

Measurements in millimetres.

Total length including caudal	47.0	42.0	41.0	40.0	37.0
Length of caudal	11.0	9.0	10.0	9.0	9.0
Length of head	8.0	7.0	7.0	7.0	7.0
Height of body	14.5	13.5	12.2	11.0	10.5
Diameter of eye	3.0	2.5	2.5	2.5	2.5
Length of snout	2.5	2.0	2.0	2.0	2.0
Interorbital distance	4.0	3.8	3.8	3.5	3.5
Commencement of dorsal from tip of snout	18.5	17.0	16.0	15.0	15.0
Longest ray of dorsal	9.5	8.0	8.0	8.0	8.0

Panchax panchax (Ham.).

1889. *Haplochilus panchax*, Day, *Faun. Brit. Ind. Fish.*, I, p. 417.

There are two specimens, about 44 mm. in total length, of *Panchax panchax* in the collection from Sandoway; they were collected from a road-side drain. *P. panchax* is a widely distributed species of the Oriental Region; its range extends from Orissa, through Lower Bengal, to Burma, Andaman Islands, Siam, Malay Peninsula and the Archipelago.

XXXII.—ON A SMALL COLLECTION OF FISH FROM THE UPPER CHINDWIN DRAINAGE.

At my request Mr. S. J. Duncan, Sub-Divisional Officer at Ukhrul, Manipur State, Assam, in the course of his tours made a small collection of fish for the Zoological Survey of India from the Upper Chindwin Drainage. As the area traversed by him is very close to the boundary between Assam and Burma, the material is of special interest for zoogeographical studies, and throws considerable light on the distribution of some of the species represented in the collection.

The material consists of 46 specimens which are referable to 12 species belonging to the families Cyprinidae, Cobitidae, Sisoridae and Ophicephalidae. These are listed below according to the localities from where the material was obtained.

1. Small stream below the village Singcha Tangkhul flowing into the Khunukong or Nambalok (called Nampanga in Burma). 21.1.1937.

i. *Oreinus molesworthi* Chaudhuri. 2 specimens.

2. Small stream below the village Chahong Khulen flowing into the Khunukong or Nambalok. 25.1.1937

i. *Barbus hexagonolepis* McClelland 1 specimen.

ii. *Barbus clavatus* McClelland 1 specimen.

3. Upper reaches of the Namya river at Kongan Thana, a Kabo or Shan village. 28.1.1937.

i. *Barilius barila* Ham. 1 specimen.

ii. *Labeo devdevi* Hora 4 specimens.

iii. *Garra gotyla* (Gray). 4 specimens.

iv. *Barbus myitkyinae* Prashad & Mukerji 2 specimens.

v. *Nemachilus vinciguerrai* Hora 7 specimens.

vi. *Glyptothorax trilineatus* Blyth 3 specimens.

vii. *Ophicephalus gachua* Ham. 2 specimens.

4. Chakpi river at Chakpi Karong. 1.iii.1937.
- | | |
|---|--------------|
| i. <i>Barilius barila</i> Ham. | 3 specimens. |
| ii. <i>Barbus pinnauratus</i> (Day) | 3 specimens. |
| iii. <i>Barbus clavatus</i> var. <i>burtoni</i> Mukerji | 2 specimens. |
5. Lokchao river at Tamu. 15.iii.1937.
- | | |
|--|--------------|
| i. <i>Barbus pinnauratus</i> (Day) | 5 specimens. |
| ii. <i>Lepidocephalichthys berdmorei</i> (Blyth) | 6 specimens. |

The range of distribution of the following species is extended in this article : *Barbus myitkyinae*, *B. pinnauratus* and *Glyptothorax trilineatus*. The most interesting record is that of *B. pinnauratus* which was hitherto known from South India only. It is also clear from the collection that the typical Burmese fauna is well represented in the Upper Chindwin Drainage.

I take this opportunity to record my sincere thanks to Mr. S. J. Duncan for the opportunity he has afforded me of examining fishes from a zoologically interesting region. The material is in an excellent state of preservation and forms a valuable addition to the collection of the Zoological Survey of India. Mr. Duncan's notes on the colouration of the species, reproduced below, are most helpful.

Family CYPRINIDAE.

***Barilius barila* Hamilton.**

1921. *Barilius barila*, Hora, *Rec. Ind. Mus.*, XXII, p. 190.

Vernacular Names.—*Thêlbôl* Kuki; *Ngapâilâ* Tangkhul; *Pakham* Kabo.

1 specimen. Namya river at Kongan Thana. 28.i.1937.

3 specimens. Chakpi river at Chakpi Karong. 1.iii.1937.

There are altogether 4 specimens of *Barilius barila* in the collection, ranging in length from 105 mm. to 120 mm. in total length. In none of the specimens the outer rays of the pectoral fins are specially strengthened for the purpose of adhesion to rocks. In all the specimens, particularly those from the Chakpi river, the body is covered with a number of black spots which represent encysted Trematode larvae; these should not to be confused with the colour markings. According to Mr. Duncan's observations the colouration is as follows :—

“Dorsal surface dark. Ventral white (or silvery). The sides are transversed by dark bluish broad stripes running parallel to each other. Fins pinkish.”

B. barila is known both from India and Burma.

***Oreinus molesworthi* Chaudhuri.**

1913. *Oreinus molesworthi*, Chaudhuri, *Rec. Ind. Mus.*, VIII, p. 247, pl. vii, figs. 2, 2a, 2b.

1935. *Oreinus molesworthi*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVII, p. 391.

Vernacular Names.—*Sana-nga* Manipuri; *Nganam* Kuki; *Khaingui* Tangkhul. The Manipuri name means “Goldfish”.

2 specimens. Stream below Singcha Tangkhul. 21.i.1937.

Oreinus molesworthi is represented by 2 young specimens in the collection which are about 130 mm. and 142 mm. in total length

respectively. Though the specimens were collected only from one small stream below Singcha Tangkhul, Mr. Duncan states that "This fish is also found in other streams of the same drainage, but it is *not* found in all streams. It inhabits mostly the higher and colder reaches of the streams where they are found." It may be noted here that the type-specimen, 202 mm. in total length, was collected from Yembung at an altitude of 1,100 feet only.

Mukerji and I had recently extended the range of the species to the Chindwin drainage system in the Naga Hills.

According to Mr. Duncan the colouration of the species is as follows :—

"The dorsal surface is dark brown. This colour decreases in intensity as it approaches the dark thin line that runs right through the middle of the side from the angle of the operculum to the root of the caudal fin. When looked at laterally the colour appears steel grey. Below the dark line the colour is silvery white. The ventral surface is also white. The scales are very very small. Fins are slightly pinkish except perhaps the dorsal."

Labeo devdevi Hora.

1934. *Labeo (Labeo) dyocheilus* (in part), Mukerji (*nec* McClelland), *Journ. Bombay Nat. Hist. Soc.*, XXXVII, pp. 55-59 (Burmese and Siamese form, p. 58).

1936. *Labeo devdevi*, Hora, *Rec. Ind. Mus.*, XXXVIII, pp. 323-324.

Vernacular Names.—*Ngatin Macha* Manipuri; *Ngachuntam* Kuki; *Ngalu* Kabo.
4 specimens. Namya river at Kongan Thana. 28.i.1937.

In Mr. Duncan's collection *Labeo devdevi* is represented by 4 young specimens, varying in length from 83 mm. to 92 mm. in total length. Its superficial resemblance to *L. dero* (Ham.) is very great indeed; but the two species can be readily distinguished by their lepidosis. Both *L. dero* and *L. devdevi* are liable to be confused with *L. dyocheilus* McClelland, but I have shown in the paper referred to above that McClelland's species has a very characteristic type of adhesive surface of the lower lip.

According to Mr. Duncan the colouration of the species is as follows :—

"Dark green dorsal surface and white ventral. The scales are small and have a coppery tint. Opercular region with a golden tint. Fins pinkish."

Garra gotyla (Gray).

1921. *Garra gotyla*, Hora, *Rec. Ind. Mus.*, XXII, p. 653.

1936. *Garra gotyla*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, p. 144.

Vernacular Names.—*Ngamu Sangkhom* Manipuri; *Ngapum* Kuki; *Masangla* Tangkhul; *Pachup-hen* Kabo.

4 specimens. Namya river at Kongan Thana. 28.i.1937.

Garra gotyla is perhaps the most widely distributed species of the genus, as it is found all along the Himalayas. The four specimens in Mr. Duncan's collection are from 97 mm. to 104 mm. in total length. The colour is almost black along the dorsal surface and the sides. Mr. Duncan found that "The whole body of the fish is dark green in colour except the ventral surface which is flattish and white." All the specimens are provided with a well developed proboscis on the snout.

In 1921, I¹ recorded *G. gotyla*, for the first time, from the north-eastern border of Burma and the Naga Hills.

Barbus hexagonolepis McClelland.

1936. *Barbus hexagonolepis*, Hora, *Rec. Ind. Mus.*, XXXVIII, p. 330.

Vernacular Names.—*Ngara* Manipuri; *Ngaha* Kuki.

1 specimen. Stream below Chahong Khulen. 25.i.1937.

In the paper referred to above I discussed the specific limits of the various species of the large-scaled Barbels found in Assam. It was also indicated that *B. hexagonolepis* is the commonest Barbel of the torrential streams of the Naga Hills. In Mr. Duncan's collection there is only one specimen, about 107 mm. in length without the caudal. Mr. Duncan states that it is the mighty *Mahseer* of this region and observes that it "is found in almost all the rivers in these hills" His description of the colour is as follows:—

"Dark green dorsal surface. A white (sometimes yellowish) broad line runs laterally and below it another dark broad line runs in the same direction from the operculum to the root of the caudal fin. White ventral surface."

Barbus myitkyinae Prashad and Mukerji.

1929. *Barbus myitkyinae*, Prashad & Mukerji, *Rec. Ind. Mus.*, XXXI, p. 198, pl. ix, figs. 2, 2a, 2b.

Vernacular Names.—*Ngasang* Kuki; *Khaisang* Tangkhul; *Pachak* Kabo.

2 specimens. Namya river at Kongan Thana. 28.i.1937.

In Mr. Duncan's collection there are two specimens of *Barbus myitkyinae*, 97 mm. and 104 mm. in total length respectively. The species was described from the Myitkina District, Upper Burma, where it is stated to be quite common in the Indawgyi Lake and the streams in the adjacent area. The present record of *B. myitkyinae* from the Upper Chindwin Drainage shows that the species is probably widely distributed in the headwaters of the Chindwin and the Irrawadi rivers.

Barbus clavatus McClelland.

1921. *Barbus clavatus*, Hora, *Rec. Ind. Mus.*, XXII, p. 185, pl. ix, fig. 1.

1935. *Barbus clavatus*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVII, p. 388.

Vernacular Names.—*Ngasang* Kuki; *Khaisang* Tangkhul.

1 specimen. Stream below Chahong Khulen. 25.i.1937.

From the vernacular names and the notes supplied by Mr. Duncan it seems that the local people make no distinction between *Barbus clavatus* and *B. myitkyinae*. The two species are, however, abundantly distinct and can be readily distinguished by the relative length of the dorsal spine, which in the former is considerably longer than the head. The dorsal surface of *B. clavatus* in front of the dorsal fin is distinctly keeled.

Mr. Duncan notes that this fish is called, rightly or wrongly, the "White Mahseer" 'Mahseer' can only be used for this species in a

¹ Hora, *Rec. Ind. Mus.*, XXII, p. 743 (1921).

very loose sense, as it neither possesses large scales nor is its dorsal spine smooth. Moreover, the body of *B. clavatus* is considerably more compressed than that of the 'Mahseers'

According to Mr. Duncan, the colouration of the species is as follows :—

“Dorsal surface dark green. Ventral surface white. The head or rather the opercular region golden tint. The whole body shows a slight golden tint when held up against the sun.”

The only specimen of the species in Mr. Duncan's collection is about 112 mm. in total length.

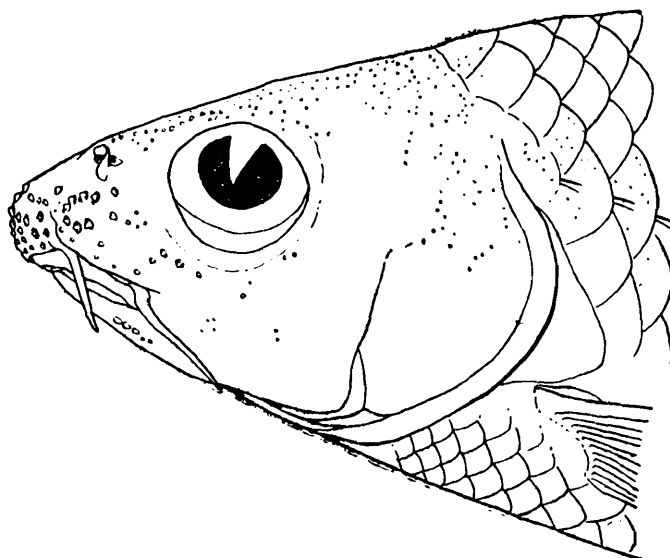
***Barbus clavatus burtoni* Mukerji.**

1934. *Barbus clavatus burtoni*, Mukerji, *Journ. Bombay Nat. Hist. Soc.*, XXXVII, p. 64, pl. iii, fig. 1 and text-figures 10 & 11.

Vernacular Name.—*Ngasang Kuki.*

2 specimens. Chakpi river at Chakpi Karong. 1.iii.1937.

In describing *burtoni* as a subspecies of *Barbus clavatus*, Mukerji distinguished it from the typical form by its longer snout (greater than the diameter of the eye), shorter dorsal spine (less than the length of the head), lepidosis (small number of scales) and colouration (much darker, especially along the dorsal surface). In all these characters the two specimens in Mr. Duncan's collection, 132 mm. and 142 mm. in total length respectively, agree with the subspecies *burtoni*. The dorsal half



TEXT-FIG. 6.—Lateral view of head and anterior part of body of *Barbus clavatus* var. *burtoni* Mukerji, showing tubercular areas on the snout. $\times 2$.

of the fish is intensely dark ; the whole of the caudal fin is dusky and especially the lower lobe. The membranes in between the dorsal rays are black, except at the bases. The distal portion of the anal fin is grayish as also the dorsal surface of the pectoral fins. As in the typical form, the dorsal surface in front of the dorsal fin is distinctly keeled. In both the specimens the snout is provided with rows of well defined tubercles.

Although Kuki Nagas make no distinction between the typical form and the subspecies *burtoni*, Mr. Duncan distinguished them in the field by their different colouration.

Barbus pinnauratus (Day).

1877. *Barbus pinnauratus*, Day, *Fish. India*, p. 561, pl. cxxxix, fig. 3.

1937. *Barbus pinnauratus*, Hora, *Rec. Ind. Mus.*, XXXIX, p. 9, fig. 1.

Local Name.—Ngahao Manipuri.

3 specimens. Chakpi river at Chakpi Karong. 1.iii.1937.

5 specimens. Lokchao river at Tamu. 15.iii.1937.

According to Day, *Barbus pinnauratus* is found in "fresh waters at Coconada down the East coast of India to Ceylon, and inland as far as the Neilgherries, also along the Western Ghats and rivers at their bases" So far as I am aware¹ this species has not been found so far in any other part of India, and its present record from the Upper Chindwin is, therefore, of exceptional interest. Attention may here be directed to the similar distribution of *Danio strigillifer* Myers² which was originally described from Upper Burma but was recently recorded from South India.³ To explain these and several other similar cases of a discontinuous range of distribution I⁴ recently advanced a hypothesis. According to this view, when through a differential orogenic movement in the region of the present high peaks of the Himalayas (the region between the Assam and the Nepal Himalayas), the Himalayas were uplifted the migration of the aquatic fauna towards the Western Himalayas was checked and diverted along the Satpura trend of mountains to the Western Ghats whence it spread southward to the hills of the Peninsula. There is abundant evidence in favour of such a view both from the distribution of fishes and from the palaeogeographical features of the country during the Tertiaries.

The specimens in Mr. Duncan's collection agree very closely with those from South India, except that the spots on the scales are not so well defined and the head is relatively smaller. The younger specimens possess a black mark below the dorsal spine similar to the one recently described by me in the Tunga river specimens.

Sundara Raj⁵ referred to the close similarity between *B. chrysopoma*, *B. pinnauratus* and *B. sarana*, all occurring in the Madras Presidency. To this complex of allied species may be added *B. caudimarginatus*, *B. oatesii*, *B. sewelli*, *B. mitkyinae*, *B. binduchitra* (a new species described above *vide* p. 327), etc., from Burma. In discussing the relationships of the new species I have already referred to the distinguishing features of *B. sewelli* and *B. pinnauratus*.

To bring out the close similarity in proportions, etc., between the South Indian and the Upper Chindwin specimens of *B. pinnauratus*

¹ Karoli (*Term. füzetek*, V, p. 179, 1882) recorded *Barbus pinnauratus* by name only from Siam and Java. Weber and de Beaufort did not include this species in their work on the "Fishes of the Indo-Australian Archipelago". Suvatti has, however, listed *B. pinnauratus* in his "Index to Fishes of Siam" on the authority of Karoli. Without further details it is not possible to be sure of Karoli's record.

² Myers, *Amer. Mus. Novitates*, No. 150, p. 1 (1924).

³ Hora, *Rec. Ind. Mus.*, XXXIX, p. 10, fig. 3 (1937).

⁴ Hora, *Rec. Ind. Mus.*, XXXIX, p. 255 (1937).

⁵ Sundara Raj, *Rec. Ind. Mus.*, XII, p. 254 (1916); also see Annandale, *Rec. Ind. Mus.*, XIV, p. 46 (1918).

I give below a table of measurements of the specimens from the two regions.

Measurements in millimetres.

	Upper Chindwin.				Shimoga.	
	83.0	90.0	103.0	116.0	83.0	92.0
Total length	83.0	90.0	103.0	116.0	83.0	92.0
Length of caudal	18.0	20.0	23.0	25.0	18.0	20.0
Length of head	15.0	16.0	17.2	21.5	16.0	19.0
Height of head	14.0	15.0	16.0	20.0	14.5	17.0
Width of head	11.0	12.2	13.0	16.1	12.0	13.0
Length of snout	4.0	5.0	5.0	6.0	5.0	5.0
Diameter of eye	6.0	6.5	6.5	7.0	6.1	6.8
Interorbital width	7.0	7.5	8.2	10.0	6.9	7.0
Height of body	23.0	26.0	27.0	32.0	24.0	25.0
Width of body	12.0	13.5	14.0	16.5	13.0	12.0
Longest ray of dorsal fin	14.0	17.0	21.0	23.0	15.0	18.0
Longest ray of anal fin	11.0	12.0	13.0	14.0	11.0	12.0
Length of pectoral fin	12.3	14.5	16.0	19.0	13.0	14.0
Length of caudal peduncle	12.0	13.0	13.5	16.0	12.0	13.0
Least height of caudal peduncle	9.0	10.0	11.0	13.0	9.0	10.0

Mr. Duncan made the following observations about the colouration of the species :—

“Dark dorsal and white ventral surface. In young specimens a biggish black spot, though not very prominent, on the body near the beginning of the caudal fin.”

Family COBITIDAE.

***Nemachilus vinciguerrai* Hora.**

1935. *Nemachilus vinciguerrae*, Hora, *Rec. Ind. Mus.*, XXXVII, p. 62, pl. iii, fig. 12.

Vernacular Names.—*Ngajou* Kuki ; *Hangkorkhai* Tangkhul ; *Pasulai* Kabo.

7 specimens. *Namy* river at *Kongan* Thana. 28.i.1937.

In Mr. Duncan's collection there are seven specimens of *Nemachilus vinciguerrai* ranging from 57 mm. to 76 mm. in total length. They agree fairly closely with the species recently described by me from Burma and Siam. Mr. Duncan's description of the colouration is as follows :—

“The general effect of the colouration scheme is a dirty biscuit colour, but the whole body is marked with transverse zebra stripes of light and dark alternately. The stripes are narrow in front of the dorsal and broader behind it as they approach towards the caudal fin. Fins have red edges.”

In larger specimens the broader stripes behind the dorsal fin are stated to be alternately pink and dark.

***Lepidocephalichthys berdmorei* (Blyth).**

1921. *Lepidocephalichthys berdmorei*, Hora, *Rec. Ind. Mus.*, XXII, p. 196.

Local Names.—*Nga Krichou* or *Nga Kachirou* Manipuri.

6 specimens. *Lokchao* river at *Tamu*. 15.iii.1937.

The specimens of *Lepidocephalichthys berdmorei* in Mr. Duncan's collection range from 46 mm. to 75 mm. in total length. In the smaller individuals the caudal fin is more markedly emarginate. Usually there

is a dark spot in the upper portion of the caudal fin near the base, but in the largest individual there is a well marked black ocellus in the same situation. This species is widely distributed in the Burmese waters.

Family SISORIDAE.

Glyptothorax trilineatus Blyth.

1923. *Glyptothorax trilineatus*, Hora, *Rec. Ind. Mus.*, XXV, p. 29.

Vernacular Names.—Monglheng Kuki; Ngaprangla Tangkhul; Payahat Kabo.

3 specimens. Namya river at Kongan Thana. 28.i.1937.

Glyptothorax trilineatus is represented by 3 specimens varying from 78 mm. to 87 mm. in total length. They possess the characteristic three white streaks and agree in every respect with Blyth's description of the species. Mr. Duncan observes that it is not a very common fish. The largest specimen he had ever caught was about 5 to 6 inches in length. The colouration of the living specimens is noted by him as follows:—

“Dark brown colour with a reddish tint. A light line runs laterally on both sides as well as along the dorsal profile. Fins very light red.”

G. trilineatus is known from Tenasserim, Rangoon and Upper Burma. It is here recorded from the Chindwin Drainage for the first time.

Family OPHICEPHALIDAE.

Ophicephalus gachua Ham.

1935. *Ophicephalus gachua*, Hora & Mukerji, *Rec. Ind. Mus.*, p. 404.

Vernacular Names.—Ngamu Manipuri; Ngavoh Kuki; Khaiwā Tangkhul.

2 specimens. Namya river at Kongan Thana. 28.i.1937.

In Mr. Duncan's collection there are two young specimens of *Ophicephalus gachua*; they are about 85 mm. in total length. The colouration of the species, according to Mr. Duncan's notes, is as follows:—

“Dark colour. White and greenish ventral. The body shows angular bands. The fins have half circles of light and dark.”

XXXIII.—ON A COLLECTION OF FISH FROM THE KUMAON HIMALAYAS.

In May-June 1936, Mr. E. O. Shebbeare, Chief Conservator of Forests, and Mr. M. P. Bhola, Divisional Forest Officer, Haldwani Division, made a small collection of fish for me in the outer Himalayan hills below Naini Tal. The fish were obtained from the Nandhaur and Kalaunia rivers; the former has its source in the Naini Tal District and flows over a bed of boulders. Within the hills its valley is narrow but broadens out in the plains. The fish were collected in the rocky portion of the stream. The Kalaunia river is similar to that of the Nandhaur river in its general physical features, but its source lies in the outer Himalayan hills of the Almora District. The fauna of the two streams is almost identical.