generalised catfishes of the family Bagridæ are represented by four genera, *viz.*, *Batasio* Blyth, *Mystus* Dumeril, *Leiocassis* Bleeker and *Pseudobagrus* Bleeker, in the fauna of the Malay Peninsula. Of these, the range of *Pseudobagrus* and *Batasio* does not extend to the Malay Archipelago, while the other two genera occur both to the north and south of the Malay Peninsula. It may be noted that identical species of *Bagroides* Bleeker, such as *B. melapterus* Blkr. and *B. macropterus* Blkr. are found in Sumatra and Borneo on the one hand and in Siam on the other. It is likely that some representatives of this genus will also be found from the Malay Peninsula. The four Malayan genera may be distinguished by the following key:—

Key to the Malayan genera of Bagridæ

A. Eyes with free or partially free orbital margins—
  I. Anal with less than 20 rays—
    a. Mouth ventral, bordered by fringed lips; barbels shorter than head. [Series of open pores on the ventral surface just behind the mouth] .. *Batasio* Blyth.
    b. Mouth terminal, bordered by plain lips; barbels longer than head .. .. *Mystus* Dumeril.
  II. Anal with more than 20 rays .. *Pseudobagrus* Bleeker.
B. Eyes subcutaneous .. .. .. *Leiocassis* Bleeker.

One species of *Pseudobagrus* was described by Duncker (*Naturh. Mus. Hamburg, Mitteil.*, XXI, p. 173, pl. ii, fig. 132, 1904) from the Muar River at Tubing Tinggi, but we have not examined any specimen of it. *Mystus* is represented by 9 species in the Malay Peninsula, but we have examined specimens of only 6. The other three species are *M. elongatus* (Günther) known from Singapore (*Cat. Fish. Brit. Mus.*, V, p. 77, 1864); *M. baramensis* (Regan), which was recently recorded by Herre and Myers from Lake Chin Chin, Jasin, Malacca, and *M. gulio* (Ham.), which is listed by Fowler (*loc. cit.*, p. 47) as *Aspidobagrus gulio* under the family Bagaridæ. Of *Leiocassis*, 5 species are known from the Malay Peninsula, of which we have not examined any specimens of *L. stenosomus* (Cuv. & Val.); this was recorded by Duncker (*loc. cit.*, p. 173) from Kuala Lumpur. Besides the two species of *Bagroides* mentioned above, *Leiocassis poecilopterus* (Cuv. & Val.) is also found in Java, Sumatra and Borneo on the one hand and Siam on the other, though it has not yet been recorded from the Malay Peninsula. Notes on 11 Bagrid species examined by us are given below. One species each of *Batasio, Mystus* and *Leiocassis* are recorded here for the first time from the Malay Peninsula.

Batasio tengana (Hamilton). (Plate IV, fig. 7).

1822. *Pimelodus tengana*, Hamilton, *Fish. Ganges*, pp. 176, 377, pl. xxxix, fig. 58.
1839. *Bagrus tengana*, Cuvier and Valenciennes, *Hist. Nat. Poiss.* XIV, p. 433.
1854. *Bagrus tengana*, Bleeker, *Verh. Bat. Gen.* XXV, p. 56.
1860. *Batasio affinis*, Blyth, *Journ. As. Soc. Bengal*, XXIX, p. 150.
1860. *Batasio tengana*, Blyth, *ibid.*, XXIX, p. 150.
1864. *Macrones affinis*, Günther, *Cat. Fish Brit. Mus.* V, p. 83.
1864. *Macrones tengana*, Günther, *ibid.*, V, p. 84.
1873. *Macrones affinis*, Day, *Proc. Zool. Soc. London*, p. 111.
1877. *Macrones Blythii*, Day, *Fish. India*, p. 445.
1877. *Gagata tengana*, Day, *ibid.*, p. 493.
1888. *Leiocassis fluviatilis*, Day, *Fish. India Suppl.*, p. 805.
1889. *Liocassis fluviatilis*, Day, *Faun. Brit. Ind. Fish.*, I, p. 164.
1889. *Macrones blythii*, Day, *ibid.*, I, p. 151.
1889. *Gagata tengana*, Day, *ibid.*, I, p. 210.
1890. *Macrones* Dayi, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 230, pl. vii, fig. 3.
1913. *Macrones marianiensis*, Chaudhuri, *Rec. Ind. Mus.* VIII, p. 253.
1921. *Macrones (Macronoides) affinis*, Hora, *ibid.*, XXII, p. 180.
1921. *Macrones (Macronoides) merianiensis*, Hora, *ibid.*, XXII, p. 736.
1937. *Leiocassis rama*, Shaw and Shebbeare (*nec* Hamilton), *Journ. Roy. As. Soc. Bengal, Science*, II, p. 90, text-fig. 88, pl. iii, fig. 4.

In the collection of the Raffles Museum there are six specimens, from 62 to 79 mm. in length, from the Chenderoh Lake, Perak, which seem to belong to *Batasio tengana*. The synonymy given above shows that great confusion has hitherto prevailed regarding the taxonomy of this species, but Hora and Law have recently elucidated its specific position in a revision of the fishes of the genus *Batasio* which will be published in the *Records of the Indian Museum* for 1941. The most characteristic feature of the species is its colouration which varies to a certain extent with age and locality.

In the examples from Perak the black blotch on the lateral line above the anal fin is very conspicuously marked, while the anterior blotch represents the area against which the air-bladder comes directly in contact with the skin. Another conspicuous feature of these examples is an oblique horseshoe-shaped band lying in front of the first dorsal fin and descending on the sides to below the lateral line. Sometimes this band breaks up into a dorsal blotch and two oblique bars on the sides. There is a submarginal band on the dorsal fin and the tips of the caudal fins are somewhat dusky but not black.

A detailed description of the species will be published by Hora and Law. So far the range of *B. tengana* was known to extend from the Eastern Himalayas, through Assam to Burma; it is here recorded from the Malay Peninsula for the first time.

Leiocassis baramensis Regan. (Plate IV, fig. 1)

1906. *Liocassis baramensis*, Regan, *Ann. Mag. Nat. Hist.*, (7), XVIII, p. 67.
1913. *Leiocassis baramensis*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 358.
1933. *Leiocassis chaseni*, de Beaufort, *Bull. Raffles Mus. Singapore*, No. 8, p. 34.
1936. *Leiocassis chaseni*, Tweedie, *ibid.*, No. 12, 19.
1938. *Leiocassis chaseni*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 249.

We have examined two specimens of *Leiocassis*, which, in our opinion, are referrable to *L. baramensis* Regan; one specimen, 150 mm. long, was collected by Mr. H. J. Kitchener at Sungai Lumpat, Pahang; while the other, 116 mm. long, was obtained from Jalong, Perak. After comparing these examples with the type of *L. chaseni*, Tweedie had referred them to that species, but a further study of these specimens has shown that the differences, which distinguish *L. chaseni* from *L. baramensis*, are not of specific value.

In his description of *L. chaseni*, de Beaufort stated that:

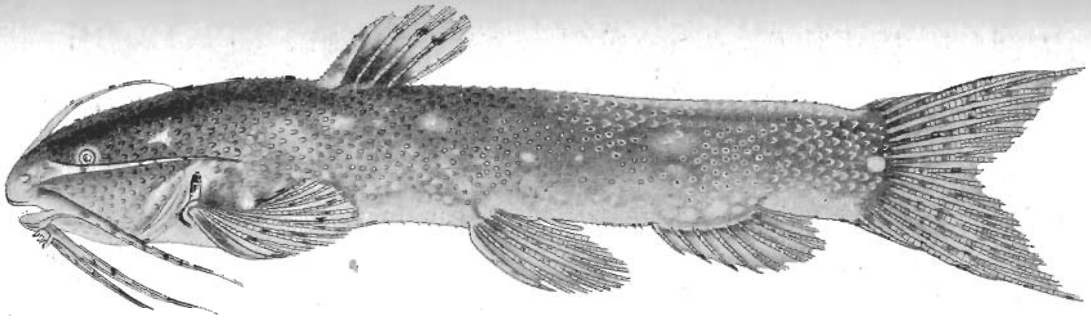
> "This species comes nearest to *L. baramensis* Reg. from Borneo, differing by its longer dorsal and pectoral spines, *baramensis* having less serrae. The eye is probably larger, but the difference may be due to the difference in size of the two type-specimens, that of Regan being 190 mm."

L. chaseni was described from a single specimen, 85 mm. in length with the caudal fin broken.

The differences between the two species noted above may now be analysed with the help of the specimens under report.

The dorsal spine of *L. baramensis* is stated to be "feebly serrated behind, ½ the length of head"; that of *L. chaseni* is "strong, with about 8 serræ posteriorly, as long as head without snout". In the specimens examined by us the spine is strong, feebly serrated with about 10–12 serræ and almost as long as head without snout which is more than half the length of the head.

The pectoral spine of *L. baramensis* is "a little more than ½ the length of head, with 23 serræ on its inner edge"; that of *L. chaseni* is "strong, serrated along its inner edge, as long as dorsal spine". In the specimens before us the spine is strong, somewhat shorter than the dorsal spine (still longer than half the length of the head) and is pectinated along the inner border with 15 to 17 serræ.



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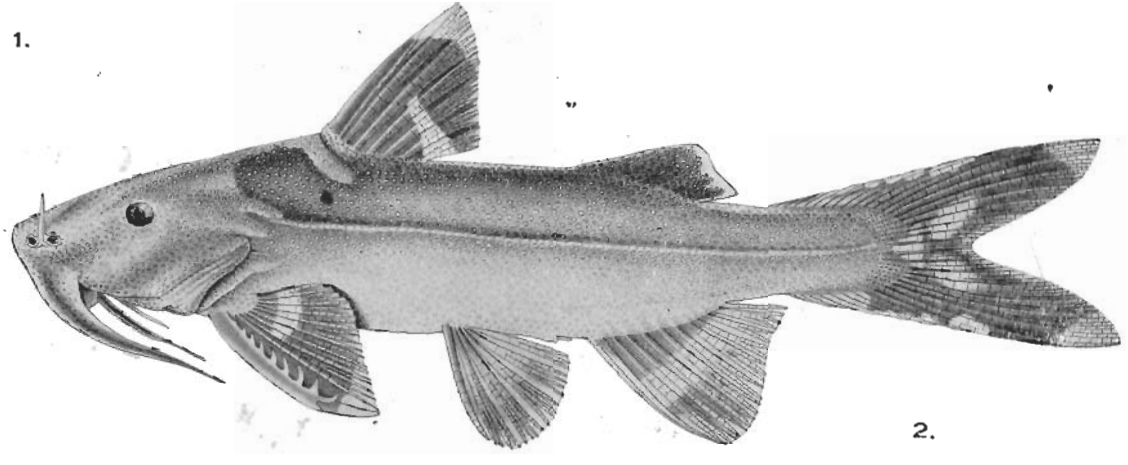

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Siluroid Fishes from the Malay Peninsula.

In *L. baramensis* "Diameter of eye 9 in the length of head"; in *L. chaseni* "Eye 3·7, less than twice in snout, 1·4 in interorbital space". In the two specimens under report, the diameter of the eye is contained from 6·5–7·0 times in the length of the head, and more than twice in the length of the snout and the interorbital space. It is well recognised that in young specimens the eyes are proportionately larger, but "3·7" in de Beaufort's description is certainly a misprint for 5·7 or something else.

It will be seen from the above that the so-called distinguishing features of the two species are not of very great importance and are likely to be bridged over when further material becomes available for study from Borneo and the Malay Peninsula.

In colouration our specimens agree fairly closely with *L. baramensis*. According to Regan its colouration is as follows:—

> "Brownish, with 2 oblong pale areas on each side of the posterior part of the body above the lateral line, the second small and well separated from the first; similar pale areas below the lateral line are confluent, and the anterior meets that of the other side in front of the anal fin; fins more or less blackish at the base and with blackish intermarginal bands."

In the smaller of the two specimens examined by us the colour pattern is more brilliantly marked. In the illustration we have reproduced the colours of this example though the outline sketch was made from the larger specimen.

L. baramensis is known from Borneo (Baram River) and the Malay Peninsula (Ulu Jelai and Sungai Lumpat, Pahang; Jalong, Perak).

Leiocassis fuscus Popta. (Plate II, fig. 2)

1913. *Leiocassis fuscus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 353.

1940. *Leiocassis bicolor*, Herre (*nec* Fowler), *Bull. Raffles Mus.*, 16, p. 36.

Leiocassis fuscus has hitherto been known from a single specimen, 51 mm. long, which was obtained from the Upper Mahakam River, Borneo. There is a small specimen, 44 mm. long, collected from a swift stream in the Mawai District, Johore, which, in our opinion, is referrable to this species. The Malayan example is more slender and depressed; the height of its head being contained twice in its length instead of 1⅔, and the height of its body is contained 7 times in the total length and 6 times in the length without the caudal. Accordingly, the height of the dorsal fin is more or less equal to the depth of the body. The dorsal spine and the adipose fin are somewhat longer. There are also other minor differences in proportions, but all of them seem to be of the nature of individual variations.

Leiocassis leiacanthus Weber & de Beaufort

1913. *Leiocassis leiacanthus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 364.
1937. *Leiocassis leiacanthus*, Herre and Myers, *Bull. Raffles Mus. Singapore*, No. 13, p. 69.

Leiocassis leiacanthus is represented by a single specimen in the collection; it is 59 mm. in length and was obtained from the river Plus in Perak. Herre collected a specimen of this species from the Mawai District, Johore.

L. leicanthus is so far known to occur in Sumatra and the Malay Peninsula.

Leiocassis micropogon (Bleeker)

1913. *Leiocassis micropogon*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 357.
1936. *Leiocassis micropogon*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 19.
1937. *Leiocassis micropogon*, Herre and Myers, *ibid.*, No. 13, p. 69.
1938. *Leiocassis micropogon*, Fowler, *Fisheries Bull. Singapore*, I, pp. 52, 249.

We have examined a single specimen of *Leiocassis micropogon;* it was collected from Bukit Merah, Perak, and is 156 mm. in length.

L. micropogon is found in Sumatra, Banka, Billiton, Borneo, and the Malay Peninsula.

Mystus micracanthus (Bleeker)

1913. *Macrones micracanthus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 339.
1936. *Macrones micracanthus*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 19.
1937. *Mystus micracanthus*, Herre and Myers, *ibid.*, No. 13, p. 69.
1938. *Mystus micracanthus*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 249.

We have examined two specimens of *Mystus micracanthus* from Perak and Perlis; they are 108 mm. and 103 mm. in length respectively. The species is known to occur in Java, Sumatra, Borneo, Malay Archipelago and Siam.

Mystus nemurus (Cuv. & Val.)

1913. *Macrones nemurus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 341.
1936. *Macrones nemurus*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 19.
1937. *Mystus nemurus*, Herre and Myers, *ibid.*, No. 13, p. 69.
1938. *Mystus nemurus*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 52, 249.

We have examined six specimens of *Mystus nemurus* from Singapore, Kelantan, Pahang and Perak; they range in length from 94 mm. to 280 mm. In some of the examples the maxillary barbels extend beyond the anal fin and the outermost ray of the

upper lobe of the caudal fin is produced into a long filamentous process. The range of distribution of this species extends from the Malay Archipelago through the Malay Peninsula to Siam.

Mystus nigriceps (Cuv. & Val.)

1913. *Macrones nigriceps*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 337.
1936. *Macrones nigriceps*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 19.
1937. *Mystus nigriceps*, Herre and Myers, *ibid.*, No. 13, p. 69.
1938. *Mystus nigriceps*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 52, 249.

Mystus nigriceps is represented in the collection by four specimens which were obtained from Johore, Kedah, Pahang and Perak; they range in length from 85 mm. to 262 mm. In the specimen from Perak, 262 mm. in length, the dorsal spine is relatively longer, being more than the length of the head without snout. In the specimen from Kedah, 91 mm. in length, the diameter of the eye is contained about 5 times, instead of 3 to 4½, in the length of the head, while the base of the anal fin is contained only 3 times in the base of the adipose fin.

M. nigriceps is found in Java, Sumatra, Borneo, Malay Peninsula and Siam.

Mystus planiceps (Cuv. & Val.)

1913. *Macrones planiceps*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 342.
1936. *Macrones planiceps*, Tweedie, *Bull. Raffles Mus.* No. 12, p. 19.
1937. *Mystus planiceps*, Herre and Myers, *ibid.*, No. 13, p. 69.
1938. *Mystus planiceps*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 53, 249.

We have examined five specimens of *Mystus planiceps*, ranging from 108 mm. to 405 mm. in length. Two of these, 302 and 405 mm. in length respectively, were collected from the Chenderoh Lake, Perak; two, 108 and 144 mm. in length respectively, were obtained at Kuala Tahan, Pahang; while the fifth specimen, 252 mm. in length, was obtained from Johore. In two examples, the eyes are comparatively smaller, being contained 2¼ times in the length of the snout instead of 1¾ times. In some of the specimens the maxillary barbels are comparatively longer; they extend as far as the commencement of the anal fin.

According to Weber and de Beaufort this fish attains a length of 335 mm. in the Malay Archipelago. We have examined a much larger specimen from Perak.

M. planiceps is found in Java, Sumatra, Borneo, Malay Peninsula and Siam.

Mystus wolffi (Bleeker)

1913. *Macrones wolffi*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 340.
1936. *Macrones wolffi*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 19.
1938. *Mystus wolffi*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 53, 249.

We have examined two specimens of *Mystus wolffi;* one measuring 144 mm. in length was collected from Perak, while the precise locality of the other, 176 mm. in length, is not known. In both the specimens the mandibular barbels extend only to the pelvic fins.

Mystus wycki (Bleeker)

1913. *Macrones wycki*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 343.
1936. *Mystus wycki*, Suvatti, *Index Fish. Siam*, p. 77.
1940. *Mystus wycki*, Herre, *Bull. Raffles Mus. Singapore*, No. 16, p. 36.

There is a single specimen of *Mystus wycki* in the collection; it was collected from the Chenderoh Lake, Perak, and is 345 mm. in length. This species has hitherto been known from Java, Sumatra and Siam, but recently it was recorded by Herre from the Malay Peninsula.

Family AMBLYCEPIDÆ

Amblyceps mangois (Hamilton)

1933. *Amblyceps mangois*, Hora, *Rec. Ind. Mus.*, XXXV, pp. 607–621, text-figs. 1–7.
1940. *Amblyceps mangois*, Hora, *Rec. Ind. Mus.*, XLII, p. 374.
1941. *Amblyceps mangois*, Hora, *Supra*, p. 7, pl. I, fig. 3.

Amblyceps mangois is recorded by one of us earlier in this journal (No. 17, p. 7) from the Malay Peninsula (Perak), and now we have 3 young specimens, 47 mm. to 67 mm. in length, from a stream near the River Galas in Kelantan. In these examples the barbels are comparatively long, and the caudal fin is deeply forked without any filamentous prolongations of the outer rays. The body is covered all over with minute rounded tubercles. Taking all the salient features into consideration, the specimens under report agree more closely with the Siamese and the Malayan form than the typical form known from India and Burma.

It may be noted that one of us has recently extended the range of the species westwards to the headwaters of the Mahanadi river in the Central Provinces.

Family AKYSIDÆ

The family Akysidæ is represented by two genera in the fauna of the Malay Peninsula, *viz.*, *Acrochordonichthys* Bleeker, and *Parakysis* Herre. In the former the gill-openings are extensive but are restricted to the ventral surface and extend dorsally only to the bases of the pectoral fins; whereas in the latter the gill-openings are small and are situated just in front of the bases of the pectoral fins. In *Acrochordonichthys* the gill-membranes are united with each other and with the isthmus; whereas in *Parakysis* the gill-membranes are separated from each other by a long distance and, in consequence, the isthmus is very wide.

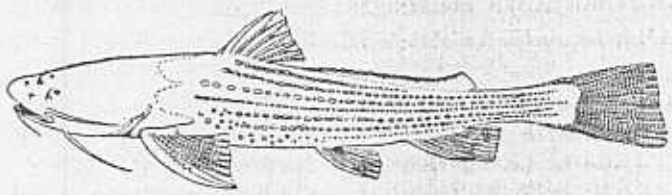
Acrochordonichthys is represented by three species in the Malay Peninsula, two of which are recorded here for the first time, and the third, *A. rugosus* (Bleeker), is recorded by one of us earlier in this journal (No. 17, p. 8) from Perak; we have now examined further material of it from the King George V National Park. *Parakysis* is monotypic so far. Notes on the four Malayan species of the family recently examined by us are given below.

It may be noted that *Akysis* Bleeker is known from Java and Borneo on the one hand and from Burma and Siam on the other. It is likely, therefore, that some representative of this genus will be found in the Malay Peninsula also.

Acrochordonichthys ischnosoma Bleeker

1913. *Acrochordonichthys ischnosoma*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 367.

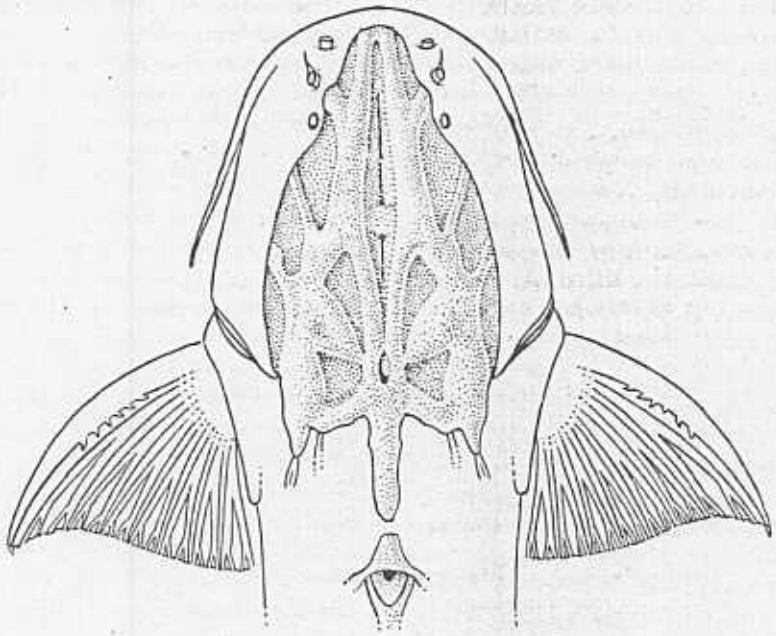
Acrochordonichthys ischnosoma is represented in the collection by a single specimen, 109 mm. in length; it was obtained by Mr. E. O. Shebbeare from the King George V National Park. The entire skin is granular and there are 7 distinct longitudinal rows of tubercles on each side, besides one along the mid-dorsal



Text-fig. 4.—Lateral view in outline of a specimen of *Acrochordonichthys ischnosoma* Bleeker from King George V National Park, Malay Peninsula. × ¾.

line. In all salient characters the specimen agrees with the description of the species as given by Weber and de Beaufort and the drawings by Bleeker in his *Atlas Ichthyologique*.

The respiratory adaptations described by one of us (Hora, *loc. cit.*) in *A. rugosus* are also present in the specimen under report, and they seem to form a very characteristic feature of the genus.



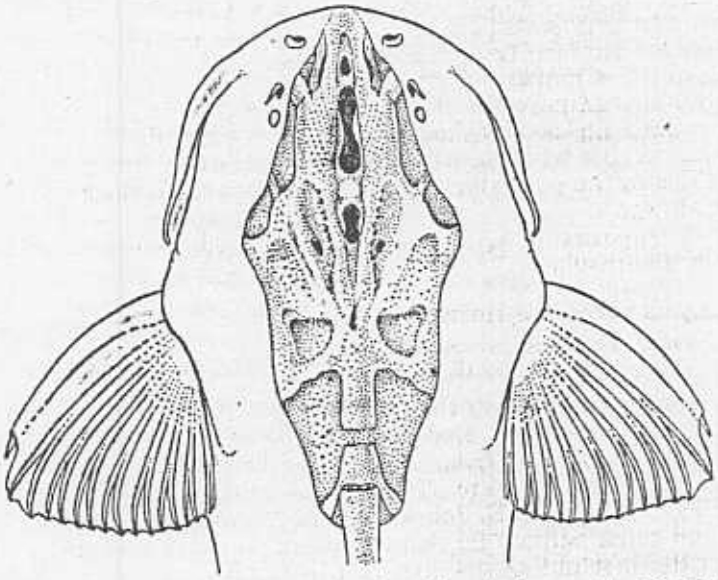
Text-fig. 5.—Dorsal surface of head of *Acrochordonichthys ischnosoma* Bleeker with a part of the skin removed to show the form of occipital process, the position of the fontanels and the associated parts of skull. × 2.

Acrochordonichthys melanogaster (Bleeker)

1913. *Acrochordonichthys melanogaster*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 369.

We have examined a single specimen, 99 mm. in length, of *Acrochordonichthys melanogaster;* it was collected at Kuala Tahan, Pahang (King George V National Park). This species has hitherto been known from a single specimen and can be readily distinguished from the allied forms by its quadratic occipital process. According to Bleeker, its median fontanel reaches to the base of the occipital process, but in the specimen from Pahang it is separated by a considerable distance from the occipital process, at the base of which lies another small, rounded fontanel. As pointed out by Weber and de Beaufort in their

note on the doubtful species of *Acrochordonichthys* (p. 370), "It may be that Bleeker has overlooked the fact that these fontanels are separated."



Text-fig. 6.—Dorsal surface of head and anterior part of body of *Acrochordonichthys melanogaster* (Bleeker) with a part of the skin removed to show the form of the occipital process, the position of the fontanels and the associated parts of skull. × 2.

In the specimen under report the dorsal surface from above the commencement of pelvic fins is marked with a whitish patch which extends halfway along the upper border of the caudal fin; in this whitish area only the tip of the adipose fin is black. We agree with Weber and de Beaufort that forms such as *A. pachyderma* Vaillant, *Sosia chamaleon* Vaillant, *A. obscurus* Popta, *A. büttikoferi* Popta and *A. varius* Popta are probably local or colour varieties of *A. melanogaster*. The median fontanel in all these forms is similar to that described above in the specimen from Pahang.

A. melanogaster is known from Sumatra and ? Borneo; it is recorded here from the Malay Peninsula for the first time.

Acrochordonichthys rugosus (Bleeker)

1913. *Acrochordonichthys rugosus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 368.
1941. *Acrochordonichthys rugosus*, Hora, *Bull. Raffles Mus. Singapore*, No. 17, p. 8.

Acrochordonichthys rugosus was only recently recorded by one of us from Perak; we have now examined three more specimens, one from Ulu Lebir, Kelantan, 81 mm. in length, and two from King George V National Park (Pahang), 42 mm. and 45 mm. in length respectively. In the specimen from Kelantan, the dorsal surface from above the pelvic fins to the base of the adipose fin is marked with a broad saddle-shaped whitish area. Behind the adipose fin the dorsal surface up to the middle of the caudal fin is streaked with white. In one of the young specimens this whitish area is more extensive while in the other the sides in the posterior part of the body are marked with three whitish spots.

A. rugosus is now known from Java, Sumatra and the Malay Peninsula.

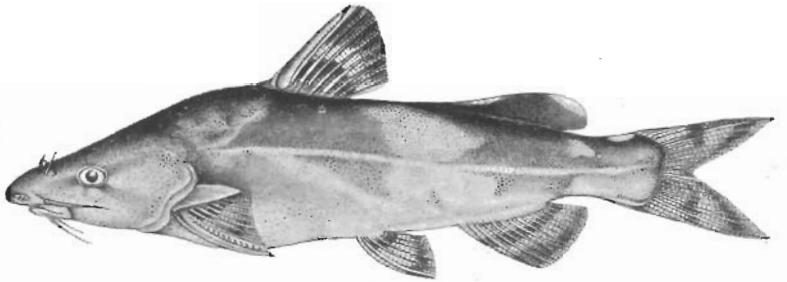
Parakysis verrucosa Herre. (Plate III, fig. 1; plate IV, figs. 2–5)

1940. *Parakysis verrucosa*, Herre, *Bull. Raffles Mus. Singapore*, No. 16, p. 12, pl. vi.

Herre in proposing the genus *Parakysis* noted that "it lacks an adipose dorsal fin", and it is on this character that he seems to have separated it from *Akysis* Bleeker. We have examined 4 young specimens, 26 to 37 mm. in length, of *P. verrucosa* from near Kota Tinggi in S. Johore and find that they possess a long, low and thick adipose fin, which, owing to tubercles on the body, is not distinct unless the specimen is held against the light. It may be noted that Herre also observed that "Some specimens, especially those from Borneo, have a low ridge or keel on the dorsal side of the caudal peduncle". The two genera are, however, abundantly distinct in their general build, the nature of gill-opening and barbels. In *Akysis* the gill-openings extend to the ventral surface for a considerable distance though there is still a broad isthmus separating them; while in *Parakysis* the gill-openings extend just round the base of the pectoral spine and the isthmus is very broad. The small gill-openings of *Parakysis* are still further reduced functionally as valve-like folds inside the gill-openings restrict the flow of the expiratory current to the upper portion where a spout-like structure is formed somewhat similar to that found in *Amblyceps*[1]. The presence of short, accessory, basal barbules at the bases of the mandibulary and mental barbels is a characteristic feature of *Parakysis*.

The alimentary canal (pl. iv, fig. 3) of *P. verrucosa* is a simple tube with only one convolution; there is no marked differentiation between the stomach and other parts of the

1. Hora, S. L.—Siluroid Fishes of India, Burma and Ceylon. I. Loach-like Fishes of the genus *Amblyceps* Blyth. *Rec. Ind. Mus.*, XXXV, p. 611, text-fig. 3 (1933).



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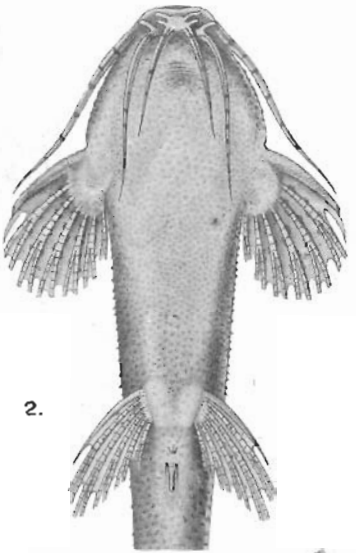

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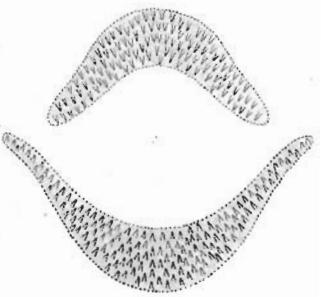

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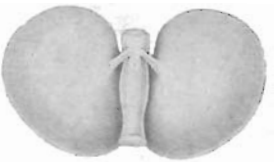

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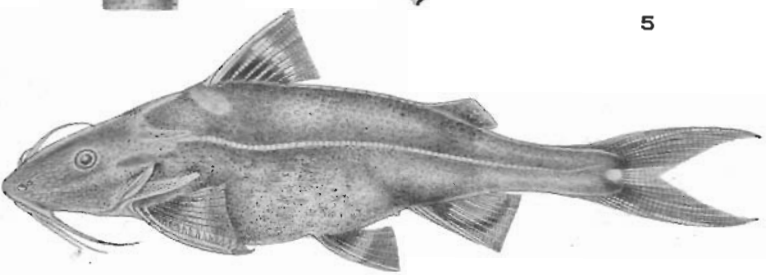

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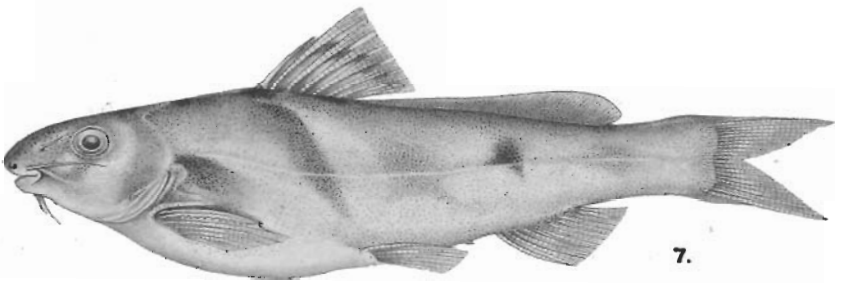

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alimentary canal. The air-bladder (pl. iv, fig. 5) is thin-walled; it is divided into two small rounded chambers which are dorsally enclosed in bony capsules and are connected with *ductus endolymphaticus* by short tubes. The teeth (pl. iv, fig. 4) are villiform and arranged in bands in the jaws; the palate is edentulous.

In general features *Parakysis* appears to be closely related to *Akysis*, but seems to be better adapted for life in torrential streams; its restricted gill-openings and the presence of accessory barbules round the mouth indicate respiratory adaptations for life in swift currents.

P. verrucosa is known from Johore (Malay States) and Sarawak (Borneo).

Family Sisoridæ

The characteristic mountain catfishes of the family Sisoridæ are represented in the fauna of the Malay Peninsula by the genera *Bagarius* Bleeker and *Glyptothorax* Blyth. The two genera can readily be distinguished by the thoracic adhesive apparatus composed of longitudinal plaits of skin which is absent in the former and present in the latter.

In his list of Malayan fishes, Fowler[1] has included *Aspidobagrus gulio* (Ham.) in the family Bagariidæ which is probably an oversight, as this species belongs to the family Bagridæ.

Bagarius is represented by the widely distributed species *B. bagarius* (Ham.), while *Glyptothorax* is represented by four species, *viz.*, *G. majus* (Blkr.), *G. platypogon* (Cuv. & Val.), *G. platypogonoides* (Blkr.) and *G. telchitta* (Ham.). Of the first species, which was recently recorded by Herre from the Malay Peninsula, we have examined several specimens, four of which had been determined by Herre as *G. majus*.

We have not examined any specimen of *G. telchitta*, which was found at Kuala Lumpur by Duncker (Fowler, *loc. cit.*, p. 48). The precise specific limits of Hamilton's *telchitta* are not known[2] and it seems to us probable that the species does not occur outside northern Bengal and Bihar. The occurrence of this species in the Malay Peninsula is thus doubtful. Of *G. platypogonoides* we have examined three specimens, two of which were determined by de Beaufort as such and are now in a very bad state of preservation.

1. Fowler, H. W.—A list of the Fishes known from Malaya. *Fisheries Bull. Singapore*, No. 1, p. 47 (1938).
2. Hora, S. L.—Notes on Fishes in the Indian Museum. V. On the Composite Genus *Glyptosternon* McClelland. *Rec. Ind. Mus.*, XXV, p. 28 (1923).

Bagarius bagarius (Hamilton)

1913. *Bagarius bagarius*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 270.
1936. *Bagarius bagarius*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1938. *Bagarius bagarius*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 47, 248.
1939. *Bagarius bagarius*, Hora, *Journ. Bombay Nat. Hist. Soc.*, XL, pp. 583–593.

Tweedie (*loc. cit.*) has examined a specimen of *Bagarius bagarius* from Singapore, and informs us (*in litt.*) that he has obtained the species at Kuala Tahan. The only other locality in the Malay Peninsula whence it has been recorded is Telan Stream, Perak-Pahang Boundary.

B. bagarius is very widely distributed in the Oriental region. It is a very ancient fish as its fossil remains are known from the Tertiary deposits of the highlands of Padang in Sumatra and the Siwalik rocks of India.

Glyptothorax majus (Boulenger). (Plate III, fig. 2)

1894. *Akysis major*, Boulenger, *Ann. Mag. Nat. Hist.* (6) XIII, p. 246.
1911. *Glyptosternum major*, Regan, *Ann. Mag. Nat. Hist.* (8) VIII, p. 563.
1913. *Glyptosternum majus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 267.
1940. *Glyptothorax majus*, Herre, *Bull. Raffles Mus. Singapore*, No. 16, p. 35.

Glyptothorax majus was described by Boulenger as *Akysis* from several specimens collected in the rivers of Sarawak, Borneo. Regan pointed out its true generic position. According to Weber and de Beaufort, specimens of this species from Borneo had been referred to *G. platypogonoides* by Vaillant and *G. nieuwenhuisi* by Popta. Herre recorded it from several localities in the Malay Peninsula. We have examined specimens of *G. majus* from the following localities:—

	specimens	*mm.*
West of Ginting Sempak, Selangor	1	47
Mawai District, Johore	3	39–44
Jalong, Perak	10	58–73
River Condor, Ulu Galas, Kelantan	3	43–71
River Ketil, Kelantan	5	50–61
Kuala Tahan, Pahang	1	46

The most characteristic feature of the species is its colouration which, according to Boulenger, is as follows:—

> "Dark brown above, whitish beneath; dorsal, pectoral, and adipose fins blackish brown, with a white border; ventrals and anal white, with one or two black bars; caudal blackish brown or black and white, the lobes constantly tipped with white."

The body is covered with well-marked tubercles and the dorsal spine is feebly denticulated in parts along the posterior

border. In the young specimens the body is somewhat more slender and the dorsal spine is sometimes smooth. There is considerable difference in the depth of colouration of the various specimens examined by us, but the general pattern is more or less the same.

Besides Borneo and the Malay Peninsula, *G. majus* has also been recorded from Siam.[1]

Glyptothorax platypogon (Cuv. & Val.)

1913. *Glyptosternum platypogon*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 264, fig. 104.
1937. *Glyptothorax platypogon*, Herre and Myers, *Bull. Raffles Mus. Singapore*, No. 13, p. 68.

Herre and Myers have already recorded *Glyptothorax platypogon* from Johore and Perak. We have examined one specimen from Kuala Tahan, Pahang, which is 70 mm. in length. *G. platypogon* is readily distinguished from the allied species by its broad caudal peduncle and colouration, which is "Lighter or dark olivaceous brown, often with dark spots scattered over the back; belly, underside of head and ventral barbels whitish. Rayed fins of the same colour, their base and irregular peripheral patches dark. Base of caudal dark."

In the specimen under report the lower lobe of the caudal fin is considerably longer. Probably this is an abnormal feature of the specimen.

G. platypogon is known from Java, Sumatra, Borneo and the Malay Peninsula.

Glyptothorax platypogonoides (Bleeker). (Plate IV, fig. 6)

1913. *Glyptosternum platypogonoides*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 267.
1936. *Glyptosternum platypogonoides*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1938. *Glyptothorax platypogonoides*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 248.
1940. *Glyptothorax platypogonoides*, Herre, *Bull. Raffles Mus. Singapore*, No. 16, p. 36.

As pointed out above, two specimens from Ulu Jelai, Pahang, were referred by de Beaufort to *Glyptothorax platypogonoides* and were listed by Tweedie in 1936. These specimens are in a desiccated condition and in a bad state of preservation. We are, therefore, unable to make any comments on them. There are, however, three specimens, 65–71 mm. in length, collected from King George V National Park, which can be definitely assigned to this species. One of the specimens is full of eggs, and in consequence the depth of the body is proportionately greater, but its narrow caudal peduncle enables it to be readily distinguished from *G. majus*. Moreover, in *G. platypogonoides*

1. Suvatti, C.—*Index to Fishes of Siam*, p. 343 (1936).

the colour is "Greenish violet with blue dots; lateral line yellow; dorsal and anal fin with a broad band along the base and along their outer portion; adipose fin and caudal dotted with brown".[1]

In the specimens examined by us the mandibulary barbels are $^3/_5$ of the length of head, instead of being equal to it, and the occipital process is somewhat broader.

Besides Sumatra, *G. platypogonoides* is known from the Malay Peninsula and Siam[2].

Family CHACIDÆ

Chaca chaca (Hamilton)

1913. *Chaca chaca*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 246.
1936. *Chaca chaca*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Chaca chaca*, Herre and Myers, *ibid.*, No. 13, p. 67.
1938. *Chaca chaca*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 247.
1940. *Chaca chaca*, Herre, *Bull. Raffles Mus. Singapore*, No. 16, p. 35.

We have examined a specimen, 118 mm. long, of *Chaca chaca* from the Mawai District, Johore. This is a very queer looking catfish, and is the sole representative of the family. It can readily be distinguished by its short anal fin, which is free from the caudal fin; by the presence of six rays in the pelvic fins, a strong, pungent spine in the dorsal fin and the union of the so-called second dorsal fin with caudal fin to form a procurrent caudodorsal.

Family SCHILBEIDÆ

In Siam and the Malay Archipelago, the family Schilbeidæ is represented by at least four genera in each region which are either identical or closely allied. *Helicophagus* Bleeker, *Laides* Jordan and *Pangasius* Cuvier & Valenciennes are common to the two regions, while *Pseudeutropius* Bleeker is replaced by *Platytropius* Hora in Siam. From the Malay Peninsula, however, no representative of *Helicophagus, Pseudeutropius* or *Platytropius* has yet been described, but it is likely that some members of these genera may be found in the Malay Peninsula. Similarly some species of *Pangasius,* such as *P. nasutus* and *P. macronema,* are not known so far from the Malay Peninsula though they have been recorded from Siam, Borneo and Sumatra.

In the fauna of the Malay Peninsula, this family is represented by *Laides hexanema* (Blkr.), *Pangasius micronema*

1. Günther, A.—*Catalogue of the Fishes in the British Museum*, V, p. 186 (1864).
2. Suvatti, C.—*Index to Fishes of Siam*, p. 81 (1936).

Blkr., *P. pangasius* (Ham.), *P. polyuranodon* Blkr.[1] and *P. ponderosus* Herre & Myers[2].

Laides hexanema (Bleeker)

1913. *Lais hexanema*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 250.
1936. *Lais hexanema*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1938. *Lais hexanema*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 47.

We have examined a single specimen of *Laides hexanema* from the Pahang River; it is 84 mm. in length. On comparing it with Weber and de Beaufort's description, we find that its eyes are proportionately smaller (about 3½ in head instead of 3, space between the eyes on the ventral surface more than diameter of eye), mandibular barbels are shorter (stopping a considerable distance away from pectorals instead of extending to base of pectorals) and the distal portions of the dorsal, pectoral, pelvic, and caudal fins are somewhat lighter in colour instead of being darker.

L. hexanema is found in Java, Sumatra, Borneo, Malay Peninsula and Siam.

Pangasius micronema Bleeker

1913. *Pangasius micronema*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 261.
1937. *Pangasius micronema*, Herre and Myers, *Bull. Raffles Mus. Singapore*, No. 13, p. 67.
1940. *Pangasius micronema*, Herre, *ibid.*, No. 16, p. 35.

We have examined 3 specimens of *Pangasius micronema*, ranging in standard length from 245 to 318 mm., they were collected from the Chenderoh Lake, Perak. In these examples the mandibular barbels are rudimentary, the vomerine and palatine teeth do not form distinct patches but those on each side are united into a common band. The eyes are somewhat more ventrally placed as the distance between them on the ventral surface is about 1·75 times the diameter of the eye.

P. micronema is known from Java, Sumatra, Borneo, Perak and Siam.

Pangasius pangasius (Hamilton)

1913. *Pangasius pangasius*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 256.
1936. *Pangasius pangasius*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Pangasius pangasius*, Herre & Myers, *ibid.*, No. 13, p. 67.
1938. *Pangasius pangasius*, Fowler, *Fisheries Bull. Singapore*, No. 1, pp. 47, 248.

1. Fowler, H. W.—A list of the Fishes known from Malaya. *Fisheries Bull. Singapore*, No. 1, p. 47 (1938).
2. Herre, W. C. T. and Myers, G. S.—A contribution to the Ichthyology of the Malay Peninsula. Part II. Fresh-water Fishes. *Bull. Raffles Mus. Singapore*, No. 13, p. 67 (1937).

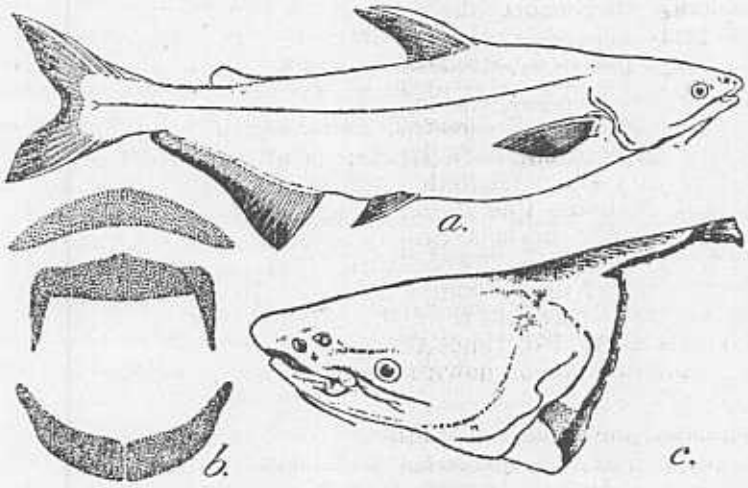
A juvenile specimen of the widely distributed Indian species *Pangasius pangasius* was recorded by Tweedie, (*loc. cit.*) ; it was obtained from the Pahang River near Mentakab. Herre and Myers recorded it from Perak.

Pangasius ponderosus Herre & Myers

1937. *Pangasius ponderosus*, Herre and Myers, *Bull. Raffles Mus. Singapore*, No. 13, p. 67, pl. vi.

Mr. Tweedie collected a specimen of *Pangasius ponderosus*, 27 inches long, from Kuala Tahan, Pahang. Being unable to preserve the entire specimen he took a photograph and the following particulars about the individual and then preserved its head.

"Length with caudal	.. ..	27 inches.
Depth ..	.. ..	6 ,,
Depth of caudal peduncle	..	1¾ ,,
Rays in dorsal	.. ..	1/7
Rays in anal	.. ..	3/23
Rays in pectoral	.. ..	1/11
Rays in ventral	.. ..	1/5



Text-fig. 7.—*Pangasius ponderosus* Herre and Myers.
a, Lateral view of a specimen 27 inches long from Kuala Tahan, Pahang. The sketch was made from a photograph and data supplied by Mr. M. W. F. Tweedie, while the head portion was finished from the specimen; *b*. Upper and lower dentition. × ½; *c*. Lateral view of head. × ½.

A group of large pores exuding slime is in the axil of each pectoral. Colour greyish green above, livid white below, the dividing line between the two running ½ inch above the lateral

line behind ventrals; descending thence to pectorals and about level of eye on head".

A detailed study of the head has shown that it differs in the following particulars from Herre and Myers' description of the species:—

(i) The eye is somewhat smaller, its diameter being contained 13 times in head (*versus* 11 times) and about 8·5 times in interorbital width (*versus* 6·25 times).

(ii) The posterior nostril is more or less in a line with the anterior one, instead of being much higher.

(iii) The mandibular barbel is nearly 2½ times the diameter of the eye, instead of being a little longer than the eye.

As the species is known from only two specimens, we regard these differences as individual variations and attach no specific value to them.

A reference to literature has shown that Fowler's *Pangasius taeniura* from Siam is very closely allied to *P. ponderosus*. In the former the barbels are somewhat longer and the head and the eyes are proportionately larger. These differences may be due to the fact that the only specimen known of *P. taeniura* is 85 mm. in total length, while the two known examples of *P. ponderosus* are over 600 mm. in length. When further material of the two species becomes available, it is likely that they will be found to be identical.

Pangasius ponderosus is so far known only from the Malay Peninsula.

Family CLARIIDÆ

The family Clariidæ is represented by six species in the fauna of the Malay Peninsula; they are distributed in three genera which may be distinguished by the following key:—

Key to the Malayan genera of the Clariidæ

A. Dorsal fin divided into two parts, the first of soft rays, the second an adipose fin of great length .. .. *Encheloclarias* Herre & Myers.[1]

B. Dorsal fin long and undivided, composed of soft rays only—

I. Dorsal, caudal and anal fins normally confluent to form a single fin .. *Prophagorus* Smith.[2]

II. Dorsal, caudal and anal fins separate *Clarias* Gronovius.

1. Herre, A. W. C. T. and Myers, G. S.—A Contribution to the Ichthyology of the Malay Peninsula. Part II. Fresh-water Fishes. *Bull. Raffles Mus. Singapore*, No. 13, p. 68 (1937).

2. Smith, H. M.—A New Genus of Clariid Catfishes. *Copeia*, No. 4, p. 236 (1939).

The first two genera are monotypic, each being represented by a single species. *Encheloclarias tapeinopterus* (Bleeker) had hitherto been included in the African genus *Heterobranchus* Geoffroy St. Hilaire and was only known from Banka and Sarawak (Borneo). Dr. A. W. C. T. Herre obtained a living specimen at Mawai, Johore. We have not examined any specimen of this species. *Prophagorus nieuhofi* (Cuvier & Valenciennes) is found in Java, Sumatra, Banka, Biliton, Borneo, Philippines, Malay Archipelago and Siam. We have examined one partly desiccated specimen of the species and find that on the nature of its confluent vertical fins it may merit a generic distinction from *Clarias*, a genus which is widely distributed in Africa, Syria, Southern Asia and the East Indian Archipelago.

Clarias batrachus (Linnaeus)

1913. *Clarias batrachus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 190.
1936. *Clarias batrachus*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Clarias batrachus*, Herre and Myers, *ibid.*, No. 13, p. 65.
1938. *Clarias batrachus*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 43.

Clarias batrachus is the most widely distributed species of the Oriental Region; we have examined four specimens, ranging in length from 120 to 182 mm., from Perlis, Singapore and Kedah. The interorbital distance is liable to vary considerably; in two specimens it is contained almost twice in the length of the head.

Clarias leiacanthus Bleeker

1913. *Clarias leiacanthus*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 192.
1936. *Clarias leiacanthus*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Clarias leiacanthus*, Herre and Myers, *ibid.*, No. 13, p. 65.
1938. *Clarias leiacanthus*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 247.

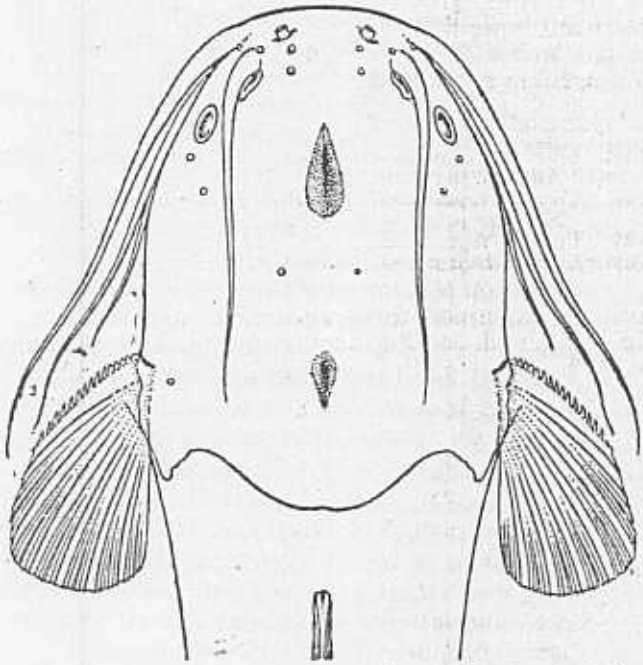
We have examined four specimens of *Clarias leiacanthus*, three from Perak and one from Johore; they vary in length from 245 mm. to 395 mm. It may be noted that according to Weber and de Beaufort this species attains a length of 330 mm. in the Malay Archipelago; two specimens from Chenderoh Lake, Perak, are 360 mm. and 395 mm. in length respectively.

In two of the specimens under report the pectoral spine, which is generally smooth, is feebly serrated; while the maxillary barbels do not reach the pelvic fins by a considerable distance in any of the specimens (according to Weber and de Beaufort they nearly reach the pelvic fins).

Clarias melanoderma Bleeker

1913. *Clarias melanoderma*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 188.
1937. *Clarias melanoderma*, Herre and Myers, *Bull. Raffles Mus. Singapore*, No. 13, p. 66.
1938. *Clarias melanoderma*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 44.

Clarias melanoderma is characterised by the possession of strong, almost vertical teeth on the front margin of pectoral spine. We refer to this remarkable species two specimens, about 109 mm. and 193 mm. in length respectively; they were



Text-fig. 8.—Upper surface of head and anterior part of body of a specimen of *Clarias melanoderma* Bleeker from the King George V National Park, Malay Peninsula. × 1½.

collected from King George V National Park. These specimens do not agree with the description of the species by Weber and de Beaufort in the following particulars:—

(i) In the smaller specimen the distance between the dorsal fin and the occipital process is ¼ (instead of $^1/_6$) of the distance between the last-named and the tip of the snout.

(ii) The front border of the frontal fontanel is in line with the front borders of the eyes, instead of being behind the eyes.
(iii) The nasal barbels reach occipital fontanel, instead of the dorsal fin.
(iv) In the larger specimen the length of the pectoral fin is relatively less, being equal to the postorbital part of the head to the gill-opening.
(v) In the larger specimen the general colouration is a neutral tint with black spots irregularly distributed over the body and fins.

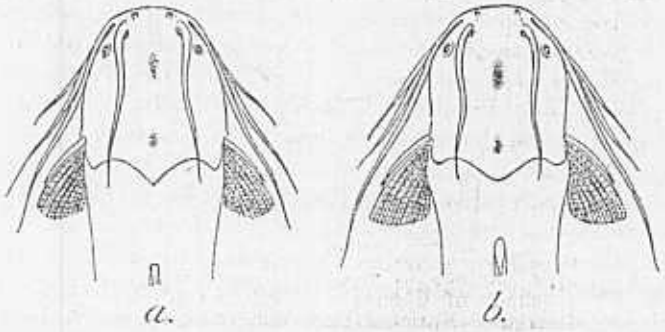
As the species grows to about 340 mm. in length, we do not attach any specific value to the above noted differences.

Clarias melanoderma is found in Java, Sumatra, Borneo, Philippines, Siam and China.

Clarias teysmanni Bleeker

1913. *Clarias teysmanni*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 191.
1936. *Clarias teysmanni*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1937. *Clarias teysmanni*, Herre and Myers, *ibid.*, No. 13, p. 66.
1938. *Clarias teijsmanni*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 44.

We have examined three specimens of *Clarias teysmanni* from Kelantan and Johore; they range in length from 171 to 180 mm. The shape of the occipital process is variable. In the



Text-fig. 9.—Upper surface of head and anterior part of body of two specimens of *Clarias teysmanni* Bleeker from Malaya, showing differences in the shape of the occipital process. *a*. From Kelantan; *b*. From Johore.

two specimens from Kelantan it is distinctly pointed, while in the example from Johore it is broadly pointed. In the Kelantan specimens the distance between the occipital process and the dorsal fin is also proportionately greater.

Prophagorus nieuhofi (Cuv. & Val.)

1913. *Clarias nieuhofi*, Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, II, p. 189.
1936. *Clarias nieuhofi*, Tweedie, *Bull. Raffles Mus. Singapore*, No. 12, p. 18.
1938. *Clarias nieuhofi*, Fowler, *Fisheries Bull. Singapore*, No. 1, p. 44.
1939. *Prophagorus nieuhofi*, Smith, *Copeia*, No. 4, p. 236.
1940. *Clarias nieuhofi*, Herre, *Bull. Raffles Mus. Singapore*, No. 16, p. 35.

We have examined a single specimen of *Prophagorus nieuhofi* from the Sedagong River, Tioman Island on the east coast of the Malay Peninsula; it is 310 mm. in length and is partly desiccated. A portion of the dorsal fin near its junction with the caudal is damaged. On comparing it with the description of the species as given by Weber and de Beaufort, we find that its head is considerably longer than its breadth (*versus* "Length of head to gill-opening nearly equalling its greatest breadth") and the interorbital distance is less than the width of the mouth (*versus* "Eye-distance greater than mouth opening").

EXPLANATION OF PLATE II

Fig. 1.—Lateral view of a specimen of *Silurichthys schneideri* Volz from Jalong, Perak. × ¾.
Fig. 2.—Lateral view of a specimen of *Leiocassis fuscus* Popta from Mawai District, Johore. × 3.

EXPLANATION OF PLATE III

Fig. 1.—Lateral view of a specimen of *Parakysis verrucosa* Herre from Kota Tinggi, S. Johore. × 3¾
Fig. 2.—Lateral view of a specimen of *Glyptothorax majus* (Boulenger) from Ketil R., Kelantan. × 2¼

EXPLANATION OF PLATE IV

Fig. 1.—Lateral view of a specimen of *Leiocassis baramensis* Regan from the Malay Peninsula. × ⅔
Fig. 2.—Ventral surface of head and anterior part of body of a specimen of *Parakysis verrucosa* Herre from Kota Tinggi, S. Johore. × 3 ⅓
Fig. 3.—Alimentary canal of *Parakysis verrucosa* Herre. × 7.
Fig. 4.—Dentition of same. × 24.
Fig. 5.—Air-bladder of same. × 8.
Fig. 6.—Lateral view of a mature female specimen of *Glyptothorax platypogonoides* (Bleeker) from King George V National Park. × 1 ⅓
Fig. 7.—Lateral view of a specimen of *Batasio tengana* (Hamilton) from Chenderoh Lake, Perak. × 1