NOTES ON FISHES IN THE INDIAN MUSEUM.

XXXVI. On a Collection of Fish from the Rajmahal Hills, Santal Parganas, Bihar.

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Introduction.

One of the zoogeographical riddles in connection with the distribution of Indian freshwater fishes is the occurrence of similar forms, such as the Homalopteridae, *Silurus* Linn., etc., in the south-western hills of Peninsular India on the one hand, and in the Eastern Himalayas, Assam Hills, Burma and further east and south on the other. Such characteristic forms have not been found to occur along the Himalayan range beyond the Tista river water-shed, and this fact has been explained by me[1] recently by supposing that through a differential orogenic movement, which probably occurred late in the Miocene period or even later, a barrier was created between the eastern and the western Himalayan fishes. After this movement " The new stock of specialised hill-stream fishes from the east, not finding means to cross the barrier, were deflected towards south-west along the Satpura Trend which probably at this period stretched across India as a pronounced range from Gujrat to the Assam Himalayas " With a view to test this hypothesis Dr. B. Prashad, Director, Zoological Survey of India, at the author's request, very kindly sent a party of the Zoological Survey of India under Drs. H. S. Rao and H. A. Hafiz in February-March, 1938, to survey the fauna of the Rajmahal Hills. The collection dealt with in this paper was made by this party both in the northern parts of the hills and on the bank of the Ganges at Sakrigali Ghat.

The Rajmahal Hills stretch from Sahibganj on the Ganges to Nangalbanga on the Rampur Hat and " consist of a succession of hills, plateaux, valleys and ravines, the general elevation of which varies from 500 to 800 feet above sea-level, though some hills have an altitude of 1,500 feet and a few are said to rise to the height of 2,000 feet. The valley is drained by the river Morel or Moran, which, flowing from the north, has scoured out a long ravine, and by the Gumāni coming from the south-west through the Chaparbhitā pass. These rivers meet at Burhait, and the united stream, which is called the Gumāni, flows along the Ghātiāri pass, and thence through the plains to the Ganges " [2]. Most of the collection was made in the valleys of these rivers and their side

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[1] Hora, S. L.—*Rec. Ind. Mus.*, XXXIX, p. 255 (1937).

[2] O'Malley, L. S. S—*Bengal District Gazetteers.* Santal Parganas, p. 3 (Calcutta : 1910).

streams, but mention may also be made of Motijharna, a picturesque water-fall, which was also visited by the party.

At the time of the visit of the Zoological Survey party certain streams, like the one near Sundarpahari, were practically dry, while the relatively large streams, like the Gumāni river, had a shallow channel in the middle or on the sides meandering through the sand with only ankle-deep water in several parts. Streams, like the Morel, with banks had pools and puddles with a small trickle of water over a pebbly bed connecting them. The bottom of the pools, where muddy, was covered with aquatic vegetation and, where rocky, with *Spirogyra* and other algae. The muddy, rocky and pebbly portions occurred alternately according to the nature of the country over which the stream flowed. In the Gumāni the bed consisted mostly of coarse to fine sand except in bends of the river where the bottom was muddy. In the Morel, though the water mostly flowed over a muddy bed, in places the substratum consisted of pebbles and shingle.

One remarkable feature of the fish collection is the presence of a very large number of young specimens of practically all the species obtained by the party and particularly of *Barilius*, *Brachydanio*, *Barbus*, etc. From this it may safely be inferred that this is probably the breeding season of the fish found in the hills.

Of the 34 species of fish obtained by the party, 16 (*vide* list on p. 171), represent the common Gangetic forms. Six of these, were also obtained from the hill area, but all the sixteen species are widely distributed and from a zoogeographical point of view do not call for any comments. The occurrence of the very young specimens of *Gadusia chapra* in the Ganges at Sakrigali Ghat shows that the fish breeds high up in the Ganges and that the breeding season extends at least up to January-March.

Of the 18 species found only in the hills, ten, *viz.*, *Chela phulo*, *Esomus danricus*, *Catla catla*, *Aspidoparia morar*, *Nandus nandus*, *Ophicephalus gachua*, *Mastacembelus armatus*, *Lepidocephalichthys guntea*, *Barbus ticto*, *Brachydanio rerio* and *Barilius bendelisis*, are very widely distributed in Indian waters. *Barbus chagunio*, *Botia dario*, *Nemachilus zonatus*, and *Gagata cenia* are primarily north Indian forms and occur along the base of the Himalayas, but they have also been recorded from Orissa. *Amblyceps mangois* is found at the bases of hills from Siam, Burma, Assam Hills and the Himalayas as far west as the Kangra Valley and its occurrence in the Rajmahal Hills to the west of the Ganges is of special significance. Similarly *Garra gotyla* is essentially a Himalayan species. The most interesting find in the collection, however, is the presence of two specimens of *Laguvia ribieroi* Hora, a form described from the Eastern Himalayas several years ago and so far known from a single specimen.

Under the ecological conditions prevailing in the Rajmahal Hills of to-day, the presence of the typical torrential forms, which require a continuous flow of water over a rocky bed, was not to be expected, but the presence of *Laguvia*, *Amblyceps*, *Garra gotyla* and *Botia dario* has undoubtedly demonstrated the continuity of the fauna of the Rajmahal Hills with that of the hills of Assam. It has to be borne in mind

that the Rajmahal Hills of to-day are mere stumps of a once mighty range which probably had a great influence on the rainfall in India and harboured perennial torrential streams along which forms like the Homalopteridae, *Silurus*, etc., migrated at a time when the Ganges did not flow eastwards. On this last point Holdich (*vide* O'Malley, *op. cit.*, p. 6) says :—

> " There was no Gangetic basin in those days, and it was probable that Rajmahal Hills and the hills of Assam continued the land area to the Himalayas east of Sikkim. Another result of this succession of earth movements was the formation of that great Indo-Gangetic depression which forms one of the natural geographical divisions of India. The break in the connection between the Rajmahal and Assam hills, which gave an opening for the eastward flow of the Ganges, is comparatively recent."

Wadia[1] has shown that the change in the direction of flow of the Ganges probably occurred as a result of the Potwar movement during the Pleistocene period.

LIST OF SPECIES.

Family CLUPEIDAE.

1. *Gadusia chapra* (Ham.)*

Family MASTACEMBELIDAE.

2. *Mastacembelus armatus* (Lacép.)

Family CYPRINIDAE.

3. *Chela clupeoides* (Bloch)*†
4. *Chela phulo* (Ham.)
5. *Barilius bendelisis* Ham.
6. *Brachydanio rerio* (Ham.)
7. *Rasbora daniconius* (Ham.)*†
8. *Esomus danricus* (Ham.)
9. *Aspidoparia morar* (Ham.)
10. *Amblypharyngodon mola* (Ham.)*
11. *Barbus chagunio* (Ham.)
12. *Barbus chola* (Ham.)*
13. *Barbus sophore* (Ham.)*†
14. *Barbus terio* (Ham.)*†
15. *Barbus ticto* (Ham.)
16. *Catla catla* (Ham.)
17. *Cirrhina reba* (Ham.)*
18. *Garra gotyla* (Gray)
19. *Labeo calbasu* (Ham.)
20. *Labeo gonius* (Ham.)*
21. *Rohtee cotio* (Ham.)*

Family COHITIDAE.

22. *Botia dario* (Ham.)*
23. *Lepidocephalichthys guntea* (Ham.)
24. *Nemachilus zonatus* (McClell.)

Family BAGRIDAE.

25. *Mystus cavasius* (Ham.)*

Family AMBLYCEPIDAE.

26. *Amblyceps mangois* (Ham.)

Family SISORIDAE.

27. *Laguvia ribeiroi* Hora.
28. *Gagata cenia* (Ham.)

Family OPHICEPHALIDAE.

29. *Ophicephalus gachua* Ham.

Family AMBASSIDAE.

30. *Ambassis baculis* (Ham.)*†
31. *Ambassis nama* (Ham.)*
32. *Ambassis ranga* (Ham.)*

Family NANDIDAE.

33. *Nandus nandus* (Ham.)

Family GOBIIDAE.

34. *Glossogobius giuris* (Ham.)*†

An asterisk (*) denotes that the species was collected from the Ganges at Sakrigali Ghat. An asterisk (*) and a dagger (†) denote that the species was collected in the Ganges as also in the hills. Specific names without any mark denote that the species were collected from the Rajmahal Hills only.

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[1] Wadia, D. N.—*Quart. Journ. Geol. Mining and Metallurgical Soc. India*, IV, p. 96 (1932).

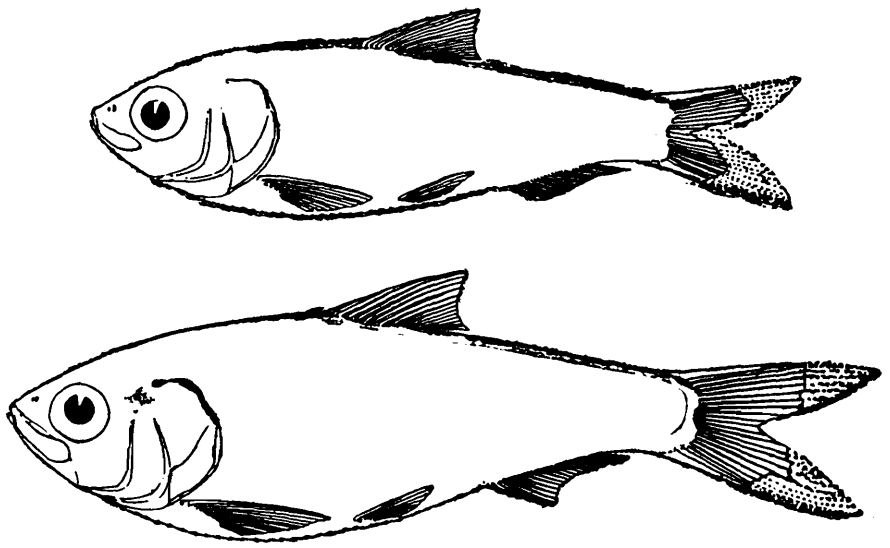
SYSTEMATIC ACCOUNT.

Gadusia chapra (Hamilton).

1917. *Gadusia chapra*, Regan, *Ann. Mag. Nat. Hist.*, (8), XIX, p. 307.

31 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

The specimens of *Gadusia chapra* range in length from 23 mm. to 104 mm. in total length without the caudal. The presence of very young specimens in the collection shows that the species breeds in the river Ganges at least as high up as Sakrigali Ghat. Young specimens



TEXT-FIG. 1.—Two young stages of *Gadusia chapra* (Hamilton), 28 mm. and 34 mm. in length without the caudal respectively. ×2.

of *G. chapra* along with a very large number of young ones of *Hilsa ilishia* were recently obtained from the River Hooghli at Nawabgunge near Calcutta. It seems, therefore, that both the species probably breed throughout their range in the Ganges and its tributary streams.

According to Day (*Fish. India*, p. 640), *G. chapra* occurs in " Fresh waters of rivers and tanks of Sind and throughout India as far south as the Kistna River, but absent from the Malabar coast and Madras ".

Mastacembelus armatus (Lacépède).

1876. *Mastacembelus armatus*, Day, *Fish. India*, p. 340, pl. lxxiii, fig. 3.

1 specimen. Gumāni river at Durgapore, Santal Parganas.
1 specimen. Povayal river along Bario-Banji road, Santal Parganas.

Mastacembelus armatus is a widely distributed species; its range extends from China, through Burma, to India and Ceylon.

Chela clupeoides (Bloch).

1878. *Chela clupeoides*, Day, *Fish. India*, p. 602.

17 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)
31 specimens. Morel river at Bario, Santal Parganas. (Purchased.)

According to Day, *Chela clupeoides* is found in " Cutch, Jubbulpore, Mysore, the Deccan, Madras Presidency, and Burma" Its occurrence in the Rajmahal Hills, an intermediate area between South India and Burma, is of unusual interest.

Chela phulo (Hamilton).

1878. *Chela phulo*, Day, *Fish. India*, p. 602, pl. cliii, fig. 1.

1 specimen. Morel river near Bario, Santal Parganas. (Purchased.)

Chela phulo is distributed from Assam, through Bengal, Orissa and Central India, to the Deccan as far southwards as the Tamboodra and the Kistna rivers.

Barilius bendelisis Hamilton.

1878. *Barilius bendelisis*, Day, *Fish. India*, p. 590, pl. cxlviii, figs. 7, 8 and 9.

There is a very large number of the young of *Barilius* collected from practically all over the area visited by the party. Though the very young ones are difficult to determine specifically, certain specimens over 2 inches in total length can definitely be referred to *B. bendelisis*. The species is fairly widely distributed in Indian waters.

Brachydanio rerio (Hamilton).

1878. *Danio rerio*, Day, *Fish. India*, p. 597, pl. cli, fig. 4.

Brachydanio rerio is represented by a large number of specimens, mostly immature, collected from practically all over the area visited by the party. According to Day, the species is found in " Bengal, as low down the Coromandel coast as Masulipatam "

Rasbora daniconius (Hamilton).

1878. *Rasbora daniconius*, Day, *Fish. India*, p. 584, pl. cxlvi, fig. 2.

1 specimen. Sakrigali Ghat, Santal Parganas. (Purchased from market.)
1 specimen. Morel river at Bario, Santal Parganas. (Purchased.)

Rasbora daniconius is the most widely distributed species of the genus ; it is found throughout India, Burma and Ceylon.

Esomus danricus (Hamilton).

1928. *Esomus danricus*, Hora & Mukerji, *Rec. Ind. Mus.*, XXX, p. 49.

1 specimen. Gumāni river near Dhamni, Santal Parganas.
1 specimen. Povayal river along Bario-Banji road, Santal Parganas.
3 specimens. Stream 2 miles from Kusma, Santal Parganas.
1 specimen. Gumāni river near Kusma, Santal Parganas.

Esomus danricus is common in the ponds and ditches of Assam, Bengal, Bihar, Orissa, Central Provinces, United Provinces and the Punjab. It is also found in South India.

Aspidoparia morar (Hamilton).

1878. *Aspidoparia morar*, Day, *Fish. India*, p. 585, pl. cxlvi, fig. 4.

1 specimen. Gumāni river near Kusma, Santal Parganas.

Aspidoparia morar is represented in the collection by a small specimen, about 27 mm. in length without the caudal. Day recorded the species from " Sind, Punjab, Continent of India (except the Western coast, and localities south of the Kistna river) also Assam and Burma "

Amblypharyngodon mola (Hamilton).

1878. *Amblypharyngodon mola*, Day, *Fish. India*, p. 555, pl. cxxxv, fig. 4.

1 specimen. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

There is a small specimen of *Amblypharyngodon mola*, about 33 mm. in length without the caudal, in the collection under report. Most of the scales have fallen off and in other respects also the specimen is not in a good condition.

A. mola is stated by Day to occur " From Sind throughout India (except the Malabar Coast), Assam and Burma "

Barbus chagunio (Hamilton).

1936. *Barbus chagunio*, Hora & Mukerji, *Rec. Ind. Mus.*, XXXVIII, p. 139.

1 specimen. Gumāni river near Dhamni, Santal Parganas.

Barbus chagunio is represented by a young specimen, about 51 mm. in length without the caudal. The species is found throughout northern India from Assam to the Punjab ; it is also known from Orissa.

Barbus chola (Hamilton).

1878. *Barbus chola*, Day, *Fish. India*, p. 571, pl. cxlii, fig. 4.

1 specimen. Pool about a mile from Sakrigali Ghat, Santal Parganas.

Barbus chola is a widely distributed species of the Indian and Burmese waters ; it is represented in the collection by a single specimen about 48 mm. in total length.

Barbus sophore (Hamilton).

1878. *Barbus stigma*, Day, *Fish. India*, p. 579, pl. cxli, fig. 5.
1916. *Barbus sophore*, Chaudhuri, *Mem. Ind. Mus.*, V, p. 436.

2 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)
1 specimen. Stream below Boarijore Inspection Bungalow, Santal Parganas.
6 specimens. Povayal river, Bario-Banji road, Santal Parganas.
1 specimen. Gumāni river near Dhamni, Santal Parganas.

Barbus sophore is a very common Indian species ; it is found in fresh and brackish waters of India and Burma.

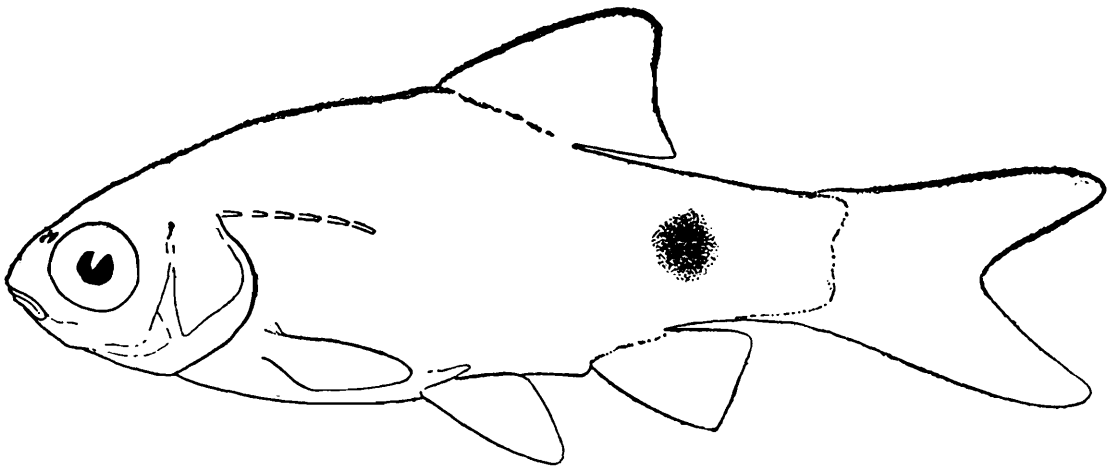
Barbus terio (Hamilton).

1878. *Barbus terio*, Day, *Fish. India*, p. 580, pl. cxliv, fig. 3.

1 specimen. Pool near Sakrigali Ghat, Santal Parganas.
10 specimens. Povayal river, Bario-Banji road, Santal Parganas.
1 specimen. Morel river near Bario, Santal Parganas.
3 specimens. Tributary of Morel river west of Bario-Burhait road, Santal Parganas.
3 specimens. Damra river near Simlong, Santal Parganas.
5 specimens. Gumāni river at Dhamni, Santal Parganas.
30 specimens. Gumāni river at Kusma, Santal Parganas.
9 specimens. A stream about 2 miles from Kusma, Santal Parganas.

Barbus terio is a small species which is found in northern India from Bengal to the Punjab and also in Orissa. The specimens in the

collection are very young, the largest being about 30 mm. in total length. The most characteristic feature of the species is the presence of a fairly large black blotch in the middle of the side over the anal fin. In the



Text-fig. 2.—A young specimen of *Barbus terio* (Hamilton), showing the position and extent of the caudal spot. ×4.

young specimens under report there are no other colour markings except that the edges of the scales are provided with a number of fine black dots.

Barbus ticto (Hamilton).

1938. *Barbus ticto*, Hora & Misra, *Journ. Bombay Nat. Hist. Soc.*, XL, p. 28.

5 specimens. Gumāni river near Dhamni, Santal Parganas.
6 specimens. Povayal river, Bario-Banji road, Santal Parganas.

The specimens of *Barbus ticto* exhibit the same sexual characters with regard to colouration, etc., which were observed in the case of the Deolali examples (*vide* reference above). The species is distributed throughout India and Ceylon.

Catla catla (Hamilton).

1878. *Catla Buchanani*, Day, *Fish. India*, p. 553, pl. cxxxiv, fig. 5.

1 specimen. Morel river near Bario, Santal Parganas. (Purchased.)

Catla catla is represented in the collection by one young specimen. The range of the species extends from Burma through Assam, Bengal to all parts of India above the Kistna river. It has, however, been recently introduced in the Cauvery river.

Cirrhina reba (Hamilton).

1878. *Cirrhina reba*, Day, *Fish. India*, p. 549, pl. cxxx, fig. 3.

2 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

Cirrhina reba is found throughout India.

Garra gotyla (Gray).

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

34 specimens. Gumāni river near Dhamni, Santal Parganas.

Only recently[1] it was pointed out by me that the young specimens of *Garra*, with a median proboscis on the snout, which I had referred to *G. lamta*, in reality belonged to *G. gotyla*; this extended the range of the latter species to the Vindhyas and the Satpuras. The common occurrence of the species in the Rajmahal Hills fully confirms the view that the Satpura trend may have once served as a highway for the migration of the Himalayan forms to the Western Ghats and thence to the hills of the Peninsular India and Ceylon.

Garra gotyla is known from the Chindwin and the Irrawadi drainage systems, and from along the base of the Himalayas. It has now been recorded from several places in the Vindhyan Range.

The largest specimen in the collection is about 75 mm. in length without the caudal. The proboscis is fairly well marked in all the examples.

Labeo calbasu (Hamilton).

1878. *Labeo calbasu*, Day, *Fish. India*, p. 536, pl. cxxvi, fig. 4.

1 specimen. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

Labeo calbasu is a widely distributed fish of the Indian and Burmese waters; its range does not extend to the south of the Kistna river.

Labeo gonius (Hamilton).

1878. *Labeo gonius*, Day, *Fish. India*, p. 537, pl. cxxvii, fig. 1.

5 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

Labeo gonius is found in Burma and throughout northern India as low as the Kistna river.

Rohtee cotio (Hamilton).

1878. *Rohtee cotio*, Day, *Fish. India*, p. 587, pl. cli, fig. 1.

39 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

The specimens of *Rohtee cotio* range in length from 31 mm. to 70 mm. without the caudal and are referrable to the typical form of the species. This is the most widely distributed species of the genus; its range extends from southern China through Burma to India. According to Day, it is not found along the Malabar Coast and in the Peninsula of India south of the Kistna river.

Botia dario (Hamilton).

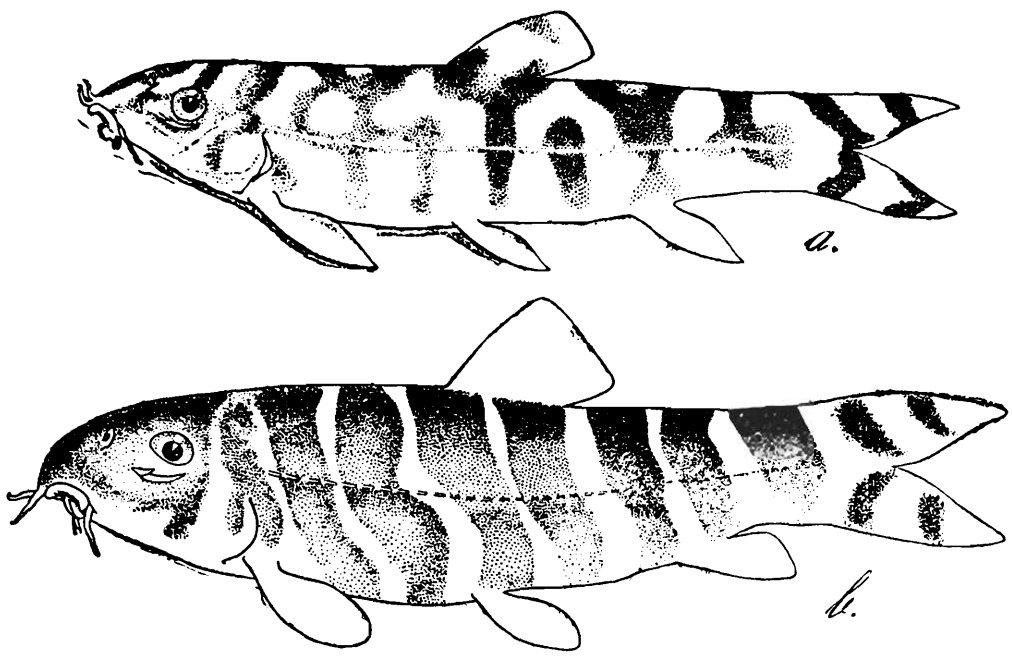
1932. *Botia dario*, Hora, *Rec. Ind. Mus.*, XXXIV, p. 573.

3 specimens. Morel river at Barhait, Santal parganas.

The three specimens of *Botia dario* are 52 mm., 74 mm. and 78 mm. in total length respectively. In the two larger specimens the colour

[1] Hora, S. L.—*Rec. Ind. Mus.*, XXXIX, pp. 347-348 (1937).

bands encircle the entire body ; some of them are split into two bands on the ventral surface. In the case of the smaller specimen the bands



TEXT-FIG. 3.—Two specimens of *Botia dario* (Hamilton), showing variation in coloura-tion at different stages of growth. *a.*$\times 1\frac{3}{5}$; *b.*$\times 1\frac{1}{5}$.

on the back enclose small spaces of ground colour which may be saddle-shaped. Some of the markings on the dorsal surface are not continuous with those on the sides. The caudal fin is marked with two bands. The colouration of this young specimen is, therefore, different from Hamil-ton's *geto*, which is regarded as a juvenile form of *B. dario*.

Botia dario has hitherto been known from Assam, and from along the Himalayan foot-hills in Bengal, Bihar and the United Provinces. It is here recorded for the first time from a region to the west of the Ganges.

Lepidocephalichthys guntea (Hamilton).

1878. *Lepidocephalichthys guntea*, Day, *Fish. India*, p. 609, pl. clv, fig. 4 ; pl. clvi, fig. 12.

7 specimens. Stream below Motijharna, Santal Parganas.
4 specimens. Morel river near Bario, Santal Parganas.
2 specimens. Stream below Boarijore Inspection Bungalow, Santal Parganas.
4 specimens. Povayal River, Bario-Banji road, Santal Parganas.
1 specimen. Dighi river, Bario-Banji road, Santal Parganas.
1 specimen. Bhanji river at Bhanji, Santal Parganas.
3 specimens. Damra river near Simlong, Santal Parganas.
9 specimens. Gumāni river near Dhamni, Santal Parganas.
3 specimens. Gumāni river near Kusma, Santal Parganas.
1 specimen. Kusmajharna (spring) at Kusma, Santal Parganas.

Lepidocephalichthys guntea is found throughout India, except Mysore, Malabar Coast and to the south of the Kistna river.

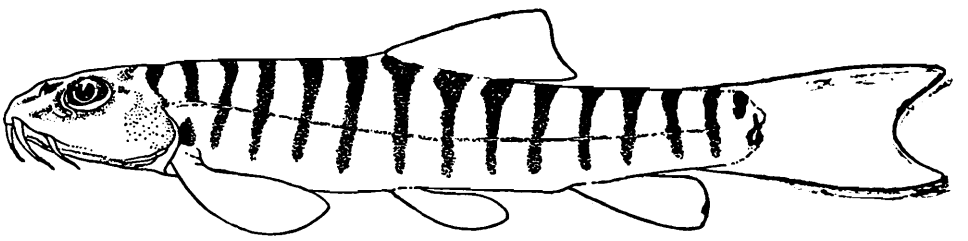
The specimens were collected from sandy or muddy places where the fish lay buried with the head protruding above the substratum.

Nemachilus zonatus (McClelland).

1878. *Nemachilus zonatus*, Day, *Fish. India*, p. 618, pl. clvi, fig. 2.

3 specimens. Gumāni river near Dhamni, Santal Parganas.

Nemachilus zonatus was described by McClelland from Upper Assam where it was found living in ponds, but Day recorded it from " Throughout the Jumna and Ganges rivers and their affluents, Bheer Bhoom, Assam and Orissa "



TEXT-FIG. 4.—Lateral view of a male specimen of *Nemachilus zonatus* (McClelland) to show the characteristic colouration of the species. ×2.

The specimens from the Rajmahal Hills were collected from a sandy substratum and agree closely with Day's description of the species. On account of its very characteristic colouration, *N. zonathus* can be distinguished readily from all the other Indian species of the genus. The largest specimen in the collection is about 44 mm. in total length.

Mystus cavasius (Hamilton).

1877. *Macrones cavasius*, Day, *Fish. India*, p. 447, pl. c, fig. 1.

6 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

Mystus cavasius is a very common Indian fish and is found in Burma also.

Amblyceps mangois (Hamilton).

1933. *Amblyceps mangois*, Hora, *Rec. Ind. Mus.*, XXXV, pp. 607-621.

15 specimens. Small pools at sides of Gumāni river near Dhamni Santal Parganas.
1 specimen. Morel river near Bario, Santal Parganas.
1 specimen. Damra river near Simlong, Santal Parganas.
1 specimen. Gumāni river at Kusma, Santal Parganas.

Only young specimens of *Amblyceps mangois* were collected from the Gumāni river and some of its tributary streams; the largest specimen is about 63 mm. in total length. The species, as a rule, lives at the bases of hills in shallow running streams among gravel and pebble, but in the dry season it is confined to small pools into which such streams are usually cut up.

The specimens from the Rajmahal Hills show precisely the same variations with regard to the depth of the body, the form of the caudal fin, etc., which had previously been observed by me in the examples collected in the Tista Valley.

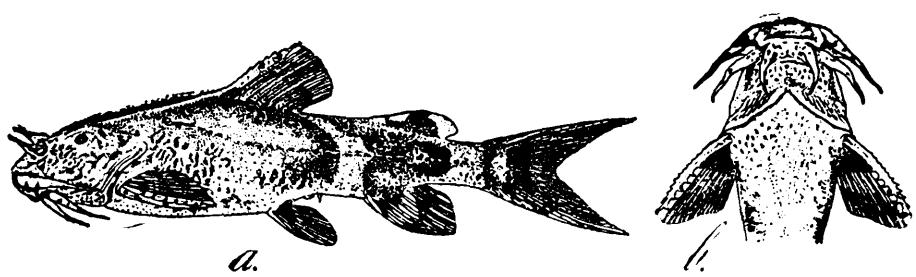
Amblyceps mangois has hitherto been known from Siam (Bua Yai, Chantabun; Pak Chong, Nakhon Rachasima; Nakhon Srithamarat and Maenam Canthaburi), North Burma (Putao Plains and Mali Hka river, Myitkyina District), Assam (Khasi, Abor and Naga Hills), Eastern

Himalayas (Siliguri, Sevoke and rivers of Terai and Duars) and Western Himalayas (Gazipore and Kangra Valley); its occurrence in the Rajmahal Hills to the west of the Ganges is of special interest as it shows that the Assam Hills and the Rajmahal Hills must have been continuous at not a very remote period of earth's history.

Laguvia ribeiroi Hora.

1921. *Laguvia ribeiroi*, Hora, *Rec. Ind. Mus.*, XXII, p. 741, pl. xxix, fig. 3.
2 specimens. Morel river near Bario, Santal Parganas.

Laguvia ribeiroi was described from a single female specimen collected in the Khoila river, a tributary of the Tista river, and was distinguished from the genotype—*L. shawi* Hora, also known from the Tista river—by the position of the nostrils and the ventrals, and by the nature of the dorsal spine and of the chest region. Since then my colleagues and I have collected hundreds of specimens of *L. shawi* from the Sevoke and the Mahanadi rivers at the base of the Darjeeling Himalayas, and have found a faintly developed adhesive apparatus on the chest of all of them. The position of the nostrils with reference to the tip of the snout and the anterior margin of the eye and also of the ventrals



TEXT-FIG. 5.—*Laguvia ribeiroi* Hora.
a. Lateral view. ×2; *b*. Ventral surface of head and anterior part of body. ×2.

with reference to the tip of the snout and the base of the caudal fin have been found to be variable characters. The two species can still be distinguished readily by the nature of the dorsal spine which is strongly serrated anteriorly in *L. ribeiroi* and is smooth in *L. shawi*. In the former the eggs are very large as compared with those of the latter.

The two specimens of *L. ribeiroi* collected in the Rajmahal Hills are about 29 mm. in total length. The colour pattern is bright and dense. The head and body are thickly covered with prominent tubercles on their dorsal and lateral surfaces. The tubercles were at first associated with the sex of the specimens, but a study of a large series of specimens of *L. shawi* showed that these structures are sometimes equally well developed in both the sexes.

Laguvia was proposed for the two Tista river species referred to above. A third species *Pimelodus asperns* McClelland[1] was referred to this genus; it was described by McClelland from Chusan in China, but later recorded by Chaudhuri[2] from Upper Burma. The occurrence of *Laguvia* in the Rajmahal Hills is of special interest as it shows the

[1] McClelland, J.—*Calcutta, Journ. Nat. Hist.*, IV, p. 404, pl. xxiv, fig. 2 (1844).
[2] Chaudhuri, B. L.—*Rec. Ind. Mus.*, XVI, p. 276, pl. xxii, fig. 2 (1919).

probable route of dispersal of some of the Far Eastern types of fish that are now found in the extreme south of the Peninsula.

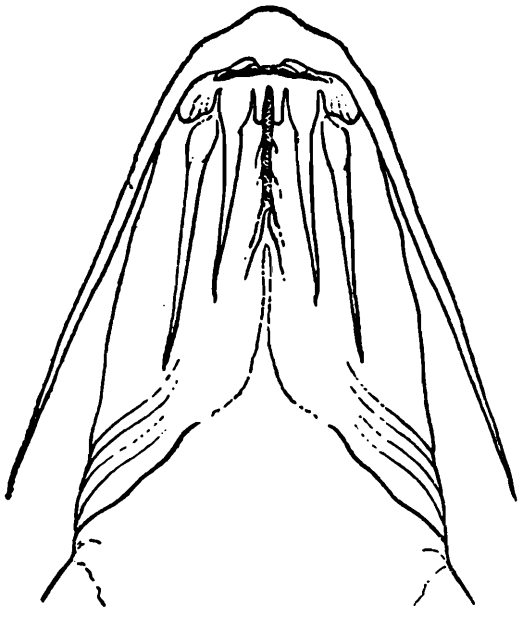
Gagata cenia (Hamilton).

1877. *Gagata cenia*, Day, *Fish. India*, p. 492, pl. cxv, figs. 4 and 5.

2 specimens. Morel river at Barhait, Santal Parganas.

According to Day, *Gagata cenia* is distributed in the "Rivers of Bengal and Orissa, the Jumna, Ganges, and Indus, also Burma"

Two young specimens of the species were collected by the party from the Morel river at Barhait.



TEXT-FIG. 6.—Ventral surface of head of *Gagata cenia* (Hamilton) to show the positions of the 3 pairs of mandibular barbels. ×4.

Besides the two mandibular pairs of barbels with stiff bases there is also a third pair. These are situated in the mid-ventral position between the bases of the inner mandibular barbels and are fleshy, and finger-like. All the three pairs of barbels lie in grooves, especially near their bases, so the median small pair is liable to be overlooked.

Ophicephalus gachua Hamilton.

1922. *Ophiocephalus gachua*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* IV, p. 321.

1 specimen. Tributary of Morel river west of Bario, Santal Parganas.
2 specimens. Gumāni river near Dhamni, Santal Parganas.
3 specimens. Povayal river along Bario-Banji road, Santal Parganas.

Ophicephalus gachua is one of the most widely distributed species of the Oriental Region.

Ambassis baculis (Hamilton).

1875. *Ambassis baculis*, Day, *Fish. India*, p. 51, pl. xv, fig. 1.

1 specimen. Pool about a mile from Sakrigali Ghat, Santal Parganas.
1 specimen. River Morel at Barhait, Santal Parganas.

According to Day, *Ambassis baculis* is found in Burma and northern India, from Bengal to the Punjab including Orissa.

Ambassis nama (Hamilton).

1875. *Ambassis nama*, Day, *Fish. India*, p. 50, pl. xiv, fig. 5.

9 specimens. Sakrigali Ghat, Santal Parganas.

Ambassis nama is a small species ; it is found throughout India and Burma.

Ambassis ranga (Hamilton).

1875. *Ambassis ranga*, Day, *Fish. India*, p. 51, pl. xiv, fig. 6.

2 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)

Ambassis ranga is distributed throughout India and Burma.

Nandus nandus (Hamilton).

1875. *Nandus marmoratus*, Day, *Fish. India*, p. 129, pl. xxxii, fig. 1.

2 specimens. Tank at Durgapore, Santal Parganas.

Nandus nandus is represented by two specimens in the collection it is found throughout India and Burma in fresh and brackish waters.

Glossogobius giuris (Hamilton).

1876. *Gobius giuris*, Day, *Fish. India*, p. 294, pl. lxv, fig. 1.

3 specimens. Sakrigali Ghat, Santal Parganas. (Purchased from market.)
1 specimen. Gumāni river at Barhait, Santal Parganas.
3 specimens. Gumāni river near Kusma, Santal Parganas.
1 specimen. Gumāni river near Dhamni, Santal Parganas.

Glossobogius giuris is a very widely distributed species and occurs in fresh and brackish waters, but according to Day, a variety of it is entirely confined to the sea and estuaries both along the coasts of India, and in the Andamans.