had assigned to it a new species *O. parvus*, which is said to grow to 31 mm. in total length. In general facies, lepidosis and colouration the Siamese fish seemed so similar to Hamilton's *cosuatis* that I requested Mr. Luang Choola, Officer-in-charge, Bureau of Fisheries, Bangkok, to send me for comparison a few specimens of Smith's species. He very kindly presented 3 examples of *O. parvus* to the Zoological Survey of India, and these have enabled me to come to a definite conclusion that *O. parvus* is a juvenile form of *Cyprinus cosuatis*. Further, it is clear that this species is sufficiently distinct, especially on account of the sensory folds on the head, from the numerous species of the genus *Barbus* known from India, and should, therefore, be retained in a separate genus *Oreichtys* Smith, which as pointed out by its author, is closely allied to *Cyclocheilichthys* Bleeker.

Oreichthys cosuatis (Ham.) is represented by a few specimens in the collection of the Indian Museum, and unfortunately most of them are not in a good state of preservation. The sensory folds on the head are, however, fairly distinct in all of them. A comparison with the young specimens from Siam shows that when the fish is about 18 mm. in length without the caudal fin (text-fig. 1 *a*.), the dorsal spine is longer than the head and the depth of the body, and the spot at the base of the caudal fin is intensely black. The spots on the dorsal and the anal fins are also well marked and seem quite compact. In a specimen about 23 mm. in length without the caudal (text-fig. 1 *b*) the depth of the body is almost equal to the length of the dorsal ; the length of the head is considerably shorter than both these dimensions. The three colour spots are somewhat diffuse but more extensive. In a specimen from Mysore, about 26 mm. in length without the caudal (text-fig. 1 *c*), the depth of the body is considerably greater than the length of the dorsal fin, which is almost equal to the length of the head. The dorsal and the anal fin spots are well pronounced, while that at the base of the caudal fin is very diffuse and indistinctly marked. The most remarkable feature about this specimen is that the lateral line, though interrupted in places, extends up to the 20th scale. As a rule, it is present only on the first 4 or 5 scales. In a specimen from the Saran District of Bihar, about 34 mm. in length without the caudal (text-fig. 1 *d*), the length of the dorsal fin, though greater than that of the head, is considerably shorter than the depth of the body. The spot on the dorsal fin is very diffuse and extensive while that on the anal fin is only faintly marked. As far as I can make out from the spirit material, the spot at the base of the caudal fin is almost absent.

Though sufficient material is not available for a detailed study of the variations undergone by this fish with growth, it is clear from the above that the young specimens from Siam are referrable to Hamilton's species.

XXXI.—On a small Collection of Fish from Sandoway, Lower Burma.

In the course of an investigation of the Anopheline fauna of Sandoway, Lieut. E. S. Feegrade, Malariogist to the Public Health Department of Burma, collected several samples of fish from the stone-lined

shallow wells and the road-side drains of the town of Sandoway, headquarters of the district of the same name in Lower Burma and situated in Lat. 18° 28′ N. and Long. 94° 21′ E. The fish were collected in several lots between June and August 1936, and sent to the Zoological Survey of India for determination. At my request, Lieut. Feegrade arranged to have further specimens collected through Dr. U. Shwe Baw for the Zoological Survey of India. Though the entire material consists of 24 specimens only, two new species have been discovered. It has also been found that the specimens of the already known species vary considerably from their respective typical series, especially in colouration. These results are not surprising when it is remembered that the freshwater fish fauna of this region, including that of the neighbouring Arakan Yomas, has never been investigated before.

Lieut. Feegrade informed me that most of his material was collected in clear, running water, such as road-side drains, seepage water drains, small hill-streams and small ponds. It may be indicated that Sandoway is situated on the left bank of the Sandoway river, about 15 miles to the S. E. of its mouth and between 4 to 5 miles due east of the sea coast in a direct line. The area in its neighbourhood is full of tidal creeks and there is practically no plain land along the valley of the Sandoway river.

The following species of fish have been found in the collection :—

1. *Rasbora daniconius* (Ham.)	2 specimens.
2. *Brachydanio choprai* Hora	4 specimens.
3. *Danio feegradei*, sp. nov. .	1 specimen.
4. *Barbus* (*Puntius*) *binduchitra*, sp. nov.	10 specimens.
5. *Barbus* (*Puntius*) *stoliczkanus* Day	5 specimens.
6. *Panchax panchax* (Ham.)	2 specimens.

I take this opportunity to offer my sincere thanks to Lieut. E. S. Feegrade for having made a valuable collection of fish for the Zoological Survey of India. The material is in a very good state of preservation.

Rasbora daniconius (Ham.).

1889. *Rasbora daniconius*, Day, *Faun. Brit. Ind. Fish.*, I, p. 336.

Rasbora daniconius is represented in Lieut. Feegrade's collection by two specimens, measuring 42 mm. and 45 mm. in total length. They were collected from a road-side drain. The black lateral band is very well marked and extends from the tip of the snout to the base of the caudal fin, the middle rays of which are stained gray. The scales above the lateral line, as also some below it, are marked with black dots along the margin. The dorsal surface is dusky with a black streak along the mid-dorsal line.

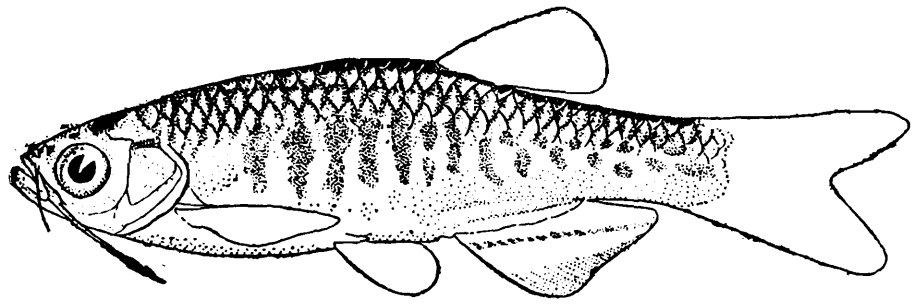
Brachydanio choprai[1] Hora.

1928. *Danio* (*Brachydanio*) *choprae*, Hora, *Rec. Ind. Mus.*, XXX, p. 39, fig.2.
1934. *Danio* (*Brachydanio*) *choprae*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVI, p. 130 (Synoptic Table to species of *Brachydanio*).

There are 4 specimens of *Brachydanio choprai* from Sandoway ; 2 were collected from a stone-well, while the remaining two were obtained

[1] By mistake *e* instead of *i* had been previously used in the termination of this specific name. The species was named after my colleague Dr. B. N. Chopra.

from a road-side drain. The two examples, 28 mm. and 30 mm. in total length respectively, from the well are more or less devoid of the typical colour pattern of the species, while those collected from the drain, 33 mm.



TEXT-FIG. 2.—Outline sketch of *Brachydanio choprai* Hora, showing colour markings in a specimen 33 mm. in total length.

and 36 mm. in total length respectively, are very gorgeously coloured. In the larger specimens the anterior vertical bands are replaced by rows of spots at the posterior end. The bands on the dorsal and the caudal fins are either faintly marked or are absent altogether. The band on the anal fin is, however, present in all the specimens.

There are several large sensory pores on the dorsal surface of the head along the supra-orbital edges. Though, as a rule, the lateral line is absent in this species, in certain specimens it may be present on the first few scales; when present, it bends abruptly downward and may extend as far as the base of the pelvic fin.

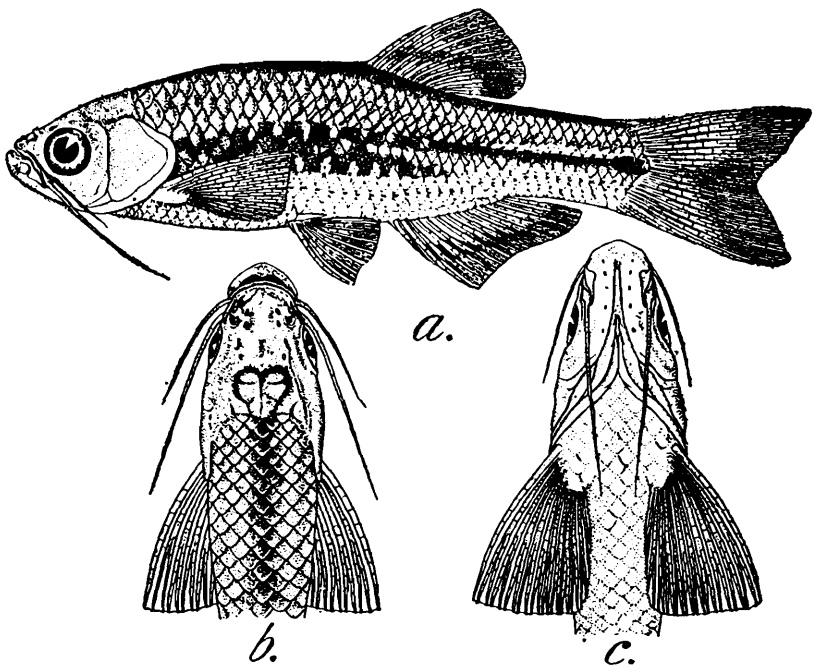
The species was hitherto known only from the Myitkyina District of Upper Burma.

Danio feegradei, sp. nov.

D. 2/9; A.3/12; P.12; V.8; C.19; L.1.39; L.tr.$7\frac{1}{2}/2\frac{1}{2}$.

The new species possesses a graceful form with both the dorsal and the ventral profiles slightly arched. The head and body are greatly compressed. The head is bluntly pointed and its length is contained 4·9 times in the total length and 3·9 times in the length without the caudal. The height of the head at the occiput is contained 1·3 times, and its width 1·8 times in its length. The diameter of the eye is contained about 3·3 times in the length of the head, 0·9 times in the length of the snout and 1·2 times in the interorbital distance. The nostrils are situated close to the anterior margin of the eye; the anterior nostril is somewhat tubular. Inner to the upper margin of the eye is a series of 4 large sensory pits similar to those described above in the case of *Brachydanio choprai*. Similar pores are also present on the ventral surface of the head. The mouth is small and oblique; it extends to below the anterior margin of the eye. The lips are thin, but are somewhat better developed near the angles of the mouth. Inner to the lower lip, on either side, there is a small pad of skin covered with spinous outgrowths. Presumably these structures represent the secondary sexual character of the male. There are two pairs of barbels; the rostrals are considerably shorter than the head, while the maxillary barbels are almost as long as the head or slightly longer. The basal portion of the rostral barbel is enclosed in a groove.

The depth of the body at the commencement of the dorsal fin is equal to the length of the head. The least height of the caudal peduncle



TEXT-FIG. 3.—*Danio feegradei*, sp. nov.
a. Lateral view. ×1½; *b*. Dorsal surface of head and anterior part of body. ×2.

is contained 1.5 times in its length. The lateral line is complete and runs along the lower half of the caudal peduncle. There are about 39 rows of scales along the lateral line and 7½ rows between it and the base of the dorsal fin. There are 2½ rows of scales between the lateral line and the base of the pelvic fin which is provided with a scaly appendage. There are about 20 predorsal scales and 14 round the caudal peduncle. There are a few rows of small scales at the base of the anal fin.

The dorsal fin is short; its commencement is equidistant between the posterior margin of the eye and the base of the caudal fin; its height is considerably less than the depth of the body below it. The pectoral fin is smaller than the head and just reaches the base of the pelvic fin. The pelvic fin extends to the anal opening, but not to the anal fin. The anal fin is fairly extensive; the length of its base is equal to the head without the snout. The caudal fin is somewhat longer than the head, it is emarginate, with the upper lobe slightly longer than the lower.

The general ground colour, after preservation in spirit, is pale-olivaceous. The dorsal surface is dusky with a black streak along the mid-dorsal line. In the middle of the fish there is a black band which is considerably broader anteriorly and terminates posteriorly in a somewhat darker spot at the base of the caudal fin. Anteriorly the black band is marked, both above and below, with short pearl-white bands and in the posterior region there is a white longitudinal band above it. The rays of the dorsal and anal fins are marked with longitudinal bands across them.

Type-specimen.—F. 12477/1, Zoological Survey of India, Indian Museum, Calcutta.

Habitat.—Road-side drains, Sandoway, Lower Burma.

Remarks.—In referring this species to the genus *Danio* Hamilton a certain amount of difficulty has been experienced. Weber and de Beaufort[1] restricted this generic denomination to fishes with " Dorsal fin elongate, with 12-16 branched rays. Lateral line complete." The remaining species, " With dorsal fin short, with 7 branched rays only. Lateral line incomplete or absent.", were referred to *Brachydanio*. In 1934, Mukerji and the writer[2] observed that

" During recent years several new forms of the *Brachydanio*-type have been discovered in Burma and though in all of them the dorsal fin is short, the lateral line has been found to be very variable. In the majority of forms it is either absent or extends over a few scales in the anterior region ; but there are some species in which it is fairly extensive or even complete."

Danio feegradi has only 9 branched rays, as against 7 in *Brachydanio* and 12-16 characteristic of the other species of *Danio*. In this respect it is intermediate between the two genera ; while in the possession of long barbels and a complete lateral line it shows greater affinities with the typical members of the *Danio* group. The colouration of this fish is quite different from other species of the genus known so far.

The name of this gorgeously coloured little fish is associated with that of Lieut. E. S. Feegrade.

Measurements in millimetres.

Total length excluding caudal	43·0
Length of head .	11·0
Height of head at occiput	8·0
Width of head	6·0
Length of snout	3·0
Diameter of eye .	3·3
Interorbital width	4·1
Height of body	11·0
Width of body	5·0
Longest ray of dorsal	8·3
Longest ray of anal	7·5
Length of pectoral	9·0
Length of caudal peduncle	9·0
Least height of caudal peduncle	6·0

Burbus (Puntius) binduchitra,[3] sp. nov.

D.3/8 ; A.3/5 ; P.16 ; V 10 ; C.19 ; L.1.28-30 ; L.tr.5½/4½.

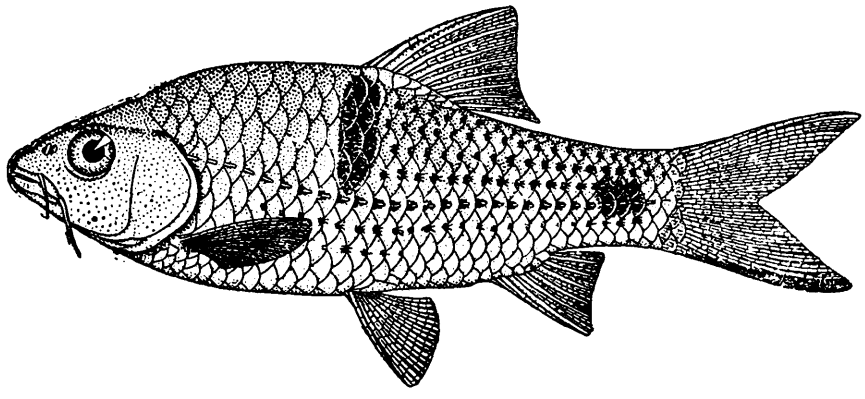
Puntius binduchitra is a small species in which both the dorsal and the ventral profiles are considerably arched. The body is greatly compressed ; the dorsal surface in front of the dorsal fin is more or less keeled. The head is bluntly pointed ; its length is contained from 4·5 to 4·7 times in the total length, and from 3·4 to 3·7 times in the length without the caudal. The height of the head at the occiput is contained from 1·1 to 1·2 times and its width from 1·3 to 1·6 times in its length. The head is proportionately smaller in the young specimens. The eye is lateral and situated close to the dorsal surface of the head ; its diameter is almost equal to the length of the snout and is contained from 2·6 (in the young) to 3·5 times in the length of the head ; usually it is contained from 3 to 3·5 times in the length of the head. The interorbital space

[1] Weber & de Beaufort, *Fish. Indo-Austral. Archipel.*, III, p. 85 (1916).
[2] Hora & Mukerji, *Rec. Ind. Mus.*, XXXVI, p. 130 (1934).
[3] *Binduchitra* is a combined Sanskrit word which means " spotted". In the specific name reference is made to the characteristic colouration of the species.

is flat and in the young specimens it is equal to the diameter of the eye; in older specimens it is somewhat greater than the diameter of the eye. The nostrils are situated close to the front border of the eye and are separated by a flap of skin. The mouth is semicircular, almost inferior and sub-terminal. The lips are thin but continuous; the labial groove is interrupted in the middle. There are two pairs of well developed barbels; the rostral barbels are equal to the diameter of the eye, but the maxillary barbels are somewhat longer.

The depth of the body increases with growth; it is contained from 3·6 to 4·4 times in the total length and from 2·8 to 3·4 times in the length without the caudal. The least height of the caudal peduncle is contained from 1·1 to 1·4 times in its length. The scales are large and firmly adherent; there are from 28 to 30 series of scales along the lateral line, $5\frac{1}{2}$ rows above it and $3\frac{1}{2}$ rows below it to the base of the pelvic fin. The number of predorsal scales varies from 9 to 10. There are 14 scales round the caudal peduncle. The pelvic fin is provided with a scaly appendage at its base. The rows of scales at the bases of the dorsal and anal fin contain somewhat smaller scales and their shape is also different from those covering the other parts of the body.

The dorsal fin commences slightly in advance of the pelvics and somewhat nearer to the base of the caudal fin than to the tip of the snout; its longest ray is usually shorter than the head. The last simple ray is articulated, but is serrated along the inner border. The anal fin is provided with 3 spines and 5 branched rays, the last of which is divided to the base. The pectoral fin is considerably shorter than the head and does not extend to the pelvic fin. The vent is situated just in front of the anal fin. The caudal fin is deeply forked; both the lobes are pointed; it is invariably longer than the head.



TEXT-FIG. 4.—Lateral view of the type-specimen of *Barbus* (*Puntius*) *binduchitra*, sp. nov. ×1¼.

The most characteristic feature of the species is its colouration. In all specimens there is a broad vertical band below the commencement of the dorsal fin which extends to the lateral line and a black blotch on the sides of the tail slightly in front of the base of the dorsal fin. In specimens over 56 mm. in total length, the scales above the lateral line and posterior to the large mark develop small rounded black spots in the centre so that the body in this region becomes spotted in a series of rows. Similar black spots appear on the scales of the lateral line and of those of the two rows below it, but they extend anteriorly beyond

the limit of the vertical mark. The upper edge of the dorsal and both the upper and lower margins of the caudal, especially the lower, become dusky in half-grown specimens and intensely black in somewhat older specimens.

Type-specimen.—F. 12478/1, Zoological Survey of India, Indian Museum, Calcutta.

Habitat.—Road-side drains and small streams at Sandoway, Lower Burma.

Remarks.—In its spotted colouration as well as in the possession of 4 well developed barbels and a serrated dorsal spine, *B. binduchitra* shows considerable affinity to *B. pinnauratus* (Day[1]) from South India and *B. sewelli* Prashad and Mukerji[2] from the Myitkyina District. In *B. sewelli* the body is considerably deeper (2·3 to 2·5 times in the length with the caudal in specimens over 90 mm. in length without the caudal), and there is always a large black blotch behind the gill-opening. Moreover, the vertical band and the caudal spot characteristic of the new species are lacking in *B. sewelli*. Both the species agree in having the dorsal surface in front of the dorsal fin keeled. *B. binduchitra* has greater affinity with *B. pinnauratus*, but its head is proportionately longer and not so high, the eye is relatively smaller, the interorbital width is less, the body is not so high but is relatively more compressed. Most of these differences seem to be correlated with the keeled nature of the dorsal surface in the new species ; in *B. pinnauratus* the dorsal surface is flatly rounded. In *B. pinnauratus* there is a black band behind the gill-opening and in some specimens a short oval spot below the commencement of the dorsal fin[3]; it has hitherto been known " From 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,"[4] but recently Mr. Duncan sent me very similar specimens from the Chindwin drainage near the border of Assam and Burma. Comments on his specimens are made below on p. 336.

Measurements in millimetres.

Total length including caudal	78·0	72·0	69·0	56·0	56·0	50·0	49·0	46·0	43·0	39·0	38·0
Length of caudal	18·5	15·3	16·0	12·5	12·3	12·0	11·5	11·0	10·3	9·0	9·0
Depth of body	20·2	20·0	18·8	15·0	15·0	13·0	12·3	10·5	10·0	9·0	8·5
Length of head	16·5	16·0	14·0	12·0	12·0	11·0	11·0	10·0	9·5	8·0	8·0
Height of head at occiput	13·3	13·0	12·5	11·0	11·0	9·0	9·0	8·0	7·5	7·0	7·0
Width of head	11·5	10·0	9·9	7·5	7·5	7·5	8·0	7·0	6·5	5·5	5·0
Length of snout	5·3	4·8	4·0	3·6	3·9	3·5	3·5	3·0	3·0	3·0	3·0
Diameter of eye	5·1	4·8	4·0	3·6	3·9	3·5	3·5	3·0	3·0	3·0	3·0
Interorbital width	5·7	5·0	4·8	4·3	4·5	4·0	4·0	3·5	3·3	3·0	3·0
Longest ray of dorsal	14·5	14·0	14·0	10·3	10·3	10·0	10·0	9·0	9·0	8·0	8·0
Longest ray of anal	10·0	10·0	10·0	7·5	8·0	7·0	7·0	6·5	6·3	5·0	5·0
Length of pectoral	12·0	12·0	11·3	8·5	9·0	7·3	7·3	6·8	6·5	6·0	6·0
Length of caudal peduncle	11·0	9·0	8·5	7·0	8·0	7·0	7·0	6·0	5·5	5·0	5·0
Least height of caudal peduncle	8·2	8·0	8·0	6·5	6·5	6·0	5·0	5·0	4·5	4·0	4·0

[1] Day, *Proc. Zool. Soc. London*, p. 300 (1865).
[2] Prashad & Mukerji, *Rec. Ind. Mus.*, XXXI, p. 197, pl. ix, fig. 1 (1929).
[3] Hora, *Rec. Ind. Mus.*, XXXIX, p. 9, fig. 1 (1937).
[4] Day, *Fish. India*, p. 562 (1877).

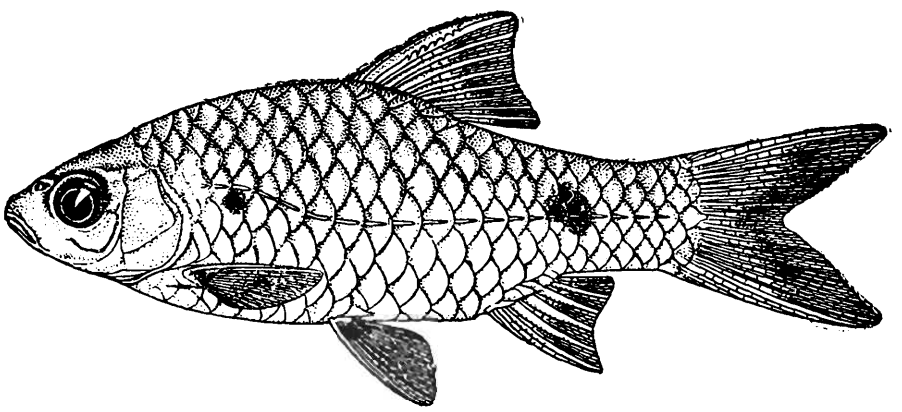
Barbus (Puntius) stoliczkanus Day.

1869. *Barbus M'clellandi*, Day (*nec* Cuvier & Valenciennes), *Proc. Zool. Soc. London*, p. 619.
1871. *Barbus (Puntius) Stoliczkanus*, Day, *Journ As. Soc. Bengal*, XL, pt. 2, p. 328.
1877. *Barbus stoliczkanus*, Day, *Fish. India*, p. 577, pl. cxliv, fig. 8.
1889. *Barbus stoliczkanus*, Day, *Faun. Brit. Ind., Fish.*, I, p. 326.
1893. *Barbus stoliczkanus*, Boulenger, *Ann. Mag. Nat. Hist.*, (6), XII, p. 202.
1918. *Barbus stoliczkanus*, Annandale, *Rec. Ind. Mus.*, XIV, p. 35.
1919. *Barbus stoliczkanus*, Chaudhuri, *Rec. Ind. Mus.*, XVI, p. 283.

Barbus stoliczkanus was originally described from a series of 21 specimens, 6 from Pegu and 15 from Moulmein, up to 4 inches in length. It was observed by Day that :—

" This species bears a strong resemblance to the *B. ticto*, H. B., which it appears to supersede in Eastern Burma. But it is distinguished by a complete instead of incomplete lateral line, and its body is not so compressed ; its dorsal spine and colouring also differ."

The dorsal spine of this species is less strongly serrated than in *B. ticto*, while the position of the lateral spots is also different. The most important difference between the two species, however, lies in the number of the predorsal scales—8 to 9 in *B. stoliczkanus* and 11 in *B. ticto*. The



TEXT-FIG. 5.—Lateral view of a specimen of *Barbus (Puntius) stoliczkanus* Day. ×2½.

extent of the lateral line in the 5 specimens from Sandoway is variable ; in two specimens it is almost complete, in two other specimens it extends over 17 to 19 scales while in one specimen it is limited to the first 7 scales. Sometimes the extent of the lateral line varies on the two sides of the same fish.

Day (1877) noted that " Some Darjeeling examples agree with the Burmese fish." Since Day's time, however, the species has been recorded only from Northern Burma (Boulenger : S. S. States ; Chaudhuri : Putao). The Sandoway specimens are young, none exceeding 47 mm. in total length ; they were collected from a road-side drain. In their proportions, lepidosis and number of fin rays, they agree with Day's description of the species, except in having a somewhat different colouration.

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 Namballok (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 Namballok. 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.