

# THE FRESHWATER FISH FROM THE ANDAMAN ISLANDS.

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(Plate II.)

## INTRODUCTION.

Our knowledge of the fishes of the Andamans (apart from deep-sea forms) is derived from three papers published many years ago, two by Blyth<sup>1</sup> and one by Day.<sup>2</sup> Neither author gave particulars as to the environment in which the different species were found, and neither, so far as can be ascertained, discussed the forms found in rapid-running water in the smaller streams. We have here to record or describe several species from this type of environment, and we take the opportunity also of giving certain particulars about the interesting genus named *Andamia* by Blyth. We have no direct information as to the circumstances in which this peculiar fish lives, and the only specimens we have examined are those originally described by Blyth (1858). From the structure of *Andamia*, however, it is clearly adapted to affix itself to stones or other objects in rapid-running water. In its structural modifications it resembles certain torrential forms very closely, but it is possibly an inhabitant of the surf-line.

Omitting *Andamia*, we have here to consider only five species, specimens of which were recently collected by one of us in streams on the lower slopes or at the base of the jungle-clad hills of South Andaman. The conditions of life in these streams are very similar to those in the smaller streams at the base of the Nilgiris or the Western Ghats in Southern India. At first sight, as seen in their natural environment, the fish seem very similar also. The little gobies of the genus *Sicyopterus*, which abound in the Andaman streams, were actually mistaken when first seen for some small species of the genus *Garra*, while the much larger *Ophiocara ophiocephalus* was thought to be a larger form of the same or an allied genus; but these Andaman fish both belong to the order Gobiodea, whereas *Garra* is in most respects a typical Cyprinoid.

The habits of *Sicyopterus garra* are closely similar to those of such species as *Garra rupiculus* from Assam, though the structures by means of which, directly or indirectly, the two fish obtain their food, are quite different. Both species cling to rocks in rapid-running water by means of a ventral sucker, and both feed by scraping organic matter, mainly minute algae, from the surface of the rocks to which they adhere. In

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<sup>1</sup> Blyth, Report of Curator, Zoological Department, for May 1858. *Journ. As. Soc. Bengal* XXVII, pp. 270-272 (1858). Report on some Fishes received chiefly from the Sitang River and its Tributary Streams, Tenasserim Provinces. *Journ. As. Soc. Bengal* XXIX, pp. 145-147 (1860).

<sup>2</sup> Day, On the Fishes of the Andaman Islands. *Proc. Zool. Soc. London*, pp. 677-705 (1870).

the Andamans the rocky bed of the hill streams examined is covered by a thin film of deposited silt. This *Sicyopterus* clears away, probably by means of its fringed lips, and then, clinging tight by its ventral fins, which are joined together and transformed into a cup-like sucker, it scrapes off the algae with a pair of horny pads on its lower jaw assisted probably by its strong canine teeth. The upper lip is pendant and fringed, it is probably of use in preventing the escape of particles scraped from the rock. The smaller species of *Garra* which live in hill streams behave in exactly the same way, but the sucker by which they adhere to the rocks is a special tegumentary organ and there are no teeth. There is, however, a veil-like structure over the upper jaw—it is not the true upper lip—which prevents the escape of particles which have been removed by the horny ridge on the lower jaw.

*Ophiocara ophiocephalus* is not so highly modified as *Sicyopterus garra* and might be mistaken if not observed in its natural haunts for a surface fish. The shape of its head, indeed, recalls that of *Panchax panchax*, which is apparently the only fish of wide range in fresh water which occurs in the Andaman streams, and *P. panchax* is essentially a surface form, only descending from the surface when alarmed. The ventral fins of *O. ophiocephalus* are not united and do not form a sucker, but they are used for clinging to rocks almost like a pair of hands, and the fish rarely rises to the surface. It cannot, however, scrape matter from the rocks and must with its up-turned lower jaw be dependent on food which reaches it from above. It is probably predaceous and catches insect larvae, etc., as they sink down to the bottom after rising through the water.

No special observations were made on the habits of *Doryichthys insularis*, the fifth species in our collection. It was found among weeds in little backwaters of the streams, where it was apparently common.

The geographical relations of the freshwater fish of oceanic islands are always interesting. Of the five species from the Andamans discussed here two have a very wide range on the coasts and islands of the Indian ocean, one (*O. ophiocephalus*) being found as far afield as the east coast of Africa. These are both estuarine forms of great physiological adaptability. *Panchax panchax*, on the other hand, the distribution of which extends from the eastern part of Peninsular India to the Sunda Islands and Siam, is mainly a freshwater fish but not uncommonly occurs in brackish or even salt water.

The remaining two species are described as new, one belonging to the family Gobiidae and the genus *Sicyopterus*. This genus is found on the coast and even in the streams of many parts of the Indian Ocean and in the warmer region of the Atlantic and the Pacific. Although it occurs on the mainland in certain places, most of its species are insular. The other new species belongs to the family Syngnathidae and the genus *Doryichthys*, which is also a genus of wide geographical range, with most of its species Indo-Pacific. They are found both in fresh and brackish water in rivers and their estuaries.

Our knowledge of the freshwater fishes of the Andamans is still far from complete, but we have no evidence that any of the Cyprinoidea or of the true fluviatile Siluroidea occur in the small streams of these

islands.<sup>1</sup> The Ophiocephalidae are apparently absent also, as indeed are all the true fluviatile families except the Cyprinodontidae and the Syngnathidae, both of which have exceptional powers of accommodating themselves to peculiar conditions of salinity in water in which they live.

The stream-fauna of the Andamans, therefore, at any rate so far as the fish are concerned, is evidently of very recent origin and is, indeed, not a true freshwater fauna at all, but consists mainly of adaptable marine species. So far as we know, the only genera not strictly marine which have established themselves naturally in freshwater on the island are those which are physiologically adaptable in an exceptional degree. There is nothing in the physical conditions adverse to the Cyprinidae or the Ophiocephalidae, for members of both of these families have been introduced into ponds in the neighbourhood of Port Blair and at other places and are doing well and apparently breeding, though more precise information as to their apparent increase in number would be desirable.

It is clear, therefore, that the fluviatile fish-fauna of the Andamans has been derived from the surrounding sea rather than from any other territory.

#### SYSTEMATIC ACCOUNT OF THE COLLECTION.

### ***Sicyopterus garra* Hora, sp. nov.**

(Plate II, figs. 2-5.)

D. 6, 7 | 1/11 ; P. 18 ; V. 1/5 ; A. 1/10 ; C. 15+ ; L. l. 64 ; L. tr. 15.

This is a strongly built subcylindrical species with a characteristic facies resembling very much that of the fishes of the genus *Garra*.<sup>2</sup> The head is broader than high and its length is contained about 4 times in the length of the fish without the caudal. The height of the body is five-sixths of the length of the head. The eye is situated almost in the middle of the length of the head and its diameter is contained 3·8 times in the length of the head. The interorbital is flat and is 1·6 times the diameter of the eye. The upper margins of the eyes project slightly beyond the dorsal profile of the head. The snout is obtuse and rounded. The mouth is on the under surface slightly behind the tip of the snout and is overhung by a loose, fimbriated, membranous fold of the skin, which is continued with the lower lip at the angle of the mouth. The lower jaw is provided with a sharp horny covering probably for rasping off algal slime from rocks and stones. This horny covering is divided in the middle. The maxilla scarcely reaches to below the middle of the eye. In the upper jaw there is a single moveable row of small teeth embedded in the gum, while in the lower jaw a large

<sup>1</sup> The chief Cyprinid introduced is *Labeo rohita*, but other, smaller species of the same family, and possibly certain Siluroidea have been brought with it from the neighbourhood of Calcutta. The fish were taken to the islands as what are locally called "fingerlings," that is to say a fry about an inch or two in length and in these circumstances little discrimination of species is usually made.

<sup>2</sup> Hora, *Rec. Ind. Mus.* XXII, pp. 633-687, pls. xxiv-xxvi (1921).

recurved canine is present on either side of the symphysis besides a row of smaller teeth internally. The teeth in the upper jaw are tricuspid, all the cusps lying in one plane which is at right angle to the long axis of the tooth. The three cusps are equal and when the whole of the tooth band is subjected to a great magnification, the teeth appear unicuspid, the other cusps being hidden beneath the outer cusp. The gill-openings are vertical and do not extend to below the base of the pectoral fin.

The spines of the first dorsal are rarely filamentous and extend only slightly beyond the membrane. In one example (figured) the second spine is very long and filamentous and is longer than the depth of the body below it. The first and second branched rays of the second dorsal are the longest, but they are not as high as the depth of the body below them. The pectoral is slightly longer than the head. The ventrals form a complete disc and are separated from the anal by a distance slightly greater than their length. The anal and the second dorsal are almost of equal extent and commence at the same level anteriorly. The anal is not as high as the dorsal. The caudal is somewhat shorter than the head and is rounded or subtruncate posteriorly.

The scales are small and regularly arranged, those behind the first dorsal are all equal and strongly ctenoid. Anteriorly they become smaller and their posterior ciliated margins become less marked. The scales are continued as far forwards as the eyes, those on the sides of the abdomen are also greatly reduced and it appears that in the region just behind the ventrals they are totally absent.

The general colour in spirit is leaden gray and this effect is produced by numerous blackish dots on a yellowish white basis. There are several indistinct pale vertical bars on the body. The ventral surface of the body is dirty white. The fins are grayish with black dots, the dorsal and the anal have the distal part of the membrane infuscated particularly in the posterior region, but the rays are whitish except the elongated ray in the first dorsal, which is also infuscated.

*Sicyopterus garra* is the third species to be described from within the limits of the Indian Empire. The first two were described by Day,<sup>1</sup> one from Burma and the other from Ceylon. Unfortunately no specimens of the earlier Indian species exist in the collection of the Indian Museum and in separating the new species from these two I had to rely on their published descriptions and figures. *S. garra* is readily distinguished in having a fringed upper lip; from *S. fasciatus* it is further distinguished by the character of its first dorsal and from *S. halei* in having much longer pectorals as compared with the length of the head. The three species in all other respects seem to be closely related to one another.

There are altogether 8 specimens of this species in the collection, two were obtained in a small stream near Birchgunge, S. Andaman, while the remaining were netted in a streamlet flowing out of the reservoir at the base of Mount Harriet. In both the streams water was running rapidly over a rocky or pebbly bed.

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<sup>1</sup> Day, *Fish. India*, p. 299, pl. lxiv, fig. 7; Suppl., p. 796 (1876-1888).

*Measurements in millimetres.*

Total length without caudal	...	...	...	...	24.3
Length of head	...	...	...	...	6.1
Length of snout	...	...	...	...	2.3
Diameter of eye	...	...	...	...	1.6
Interorbital width	...	...	...	...	2.6
Height of body	...	...	...	...	5.1
Length of pectoral	...	...	...	...	6.5
Length of caudal	...	...	...	...	5.6

**Ophiocara ophiocephalus** (Kuhl. & v. Hass.).

1870. *Eleotris ophiocephalus*, Day, *Proc. Zool. Soc. London*, p. 694.

1878. *Eleotris ophiocephalus*, Day, *Fish. tumifrons India*, p. 312, pl. lxxvii, fig. 2.

The synonymy of this species still seems to us doubtful. Day in the Supplement to the Fishes of India (1888, p. 795) called it *Eleotris tumifrons* but in Cuvier and Valenciennes' original description of that species the top of the head is said to be "bombé entre les yeux."<sup>1</sup> This description cannot apply either to our specimens or to those named *ophiocephalus* by Day, for the surface between the eyes is actually concave in some individuals and quite flat in others. The natural colouration is very striking. The whole of the upper surface is suffused with dark blue and the other markings have the same colour. There are two or three radiating lines on the side of the head behind the eye, a conspicuous T-shaped mark at the base of the pectoral fin and an irregular mid-lateral stripe with much narrower and less complete stripe or series of spots below it. The fins are bluish gray.

Six young and half-grown specimens of this species were obtained in a streamlet flowing out of the reservoir at the base of Mount Harriet.

*Ophiocara ophiocephalus* is found along the eastern coast of Africa, in the Andamans and the Malay Archipelago.

**Eleotris fusca** (Bl. & Schn.)

1870. *Eleotris fusca*, Day, *op. cit.*, p. 694.

1870. *Electris fusca*, Day, *op. cit.*, p. 313, pl. lxxv, fig. 7.

This species is common in small streams in South Andaman, both close to the sea and at some miles from it.

*Eleotris fusca* is found along the coasts of India and its range extends to the Malay Archipelago.

**Panchax panchax** (Ham. Buch.)

1870. *Haplachilus panchax*, Day, *op. cit.*, p. 700.

1922. *Panchax panchax*, Weber and Beaufort, *Fish. Indo-Austral. Archipel.* IV, p. 374, figs. 96, 97.

This species is common in the quieter parts of jungle-streams in South Andaman. It does not appear to have been introduced artificially as its occurrence in the Andamans was mentioned by Day in 1870.

The species has a wide distribution in eastern Peninsular India as far south as the Chilka Lake, in Assam, Burma, Siam, the Malay Peninsula and the Sunda Islands.

<sup>1</sup> Cuvier and Valenciennes, *Hist. Nat. Poiss.* XII, p. 241 (1837).

**Doryichthys insularis** Hora, sp. nov.

(Plate II, fig. 1.)

D. 34-35 ; A. 3 ; P. 18 ; C. 9 ; Rings 18+31 ; subdorsal rings 1+7.

It is a narrow, elongated, slender species, in which the length of the head is contained 8.4 to 9 times in the total length of the fish. The snout is slightly shorter than the remaining part of the head and the eye is situated distinctly nearer to the posterior margin of the operculum than to the tip of the snout ; its diameter is contained about 6.4 times in the length of the head. The greatest body height is equal to half the length of the head excluding the snout.

The shields are finely striated transversely and their edges minutely serrated in half-grown examples. The edges appear to be quite smooth in young individuals. The inferior cristae of trunk and tail are discontinuous, while the median cristae of trunk are continuous with the inferior cristae of tail. The superior cristae of trunk are continued to the end of the dorsal while the superior cristae of the tail are continued as far forwards as the commencement of the dorsal. The operculum is provided with a complete, longitudinal, rectilinear keel, while one or two of shorter length, but of a similar nature, are situated close below it. The snout is also provided with as many as eight longitudinal keels. The nuchal crista runs in the middle of the dorsal surface of the head from behind the eyes to as far backwards as the pectorals. In none of the specimens examined is the brood-pouch formed.

The colour in spirit is very characteristic of the species and shows some variations with age. In young individuals it is grayish white mottled with black on the sides of the tail and body, towards the anterior extremity of the latter the markings become more definite and a dark irregular band appears above the middle line with a series of more or less well-defined white spots below it. The dark band is continued as a more definite streak on the post-orbital part of the head. The snout is mottled. In the adult all these markings become of a more definite nature. The dorsal surface is yellowish white with numerous black dots, and the ventral surface is paler but is also provided with black dots. Sometimes a series of round black spots is present in the middle line of the anterior part of the body. The fins are grayish white.

Six specimens of the new species were obtained from among small patches of *Potamogeton* at the edge of a pool in a small stream running rapidly over a pebbly bed through fairly open country at Birchgunge, S. Andaman.

*Doryichthys insularis* is closely allied to *D. retzii* (Bleeker)<sup>1</sup> ; but differs from it in not having prolonged rays in the caudal, in the forward extension of the superior cristae of the tail, in colouration and proportions.

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<sup>1</sup> Weber and Beaufort, *Fish. Indo-Austral. Archipel.* IV, p. 52 (1922).

*Measurements in millimetres.*

Total length including caudal	...	...	...	81.4	97.0
Length of head	...	...	...	9.6	10.7
Length of snout	...	...	...	4.4	5.0
Diameter of eye	...	...	...	1.5	1.9
Length of head and trunk	...	...	...	37.0	43.5
Length of tail region	...	...	...	44.4	53.5
Height of body	...	...	...	2.5	2.8
Length of caudal	...	...	...	3.6	4.0

A SHORT NOTE ON *Andamia heteroptera* (BLEEKER).***Andamia heteroptera* (Bleeker).**

(Plate II, fig. 6.)

1857. *Salarias heteropterus*, Bleeker, *Act. Soc. Sci. Indo-Neerl.* II, pp. 65, 66 (Amboina).  
 1857. *Salarias heteropterus*, Bleeker, *Nat. Tijdschr. Ned. Ind.* XIII, p. 372.  
 1858. *Andamia expansa*, Blyth, *Journ. As. Soc. Bengal*, XXVII, p. 271.  
 1861. *Salarias aequipinnis*, Günther, *Cat. Fish. Brit. Mus.* III, p. 253.  
 1861. *Andamia expansa*, Günther, *Cat. Fish. Brit. Mus.* III, p. 294.  
 1869. *Andamia expansa*, Day, *Proc. Zool. Soc. London*, p. 518.  
 1878. *Andamia expansa*, Day, *Fish. India*, p. 336, pl. lxxi, fig. 2.  
 1889. *Andamia heteroptera*, Day, *Faun. Brit. Ind. Fish.* II, p. 323, fig. 104.

A paratype of *Andamia expansa* Blyth was sent to Mr. J. R. Norman of the British Museum for comparison with the specimens of Günther's *Salarias aequipinnis* and of Bleeker's *S. heteropterus*. He has very kindly favoured us with the following report:—"I have examined 6 specimens of this species (*Andamia expansa*), and the types of *Salarias aequipinnis*, but unfortunately we have no examples of Bleeker's *S. heteropterus*. The principal measurements, etc., of the different specimens are given below, the depth of the body and length of head being taken into the length (without caudal) as usual. As far as I am able to judge, *Andamia expansa* is certainly synonymous with *Salarias aequipinnis*, and from Bleeker's description I should think it very probable that *S. heteropterus* also pertains to the same species."

The following are the measurements sent to us by Mr. Norman:—

			Port Blair (Day) 3 specimens.	Andamans (Day) 3 specimens.	<i>S. aequi- pinnis</i> , 2 spe- cimens.
Depth of body	...	...	8½—9	8½—8¾	8¾—9
Length of head	...	...	5½—5¾	5¾—6	5¾—5¾
Diameter of eye	...	...	3½—4	4½	4
Length of pectoral (in body)	...	...	5¾—5½	5½—5¾	5¾
Dorsal rays	...	...	XVI 18-19	XVI 19	XV-XVI 18-19
Anal rays	...	...	24-26	25	25
Caudal rays	...	...	12-13	13	12-13
Pectoral rays	...	...	15	14-15	15
Total length	...	...	60-77mm.	45-67mm.	60-70mm.

There appears to be a certain amount of confusion regarding the systematic position of Blyth's genus *Andamia*. Jordan<sup>1</sup> in his recent work

<sup>1</sup> Jordan, A Classification of Fishes. *Stanford University Publications. University Series. Biological Sciences* III, No. 2, p. 233 (1923).

on the classification of Fishes places *Andamia* in his family Runulidae, which he defines as "A group of naked blennies with the mouth small, transverse and inferior." He confesses, however, that the members of this family are "perhaps not related one to another." *Andamia*, whatever be the status of the other genera of "Runulidae," does not conform to Jordan's definition for its mouth though transverse and inferior is by no means small. We see no reason for regarding Blyth's genus as anything but an abnormal and highly modified Blennid.

Bleeker's species of the interesting genus *Andamia* is long and slender and is, as has already been pointed out, well adapted for life in rapid-running water. The head and the anterior part of the body are greatly depressed and the under surface in this region is almost flat. The mouth is on the under surface of the head slightly behind the tip of the snout; the lips are fleshy and well developed; they are continuous at the angle of the mouth, being joined together by broad integumentary folds. The upper lip is minutely fringed and pendant, it projects considerably beyond the upper jaw and conceals the teeth within its fold. The lower lip appears to be free from its jaw and is coarsely fringed. Behind the lower lip is an adhesive sucker formed by a modification of the skin and closely resembles the disc on the belly of the tadpoles of the *Ranaeformosae* in general structure. In *Andamia*, the sucker is not operated by the bones of the hyoid apparatus as in *Garra* or attached to the vertebral column as in the tadpoles, but moves in correlation with the mandible with which it is closely connected. Unfortunately the exact nature of the connection is not altogether clear in the material examined. Neither the free marginal portions of the disc nor the lower or the upper lip are apparently provided with papillae, but the histology of the whole structure is difficult to study as the specimens have been preserved for about three-quarters of a century. It may, however, be pointed out that even in young specimens about 26 mm. in total length the disc is as fully formed as in older examples. The teeth in both the jaws are small and pointed and are arranged in a regular linear series on a somewhat raised ridge. So far as can be seen, they appear to be quite efficient in rasping off algal slime from rocks and stones.

Other structures that exhibit modifications are the paired fins. The pectorals are greatly expanded and resemble in certain respects, as has been pointed out by Blyth, those of the fishes of the genus *Balitora*. Their bases are orientated in such a way that the lower portion of the fin can act as an adhesive organ and it appears probable that the under surface of some of the lower rays may have been provided with integumentary pads. The ventral fin consists of 4 rays; the two outer rays are greatly flattened and thickened and are segmented throughout their length except at the base. The two inner rays are very much like long and slender bony spines. They are entire for the greater part of their length but are segmented or jointed towards their extremities. The fin, however, must be dissected before its structure can be made out and our specimens were not sufficiently well preserved to show integumentary details. The structure of the two outer rays recalls that of the outer ray of the pectoral and ventral fins of certain species of the genus *Glyptosternum*



We believe that the ventral fin of *Andamia* is used for adhesive purposes. In most of the members of the family Blennidae the ventrals are very small and, indeed, often vestigial, but in *Andamia* these fins are specially developed, offering a clear instance of convergent evolution when considered with those of many of the fishes of hill streams. In its whole structure, indeed, *Andamia* affords a most interesting example of this phenomenon. It is probably a fish of rocks in the surf-line or of the shores of islands and is evidently modified for resistance to rapid-flowing water of marine waves.