ON A FURTHER COLLECTION OF FISH FROM THE NAGA HILLS.[1]

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Early this year Dr. B. Prashad and Dr. B. Chopra paid another visit to the Naga Hills, and availed themselves of the opportunity to make a further collection of fishes. The greater part of the material, which comprises 129 specimens, was obtained from the streams of the Barail Range over which crosses the road from Imphal to Silchar, a part of the Naga Hills[2] the fauna of which had not been investigated so far.

The following are the streams of the Barail Range from which collections were made : (i) Laimatak River, 32 miles from Imphal, (ii) Irang River, 51 miles from Imphal, (iii) Khathalo stream near Nongba, (iv) Barak River between Nongba and Kalanaga, and (v) Makru River, 87 miles from Imphal. The waters from this part of the Naga Hills drain into the Barak River, which is a tributary of the Brahmaputra. From the collections before me all the streams appear to be large hill-streams with rocky beds and fairly deep waters.

Collections were also made by the Zoological Survey party at two places between Kohima and Imphal : Zekwara in the neighbourhood of Khezobama and at Karong on the ridge separating Naga Hills from the Manipur Valley. The waters from these two places drain ultimately into the Brahmaputra.

Besides, there are a few specimens, belonging to *Garra naganensis*, *Danio naganensis*, *Danio dangila*, *Psilorhynchus homaloptera* and *Nemachilus kangjupkhulensis*, of which the locality labels were torn to bits in transit and, in consequence, the precise habitat cannot now be given. Of these, *D. naganensis* and *N. kangjupkhulensis* are known only from the Chindwin drainage system and it seems likely that the party also made collections from areas whence the waters drain into the Chindwin River. *Psilorhynchus homaloptera* is known from the Brahmaputra system, *Garra naganensis* is found in both the Brahmaputra and the Chindwin systems, while *Danio dangila* is a widely distributed species.

According to the localities enumerated above the collection may be arranged as follows :—

1. Zekwara, Naga Hills. 28.i.36.

i. *Barilius bendelisis* (Ham.)	1 specimen (28 mm.).
ii. *Oreinus molesworthi* Chaudhuri	5 specimens (98-120 mm.).

2. Karong, Naga Hills. 5.ii.36.

i. *Barbus clavatus* McClell.	18 specimens (126-192 mm.).

[1] For a comprehensive report on the fish fauna of the Naga Hills see Hora & Mukerji, *Rec. Ind. Mus.*, XXXVII, pp. 381-404, 6 text-figs. 1 pl. (1935).

[2] It may again be pointed out that for the purpose of this paper under the name "Naga Hills" is included all the country inhabited by the Naga tribes and not merely the district to which the name is officially applied. The part of the Barail Range traversed by the party of the Zoological Survey is under the Manipur State and is inhabited by the Kacha Nagas of whom the Kabui is the predominant type.

3. Laimatak River, Imphal-Silchar Road. 8.ii.36.

i. *Pseudecheneis sulcatus* (McClell.)	1 specimen (171 mm.).
ii. *Barbus progeneius* McClell.	1 specimen (137 mm.).
iii. *Barilius bendelisis* (Ham.)	4 specimens (123-147 mm.).
iv. *Barilius barila* (Ham.) . .	11 specimens (105-145 mm.).
v. *Psilorhynchus homaloptera* Hora & Mukerji	1 specimen (106 mm.).

4. Irang River, Imphal-Silchar Road. 11-13.ii.36.

i. *Barbus clavatus* McClell. .	5 specimens (107-157 mm.).
ii. *Barbus progeneius* McClell.	4 specimens (107-202 mm.).
iii. *Crossochilus latius* (Ham.)	3 specimens (133-143 mm.).
iv. *Garra gotyla* (Gray) .	1 specimen (200 mm.).
v. *Barilius bendelisis* (Ham.)	1 specimen (99 mm.)
vi. *Barilius barila* (Ham.)	16 specimens (99-162 mm.).

5. Khathalo stream near Nongba, Imphal-Silchar Road. 13.ii.36.

i. *Silurus cochinchinensis* Cuv. & Val.	2 specimens (198-200 mm.).
ii. *Barbus hexagonolepis* McClell.	12 specimens (113-280 mm.).
iii. *Garra naganensis* Hora.	2 specimens (124-126 mm.).

6. Barak River between Nongba and Kalanaga, Imphal-Silchar Road. 13.ii.36.

i. *Barbus progeneius* McClell.	1 specimen (710 mm.).
ii. *Barbus tor* (Ham.) . .	1 specimen (491 mm.).
iii. *Labeo dyocheilus* (McClell.)	2 specimens (1 complete 672 mm., one head of a still larger specimen).

7 Makru River, Imphal-Silchar Road. 18.ii.36.

i. *Barbus hexagonolepis* (McClell.)	6 specimens (125-183 mm.).
ii. *Garra naganensis* Hora	1 specimen (113 mm.).
iii. *Ophicephalus gachua* Ham.	3 specimens (88-152 mm.).

8. Locality unknown.

i. *Garra naganensis* Hora . .	3 specimens (72-91 mm.).
ii. *Danio (Danio) naganensis* Chaudhuri	1 specimen (*ca.* 160 mm.).
iii. *Danio (Danio) dangila* (Ham.)	20 specimens (25-46 mm. without caudal).
iv. *Psilorhynchus homaloptera* Hora & Mukerji	1 specimen (70 mm.).
v. *Nemachilus kangjupkhulensis* Hora .	2 specimens (55-73 mm.).

Of the 18 species represented in the recent collection 5—*Silurus cochinchinensis, Pseudecheneis sulcatus, Labeo dyocheilus, Barbus progeneius* and *Garra gotyla*—are recorded from this area for the first time. The last species was, however, obtained by Dr. Murray Stuart (Hora, *Rec. Ind. Mus.*, XXII, p. 743, 1921) from the North-eastern border of Burma and the Naga Hills, but it can now be definitely included in the fauna of the latter district. The range of *S. cochinchinensis* extends from the Eastern Himalayas (below Darjeeling) through Assam hills and Burma to Cochin China, Fukien and Hainan. *Pseudecheneis sulcatus* is found in Assam and Northern Burma and westwards its range extends to the Darjeeling Himalayas. *Labeo dyocheilus* was described from the Brahmaputra in Assam but since then it has been recorded from Hardwar, Simla and the Sind hills. *Barbus progeneius* was described from the Brahmaputra but its identity had been confused with *B. tor*. *Garra gotyla* is found along the Himalayas from the Dehra Dun hills to Assam and Burma.

Including the collection under report, the fish fauna of the Naga Hills comprises 49 species distributed among the following families: 2 to Siluridae, 1 to Bagridae, 1 to Amblycepidae, 4 to Sisoridae, 24 to

Cyprinidae, 2 to Psilorhynchidae, 11 to Cobitidae, 1 to Mastacembelidae, 1 to Nandidae and 2 to Ophicephalidae.

Though most of the species represented in the collection do not call for any comments, it has been possible to elucidate the chief distinguishing features of the large-scaled Barbels of Assam—*B. hexagonolepis*, *B. tor* (=*B. hexastichus*), *B. putitora* and *B. progeneius*. The study of a large specimen of *Labeo dyocheilus* has also enabled me to clear up the specific identity of this species and to distinguish it from the allied *L. dero*. The Burmese and Siamese specimens of *L. dero* are separated into a distinct species **L. devdevi**, sp. nov. Further it is shown that Mukerji's "Assamese and Burmese form" of *Crossochilus latius* is restricted to the Burmese drainage systems and that in the parts of Assam drained by the Brahmaputra only the typical form of the species is found. In view of the structural differences between the two forms and their restricted ranges of distribution the name **burmanicus** is proposed here for the Burmese form. Observations are also offered regarding variation in structure or colouration of *Silurus cochinchinensis* and *Pseudecheneis sulcatus*. The record of *Psilorhynchus homaloptera* from a different part of the Naga Hills is also of special interest, as it shows that the species is not strictly localised in its distribution.

The following vernacular names were noted down by the party:—

1. *Khotavu* Angami: *Oreinus molesworthi* Chaudhuri.
2. *Kha suang: Pseudecheneis sulcatus* (McClell.).
3. *Tau pompoi: Psilorhynchus homaloptera* Hora & Mukerji.
4. *Them ga: Barilius bendelisis* (Ham.) and *B. barila* (Ham.).
5. *Kha goi: Barbus clavatus* McClell.

Kha means fish corresponding with the Burmese *Nga*. *Tau* means stone and *pompoi* means 'to stick to', *Tau pompoi* is thus a very appropriate name for *Psilorhynchus homaloptera*. *Goi* means 'serrated like a saw', thus *Kha goi* means a fish with the dorsal spine serrated like a saw, a very significant name for *Barbus clavatus*. These fish names indicate the great familiarity of the local people both with the habits and structures of the fishes inhabiting their part of the Naga Hills.

SILURIDAE.

Silurus cochinchinensis Cuvier & Valenciennes.

1929. *Silurus cochinchinensis*, Prashad & Mukerji, *Rec. Ind. Mus.*, XXXI, p. 171.

Khathala stream near Nongba, Imphal-Silchar Road. 13.ii.36.

Silurus cochinchinensis is represented by two adult specimens, about 200 mm. in total length, in the recent collection of fish from the Naga Hills. In this species there are only two mandibular barbels and, in consequence, it is placed in the genus *Parasilurus* Bleeker by certain ichthyologists. Day[1] and Günther[2], however, did not attach much importance to this character and their contention is now fully borne

[1] Day, *Fish. India*, p. 481 (1877).
[2] Günther, *Cat. Fish. Brit. Mus.*, V, p. 32 (1864).

out by the discovery of 3 pairs of barbels[1] in the young stages of *Silurus asotus* Linn., the genotype of *Parasilurus*. In the course of growth, however, one pair of mandibular barbels is absorbed.

Usually there are 2 to 4 soft rays in the dorsal fin which, in the case of well preserved specimens, are invariably enveloped in thick skin. In both the specimens under report the dorsal fin is totally absent and no vestige of it can be made out externally. It would thus appear that no taxonomic value can be attached to the presence or absence of a vestigial dorsal fin in the case of Silurid fishes.

S. cochinchinensis was originally described from Cochin China, but it has since been found in Burma, Assam, and Darjeeling Himalayas towards the west and in Hainan and Fukien towards the east. It is a small species growing to about 8 or 9 inches in length.

SISORIDAE.

Pseudecheneis sulcatus (McClelland).

1923. *Pseudecheneis sulcatus*, Hora, *Rec. Ind. Mus.*, XXV, p. 44.

Laimatak River, Imphal-Silchar Road. 8.ii.36.

Only one example of *Pseudecheneis sulcatus*, 171 mm. in total length, was collected by. Drs. B. Prashad and B. Chopra in their recent visit to the Naga Hills. It corresponds with specimens from other localities, except that it is much darker in colour and the lighter bands across the back are fewer and shorter.

The range of the species extends from the Darjeeling Himalayas and the Assam hills to Upper Burma.

CYPRINIDAE.

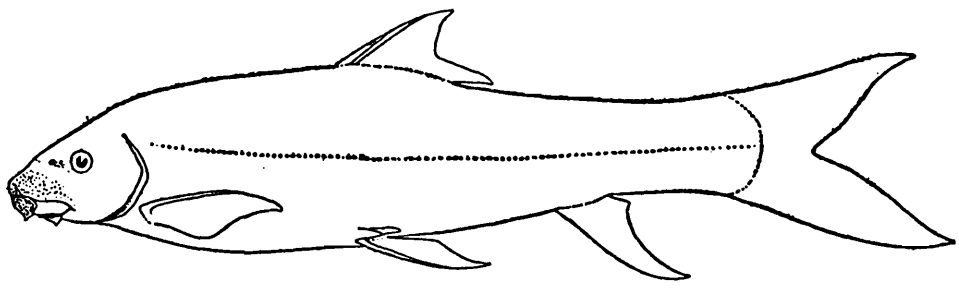
Labeo dyocheilus (McClelland).

1839. *Cyprinus* (*Labeo*) *dyocheilus*, McClelland, *As. Res.*, XIX, pp. 268, 330, pl. xxxvii, fig. 1.

1877. *Labeo dyocheilus*, Day, *Fish. India*, p. 540, pl. cxxx, fig. 1.

Barak River between Nongba and Kalanaga, Imphal-Silchar Road. 13.ii.36.

Labeo dyocheilus and *L. dero* (Ham.). are similar in several features and as their respective ranges of distribution more or less coincide they



TEXT-FIG. 1.—Lateral view of a stuffed specimen of *Labeo dyocheilus* (McClelland). $\times \frac{2}{15}$.

are liable to be confused with each other. Though the original accounts of the species are inadequate for the determination of their precise specific

[1] Atoda, *Doutsugaku Zasshi*, XLVII, p. 228, (1935) [text in Japanese]; Kimura, *Journ. Shanghai Sci. Inst.*, sec. 3 III, p. 105 (1935).

limits, the specimens referred by Day to the two species and now preserved in the collection of the Indian Museum show that he was familiar with the differences between them. According to Day's descriptions, the two species may be differentiated as follows:

	"*Labeo diplostomus*"[1] (*L. dero*).	*Labeo dyocheilus.*
i.	6-7 rows of scales below lateral line to base of ventral.	5 rows of scales below lateral line to base of ventral.
ii.	Length of head 5½-6¼, height of body 5-5½ in total length.	Length of head 5-5½, height of body 3¾ to 4½ in total length.
iii.	Diameter of eye 5-6½ in length of head, 2½-3 in interorbital width.	Diameter of eye 6-9 in length of head, 3½-5 in interorbital width.
iv.	Snout with a groove and without lateral lobes.	Snout without a groove[2] and with distinct lateral lobes.
v.	Mouth rather narrow	Mouth wide.
vi.	Upper margin of dorsal deeply concave in the adult.	Upper margin of dorsal slightly concave in the adult.
vii.	Pectoral does not extend to ventral, nor the latter to anal.	Pectoral reaches ventral, and the latter base of anal.

I have studied these differences in reference to the material in the Indian Museum and find that the proportions of various parts vary considerably with age in both the species, except that the interorbital space is relatively much broader and the eyes smaller in *L. dyocheilus* than in *L. dero*. The number of scales below the lateral line is also a good diagnostic character for distinguishing the two species. The nature of the snout offers a useful character, especially in adults. In *L. dyocheilus* the front part of the snout, dorsally, laterally and ventrally, is studded with pearl organs or spiny tubercles, whereas in *L. dero* they are, when present, fewer in number and totally absent from the ventral surface of the head. Along with the appearance of large pearl organs a deep groove is developed on the snout of *L. dero*, especially in the males. The prolongation of the anterior dorsal rays in *L. dero* is also associated with the development of the pearl organs in the males, while in *L. dyocheilus* there is no such correlation. It is thus seen that marked sexual dimorphism is also a feature of *L. dero*. Reference may here be made to an interesting case of sexual dimorphism found by Mukerji and myself[3] in the case of *Barbus chagunio* (Ham.).

The examination of a large series of specimens has shown that the two species can be readily distinguished by the nature of the dorsal surface of the free portion of the lower lip. In *L. dero*, as indicated already,[4] this surface is studded with large tubercles, whereas in *L. dyocheilus* there are series of ridges instead of tubercles or papillae. This difference in the structure of the lower lip is noticeable both in the young and adult specimens of the two species.

McClelland remarked that his *L. dyocheilus* "is found in the clear active currents of the Brahmaputra from Middle Assam to the rapids at

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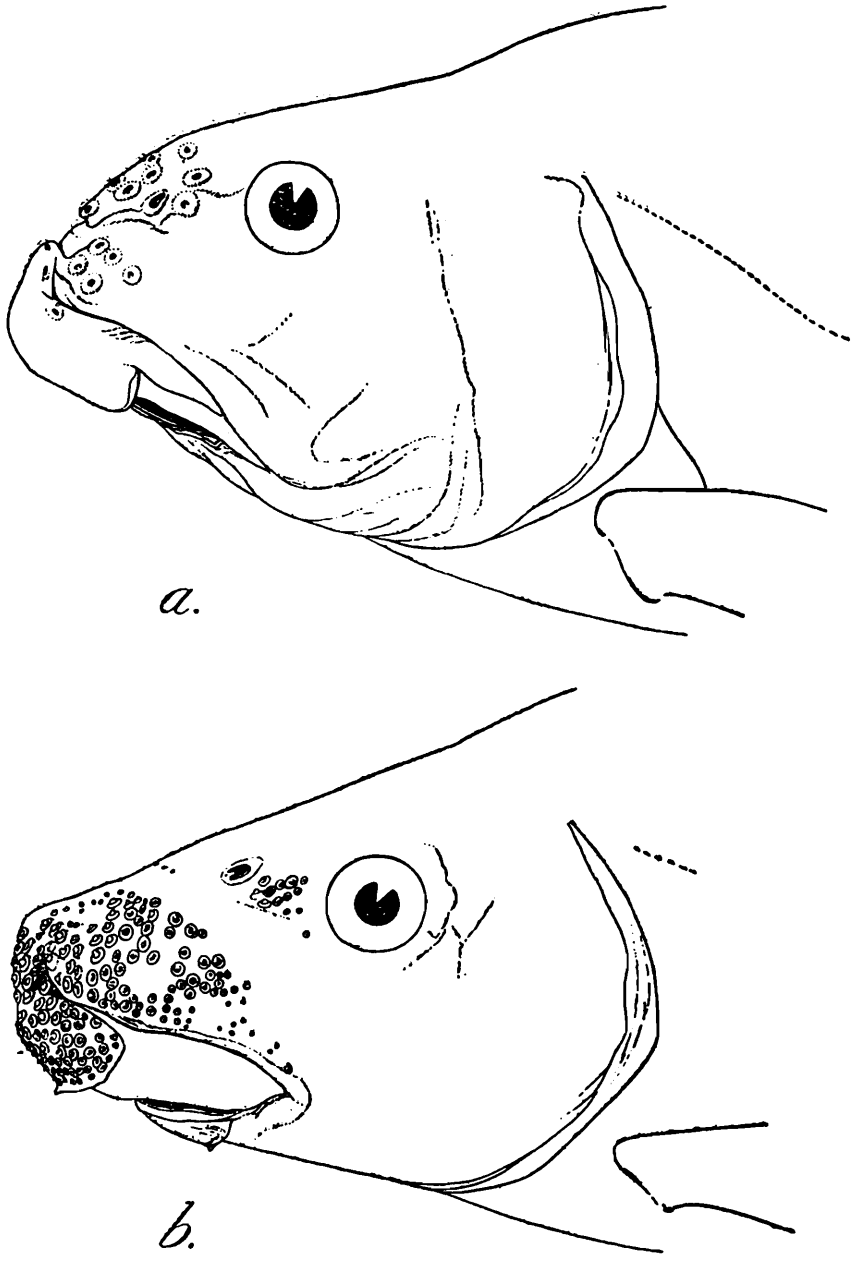
[1] All the specimens determined by Day as *L. diplostomus* and now preserved in the collection of the Indian Museum are referable to *L. dero* (Ham.).

[2] Day noticed a Sind specimen with a depression across the snout.

[3] Hora & Mukerji, *Journ. As. Soc. Bengal* (N. S.) XXVII, pp. 137-139 (1933).

[4] Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, p. 142 (1936).

the extremity of the valley, but appears to be equally unknown in mountain torrents, and sluggish rivers and jeels in the plains." This indicates that the species is to be found in deeper parts of swift flowing rivers, like the Brahmaputra. Drs. Prashad and Chopra obtained the

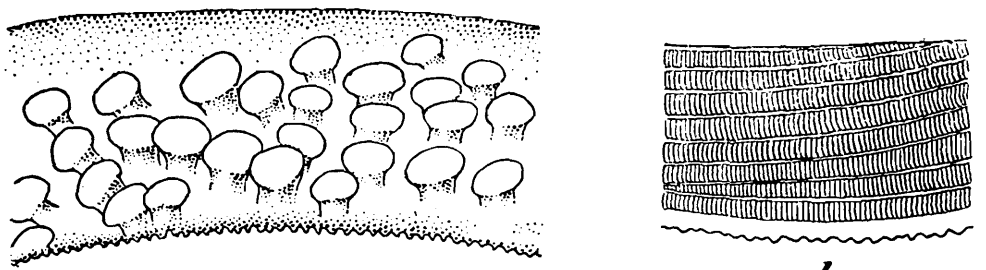


TEXT-FIG. 2.—Lateral view of head and anterior part of body of *Labeo dero* (Ham.) and *Labeo dyocheilus* McClelland, showing general form of head and arrangement of tubercles.

a. Labeo dero (Ham.). *ca.* Nat. size; *b. Labeo dyocheilus* (McClell.). × *ca.* ½.

two specimens noted above in similar situations in the Barak River. *L. dero*, on the other hand, is found at the sides of torrential streams in shallow waters and is caught in large numbers with the help of cast nets. Probably on account of these differences in the habitats of the two species, we find that *L. dero* is well represented in Museum collections whereas *L. dyocheilus* is rather rare. Both the species are of great economic importance, *L. dero* growing to a length of about 18 inches and *L. dyocheilus* to 3 feet or more. The largest specimen of the former in the collection of the Indian Museum is 17 inches and of the latter 26 inches.

Mukerji's[1] observations on *L. dyocheilus* were unfortunately based on inadequate material in the collection of the Indian Museum which then consisted of only three specimens, one from Simla, one from Hardwar, and one from the Abor Hills, Assam.[2] As the species was



TEXT-FIG. 3.—A portion of dorsal surface of the free lower lip of *Labeo dero* (Ham.) and *Labeo dyocheilus* (McClell.). × 61.
a. *Labeo dero* (Ham.); *b*. *Labeo dyocheilus* (McClell.).

originally described from Assam, Mukerji regarded the Assamese specimen as *forma typica* and remarked: "These two specimens from the Western Himalayas do not appear to me to represent the true *L. dyocheilus* so far as I am able to judge by comparison with the Abor specimen, which I consider to be the typical form of *L. dyocheilus*. It seems probable that the Western Himalayan form of the species is distinct." In conformity with the conclusions recorded above specimens received from the Darjeeling Himalayas were referred by Mukerji and myself to the typical form of *L. dyocheilus*.

The presence of two large specimens of *L. dyocheilus* in the collection under report made me examine the previous material once again and it was found that the Simla and Hardwar specimens represent *Labeo dyocheilus*, while all the other specimens from the Darjeeling Himalayas, Assam, Burma and Siam are referrable to the allied species *L. dero* and its Burmese form. Of the typical *L. dero* Mukerji and I[3] had recently collected a large number of specimens in the Dehra Dun hills. The four specimens of *L. dyocheilus* seem to agree in almost all particulars, but as they greatly differ in size no real comparison can be made between them.

The position with regard to *L. dero* is different. This species is represented by a large number of specimens collected from the Ganges and the Brahmaputra drainage systems and from the Burmese drainage systems. There are two specimens from the Kashmir Valley also. The differences noted by Mukerji in the Eastern Himalayan and Assamese specimens (Brahmaputra drainage) and the Burmese and Siamese specimens show that here again we have a condition similar to that of *Crossochilus latius* (*vide infra*) and it seems advisable to regard the two forms as distinct species. The Burmese and the Siamese form which differs from the typical specimens of *L. dero* in having a somewhat shorter head, bluntly rounded snout with the depression across it less

[1] Mukerji, *Journ. Bombay Nat. Hist. Soc.*, XXXVII, pp. 55-59 (1934).
[2] Chaudhuri, *Rec. Ind. Mus.*, VIII, p. 249 (1913).
[3] Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, p. 142 (1936).

marked, 40-41 scales along the lateral line and 13 in a transverse series between the bases of the dorsal and ventral fins (*versus* 40-44 along the lateral line and 16-17 rows between the bases of the dorsal and ventral fins) and 19-21 scales round the caudal peduncle (*versus* 22-23) may be called **L. devdevi**, thus associating its name with that of Mr. Dev Dev Mukerji who first noticed these differences.

The Kashmir specimens seem to differ from both *L. dero* and *L. devdevi*, but the material is not sufficient to discuss their true relationships. They had better be kept separate as *L. diplostomus* (Heckel)[1] for the time being.

Crossochilus latius (Ham.).

1934. *Crossochilus latius* (*forma typica*), Mukerji, *Journ. Bombay Nat. Hist. Soc.*, XXXVII, p. 52.

Irang River, Imphal-Silchar Road. 13.ii.36.

The specimens of *Crossochilus latius* hitherto collected from Assam (Manipur Valley[2]; Tizu River, Naga Hills[3]) have been referred to the Assamese and Burmese form as recognised by Mukerji (*op. cit.*). The three specimens recently collected from the Naga Hills, however, belong to the typical form known from the Brahmaputra[4] and the Gangetic[5] drainage of the Himalayas. It would thus appear that the term "Assamese form" is ambiguous, for within the political limits of Assam both the forms are met with. When, however, the distribution of the two forms is considered with regard to the various drainage systems, it is found that the *forma typica* is restricted to the Brahmaputra and the Gangetic systems, whereas the form **burmanicas** (this new specific name is proposed for the Assamese and Burmese form of Mukerji) is found in the various drainage systems of Burma—the Chindwin, the Irrawadi[6], the Salween[7], etc.[8]. The two forms differ mainly in their lepidosis and the relative length of the head. Even superficially they appear to be quite distinct, and it seems desirable to denote them by different names, as has been done already by Mukerji[9] for the Punjab form.

Large-scaled Barbels of Assam.

In Bengal and Assam the vernacular names *Mahasaula*, *Mahaseer*, *Tora*, etc., in which reference is made to the large size of the head or scales, are indiscriminately applied to several species of large-scaled Barbels which are usually confined to the rapid and clear currents of the larger rivers at the bases of mountains. The confusion has become worse on account of the sportsmen having either adopted local names

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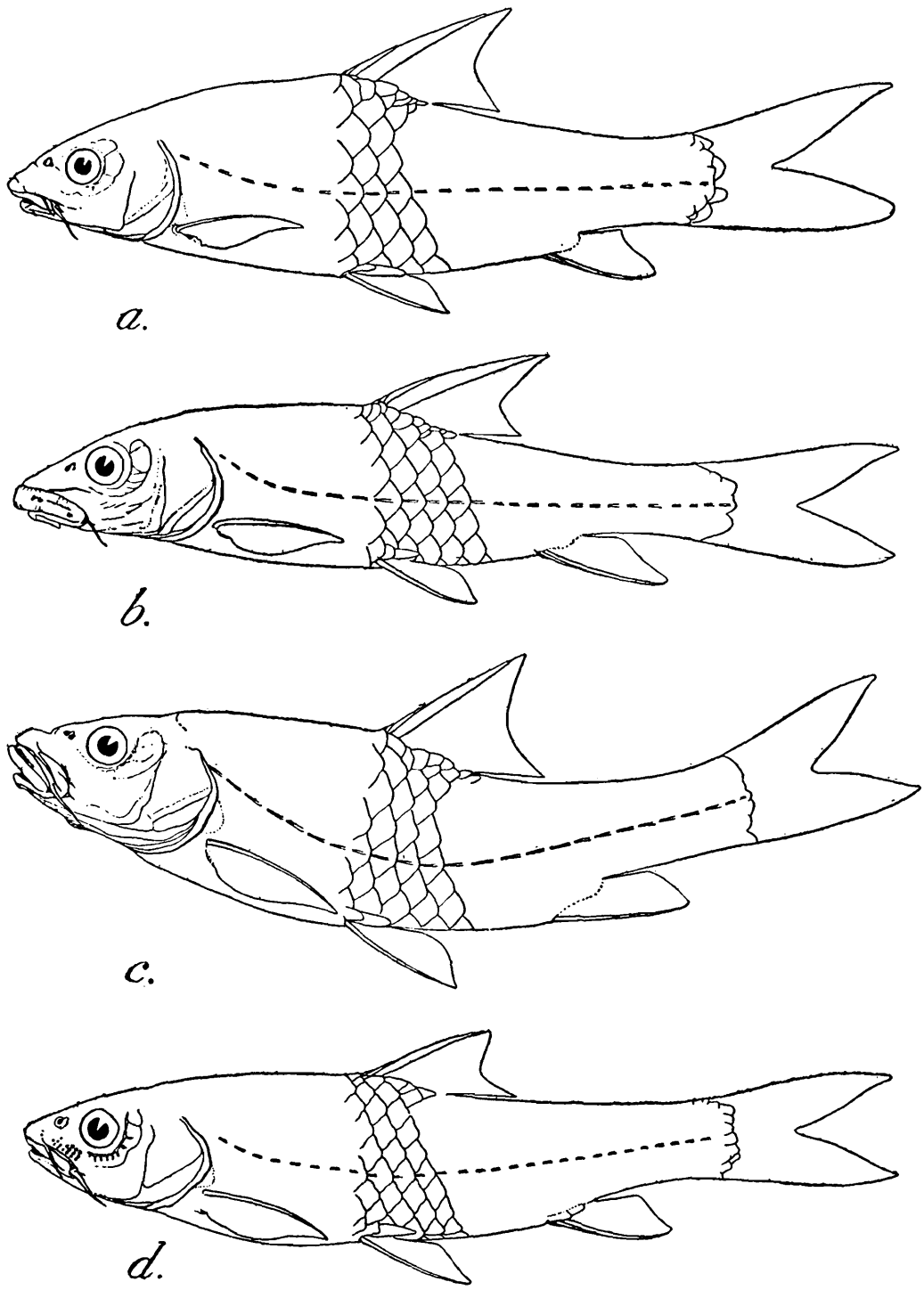
[1] Mukerji, *Mem. Connecticut Acad. Arts. & Sci.*, X, p. 329 (1936).
[2] Hora, *Rec. Ind. Mus.*, XXII, p. 183 (1921).
[3] Hora & Mukerji, *Rec. Ind. Mus.*, XXXVII, p. 389 (1935).
[4] Hamilton, *Fish. Ganges*, p. 345 (1822).
[5] Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, p. 143 (1936).
[6] Mukerji, *Journ. Bombay Nat. Hist. Soc.*, XXXVII, p. 52 (1934).
[7] Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 280 (1890).
[8] Mukerji, *Rec. Ind. Mus.*, XXXIV, p. 283 (1932).
[9] Mukerji, *Mem. Connecticut Acad. Arts & Sci.*, X, p. 331 (1936).

or called their catches representing various species as *Mahseer*. Unfortunately, the ichthyologists, not having sufficient material of the various forms at one place for examination, have also thought it convenient to lump together several forms under *Barbus tor*. Recently Mukerji and



Text-fig. 4.—Large-scaled Barbels of Assam.

a. Lateral view of a young specimen of *Barbus tor* (Ham.). × ½.
b. Lateral view of a young specimen of *Barbus putitora* (Ham.). × ½.
c. Lateral view of a young specimen of *Barbus progeneius* McClelland. × ½.
d. Lateral view of a young specimen of *Barbus hexagonolepis* McClelland. × ½.

The number of scales along the lateral line, the lepidosis between the bases of the dorsal and pelvic fins and also the nature of the last dorsal spine are shown in each case. The above characters help to differentiate these closely allied species.

I[1], as a result of field observations in the Dehra Dun hills and an examination of a large material in fresh condition, were able to define the specific limits of the three species of such carps described by Hamilton in his *Gangetic Fishes—B. putitora, B. mosal* and *B. tor.* The material brought back by Drs. Prashad and Chopra from the Naga Hills now affords an opportunity to discuss the identity of the forms described by McClelland from Assam.

In his "Indian Cyprinidae" McClelland recognised 5 species of large-scaled Barbels, *viz., Barbus hexastichus* (=*Cyprinus tor* Ham.), the *Lobura* of the Assamese; *B. progeneius*, the *Jungha* of the Assamese; *B. macrocephalus*, the *Burapetea* of the Assamese; *B. hexagonolepis*, the *Bokar* of the Assamese and *B. megalepis* (=*Cyprinus mosal* Ham.). The first 4 species were studied in the field either by Griffith or McClelland himself and large series of each seem to have been examined. Of *B. megalepis* McClelland observes:

"The only specimen of this species I have seen is contained in a small collection of fishes presented to the Society by Mr. Hodgson. Its principal difference from the last described [*B. hexagonolepis*] consists in its having a longer head, which is narrower and more compressed at the snout."

The *Mosal* was found by Hamilton in the Kosi River and McClelland surmises that Mr. Hodgson's specimen also came from the same area.

Regarding Hamilton's *Cyprinus putitora*, McClelland made the following observations under *B. hexagonolepis*:

"There is still another large species *Cyp. pitutora*, Buch. closely allied to the preceding Barbels, which according to Buchanan attains nine feet in length; it has the following rays in its fins,

D. 11 : P. 15 : V. 9 : A. 7 : C. 19.

The head is said to be blunt, oval, and small, with a protractile mouth, and the scales to terminate with a notch behind. The first of these characters would seem partly to refer it to *B. hexagonolepus*, while the notch at the apex of the scales is only apparent in *B. macrocephalus*. There is no drawing in Buchanan's collection of the species alluded to, and as his description is not sufficiently clear, we must for the present consider *Cyp. pitutora* as a doubtful species."

Barbus tor (Hamilton).

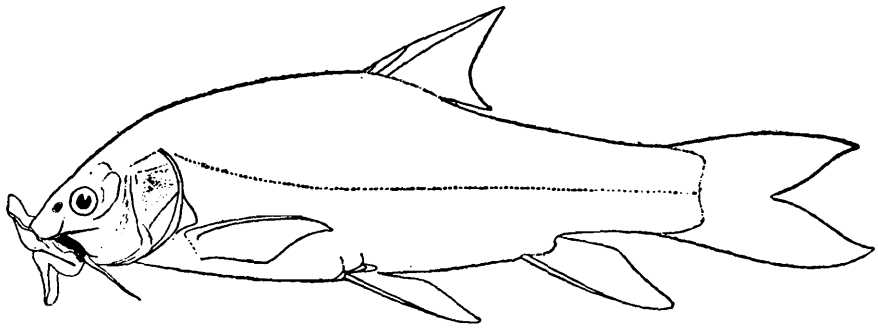
1922. *Cyprinus tor*, Hamilton, *Fish. Ganges*, pp. 305, 388.
1839. *Barbus hexastichus*, McClelland, *As. Res.*, XIX, pp. 269, 333, pl. xxxix, fig. 2.
1936. *Barbus tor*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, p. 139.

Barak River between Nongba and Kalanaga, Imphal-Silchar Road. 13.ii.36.

In the collection under report *Barbus tor* is represented by a single specimen about 49 cm. in length. Mukerji and I (*op. cit.*) have already referred to the distinguishing features of this species, *i.e.*, the red colour of its fins when alive (a character referred to by McClelland also: "with the tips of fins a more decided red"); small head, shorter than depth of body (about 4 or more than 4 times in total length without the caudal) and deeper body (its height being less than 4 times in the total length without the caudal). In the young or half-grown specimens that I had

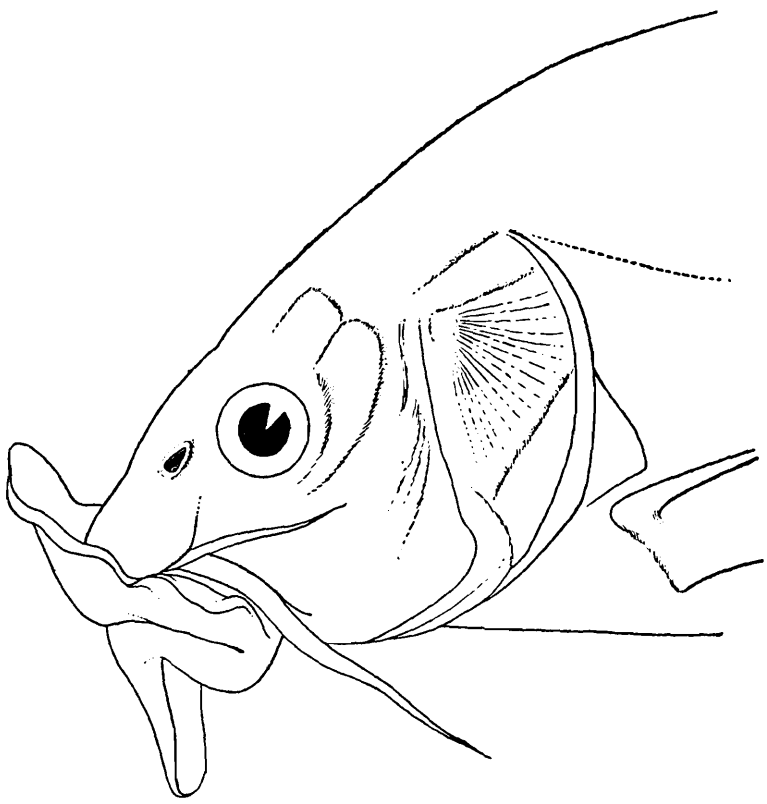
[1]Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, pp. 139—142 (1936).

hitherto examined, the lips were of the normal type, without any pendulous lobes, but in the specimen from the Barak River both the lips are reflected backwards throughout their extent and produced into broad lobes in the middle. Neither Hamilton nor McClelland noticed such



Text-fig. 5.—Lateral view of a spirit specimen of *Barbus tor* (Ham.). $\times \frac{2}{11}$.

a condition of the lips in this species. Day[1] figured a specimen as *B. tor* from South India (Canara or Malabar) in which the condition of the lips corresponds with the specimen from the Barak River. In Day's figure the height of the body is almost equal to the length of the head which



Text-fig. 6.—Lateral view of head and anterior part of body of the specimen illustrated in text-figure 5, showing the nature of the hypertrophied upper and lower lips. $\times \frac{3}{5}$.

is not the case with the Assamese example. It seems very probable that in the Peninsula the species is represented by a relatively slender form.

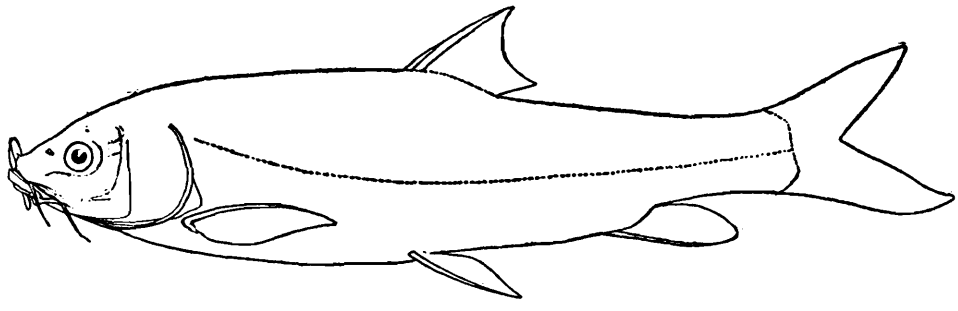
[1] Day, *Fish. India*, pl. cxl, fig. 1 (1877).

McClelland observes that the figure of this species in Buchanan's collection of Ms. Drawings refers to *B. progeneius* and not to this species. The drawing referred to is 121 of volume IV of the Ms. drawings[1]. From the nature of the dorsal spine, which is very hard, bony and long, and the red colouration of the distal parts of the pectoral, ventral and anal fins it seems almost certain that the species figured is *B. tor* and not *B. progeneius*. The figure is, however, inaccurate in so far as the size of the head is concerned. A small lobe of the lower lip is shown in the figure, but such a structure is found in several species, including *B. tor* though McClelland observed it only in his *B. progeneius*.

Barbus progeneius McClelland.

1839. *Barbus progeneius*, McClelland, *As. Res.*, XIX, pp. 270, 334, pl. lvi, fig. 3.
Laimatak River, Imphal-Silchar Road. 8.ii.36.
Irang River, Imphal-Silchar Road. 11-13.ii.36.
Barak River between Nongba and Kalanaga, Imphal-Silchar Road. 13.ii.36.

In characterising *Barbus progeneius*, McClelland was greatly influenced by the character of the lower lip which, in the adult, is produced



TEXT-FIG. 7.—Lateral view of a stuffed specimen of *Barbus progeneius* McClelland. × ⅛.

into a median, fleshy lobe. As this character is common to *B. tor* (*vide supra*), *B. putitora*, and certain South Indian forms, this species has not usually been recognised as distinct. In the present collection from the Naga Hills there are 6 specimens ranging in length from 113 to 710 mm. which represent *B. progeneius* and it is now possible to give the distinguishing features of this species.

McClelland defined the species as follows :—

" Length of the head to that of the body as one to three ; scales large and rounded, posteriorly ; twenty-six along each lateral line, and six from the base of each ventral to the dorsum. Fins short. The number of rays are,

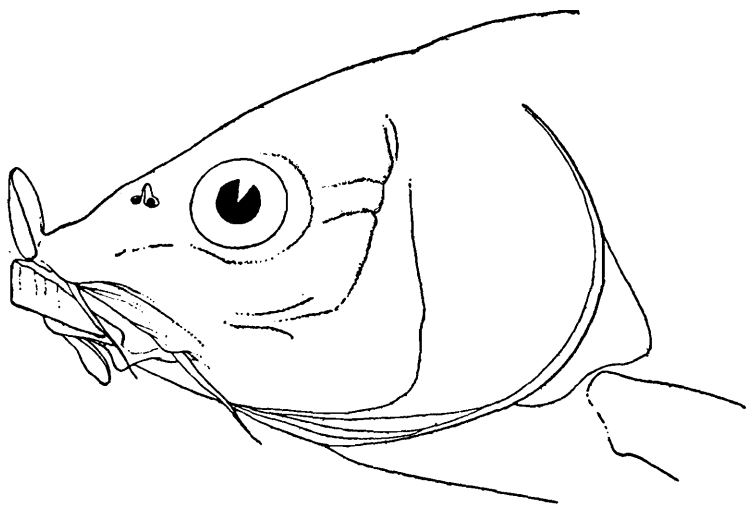
D. 12 : P. 16 : V. 9 : A. 7 : C. 19.

The head is long and much compressed, the mouth is narrow and small, and from the lower lip a fleshy appendix is extended, by which it is distinguished from the neighbouring species."

The long, compressed head and short fins are very characteristic of *B. progeneius*. The dorsal spine is less developed than in *B. tor*. The length of the head is almost equal to the depth of the body. In adult specimens the median lobe of the lower lip is reflected backwards and the middle portion is produced into a tongue-like flap. The tip of the

[1] Hora, *Mem. Ind. Mus.*, IX, p. 189 (1929). There is also another unfinished drawing (No. 125a) of the same species ; this seems to have been added later on. This drawing was published by Gray in his *Illustrations of Indian Zoology*, II, pl. xcvi, fig. 1 (1830-34).

snout is fleshy and produced into a more or less circular flap. The upper lip is fleshy but not produced as in *B. tor.*

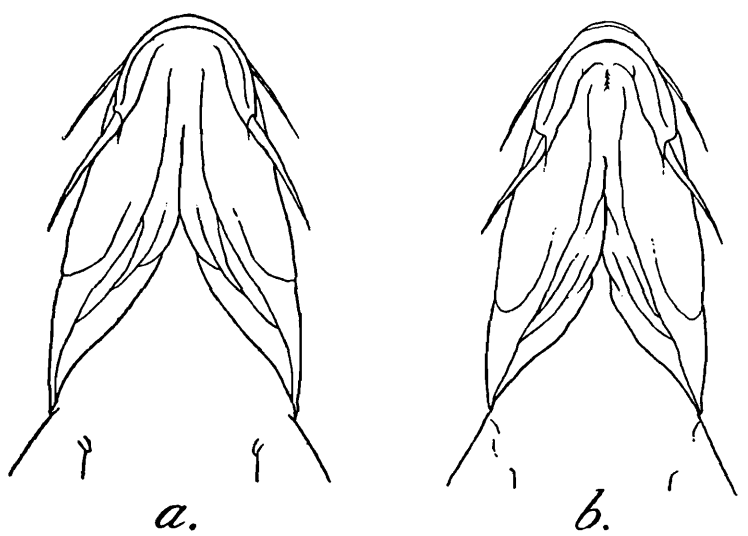


TEXT-FIG. 8.—Lateral view of head and anterior part of body of the specimen illustrated in text-figure 7, showing the nature of the hypertrophied snout and lower lip. × $\frac{2}{3}$.

NOTE.—The upper lip is fleshy, but not hypertrophied.

In the shape of the head this species shows considerable resemblance to *B. putitora*, but the form of the latter is more graceful (height of body considerably less than length of head), the dorsal spine more bony, the head relatively longer, the snout more blunt and the eyes proportionately smaller. The median lobe of the lower lip is well developed even in the young of *putitora.*

In its weak dorsal spine *B. progeneius* resembles *B. hexagonolepis*, but besides the hexagonal form of the exposed surfaces of the scales



TEXT-FIG. 9.—Ventral surface of head and anterior part of body of *Barbus progeneius* McClelland and *Barbus hexagonolepis* McClelland. *Nat. size.*
a. Barbus hexagonolepis McClell.; *b. Barbus progeneius* McClelland.

the latter possesses a widely interrupted labial groove, about 28 scales along the lateral line and 7 between the bases of the dorsal and ventral fins (against 26 along the lateral line and 6 between the bases of the dorsal and ventral fins in *B. progeneius*) and the barbels longer than the diameter of the eye. In the young of *B. progeneius* there is a black streak

behind the gill-openings, but the general body colour is lighter than that of *B. hexagonolepis.*

The alimentary canal is only 1·3 times as long as the fish and this shows that it is more or less a carnivorous species.

Barbus putitora (Hamilton).[1]

1822. *Cyprinus putitora*, Hamilton, *Fish. Ganges*, pp. 303, 388.
1822. *Cyprinus mosal*, Hamilton, *ibid.*, pp. 306, 388.
1839. *Barbus macrocephalus*, McClelland, *As. Res.*, XIX, pp. 270, 335, pl. lx, fig. 2.
1839. *Barbus megalepis*, McClelland, *ibid.*, pp. 271, 337.
1936. *Barbus putitora*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, p. 141.

So far no specimen of this species seems to have been collected from the Naga Hills, but McClelland's account of *Barbus macrocephalus* shows that the fish is fairly common in the rapids of Assam. Mukerji and I referred to the distinguishing features of this species as compared with *B. tor* and I have pointed out above the differences between *B. progeneius* and *B. putitora.* Its long head, narrow body and strong dorsal spine are some of its principal diagnostic features.

In the form of the scales McClelland noticed the resemblance between his *B. macrocephalus* and *B. putitora.* On the authority of Griffith it was pointed out by McClelland regarding this species and " another fish very nearly allied to it, called by the natives *Mahaseer*, that they are extremely voracious and carnivorous in their habits as to swallow any of the smaller fishes that approach them." From an examination of the viscera of *B. putitora* Mukerji and I also concluded that this species is more carnivorous and voracious than *B. tor.* In the Dehra Dun hills the chief bait for *B. putitora* is *Barilius bendelisis* and *Labeo dero*, so it appears evident that the fish feeds on smaller species. *B. putitora* is probably widely distributed in the submountainous streams of the Himalayas and the Assam hills.

Barbus hexagonolepis McClelland.

1839. *Barbus hexagonolepis*, McClelland, *As. Res.*, XIX, pp. 270, 336, pl. xli, fig. 3.
1936. *Barbus hexagonolepis*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVII, p. 389.
Khathalo stream near Nongba, Imphal-Silchar Road. 13.ii.36.
Barak River between Nongba and Kalanaga, Imphal-Silchar Road. 13.ii.36.

This is probably the commonest Barbel of the torrential streams of the Naga Hills. The relatively smaller scales (28-30 along the lateral

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[1] McClelland (*op. cit.*, p. 271, foot-note) considered *Barbus putitora* (Ham.) as a variety of his *B. hexagonolepis* and remarked: " This fish I have been unable to identify with Buchanan's description, I may therefore have described it under another name; he says the head is blunt, oval, small, and smooth, which scarcely applies to either of the foregoing [*B. progeneius* and *B. macrocephalus*], in which the head is remarkably lengthened; that of *B. hexagonolepis* would come nearest to it, though some of the others seem to correspond more in other respects with the account given. Pisc. Gang. 303." Hamilton's description of the head of *B. putitora* as " blunt, small, and smooth with a very minute *tendril* at each corner of the mouth, and another from each side of the under jaw " is rather unfortunate and seems to have been responsible for the confusion in the identity of the largest of the Indian Carps. It appears probable, however, that the above description referred to the snout and not to the head as a whole. Any how there can be little doubt now about the precise specific limits of *putitora* (*vide* Hora & Mukerji, *op. cit.*, 1936).

line and 7 between the bases of the dorsal and ventral fins), shorter and rounded head covered with tubercles on the sides, relatively shorter pectoral and ventral fins and weak dorsal spine are its principal characteristic features. McClelland distinguished it by the hexagonal outline of the exposed parts of its scales.

McClelland observes on the authority of Griffith that *B. hexagonolepis*

> "is to be found in all large rivers on the Eastern frontier, from the base of the mountains to the situation at which the currents first become languid in the plains, keeping mostly in the middle of the stream, where it takes a red hackle very freely, as well as worms and other bait. It is very powerful, often attaining two feet and upwards in length, and usually weighing from eight to twelve pounds."

The alimentary canal is short, about 2 to 2·2 times the length of the fish. As pointed out by McClelland the intestine of this species is of great capacity. The fish seems to be predacious in its habits feeding on insect larvae and small fish.

ADDENDUM.

After the above article had been sent to the press I found among the undetermined material in the Indian Museum another small collection of fish from the Naga Hills made by Mr. C. McCann of the Bombay Natural History Society in February 1930. It comprises 52 specimens belonging to 10 species. Of these 51 specimens were collected from pools in the bed of a rocky stream at Chang Chang, while one specimen of *Ophicephalus gachua* was obtained from a muddy tank at Chareli. The waters of these parts of the Naga Hills drain into the Brahmaputra system.

The following species are represented in this material :—

BAGRIDAE.	
1. *Mystus bleekeri* (Day)	2 specimens.
OLYRIDAE.	
2. *Olyra longicaudata* McClelland	5 specimens.
CYPRINIDAE.	
3. *Danio dangila* (Ham.)	7 specimens.
4. *Danio aequipinnatus* McClelland	14 specimens.
5. *Barbus* sp. (Juv., Mahseer type)	2 specimens.
6. *Barbus* sp. (Juvenile specimens)	3 specimens.
7. *Barbus ticto* (Ham.)	3 specimens.
NANDIDAE.	
8. *Badis badis* (Ham.)	12 specimens.
OPHICEPHALIDAE.	
9. *Ophicephalus punctatus* Bloch.	1 specimen.
10. *Ophicephalus gachua* Ham.	3 specimens.

The only species new to the fauna of the Naga Hills is *Olyra longicaudata* which was originally described from the Khasi Hills. I[1] have pointed out elsewhere that *O. elongata* Günther[2] and *O. kempi* Chaudhuri[3] are to be regarded as synonyms of this species. *O. longicaudata*, thus defined, is found in the Darjeeling Himalayas, the hills of Assam and Tenasserim.

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[1] Hora, *Rec. Ind. Mus.*, XXXVIII, p. 207 (1936).
[2] Günther, *Ann. Mag. Nat. Hist.*, (5), XI, p. 139 (1883).
[3] Chaudhuri, *Rec. Ind. Mus.*, VII, p. 443 (1912).