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By

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NOTES ON FISHES IN THE INDIAN MUSEUM.

XLVII.—REVISION OF THE GLYPTOSTERNOID FISHES OF THE FAMILY SISORIDAE, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES.

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[PLATE I.]

INTRODUCTION.

In 1922, while discussing the structural modifications of the fish of mountain torrents, in a foot note, one of us¹ suggested certain nomenclatorial changes in the Glyptosternoid group of the Sisorid fishes, and thereby restricted the use of the generic name *Glyptosternum* McClelland to the species in which “*the first ray of the pectoral and ventral fins soft and pinnate, giving off soft pointed cartilaginous rays along the anterior margin ; which are enveloped in the membrane of the fin*”. (Italics are ours). Blyth² had already restricted this name for *G. reticulatum* McClelland from Afghanistan in which the nature of the first ray of the paired fin had been described by McClelland³ as quoted above. As other species under *Exostoma* Blyth, such as *Exostoma labiatum* McClell. (Hora, *loc. cit.*, p. 37, text-fig. 1a), showed a similar structure of the first ray of the paired fins, they were also referred to *Glyptosternum*. As the structure of the first ray of the paired fins of the so-labelled type-specimen of *Exostoma berdmorei* Blyth, the type of the genus *Exostoma*, showed features similar to those of species included under *Glyptothorax* Blyth and dissimilar to that described for *Glyptosternum*, *Exostoma* was considered a synonym of *Glyptothorax*. These nomenclatorial changes were subsequently elaborated by Hora⁴ in his revision of the composite genus *Glyptosternon* McClelland, wherein he discussed Regan's⁵ classification of Glyptosternoid fishes into *Parexostoma* Regan, *Euchiloglanis* Regan and *Exostoma* Blyth. Hora recognised differences in dentition among the species included by him under *Glyptosternum* and in fact figured four main types. He, however, stated that:—

“by relying only on the arrangement and the nature of the teeth, the genus *Glyptosternum* can be split up into four groups, but there are equally important characters such as the nature of the gill opening and the labiat fold, which do not permit of such a division.”

Regan⁶ in a note on the Siluroid genera *Glyptosternum* and *Exostoma* did not agree with Hora's conclusions and with regard to the former genus remarked that “I do not think the matter can be carried further until *Gl. reticulatus* has been rediscovered and redescribed.” Norman⁷ in describing two new fishes from Tonkin, made comments on the Siluroid genera *Glyptosternum* and *Exostoma* and upheld Regan's

¹ Hora, S. L., *Rec. Ind. Mus.*, XXIV, pp. 33, 37 (1922).

² Blyth, E., *Journ. As. Soc. Bengal*, XXIX, p. 153 (1860).

³ McClelland, J., *Calcutta Journ. Nat. Hist.*, II, pp. 584-585 ; 587-588 (1842).

⁴ Hora, S. L., *Rec. Ind. Mus.*, XXV, pp. 1-44, pls. i-iv (1923).

⁵ Regan, C. T., *Ann. Mag. Nat. Hist.*, (8), VIII, p. 564 (1911).

⁶ Regan, C. T., *Ann. Mag. Nat. Hist.*, (9), XI, p. 608 (1923).

⁷ Norman, J. R., *Ann. Mag. Nat. Hist.*, (9), XV, p. 570 (1925).

classification, in spite of Annandale's¹ clear exposition of the relative merits of Regan's and Hora's points of view. Whereas, Annandale agreed with Hora that the stage had not then reached of splitting up McClelland's *Glyptoternum* as restricted to *G. reticulatum*, Norman recognised Hora's four types of dentition groups and established a new genus *Glaridoglanis* for Hora's *Glyptosternum andersonii*.

In 1931, Myers² examined the nomenclatorial position of the genera *Glyptothorax* and *Glyptosternum* and concluded :

" Thus it seems certain that the name *Glyptosternon* belongs with the group usually called *Exostoma*. This group has, however, been split into four genera by Norman (paper mentioned below, in foot note). Hora does not recognize these groups as of generic rank, and he does not attempt to place *G. reticulatum* in his key. Until more material of this type species is obtained from McClelland's type locality, the name *Glyptosternon* cannot be applied to any of the four, all of which are good genera. Hora's attempt to change the type of *Glyptosternon* from *reticulatum* to *labiatum* is in violation of the International Rules and cannot be accepted. Furthermore, it appears to be fairly certain (following Hora and Annandale) that the type of *Exostoma* (*E. berdmorei*) is a *Glyptothorax* and that the group called *Exostoma* by Norman is at present without a name (unless it is found that *Glyptosternon* actually belongs here ").

In 1932, Hora³ announced the rediscovery of McClelland's *G. reticulatum* and showed that it was in fact the same species as *Parexostoma stoliczkae* (Day). His material was then obtained from Chitral whence waters drain into the Kabul river, the type locality of the species. If any doubt was still left about the identity of *G. reticulatum*, it was finally removed when specimens were reported upon by Hora from Afghanistan.⁴

Smith⁵ and Berg⁶ recognised *Glyptosternum* as restricted to *G. reticulatum* with *Parexostoma* Regan as its synonym. Smith described a new genus in this group from Siam, mostly on teeth characters, but recognised *Exostoma* Blyth in his key to the five genera then known in this group. In 1934, Hora⁷ gave a detailed definition of the genus *Glyptosternum* and also commented on the distribution and bionomics of the species *G. reticulatum*. He stated that "*In view of this evidence it is now possible to split up the composite assemblage and to define the generic limits of each group*". (Italics are ours). Though Hora was then prepared to recognise a number of genera in this heterogenous assemblage of species included by him under *Glyptosternum*, he did not actually do so. He only redefined the genus *Glyptosternum* and offered no comments on the status of other genera recognised by Regan, Norman and Smith.

We have now re-examined the rich material of Glyptosternoid fishes in the collection of the Zoological Survey of India (*Ind. Mus.*, Calcutta)

¹ Annandale, N., *Ann. Mag. Nat. Hist.*, (9), XII, 573 (1923).

² Myers, G. S., *Lingnan Sci. Journ.*, X, p. 260 (1931).

³ Hora, S. L., *Ann. Mag. Nat. Hist.*, (10), X, p. 176 (1932); *Curr. Science* I, p. 130 (1932).

⁴ Hora, S. L., *Journ. Bombay Nat. Hist. Soc.* XXXVI, p. 697 (1933); *ibid.*, XXXVII, p. 787 (1935).

⁵ Smith, H. M., *Journ. Siam Soc., Nat. Hist. Suppl.*, IX, pp. 70-74 (1933).

⁶ Berg, L. S., *Poiss. Eaux Douces, U. S. S. R.*, 3rd Ed., pt. ii, p. 596 (1933).

⁷ Hora, S. L., *Rec. Ind. Mus.*, XXXVI, pp. 285-292 (1934).

and have carefully assessed their diagnostic characters in the light of the opinions discussed above. As a result of this study, we have been obliged to create some new genera for a satisfactory classification of these remarkable torrential fishes. As is usual with the Siluroids, we have based our major subdivisions on the nature of teeth in both jaws and the form of the teeth-bands. The extent of the gill-openings, nature of the post-labial groove, number of branched rays in the pectorals, extent of the pectorals in relation to the commencement of the pelvics, form of caudal peduncle, the extent of the pelvics in relation to vent and the commencement of the anal fin, etc., are no doubt adaptive characters induced by the factors of a torrential stream environment, but fairly well-marked to be given a generic significance. The above characters are a mix up as was pointed out by Hora in 1923, but the systematics of the group are now sufficiently clear to recognise the following genera :—

Key of the Glyptosternoid genera.

- I. All teeth in both jaws conical and pointed.
 - A. Teeth in upper jaw forming a continuous band which is produced backwards at the sides. (Post-labial groove widely interrupted).
 - 1. Gill-openings extending to ventral surface of body. Pectorals with 11 branched rays. .. *Glyptosternum* McClelland.
 - 2. Gill-openings restricted to the dorsal surface. Pectorals with 13 branched rays. .. *Coroglanis*, gen. nov.
 - B. Teeth in upper jaw forming a bilobed band which is not produced backwards at the sides. Gill-openings restricted to dorsal surface.
 - 1. Post-labial groove interrupted. Pectorals with 13 to 17 branched rays. .. *Euchiloglanis* Regan.
 - 2. Post-labial groove continuous. Pectorals with 16 to 19 branched rays. .. *Myersglanis*, gen. nov.
- II. All teeth in both jaws not conical and pointed.
 - A. Teeth in upper jaw form a narrow, continuous band which is not produced backwards at the sides.
 - 1. Teeth in both jaws greatly compressed, with broad, emarginate or notched apices (Post-labial groove widely interrupted; gill-openings restricted to the dorsal surface; pectorals with 10 branched rays. ... *Glaridoglanis* Norman.
 - 2. Teeth in upper jaw conical and pointed, those in lower jaw of two distinct types: posterior conical and pointed while the anterior much larger with slender base and free end expanded into a truncate-spatulate shape with inner surface slightly hollow. (Post-labial groove continuous; gill-openings restricted to dorsal surface; pectorals with 17 or 18 branched rays. ... *Oreoglanis* Smith.

- B. Teeth in upper jaw arranged in two well-separated patches. Teeth in both jaws oar-shaped, flattened distally, depressed and directed backwards (Post-labial groove continuous; gill-openings restricted to the dorsal surface; Pectorals with 10 or 12 branched rays; in one species 17 to 18 branched rays). *Exostoma* Blyth.

Glyptosternum McClelland.

1842. *Glyptosternon*, McClelland, in part, *Calcutta Journ. Nat. Hist.*, II, p. 584.
 1860. *Glyptosternon*, Blyth, *Journ. As. Soc. Bengal*, XXIX, p. 152.
 1905. *Parexostoma*, Regan, *Ann. Mag. Nat. Hist.*, (7), XV, p. 182.
 1923. *Glyptosternum* (in part Group I.), Hora, *Rec. Ind. Mus.*, XXV, p. 30.
 1934. *Glyptosternum*, Hora, *Rec. Ind. Mus.*, XXXVI, p. 285. (Synonymy, discussion and characterisation of the genus).

For the diagnostic features of *Glyptosternum*, reference may be made to the key above and to the detailed description given by Hora in 1934.

Genotype.—*Glyptosternum reticulatum* McClelland.

Distribution.—Head waters of the Indus (Basgo, Sneema, Leh, Ladak and the Kashmir Valley), head waters of the Kabul River (Afghanistan and Chitral), the Oxus River System (the Syr-Darya and the Amu-Darya in Eastern Turkestan, and Bamain River in Afghanistan), Eastern Tibet and Sikkim.

Key to the species of Glyptosternum McClelland.

- I. Rayed and adipose dorsals separated by considerable space.
- A. Caudal peduncle 3 times as long as deep. Pectorals extending $\frac{2}{3}$ to $\frac{3}{4}$ of the distance to the bases of the pelvises. *G. reticulatum* McClell.
- B. Caudal peduncle 2 times as long as deep. Pectorals extending $\frac{1}{2}$ to $\frac{3}{8}$ of the distance to the bases of the pelvises. *G. maculatum* Regan.
- II. Rayed and adipose dorsals almost continuous; caudal peduncle $2\frac{1}{2}$ times as long as deep. Pectorals extending $\frac{3}{4}$ of the distance to the bases of the pelvises. *G. akhtari* Silas, sp. nov.

Glyptosternum reticulatum McClelland.

1842. *Glyptosternon reticulatus*, McClelland, *Calcutta Journ. Nat. Hist.*, II, p. 584.
 1934. *Glyptosternum reticulatum*, Hora, *Rec. Ind. Mus.* XXXVI, p. 287. (synonymy, distribution, sexual-dimorphism, proportion of sexes and bionomics).

Type-locality.—Sir-i-Chushma, at the source of the Kabul River, Afghanistan.

Type-specimen.—Does not seem to have been preserved.

Logo-types.—Several specimens have now been obtained from Chitral and Afghanistan whence waters drain into the Kabul River. No specimen from Sir-i-Chushma has, however, been collected in recent years. Major A. E. Farwell¹ obtained specimens of *Oreinus* and *Nemachilus* from

¹Hora, S. L., *Journ. Bomb. Nat. Hist. Soc.*, XXXVII, p. 784, (1935).

there. It is probable that the conditions of life in the spring may have changed since Griffith obtained his specimens which were reported upon by McClelland.

Distribution.—Same as that of the genus with the exception of the Bamian River, Eastern Tibet and Sikkim.

List of specimens in the Zoological Survey of India Collection (Indian Museum).

Reg. No.	Locality.	Donor or Collector.	No. of specimens and state of preservation.
497	Harwan, Kashmir.	Purchased from F. Day. Original of Day's <i>Fishes of India</i> , pl. cxvii, fig. 3. Type of <i>Exostoma stoliezkae</i> Day.	1 specimen. Left pectoral and part of the pelvices slightly damaged.
F.10133/1	Harwan, Kashmir.	Kashmir Survey	.. 2 specimens. Dorsal and left pectoral of one specimen damaged.
F.641/2	From a small rapid stream near Kola Tee, Ladak-Kashmir.	Dr. Hutchinson	.. 2 specimens. In good state of preservation.
1102	} Sneema, Kashmir.	Purchased from F. Day.	5 specimens in good state of preservation.
1104			
1105			
1106			
1107	} Basgo, Kashmir.	Do.	.. 4 specimens in good state of preservation.
1113			
1114			
1115			
1116	} Leh, Kashmir.	Do.]	.. 3 specimens in good state of preservation. 1 specimen slightly damaged.
1196			
1197			
1198			
F. 11307/1	Palagra stream, 2 miles below Kunisht in Chitral.	Dr. B. N. Chopra	.. 16 specimens. All in good state of preservation.
F. 11308/1	Lutkuh River, Chitral,	Do. 2 specimens in good state of preservation.
F. 11309/1	Mastung River between Koghazi and Mustang, Chitral.	Do. 1 specimen in good state of preservation.

List of specimens in the Zoological Survey of India Collection (Indian Museum)—contd.

<i>Reg. No.</i>	<i>Locality.</i>	<i>Donor or Collector.</i>	<i>No. of specimens and state of preservation.</i>
F. 11310/1	Small spring between Tar and Drosh, Chitral.	Dr. B.N. Chopra	.. 1 specimen.
F. 11311/1	Kamramgol, near its Junction with Chitral river below Aranda, Chitral.	Do. 2 specimens in good state of preservation.
F. 11312/1	Bambout river between Daimeli and Karakal, Chitral.	Do. 75 specimens. All in good state of preservation.
F. 11312/1	Chitral ..	Do. 24 specimens. A few in very bad state of preservation.
F. 11516/1	Paghman river, Afghanistan.	British Legation, Kabul.	1 specimen in a fairly good state of preservation.
F. 11640/1	Surchat river, Afghanistan.	Zoological Museum der Universitat, Moscow (Russia).	1 specimen in good state of preservation.

***Glyptosternum maculatum* (Regan).**

1905. *Parexostoma maculatum*, Regan, *Ann. Mag. Nat. Hist.* (7), XV, p. 183.

1923. *Glyptosternum maculatum*, Hora, *Rec. Ind. Mus.* XXV, p. 36, text-fig. 1, pl. iii, figs. 4 and 5.

Type-locality.—Lhasa, Tibet.

Type-specimen.—In the collection of the British Museum of Natural History (2 specimens, type not specified).

List of specimens in the collection of the Zoological Survey of India (Indian Museum).

<i>Reg. No.</i>	<i>Locality.</i>	<i>Donor or Collector.</i>	<i>No. of specimens and state of preservation.</i>
F. 2145/1	Gyangtse, Tibet ..	Capt. F. H. Stewart, I.M.S.	1 specimen. The head near the occiput is slightly damaged.
F. 10132/1	Sikkim ..	Lord Carmichael ..	1 specimen. The caudal peduncle is badly damaged.

Since Hora examined this collection in 1923, one specimen from Gyangtse appears to have been lost in the floods of the Varuna River at Banaras in September 1943.

The specimen from the Sikkim Himalayas bears no definite locality, but it can safely be presumed that it may have come from the streams along the northern slopes of the Himalayas in the region of Sikkim. Extensive collections made in the Tista drainage have not revealed the presence of this species. Along with its two other congeners, it can be assigned to the Trans-Himalayan fauna.

***Glyptosternum akhtari* Silas, sp. nov.**

(PLATE I, FIGS. 4-6)

D. 1/6/0; A. 1/5; P. 1/11; V. 1/5; C. 17.

In general facies, *Glyptosternum akhtari* resembles *G. reticulatum* but differs from it in having more extensive paired fins, and adipose dorsal. The head and the body are greatly flattened and the ventral profile is horizontal. The dorsal profile is slightly arched. The ventral surface of the head is closely papillated.

The length of the head is contained $4\frac{3}{4}$ to 5 times and the depth of the body and 7 to $7\frac{1}{2}$ times in the total length. The head is slightly longer than broad. The eyes, which are placed midway between the tip of the snout and the post-orbital part of the head are small and are not visible from the ventral surface. The interorbital width is $3\frac{1}{2}$ to 4 times in the length of the head.

The maxillary barbels reach nearly the upper angles of the gill-openings. The outer mandibular barbels are longer than the inner and are as long as the nasal barbels. The length of the nasal barbels are contained $2\frac{1}{4}$ to $2\frac{1}{2}$ times in the length of the head, and they extend beyond the eye. The post-labial groove is broadly interrupted. The width of the mouth is contained $2\frac{1}{2}$ to $2\frac{3}{4}$ times in the length of the head. The teeth in both jaws are pointed, and in the upper jaw they form a band which is produced backwards at the sides. In the lower jaw they are in two distinct bands which are pointed at the sides. The gill-openings extend for a short distance on the ventral surface. The width of the isthmus is nearly half the length of the head.

The dorsal commences nearer to the tip of the snout than to the base of the caudal fin. The distance from the tip of the snout to the commencement of the dorsal is contained $1\frac{1}{2}$ times in the distance from the commencement of the dorsal to the base of the caudal fin. The dorsal fin arises a little in front of the extremity of the pectorals. The pectorals are a little longer than the head and possess 11 branched rays. The outer ray of the pectoral and pelvic fins correspond to the structure described by McClelland for *G. reticulatum* and figured by Annandale. The pelvics extend for a short distance beyond the anal fin. The caudal fin is truncate. The least height of the caudal peduncle is contained about $2\frac{1}{2}$ times in its length. The vent is placed closer to the commencement of the anal fin than to the origin of the pelvics. The adipose dorsal arises beyond the free extremity of the dorsal and is not confluent with the caudal.

In spirit, the colour of the specimens is greyish with the ventral surface lighter. The posterior portions of the anal and caudal fins are black.

The following table shows the main differences between *G. akhtari* and *G. reticulatum* :—

<i>G. akhtari.</i>	<i>G. reticulatum.</i>
1. Least height of caudal peduncle is contained $2\frac{1}{2}$ times in its length.	Least height of caudal peduncle is contained 3 times in its length.
2. The adipose dorsal commences behind the free extremity of the dorsal.	The adipose dorsal is separated from the free extremity of the dorsal by a considerable distance.
3. The pelvics extend for a short distance beyond the commencement of the anal.	The pelvics are separated from the commencement of the anal by a considerable distance.
4. The distance between the tip of the snout and the origin of the dorsal is contained $1\frac{1}{2}$ times in the distance between the commencement of the dorsal and the base of the caudal.	The distance between the tip of the snout and the origin of the dorsal is contained nearly 2 times in the distance between the commencement of the dorsal and the base of the caudal.
5. The length of the dorsal is contained about $5\frac{1}{2}$ times in the total length.	The length of dorsal is contained $7\frac{1}{2}$ to 8 in the total length.

Type-locality.—Bamian River, Oxus Watershed, Afghanistan.

Type-specimen.— F. 643/2, *Zoological Survey of India*, (Indian Museum). There is also a cotype No. F. 644/2.

The species is named after Mr. A. S. Akhtar, Professor of Biology, Faculty of Medicine, University of Kabul, Afghanistan, in slight recognition of the valuable collections of fish he made in Afghanistan from time to time for Dr. S. L. Hora of the Zoological Survey of India.

Coraglanis gen. nov.

(PLATE I FIG. 1-3)

1934. *Euchiloglanis* (in part), Kimura, *J. Shangai Sci. Inst.*, Sec. 3, I, p. 178.

For the diagnostic features of the genus *Coraglanis* reference may be made to the key on page 7. For a detailed description, the account of the only species known given below may be consulted.

Genotype.—*Coraglanis kishinouyei* (Kimura).

Type-locality.—Chengtou or Kiating, Szechwan, China.

We have great pleasure in associating this remarkable genus with the name of Dr. Cora D. Reeves, now on the staff of the Montreal College, Montreal, North Carolina, U. S. A., who collected the specimens in 1940.

Coraglanis kishinouyei Kimura.

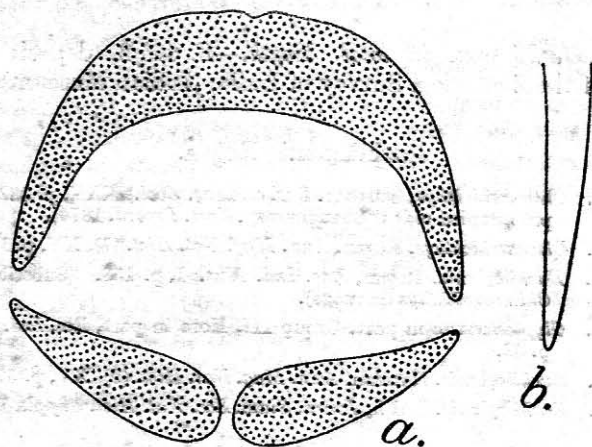
1934. *Euchiloglanis kishinouyei*, Kimura, *J. Shangai Sci. Inst.*, sec. 3, I, pp. 178-179, pl. vi, fig. 1-3.

D. $1/6|0$; P. $1/13$; V. $1/5$; A. $1/5$; C. 17.

To this remarkable species are referred two medium sized specimens obtained by Dr. Cora D. Reeves from the markets of Chengtu and Kiating in China. Their characteristic features are drawn up below.

The head and body are considerably depressed. The dorsal profile is slightly arched, and rises gradually from the tip of the snout to the origin of the dorsal fin, whence it slopes down gradually to the caudal peduncle, where it is horizontal. The head is slightly longer than broad. It is contained $3\frac{1}{4}$ to 4 times in the standard length. The depth of the body is half or slightly more in the length of the head. It is also contained $7\frac{1}{2}$ to $8\frac{3}{4}$ in the total length. The length of the snout is equal to the postorbital part of the head. The eyes, which are dorso-lateral in position, are situated in the middle of head and are not visible from the ventral surface. The diameter of the eye is contained $9\frac{1}{2}$ to $10\frac{1}{2}$ times and the interorbital width about 2 times in the length of the snout. The diameter of the eye is also contained about 5 times in the interorbital width. The snout is considerably depressed and broad anteriorly.

The mouth is subterminal and is more transverse than crescentic. It is fringed anteriorly by a thick lip which is continuous with the fold of the lower lip at the angles of the mouth. The post-labial groove is broadly interrupted. The teeth are sharp and those on the upper jaw form a transverse band, which is produced backwards at the sides. The teeth on the lower jaw form two bands which are pointed towards the sides.



TEXT-FIG. 1. Teeth bands of *Coraglanis kishinouyei* along with a tooth of the upper jaw magnified. a. Teeth bands $\times 5$; b., One tooth $\times 30$.

Four pairs of barbels are present. The nasal barbels extend up to the preorbital part of the eyes. The maxillary barbels are provided with very broad bases and on the ventral surfaces of their outer half bear striated pads of adhesive skin. The maxillary barbels also extend nearly to the upper angle of the gill-openings. The gill-openings are restricted and extend only upto above the base of the pectoral spine. The gill membrane is broad and free throughout its length.

The dorsal fin originates posterior to the base of the pectoral fin, but slightly in advance of the free extremity of the pectorals. The length

of the dorsal is greater than the depth below it and is contained about $6\frac{1}{4}$ times in the total length. The dorsal possesses 6 branched rays. The paired fins are broad, rounded and horizontally placed. They are vertical in their inner and horizontal in their outer halves. The pectorals are as long as the head and are separated from the pelvics by a short distance. The number of branched rays in the pectorals is 13. The pelvics commence opposite the posterior end of the base of the dorsal, and are almost as long as the dorsal and possess 5 branched rays. The anal is with 6 rays. The adipose dorsal is long and low and separated from the caudal by a short distance. The caudal is truncate and its length is contained $7\frac{1}{2}$ times in the total length. The caudal peduncle is about 3 times as long as deep.

The colour of the specimens in spirit is brown all over the dorsal surface and the sides of the body, while the fins and the lower surface are pale. The caudal is tinged with a broad dark transverse band.

Type-locality.—Chengtou or Loshan (=Kiating) markets (Min River drainage), Szechwan, China.

Type specimen, 126.5 mm. in total length.—M. 158522 is placed in the Museum of Zoology, University of Michigan, Ann Arbor, Michigan, U. S. A.

Cotype, 113.25 mm. in total length.—F. 646/2, deposited in the collection of the Zoological Survey of India, (Indian Museum), Calcutta.

Euchiloglanis Regan.

1874. *Chimarrichthys*, Sauvage, *Rev. et. Mag. Zool.*, XXV, p. 332. (The name preoccupied *vide* O'Shaughnessy, *Zool. Record*, 1874).
1905. *Chimarrichthys*, Regan, *Ann. Mag. Nat. Hist.* (7), XV, p. 182.
1907. *Euchiloglanis*, Regan, *Rec. Ind. Mus.*, I, p. 158. (Substitute name for *Chimarrichthys* Sauvage).
1923. *Glyptosternum* in part, Group III, Hora in part, *Rec. Ind. Mus.*, XXV, p. 32.
1925. *Euchiloglanis*, Norman, *Ann. Mag. Nat. Hist.* (9), XV, p. 572.
1933. *Euchiloglanis*, Smith, *Journ. Siam. Soc. Nat. Hist. Suppl.*, IX, p. 71.

Though the diagnostic features of *Euchiloglanis* have been tabulated by Regan, Norman and Smith, its complete diagnosis has not yet been given. We have not examined any specimen of the type-species, *E. davidi* (Sauvage), but a new description of this was furnished by Norman in 1925. The genus *Euchiloglanis* is redefined here as follows :—

The genus *Euchiloglanis* comprises small and medium sized, greatly flattened, Sisorid fishes in which the head and the anterior part of the body are depressed and the tail is compressed from side to side. The skin is soft and is minutely papillated on the ventral surface. The eyes are minute and subcutaneous. They are situated on the dorsal surface of the head, and are not visible from the ventral surface. The mouth is transverse and is situated considerably behind the snout. The teeth are

pointed, those on the upper jaw form a band which is not produced backwards at the sides. The fold of the lower lip is broadly interrupted. There are 8 barbels, 2 nasal, 2 maxillary and 4 mandibular. The maxillary barbels are provided with very broad bases and on the ventral surface of their outer halves bear striated pads of adhesive skin. The gill-openings are narrow and restricted to the sides of the head, and extend only up to the middle of the base of the pectoral spine. The gill membranes are broad and free throughout their entire length.

The fins are without spines and the structure of the outer ray of the paired fins are as that described by McClelland for *G. reticulatum* and figured by Annandale. The dorsal fin is situated closer to the snout than to the base of the caudal. The dorsal arises anterior to the extremity of the pectorals, but is equidistant from the base of the pectoral and the middle of the base of the pelvics. The adipose fin is low and long. The paired fins are broad, rounded, and horizontally placed; they are vertical in their inner halves and horizontal in their outer halves. The skin on the ventral surface of the first rays of paired fins are corrugated in pinnate folds for the purpose of adhesion. The caudal fin is obliquely truncate or somewhat rounded.

Genotype.—*Euchiloglanis davidi* (Sauvage).

Type-locality.—Eastern Tibet.

Distribution.—Tao in upper Burma; Nga Kyankka Kyoukguet; Eastern Tibet; Szechwan, Lo-Ma Ho, tributary of River Mekong at Lamping, Yunnan, China; Pharping in Nepal; Darjeeling and Kurseong Teesta Drainage and Abor Hills, Assam.

Key to the species of the genus Euchiloglanis Regan.

- I. Lower angle of the gill-opening above the base of the pectoral spine.
 - A. Pectoral fin extending scarcely $\frac{2}{3}$ of the distance from its base to the base of the pelvics. Band of teeth in the upper jaw partially divided in the centre. Pectorals with 15 branched rays. *E. feae* (Vinciguerra).
 - B. Pectoral fin extending $\frac{3}{4}$ or more of the distance from its base to the base of the pelvics. Band of teeth in the upper jaw not divided.
 1. Pectorals with 13-15 branched rays. Caudal peduncle much longer than deep.
 - a. Width of mouth $2\frac{1}{2}$ in length of head. Caudal peduncle $2\frac{3}{4}$ times as long as deep. *E. davidi* (Sauvage).
 - b. Width of mouth $2-2\frac{1}{2}$ in length of head. Caudal peduncle 3 times as long as deep. *E. myzostoma* Norman.
 2. Pectorals with 16-17 branched rays. Caudal peduncle about as long as deep. *E. hodgarti* (Hora).
- II. Lower angle of the gill-opening opposite the base of the pectoral spine.
 - A. Band of teeth in the upper jaw partly divided in the centre. Pectorals with 13 branched rays. *E. sinensis*, sp. nov.
 - B. Band of teeth in the upper jaw not divided in the centre. Pectorals with 16 branched rays. *E. macrotrema* Norman.

Euchiloglanis feae (Vinciguerra).1923. *Glyptosternum feae*, Hora, *Rec. Ind. Mus.*, XXV, p. 37.1925. *Euchiloglanis feae*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 572.

We have examined eight specimens of *E. feae* in the collection of the Zoological Survey of India. A cotype received from the Genova Museum and examined by Hora in 1923 is present in the collection. The specimens agree in all details with Vinciguerra's description of the species.

Reg No.	Locality.	Donor or Collector.	No. of specimens and state of preservation.
T. 10260/1	Tao, Upper Burma.	Exchange, Genova Museum.	1 specimen (Co-type).
F. 645/2	Nga Kyankka Kyoukquet, Burma.	..	7 specimens.

Euchiloglanis davidi (Sauvage).1923. *Glyptosternum davidi*, Hora, *Rec. Ind. Mus.*, XXV, p. 37.1925. *Euchiloglanis davidi*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, pp. 574-575.

Sauvage¹ (1874) in describing this species made no comments about the nature of the labial fold. We have not examined any specimen of *E. davidi*. Regan² (1905) and later Norman (1925), who redescribed this species, have shown that its labial fold is widely interrupted.

Euchiloglanis davidi is known from Eastern Tibet, Yunnan and Szechwan in China.

Euchiloglanis myzostoma Norman.1923. *Euchiloglanis myzostoma*, Norman, *Ann. Mag. Nat. Hist.*, (9), X, pp. 562-562.1925. *Euchiloglanis myzostoma*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 573.

E. myzostoma described by Norman in 1923 is represented by a single specimen in the collection of the Zoological Survey of India. *E. myzostoma* is closely related to *E. davidi*, from which it differs in the relatively longer caudal peduncle and narrower mouth.

Reg. No.	Locality.	Donor or Collector.	No. of specimens and state of preservation.
F. 10435/1	Lo-ma Ho, tributary of river Mekong at Lamping, Yunnan, China.	British Museum, Exchange.	1 specimen. Ventral surface is slightly damaged.

¹ Sauvage E., *Rev. et. Mag. Zool.* XXV, p. 333 (1874).² Regan, C. T., *Ann. Mag. Nat. Hist.* (7), XV, p. 183 (1905).

Euchiloglanis hodgarti (Hora).1923. *Glyptosternum hodgarti*, Hora, *Rec. Ind. Mus.*, XXV, p. 38.1925. *Euchiloglanis hodgarti*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, pp. 573.

We have examined abundant material of *E. hodgarti* present in the collection of the Zoological Survey of India. For a detailed description of this species reference may be made to Hora's work.

E. hodgarti is known from Nepal, Darjeeling and Assam.

Reg. No.	Locality.	Donor or Collector.	No. of specimens and state of preservation.
F. 1553/1	Pharping, Nepal	Mr. Hodgart. (TYPE)	1 specimen.
Cat. 598	Darjeeling	Stoliczka	1 specimen.
2631	Darjeeling	Purchased from F. Day	1 specimen.
F. 88/1	Kurseong	Ditto.	1 specimen.
F. 7776-7/1	Between Rotung and Rening, Abor Hills, Assam.	..	2 specimens.
F. 10080/1	Darjeeling	G. E. Shaw	1 specimen.
F. 11379/1	From Riyang and Rangbi rivers, Teesta Valley.	G. E. Shaw and E. O. Shebbeare.	4 specimens.

Euchiloglanis macrotrema Norman.1925. *Euchiloglanis macrotrema*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, pp. 570-571.

E. macrotrema closely resembles *E. feae* (Vinciguerra) from which it is distinguished by its larger gill-openings and more slender caudal peduncle. We have not examined specimens of this species. For a detailed description reference may be made to Norman's work.

E. macrotrema is known from Ngoi-Tio, Col des Nuages, Tonkin (latitude 4,500—6,500 feet) in Indo-China. Norman's description is based on two specimens from the type locality.

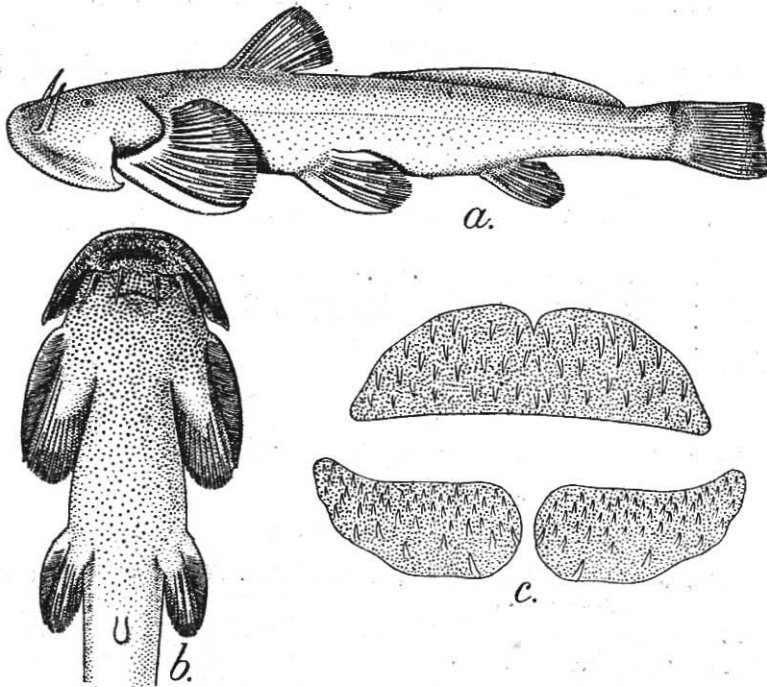
Euchiloglanis sinensis, sp. nov.

D. 1/6/0; A. 1/5; P. 1/13; V. 1/5; C. 17.

To this species is referred a single specimen, received from the Fan Memorial Institute of Biology, Peiping, China. It is readily distinguished from other species of the genus by certain well defined characters, such as the nature of the teeth band, the number of branched pectoral rays, and the relative length proportions.

The head and the body are greatly depressed. The dorsal profile is slightly arched and the ventral surface is flattish and horizontal up to the anal, whence it slightly rises up to the caudal. The ventral surface anterior to the base of the pectorals is minutely papillated. The length of the head is $4\frac{1}{2}$ to $4\frac{3}{4}$, and the depth of the body is $6\frac{1}{2}$ to 7 in the standard length. The head is slightly longer than broad. The eyes are very small, are placed dorso-laterally and are not visible from the ventral surface. The eyes are placed in the posterior half of the head and their diameter is contained $9\frac{1}{2}$ to 10 times in the length of the snout and $4\frac{3}{4}$ in the interorbital distance. The snout is longer than the post orbital

part of the head. The interorbital width is contained 4 times in the length of the head.



Text-FIG. 2. *Euchiloglanis sinensis*, sp. nov. a. Lateral view, $\times 5/7$; b. Ventral view, $\times 5/7$; c. Teeth bands of upper and lower jaws.

The teeth in both jaws are conical and pointed. In the upper jaw they form a band which is not produced backwards at the sides. The band of teeth in the upper jaw is partly divided in the centre anteriorly. The gill-openings extend to opposite the lower end of the pectoral base. The gill membranes are broad and free throughout their entire length.

The dorsal arises closer to the snout than to the base of the caudal. The distance between the tip of the snout and the commencement of the dorsal is contained slightly more than two times in the distance between the origin of the dorsal and the base of the caudal. The origin of the dorsal is in front of the extremity of the pectoral and is equidistant from the upper end of the pectoral base and the middle of the pelvic base. The length of the dorsal is equal to or slightly more than the depth of the body below it. The paired fins are broad, rounded and horizontally placed. They are vertical in their inner and horizontal in their outer halves. The pectorals have 13 branched rays, and are about as long as the head. The pectorals are separated from the pelvics by a short distance. The pelvics possess five branched rays and are slightly longer than the dorsal. The anal has 6 rays. The caudal is truncate. The least height of the caudal peduncle is contained $3-3\frac{1}{2}$ times in its length.

The colour in spirit is dark greyish. The ventral surface and the free ends of the fins are lighter in colour.

Type-specimen.—F. 12208/1, Zoological Survey of India (Indian Museum), Calcutta.

The specimen was received from the Fan Memorial Institute of Biology, Piepeing, China, under the name *Euchiloglanis davidi* without any locality label, but presumably it is from some part of China, possibly Yunnan.

Myersglanis, gen. nov.

1869. *Exostoma* (in part), Day, *Proc. Zool. Soc. London*, p. 525.

1923. *Glyptosternum* (in part), Hora, *Rec. Ind. Mus.*, XXV, p. 42.

1925. *Euchiloglanis* (in part), Norman, *Ann. Mus. Nat. Hist.*, (9), XV, p. 574.

The genus *Myersglanis* is established to accommodate a distinct generic type included by Day (1869), Hora (1923) and Norman (1925) under the genera *Exostoma*, *Glyptosternum* and *Euchiloglanis* respectively. This monotypic genus is represented now by the species *blythi* (Day). This species was included, along with *Glyptosternum feae* and *G. hodgarti*, by Hora (*op. cit.*) in his 'third group', but he distinguished it from the latter two species by the continuous nature of the fold of the lower lip. Later Norman in 1925 included Hora's *Glyptosternum blythi* along with *G. macropterus* under the genus *Euchiloglanis*, but in his key he differentiated these two species from the other species of *Euchiloglanis* by the continuous nature of the fold of the lower lip. The nature of the dentition has made us provisionally assign *E. macropterus* to the genus *Oreoglanis* Smith. The continuous nature of the fold of the lower lip being by itself a character of generic importance and second in importance only to the nature of the dentition, distinguishes Norman's *Euchiloglanis blythi* (Day) from all other species of the genus *Euchiloglanis*. In order to bring about a satisfactory classification of these torrential fishes we have been obliged to recognize *E. blythi* (Day) under a distinct genus, *Myersglanis*, which may be characterised as follows:—

Members of the genus *Myersglanis* are small and greatly flattened Sisorid fishes in which the head and the anterior part of the body are considerably depressed and the tail is compressed from side to side. The eyes are minute, subcutaneous and situated on the dorsal surface of the head. The teeth are all conical and pointed. The teeth in the upper jaw form a transverse band which is not produced backwards at the sides. The band of teeth in the lower jaw is divided in the centre, and is pointed towards the sides. The fold of the lower lip is continuous. There are 8 barbels, 2 nasal, 2 maxillary and 4 mandibular. The maxillary barbels are provided with broad bases. Gill-openings are narrow and extend only up to the middle of the base of the outer pectoral ray. The gill membrane is broad and free throughout its length.

The dorsal is situated nearer to the tip of the snout than to the base of the caudal. The fins, as in *Glyptosternum* McClelland, are without spines. The outer ray of the paired fins approximate more or less to the structure described by McClelland for *G. reticulatum* and figured by Annandale. The paired fins are rounded, flattened and horizontal.

They are vertical in their inner and horizontal in their outer halves. The skin on the ventral surface of the outer ray of the paired fins is corrugated in pinnate folds for the purpose of adhesion.

Myersglanis blythi (Day.)

1869. *Exostoma blythi*, Day, *Proc. Zool. Soc. London*, p. 525.
 1923. *Glyptosternum blythi*, Hora, *Rec. Ind. Mus.*, XXV, p. 42.
 1925. *Euchiloglanis blythi*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 574.

Exostoma blythi was originally described by Day from two unlocalized specimens, which are at present in the collection of the Zoological Survey of India, Indian Museum. In 1871 Day referred certain other specimens from the rivers below Darjeeling to this species. Hora in 1923 separated the Darjeeling specimens as a distinct species, *Euchiloglanis hodgarti*. *M. blythi* differs from *Euchiloglanis* Regan in its continuous labial fold. The specimens are in a bad state of preservation so a redescription of it, as far as possible, is given below.

D. 1/6/0; P. 1/16; V. 1/5.

The head and the anterior part of the body are considerably depressed. The dorsal profile is slightly arched. It rises from the tip of the snout to the base of the dorsal whence it slopes down gradually to the base of the caudal. The head is about as long as broad. The snout corresponds in length to the post orbital part of the head. The length of the head is contained $4\frac{1}{2}$ to 5 times in the standard length. The eyes are small and are placed dorsally in the middle of the head and are not visible from the ventral surface. The teeth are all conical and pointed, and in the upper jaw form a transverse band which is not produced backwards at the sides. The fold of the lower lip is continuous. The gill-openings are restricted to the sides and do not extend to the ventral surface. The gill membranes are broad and free throughout their length.

The dorsal arises closer to the snout than to the base of the caudal. The dorsal is also placed entirely in advance of the pelvics. The paired fins are broad, rounded and horizontally placed; they are vertical in their inner halves and horizontal in their outer halves. The outer rays of the paired fins are pinnate and correspond in structure to that described by McClelland for *G. reticulatum*. The pectorals have 16 branched rays and are separated from the pelvics by a short distance. The pelvics contain 5 branched rays, and extend beyond the vent. The anal is situated far behind the vent, and its origin is closer to the base of the caudal than to the origin of the pelvics. Due to the present condition of the specimens it is not possible to determine the nature of the adipose dorsal and the caudal.

Type-specimen.—A. S. B. Cat, 599: Two unlocalized specimens.

According to Regan¹ *M. blythi* is known from Pharping in Nepal. We have not examined the material studied by Regan but Nepal could be taken as the habitat of this species.

¹ Regan, C. T., *Rec. Ind. Mus.*, I, p. 158 (1907).

Glaridoglanis Norman.

1923. *Glyptosternum* (in part, Group II), Hora, *Rec. Ind. Mus.*, XXV, p. 32.
 1925. *Glaridoglanis*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 574.
 1933. *Glaridoglanis*, Smith, *Journ. Siam. Soc. Nat. Hist. Suppl.*, IX, p. 71.

Although the diagnostic features of *Glaridoglanis* have been drawn up by Hora, Norman and Smith, a complete description of this genus has not so far been furnished. Since we have examined two specimens of the type-species, *G. andersonii* (Day), we are able to draw up a description for this genus. The genus *Glaridoglanis* may be characterized as follows :—

The genus *Glaridoglanis* comprises medium-sized, flattened Sisorid fishes in which the head and anterior part of the body are depressed and the tail is compressed from side to side. (Due to the desiccated condition of the specimens it is not possible to determine the nature of the skin). The eyes are minute and are placed on the dorsal surface of the head and are not visible from the ventral surface. The mouth is transverse and subterminal. The teeth are greatly compressed, with apices broad, truncate or notched, those of the upper jaw forming a band which is not produced backwards at the sides. The teeth in the lower jaw form two bands which are pointed towards the sides. The folds of the lower lip are broadly interrupted. There are 8 barbels, 2 nasal, 2 maxillary and 4 mandibular. The maxillary barbels are provided with very broad bases and on the ventral surface in their outer halves bear striated pads of adhesive skin. The gill-openings are wide and extend to opposite the base of the pectorals, but do not extend to the ventral surface. The fins are without spines, the first rays of the pectoral and pelvic fins are soft and pinnate, giving off soft, pointed, cartilagenous rays along the anterior margin which are enveloped in the membrane of the fin. The dorsal, which is placed nearer to the tip of the snout than to the base of the caudal, arises slightly in advance of the free extremity of the pectorals, and entirely in front of the pelvics. The skin on the ventral surface of the outer rays of the paired fins is drawn out in pinnate folds to serve for purposes of adhesion.

Type-species.—*Glaridoglanis andersonii* (Day).

Type-locality.—Hotha in Yunnan and Pensee, China.

Glaridoglanis andersonii (Day).

1923. *Glyptosternum andersonii*, Hora, *Rec. Ind. Mus.*, XXV, p. 32.
 1925. *Glaridoglanis andersonii*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 574.

To this species are referred two specimens in the collection of the Zoological Survey of India, (*Indian Museum*). Hora in 1923 had examined 4 specimens of *G. andersonii*, and since then two of the specimens Cat. 596 have been lost, apparently, in the floods of the Varuna river at Banaras in September 1943. The remaining two specimens are badly desiccated. In one the head is separate from the rest of the body. The fins are all damaged. The outer rays of the pectoral and pelvic fins correspond to

the structure described by McClelland for *G. reticulatum* and figured by Annandale.

Reg. No.	Locality.	Donor or Collector.	No. of specimens and state of preservation.
F. 9173/1	Hotha in Yunnan and Pensee, China.	Dr. J. Anderson	2 specimens. Badly desiccated. The head is separated from the rest of the body in one of the specimens.
F. 9174/1			

Oreoglanis Smith.

1933. *Oreoglanis*, Smith, *Journ. Siam. Soc. Nat. Hist. Supp.*, IX, (1), pp. 70-74.

1945. *Oreoglanis*, Smith, *Bull. U. S. Nat. Mus.* 188, p. 395.

For the diagnostic features of *Oreoglanis*, reference may be made to the key for the genera and to Smith's original description.

Genotype.—*Oreoglanis siamensis* Smith.

Distribution.—Kang River, near Doi Angka; Northern Siam; Kakhyen Hills and Pazi, Monghong Hsipai State, northern frontier of Burma.

Key to the species of *Oreoglanis* Smith.

- I. Teeth in the upper jaw conical and pointed.
Teeth in the lower jaw are compressed and possess truncate apices. Pectorals with 19 branched rays *O. macropterum* (Vinciguerra).
- II. Teeth in the upper jaw conical and pointed.
Teeth in the lower jaw of two distinct types, the posterior like those of the upper jaw and the anterior much larger, the bases slender, the free ends expanded into truncate spatulate shape with inner surface slightly hollowed. Pectorals with 17 or 18 branched rays *O. siamensis* Smith.

Oreoglanis macropterum (Vinciguerra).

1923. *Glyptosternum macropterum*, Hora, *Rec. Ind. Mus.*, XXV, p. 39.

1925. *Euchiloglanis macropterus*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 574.

Four specimens of this species examined by Hora in 1923 have since been lost, probably in the floods of the Varuna river at Banaras in September 1943. Of the original four specimens, three were presented to the Museum by Mr. J. Coggin Brown and the remaining one by Dr. Vinciguerra of the Genova Museum.

O. macropterum differs from *Euchiloglanis davidi* in the continuous nature of the fold of the lower lip and the number of branched rays in the pectorals. It resembles *Myersglanis blythi* in the former character. Hora in (1923) has shown that in *O. macropterum* the teeth in the lower jaw differed from those of the other species.

Locality.—Northern frontier of Burma, Kakhyen Hills and Pazi, Monghong Hsipai State.

Oreoglanis siamensis Smith.

1933. *Oreoglanis siamensis*, Smith, *Journ. Siam. Soc. Nat. Hist. Supp.*, IX, (1), pp. 72-74, pl. 3, figs. 1 and 2, Text.-fig. 4.
 1945. *Oreoglanis siamensis*, Smith, *Bull. U. S. Nat. Mus.* 188, p. 395.

Smith in 1933 described this species in detail. His observations were confirmed by Hora, who examined the specimens sent to him by Smith. The topotype, which was deposited in the collection of the Zoological Survey of India (*Indian Museum*), has been lost, most probably in the floods of the Varuna river at Banaras in September 1943.

Type-locality.—Taken from the river Karg, near the base of the Doi Angka, Northern Siam (December 3rd, 1928).

Exostoma Blyth.

1860. *Exostoma*, Blyth, *Journ. As. Soc. Bengal*, XXIX, p. 154.
 1864. *Exostoma*, Günther (in part), *Cat. Brit. Mus. Fish.*, V, p. 264.
 1878. *Exostoma*, Day (in part), *Fish. India*, p. 501.
 1889. *Exostoma*, Day (in part), *Faun. Brit. Ind., Fish.*, I, p. 108.
 1905. *Exostoma*, Regan, *Ann. Mag. Nat. Hist.*, (7), XV, p. 182.
 1925. *Exostoma*, Norman, *ibid.*, (9), XV, p. 574.
 1933. *Exostoma*, Smith, *Journ. Siam. Soc. Nat. Hist. Suppl.*, IX, p. 71.

The genus *Exostoma* was established by Blyth to accommodate a fourth distinct generic type included by McClelland in his composite genus *Glyptosternon*. The other genera are *Glyptosternum* McClelland (*vide supra*, p. 8), *Pseudocheneis* Blyth and *Glyptothorax* Blyth. *Exostoma* was characterized by him as follows:—

“Otherwise generally similar to *Glyptothorax*, but with no pectoral disk, the dorsal spine exceedingly slender (if always present?) and the eyes somewhat larger. Lips reflected and spread continuously round the mouth, so as to form a broad flat sucker. Two distinct lateral lobes of minute card-like teeth, both above and below, reflected much apart and having an obviously suctorial centre. Only one pair of lower cirri situated at the posterior corners of the reflected lower or hinder lip: the entire lower parts smooth and flat. Anal fin small; the adipose dorsal lengthened but very slight and low, extending nearly to the caudal.”

He first described a new species *E. bermorei* under it which has to be regarded as the type, but also referred *Glyptosternon labiatus* McClelland from the Mishmi Hills to this genus.

Blyth seems to have been very clear about the limits of the four genera into which he divided McClelland's *Glyptosternon*, for he observed:

“Dr. Bleeker refers the (*Pimelodus*) *nangra* B. H., to *Glyptosternon*; but this I cannot understand. *Vide* Hamilton's published figures. He also gives a *Gl. platypogon* (K. et. V. H.), from Java and Hindustan, and *Gl. Platypogonoides*, Blkr., from Sumatra; both which appear to fall under *Glyptothorax*, nobis, *ut. supra.*”

Depending upon an old damaged specimen labelled as *Exostoma bermorei* from Tenasserim bearing the A.S.B. Cat. No. 600 in the collection of the Zoological Survey of India, (*Indian Museum*) and taking it as the type-specimen of the species, Hora¹ proposed certain

¹ Hora, S. L., *Rec. Ind. Mus.*, XXIV, p. 33 Foot-note (1922); *ibid.* XXV, p. 8 (1923).

nomenclatorial changes by which he assigned *Exostoma* Blyth to the synonymy of *Glyptothorax* Blyth. This led to great controversy in which Regan¹, Annandale², Norman³ and Myers⁴ joined. The position was summed up by Myers as follows: "Furthermore it appears to be fairly certain (following Hora and Annandale) that the type of *Exostoma* (*E. berdmorei*) is a *Glyptothorax* and that the group called *Exostoma* by Norman is at present without a name (unless it is found that *Glyptosternon* actually belongs here)." Smith⁵ the last worker, to deal with this group of fishes, recognised the generic name *Exostoma* in the same sense as Regan and Norman without any comments.

In our present revision of these Sisorid fishes, two important considerations have led us to doubt the specimen A. S. B. Cat. No. 600 as being the type of *Exostoma berdmorei*. Firstly, as noted above, Blyth's description of the genus, which is fairly comprehensive, goes against this specimen being the type. Secondly, two specimens registered as A. S. B. Cat. No. 597 and referred to by Hora as *Glyptosternum* sp. in the *Records of the Indian Museum*, XXV, p. 43, 1923, seem to agree in every respect with Blyth's description of *Exostoma berdmorei*. It would thus appear that when the specimens were transferred from the Museum of the Asiatic Society of Bengal between 1864 to 1868, the labels may have got mixed up. We are now describing these specimens here as *E. berdmorei* and agree to the nomenclature proposed by Regan and Norman for these fishes.

The genus *Exostoma* may now be re-defined as follows:—

The genus *Exostoma* comprises small and medium-sized, greatly flattened, Sisorid fishes in which the head and the anterior part of the body are depressed and the tail is compressed from side to side. The skin is soft and is sparsely covered with minute papillae in the region anterior to the pectorals on the ventral surface. The eyes are minute, subcutaneous, and situated on the dorsal surface of the head. The mouth is more or less crescentic and is situated considerably behind the tip of the snout. The teeth are rather large, movable, oar-shaped, flattened distally and directed backwards, and are arranged in two distinct patches in the upper jaw. The fold of the lower lip is continuous. There are 8 barbels, 2 nasal, 2 maxillary and 4 mandibular. The maxillary barbels are provided with broad bases and on the ventral surfaces of their outer halves bear striated pads of adhesive skin. The gill-openings are wide but do not extend to the ventral surface of the head. The gill membrane is broad and free throughout its length. The fins are without spines. The outer ray of the paired fins are soft and pinnate giving off soft pointed cartilagenous rays along the anterior margin which are enveloped in the membrane of the fin. The dorsal is situated entirely behind the pectorals, but slightly in advance of the pelvics. The adipose fin, which is separated by a considerable distance from the

¹ Regan, C. T., *Ann. Mag. Nat. Hist.*, (9), XI, p. 608 (1923).

² Annandale, N., *ibid.*, (9), XII, p. 573 (1923).

³ Norman, J. R., *ibid.*, (9), XV, p. 571 (1925).

⁴ Myers, G. S., *Lingnan Sci. Journ.*, X, p. 260 (1931).

⁵ Smith, H. M., *Journ. Siam. Soc. Nat. Hist. Suppl.*, IX, p. 71 (1933).

dorsal, is long and low and may or may not be confluent with caudal. The paired fins are broad, rounded and horizontally placed. They are vertical in their inner and horizontal in their outer halves. The skin on the ventral surface of the first ray is produced into fine pinnate folds for the purpose of adhesion. The caudal fin may be truncate, forked slightly or deeply emarginate.

Type-species.—*Exostoma berdmorei* Blyth.

Type-locality.—Tenasserim, Burma.

Distribution.—Putao plains in North-Eastern Burma; Catcin in Burma; Pazi, Monghong-Hsipi State, Northern Shan States in Burma, Tenasserim, Burma; Abor and Naga hills in Assam.

Key to the species of the genus Exostoma Blyth.

I. Caudal fin truncate or slightly emarginate.

A. Pectorals with 10 branched rays.

1. Adipose dorsal confluent with the caudal.
Caudal peduncle 3-3½ times as long as deep. *E. vinciguerrae* Regan.

2. Adipose dorsal not confluent with the caudal.
Caudal peduncle 2-2½ times as long as deep. *E. stuarti* (Hora).

B. Pectorals with 17-18 branched rays *E. Yunnanensis* (Tchang).

II. Caudal fin forked or deeply emarginate.

A. Gill-openings greatly restricted and extending to above the base of the Pectorals. Pectorals with 10 branched rays *E. berdmorei* Blyth.

B. Gill openings wide and extend to opposite the base of the pectoral spine. Pectorals with 12 branched rays *E. labiatum* (McClelland).

Exostoma vinciguerrae Regan.

1923. *Glyptosternum vinciguerrae*, Hora, *Rec. Ind. Mus.*, XXV, p. 41.

1923. *Glyptosternum chaudhurii*, Hora, *Rec. Ind. Mus.*, XXV, p. 41.

1925. *Exostoma vinciguerrae*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 574.

It was pointed out by Norman that *E. vinciguerrae* Regan includes *G. chaudhurii* Hora and we have now been able to confirm this finding. A number of specimens of this species are present in the collection of the Zoological Survey of India, Indian Museum.

Reg. No.	Locality.	Donor or Collector.	No. of specimens and state of preservation.
F. 9741/1	Putao plains, N.E. Burma, Tibetan frontier.	Mr. Murray Stuart.	1 specimen. (Type of <i>E. chaudhurii</i> .)
F. 10259/1	Catcin in Burma	Received from Genova Museum.	2 specimens. (Co-types.)
F. 6665/1 F. 6667/1 F. 6669/1 F. 6671/1	} Pazi, Monghong, Hsipi State, Northern Shan States, Burma.	Mr. J. Coggin Brown	4 specimens.

Exostoma stuarti Hora.1923. *Glyptosternum stuarti*, Hora, *Rec. Ind. Mus.*, XXV, p. 39.1925. *Exostoma vinciguerrae* (in part), Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 574.

To this species was referred a single specimen collected by Dr. Murray Stuart from the Nam-Yak river, at Tanja in Northern Burma. Norman in 1925 treated this species as a synonym of *E. vinciguerrae*, along with *E. chaudhurii* (Hora). After having examined specimens of all the three species we find that *E. stuarti* differs considerably from *E. vinciguerrae* and *E. chaudhurii*, whereas the latter two resemble each other in all salient features.

Reg. No.	Locality.	Donor or Collector.	No. of specimen and state of preservation.
F. 9742/1	Nam-Yak river at Tanja, Putao Plains, N. Eastern Burma near Tibetan frontier.	Mr. Murray Stuart.	1 specimen.

Exostoma yunnanensis (Tchang).1935. *Glyptosternum yunnanensis*, Tchang, *Bull. Fan. Mem., Inst. Biol.* VI, (4), pp. 174-175, fig. 1.1936. *Glyptosternum yunnanensis*, Tchang, *ibid.*, VII, (1), p. 47.

Tchang (1935), in describing a new Catfish, *Glyptosternum yunnanensis* from Yunnan, has given its complete diagnosis. The nature of the dentition, teeth bands and the labial fold clearly indicate its place in the genus *Exostoma*. For the sake of completeness, it may be well to reiterate here Tchang's description of the species, which runs as follows:—

“Body elongate, anterior part depressed, caudal peduncle rather compressed; head depressed and covered superiorly with soft skin; no thoracic adhesive apparatus; gill openings narrow, not extending to lower surface of body; eyes superior, very small; nostrils close together separated by a short barbel, situated nearer tip of snout than anterior margin of eye; maxillary barbels short and broad; 4 mandibular barbels; fold of lower lip flat, broad and continuous; teeth rather large, movable, oar shaped, flattened distally, arranged in two well separated bands or patches in each jaw; body naked; lateral line straight; dorsal short; dorsal spine very weak, situated in front of ventral, about midway gill opening and ventral origin; adipose dorsal long and low, much longer than dorsal and anal; pectorals broad, just reaching ventral, with a weak spine. Ventral surface of spine plaited; Pectorals with 17; in one 18 branched rays. Ventral not reaching vent; anal short; caudal subtruncate”. (*Italics are ours.*)

From *Exostoma vinciguerrae* Regan, found in Upper Burma, *E. yunnanensis* differs in the much longer body and the larger number of branched rays in the pectoral fin.

Type-locality.—Yunnan.

Type specimen is preserved in the Zoological Museum of Fan Memorial Institute of Biology, Peiping.

Exostoma berdmorei Blyth.1869. *Exostoma labiatum*, Day, *Proc. Zool. Soc. London*, p. 525.1923. *Glyptosternum* sp., Hora, *Rec. Ind. Mus.*, XXV, p. 43.1925. *Exostoma berdmorei*, Norman, *Ann. Mag. Nat. Hist.*, (9), XV, p. 574.

Two specimens now preserved in the Zoological Survey of India were referred by Day (*op. cit.*) as *Exostoma labiatum*. Hora in 1923 found that they differed from *E. labiatum*, so he treated them as *Glyptosternum* sp. We have given reasons above (*vide supra*, pp. 23-24) for considering these specimens as the types of *Exostoma berdmorei*. A brief description of these specimens is furnished below :

D. 1/6|0 ; P. 1/10 ; V. 1/5.

To this species are referred two medium sized, greatly flattened fishes in which the head and the anterior part of the body are considerably depressed and the tail is compressed from side to side. The skin is soft. The eyes are small but easily distinguishable. They are placed dorsally in the posterior half of the head, and are not visible from the ventral surface.

The length of the head is $5-5\frac{1}{2}$ times and the depth of the body 9-10 times in the standard length. The head is about as broad as long. The interorbital width is nearly $3\frac{1}{2}$ to $3\frac{3}{4}$ times contained in the length of the head. The snout, which is more pointed than in other species, is longer than the postorbital part of the head. The maxillary barbels reach only up to the base of the pectorals. The nasals are short and do not extend up to the eyes. The outer mandibular barbels are longer than the inner and correspond in length to the nasal barbels. The fold of the lower lip is continuous. The width of the mouth is contained 2 to $2\frac{1}{2}$ times in the length of the head. The teeth are rather larger, movable, oar shaped and flattened distally, depressed and directed backwards, and are arranged in two well separated bands or patches in each jaw. The gill openings do not extend to the lower surface of the body.

The dorsal originates closer to the snout than to the base of the caudal, and slightly in advance of the pelvics. The pectorals possess 10 branched rays and do not reach the pelvics. The pelvics have 6 branched rays and are separated from the vent by a short distance. The least height of the caudal peduncle is contained $2\frac{1}{2}$ to $2\frac{3}{4}$ times in its length. In spirit the colour is pale yellowish.

Reg. No.	Locality.	Donor or Collector.	No. of specimens and state of preservation.
Cat. 597	A. S. B.	2 specimens. In very bad condition. The head is damaged in both the specimens.

Exostoma labiatum (McClelland).1889. *Exostoma labiatum*, Day, *Fauna Brit. Ind. Fish.*, I, p. 108.1923. *Glyptosternum labiatum*, Hora, *Rec. Ind. Mus.* XXV, p. 42.1925. *Exostoma labiatum*, Norman, *Ann. Mag. Nat. Hist.*, (9) XV, p. 574.

D. 1/6|0 ; P. 1/12 ; V. 6 ; A. 1/5 ; C. 17.

Both in the *Fishes of India* and in the *Fauna of British India*, Day gave a short account of *E. labiatum*. In view of the fact that we have examined a number of specimens of *E. labiatum*, and as there exists no detailed description of this species elsewhere, we are redescribing it here. The species *E. labiatum* may be characterized as follows :

In general characters *E. labiatum* resembles *E. bermorei*, but differs from it in having larger number of branched pectoral rays. The head and the body are considerably depressed. The ventral profile is flattish and horizontal. The dorsal profile is slightly arched. It rises from the tip of the snout to the commencement of the dorsal, whence it gradually slopes down to the base of the caudal. The ventral surface of the head behind the mouth, and the sides of the head are sparsely and minutely papillated.

The length of the head is contained $5\frac{1}{2}$ to 6 times and the depth of the body 8 to $10\frac{1}{2}$ times in the total length. The head is almost as long as broad. The eyes are minute and are placed almost in the middle of the head. The diameter of the eye is contained $4\frac{1}{2}$ times in the length of the snout and 3 times in the interorbital width. The interorbital width is $3\frac{1}{2}$ to $3\frac{3}{4}$ times contained in the length of the head.

The maxillary barbels reach nearly the upper angle of the gill-openings. They are broad at their bases and along the outer halves on the ventral surface are provided with a number of folds to help in adhesion. The outer mandibular barbels are longer than the inner and are about $\frac{3}{4}$ in the length of the nasal barbels. The nasal barbels extend for a short distance beyond the eyes. The inner mandibular barbels are very short and are confluent at their bases with the fold of the lower lip. The fold of the lower lip is continuous. The width of the mouth is contained $2\frac{1}{2}$ times in the length of the head. The teeth are large, movable, oar shaped, and flattened distally and directed backwards. In the upper jaw, they are arranged in two distinct patches. The gill openings reach to opposite the base of the pectorals, but do not extend to the ventral surface.

The dorsal commences nearer to the tip of the snout than to the base of the caudal fin. The dorsal fin is placed entirely posterior to the pectoral fins but slightly in advance of the pelvic fins. The paired fins are broad, rounded and horizontal in their outer halves. The pectorals, which are slightly longer than the head possess 12 branched rays. The pelvics are about as long as the dorsal. The outer ray of the paired fins correspond in structure to that figured by Annandale¹ for *G. vinciguerrae* (Regan). In *E. vinciguerrae* and *E. labiatum*, the pinnate processes on the outer face of the ray are less well developed than in *G. reticulatum* and other species. But in the general structure they are exactly the same. According to Annandale "In others such as *G. vinciguerrae* and *G. labiatum*, the structure is precisely the same, so far as its outline is concerned, therefore the rays agree precisely particularly in the species first mentioned, with both McClelland's description of *G. reticulatum* and Dr. Hora's figure of *G. labiatum*". The pelvics do not reach the vent. The adipose dorsal is long and low and is confluent with the caudal. The caudal is deeply emarginate.

¹ Annandale N., *Ann. Mag. Nat. Hist.*, (9), XII, p. 575 (1923).

In spirit the colour of the specimens vary from light yellow to greyish. In the latter case, the ventral surface and the fins are lighter in colour.

<i>Reg. No.</i>	<i>Locality.</i>	<i>Donor or Collector.</i>	<i>No. of specimens and state of preservation.</i>
F. 7728/1	Egar Stream between Renging and Rotung Assam.	Dr. S. W. Kemp ..	1 specimen.
F. 10131/1	Abor country, Assam.	Capt. de Courcy ..	2 specimens.
F. 11817/1	Sakhai, Lizho river, Naga Hills.	Dr. B. Prashad and Dr. B. N. Chopra ..	4 specimens.
F. 11818/1	Sakhai, Tiza river, Naga Hills.	Ditto ..	2 specimens.
F. 11819/1	Ditto	Ditto ..	15 specimens.
F. 11820/1	Purobami and Sahunyu, sources of the Tiza river, Naga Hills, Assam.	Mr. J. H. Hutton ..	4 specimens.

EXPLANATIONS OF PLATE I.

Two Species of Glyptosternoid Fishes.

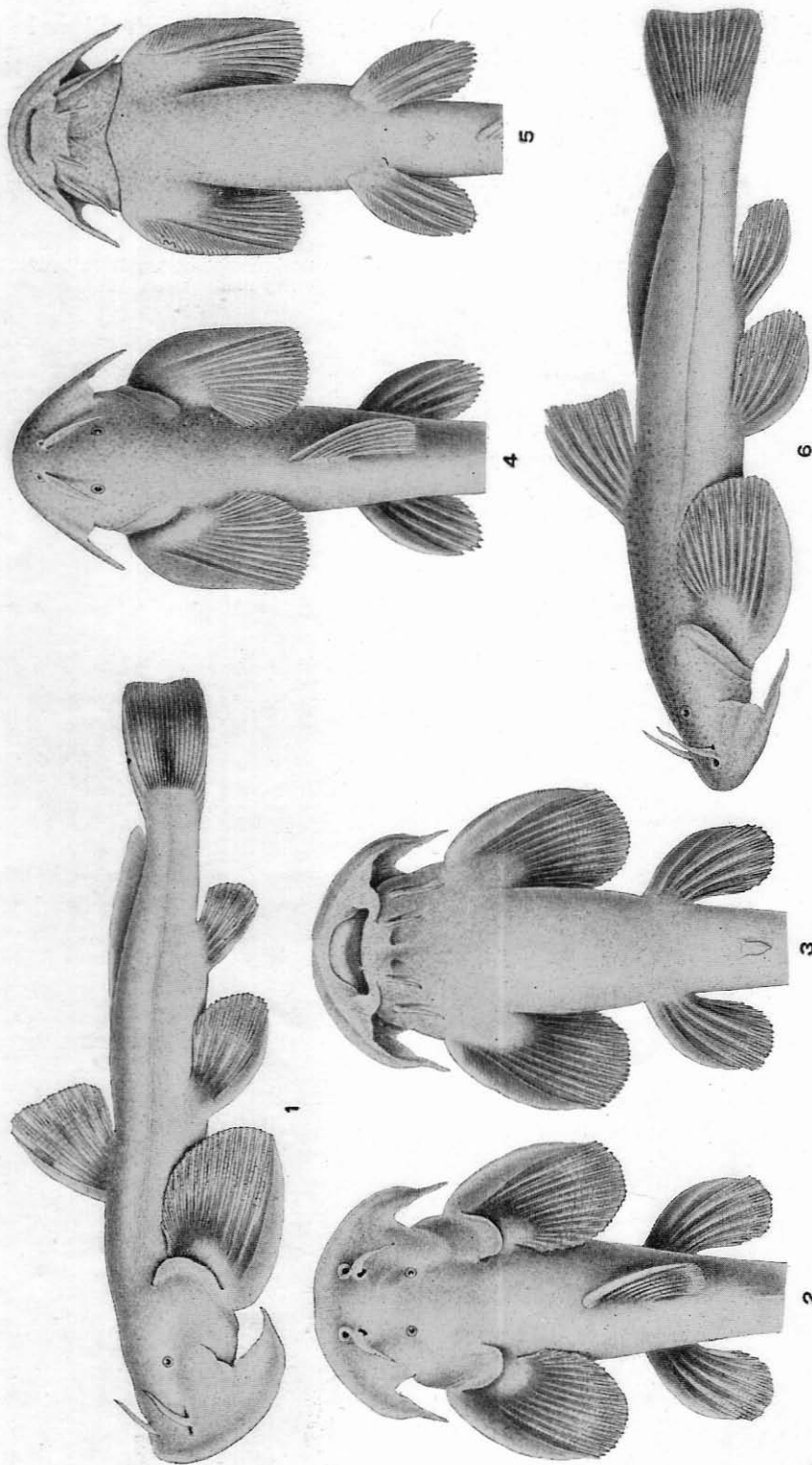
Coraglanis kishinouyei (Kimura).

- FIG. 1.—Lateral view.
FIG. 2.—Dorsal view of head and body.
FIG. 3.—Ventral view of head and body.

Glyptosternum akhtari Silas, sp. nov.

- FIG. 4.—Dorsal view of head and body.
FIG. 5.—Ventral view of head and body.
FIG. 6.—Lateral view.

All figures are of natural size.



GLYPTOSTERNOID FISHES