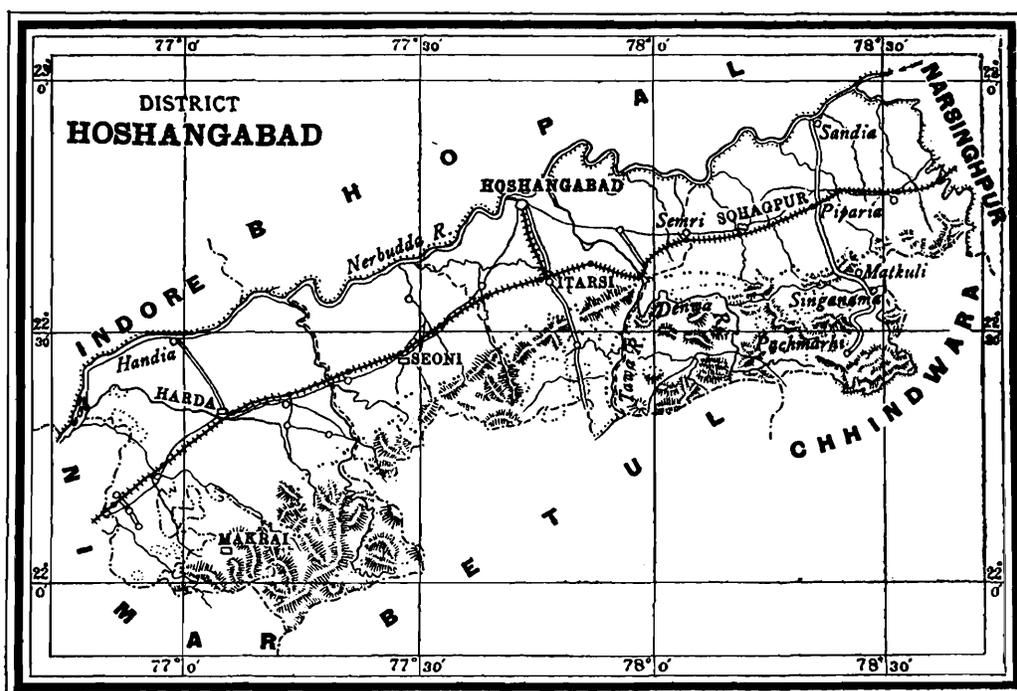


FISHES OF THE SATPURA RANGE, HOSHANGABAD DISTRICT, CENTRAL PROVINCES.

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In 1937, one of us¹, while referring to the distribution of Himalayan fishes, explained the occurrence of similar forms in the Eastern Himalayas and the Assam Hills on the one hand and the south-western hills of Peninsular India on the other by suggesting that the Satpura Trend of mountains probably stretched across India as a continuous range from the Assam Himalayas to Gujarat from the Miocene period till comparatively recent times. To test this hypothesis, the Zoological Survey of India has made collections in the Rajmahal Hills², Santal Parganas³, Hazaribagh Hills⁴, headwaters of the Mahanadi River, Raipur District⁵, and from the Satpura Range, Hoshangabad District.



Map of the Hoshangabad District, Central Provinces, showing the localities in which collections of fish were made.

The last locality was visited by Drs. B. N. Chopra and M. L. Roonwal, who made an extensive collection of fish in the small hill-streams arising from the Satpura Range in the vicinity of the Pachmarhi Plateau and

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

² Hora, S. L., *Rec. Ind. Mus.* XL, pp. 169-181 (1938).

³ Mr. K. N. Das is preparing a report on the fish collected by Dr. H. A. Hafiz in the Santal Parganas during November-December, 1938.

⁴ Das, K. N., *Rec. Ind. Mus.* XLI, pp. 437-450 (1939).

⁵ Hora, S. L., *Rec. Ind. Mus.* XLII, pp. 365-374 (1940).

from comparatively sluggish streams in the plains at Itarsi and Harda. Dr. Chopra has very kindly supplied us the following note on the physical features and the ecological conditions of the area surveyed :

“ The Hoshangabad District¹ in the Central Provinces of India lies between latitude 21° 53' and 22° 59' N. and longitude 76° 47' and 78° 44' E. It is a long and narrow strip of country stretching along the left bank of the Nerbudda, between the Vin-dhyan mountains and the Satpura hills, and includes parts of the latter range within its borders. The Nerbudda forms the northern boundary of the District.

“ The drainage of the Hoshangabad District need not be considered in detail but for the purpose of this note it may be stated that many streams, large and small, flow down from the Satpuras, generally in a north-westerly direction, into the Nerbudda. The Nerbudda itself is a large river flowing between somewhat steep banks along the northern boundary of the District. From the eastern slopes of the Pachmarhi hills in the south-east corner of the District the water is collected in a large number of streams and flows into the Denwa which, after a short northerly course, turns due west near Matkuli, about 14 miles below Pachmarhi, and joins the Tawa which is the most important tributary of the Nerbudda in this District. The western slopes of the Pachmarhi hills are drained by the Sonbhadra, which flows north to join the Denwa. Another important tributary of the Denwa is the Nag Dewali, which rises near Pachmarhi in the deep gorge known as Jambudwip and descends north-westwards through the hills to join the Denwa. This stream forms a series of charming cascades. The Nerbudda has several other important tributaries also, but the only one that need be mentioned here is the Ajnal which passes close to Harda and joins the Nerbudda in the north-west corner of the District. Near Itarsi, practically in the centre of the District, a small stream flows in a north-westerly direction and joins the Lathia, before it falls into the Nerbudda.

“ The plateau of Pachmarhi lies at an elevation of about 3,500 feet, with the Mahadeo hills of the Satpura range forming a rugged background of great beauty and rising in places to almost 4,500 feet above the sea-level. The plateau is formed of almost level or slightly undulating stretches of grassy glades, interspersed with clumps of forest trees. The prevailing sandstone, which is of great depth and succumbs readily to denudation, has, under the action of water, formed a maze of gorges and ravines in which numerous streams flow. The plateau receives a rainfall of about 77 inches a year and nearly the whole of it falls between June and September. The climate is rather mild, the average minimum and maximum temperatures ranging between 47.5° and 95.1° F.

“ The plains consist of a rich alluvium, the average rainfall is about 47 inches per annum and the average minimum and maximum temperatures at Hoshangabad vary between 71.3° and 107.6° F.

“ The survey was carried out in February and March, which are practically the driest months in the year in the District. The streams in the hills, that is, around the Pachmarhi plateau, had only a restricted flow, while those in the plains had naturally considerable quantities of water in them. In a few of the former the current was merely in the form of a trickle and in none was the flow very rapid, except near cascades and falls. There were pools in the course of most of these streams and rich collections were obtained in these pools. The bottom for the most part consisted of stones and pebbles mixed with sand and clay, but in the pools and in some other parts also there was a lot of mud. This was especially the case in some parts of the small streams round Badkachar. In some cases the water flowed over large rocks and boulders, some of which had been worn flat by the current; this was the case in the vicinity of the Small Water Fall, some parts of the stream in the Jambudwip gorge and that in the neighbourhood of the Pansy Pool. There was only a small amount of vegetation in most of the streams, except in some near Badkachar and those near Singanama. In many cases the country through which the streams were flowing was thickly wooded; this was especially the case with the streams near Pansy Pool, that near Rohrighat and the Jambudwip. The streams round Badkachar, that near Darmar and one or two others flowed through country which was for the most part bare. The water in all these streams was clear. In the hill-streams the dominant fish at this time of the year was *Garra mullya*. This fish was collected in practically every stream, sometimes in considerable numbers, and was found even in pools with a muddy bottom and slow current. Two species of *Nemachilus*, locally known as *Patharchat* (stone licker) were also met with practically everywhere, living under stones and hiding in the vegetation near banks. Another fish collected in some streams in considerable numbers is *Danio aequipinnatus*. This prominently striped fish was found to be the dominant form in streams round Badka-

¹ The information regarding physical features, etc., has been taken partly from the Hoshangabad District Gazetteer by Corbett and Russel (1908), and that about the distribution of fishes from the lists prepared by Dr. Hora and Mr. Nair.

char, at Rohrihat and in some streams round Singanama; in these streams *Garra* was collected in comparatively smaller numbers. Several other species also were collected in these streams, the genera represented being *Parapsilorhynchus*, *Barbus*, *Barilius*, *Rasbora*, *Lepidocephalus*, and *Ophicephalus*.

"The streams in the plains differed considerably in their physical conditions from those described above. In most of these there was a considerable flow of water, the current was sluggish to moderately swift and the bottom for the most part consisted of sand and mud, with occasional patches of small stones and pebbles. There was considerably more vegetation in the water than in the hill-streams and in the Ajnal nullah near Harda there was such a luxurious growth of algae and other vegetation in the stream that it required considerable efforts to wade through it. This thick vegetation afforded excellent protection to large numbers of fish and though plenty of them could be seen darting about from cover to cover, it was difficult to bag them. The course of these streams lay through country that was for the most part only sparsely wooded, and in parts was quite bare. The water was more or less clear. *Garra* was practically absent in these streams and was collected in small numbers only in the stream near Mehragaon, close to Itarsi. *Nemachilus* was collected in practically all these streams, but of the two species found in the hills, one, *N. evezardi*, was totally absent in the plains, while the other, *N. dayi*, was common throughout. A third species of *Nemachilus*, *N. botius*, which was met with rather rarely in the hills, was found in fair numbers in these streams. There are several species that were common to both the localities, but some of these were more abundant in one than in the other. Barbels were far more common, both in the number of species and in individuals, in the plains than in streams round Pachmarhi. Among the genera met with in the streams in the plains only may be mentioned *Brachydanio*, *Esomus*, *Labeo*, *Rohtee*, *Oreochthys*, *Amblyceps*, *Xenentodon*, *Badis*, *Laguvia*, *Glossogobius*. In all 26 genera were collected; of these, nine were found in the hill streams also."

DESCRIPTIONS OF LOCALITIES WITH LISTS OF FISHES COLLECTED FROM EACH.

Jambudwip stream, about 2 miles north-west of Pachmarhi. 9. ii. 1941.

This is a typical hill-stream running in a deep well-wooded valley. The bottom is rocky or strewn over with stone and pebbles in some places and muddy in others. The current is not very fast, except in the regions of small falls and cascades. Portions of the stream contain plenty of vegetation. Here and there large pools are formed with the bottom generally muddy. In some places the stream flows as a small trickle over a bed of large flat rocks.

			Length in mm.	No. of specimens.
<i>Garra mullya</i> (Sykes)	..	..	59—69	4
<i>Parapsilorhynchus tentaculatus</i> (Ann.)	..	..	26—41	5
<i>Nemachilus dayi</i> Hora	..	..	26—40	12
<i>Nemachilus evezardi</i> Day	..	..	18—52	11

"*Pansy Pool*", about 4 miles south-west of Pachmarhi. 10. ii. 1941.

The Denwa river runs in places through a deep *khud* between high rocks and forms a series of deep pools, popularly known as "*Pansy Pool*". The current is generally sluggish but in between the pools rapids are formed. The bottom consists of rocks and stones intermixed with pebbles and sand. Parts of the stream are thickly shaded, but there is little vegetation in the water.

			Length in mm.	No. of specimens.
<i>Barbus (Tor) khudree</i> Sykes..	..	..	33	1
<i>Garra mullya</i> (Sykes)	..	..	39—76	20
<i>Nemachilus dayi</i> Hora	..	..	21—57	8
<i>Nemachilus evezardi</i> Day	..	..	23—28	3

“ *Small Waterfall* ” about 2 miles east of Pachmarhi. 11. ii. 1941.

The waterfall is about 75 feet high and below it there is a typical hill-stream formed of rapids and pools in succession. The bottom is formed of pebbles and brownish sand, and the banks are overgrown with grasses and forest trees. Some of the pools are over 10 feet deep and the current in them is sluggish.

	Length in mm.	No. of specimens.
<i>Burilzus bendelisis</i> Ham.	46—85	13
<i>Danio aequipinnatus</i> (McClell.)	55—73	7
<i>Barbus (Puntius) dorsalis</i> (Jerdon)	53 & 56	2
<i>Barbus (Puntius) ticto</i> Ham.	28—53	5
<i>Parapsilorhynchus tentaculatus</i> (Ann.)	31	1
<i>Nemachilus evezardi</i> Day	26—35	4

Darmar stream near Darmar village, below Pachmarhi-Piparia Road about 3 miles north-east of Pachmarhi. 12. ii. 1941.

A small stream with a comparatively slow current of clear water flowing over stones and boulders, and in places over sand and shingle, etc. In the course of the stream there are several pools with muddy bottom and a sluggish current. There is no vegetation in the water but there are some tall trees along the banks.

	Length in mm.	No. of specimens.
<i>Garra mullya</i> (Sykes)	29—78	113
<i>Nemachilus dayi</i> Hora	25—83	16
<i>Nemachilus evezardi</i> Day	20—38	7

Streams around Badkachar, about 6 miles north-west of Pachmarhi. 14. ii. 1941.

The streams are small and sluggish with restricted flow over a bottom of stones and rocks. In places the bottom is muddy. There is very little of aquatic vegetation, but there are trees along the banks of the streams.

	Length in mm.	No. of specimens.
<i>Danio aequipinnatus</i> (McClell.)	45—76	46
<i>Parapsilorhynchus tentaculatus</i> (Ann.)	23—28	7
<i>Nemachilus dayi</i> Hora	31—65	6

Rohrighat stream near Rohrighat village, about 8 miles south-west of Pachmarhi. 15. ii. 1941.

A small, comparatively sluggish stream running on two sides of the village. In places the stream runs through open country without any shade, while in other places the banks are very thickly wooded. There is very little aquatic vegetation. The bottom is mostly muddy, but

in places there are lots of stones. The stream forms several pools in its course.

		Length in mm.	No. of specimens.
<i>Barilius bendelisis</i> Ham.	..	105 & 110	2
<i>Danio aequipinnatus</i> (McClell.)	..	42—86	64
<i>Rasbora daniconius</i> (Ham.)	..	97	1
<i>Garra mullya</i> (Sykes)	..	43—75	7
<i>Nemachilus dayi</i> Hora	..	23—79	12
<i>Ophicephalus gachua</i> Ham.	..	120	1

Choka nullah near Singanama on the Pachmarhi-Piparia Road, about 14 miles from Pachmarhi. 18 & 20. ii. 1941.

A small sluggish stream with a muddy bottom, which is strewn over with rocks in places. Pools in the course of the stream are almost stagnant and have a lot of algae and other aquatic vegetation. The bottom consists of black mud, mixed with sand. The water is generally clear. This stream joins the Denwa a little below Singanama village.

			Length in mm.	No. of specimens.
<i>Barilius bendelisis</i> Ham.	..	..	..	Several young specimens.
<i>Danio aequipinnatus</i> (McClell.)	..	..	49—72	11
<i>Rasbora daniconius</i> (Ham.)	..	...	41—78	7
<i>Barbus (Puntius) dorsalis</i> (Jerdon)	..	..	44	1
<i>Barbus (Puntius) ticto</i> Ham.			32—63	5
<i>Barbus (Tor) khudree</i> Sykes.	..		33 & 37	2
<i>Garra mullya</i> (Sykes)	..		57—65	5
<i>Lepidocephalus guntea</i> (Ham.)			60 & 66	2
<i>Nemachilus dayi</i> Hora	..		66	1
<i>Ophicephalus gachua</i> Ham.	..	..	83 & 88	2

Denwa river near Singanama, on Pachmarhi-Piparia Road, about 14 miles from Pachmarhi. 19 & 20. ii. 1941.

The Denwa opens out into a broad stream of clear water flowing over a bed of sand, with large rocks here and there. The water is clear and there is very little aquatic vegetation. The current is moderately swift. On the sides of the river there are isolated pools.

			Length in mm.	No. of specimens.
<i>Barilius bendelisis</i> Ham.	..		27—98	58
<i>Danio aequipinnatus</i> (McClell.)			46—70	5
<i>Rasbora daniconius</i> (Ham.)	..		58 & 75	2
<i>Barbus (Puntius) pinnauratus</i> (Day)			82	1
<i>Barbus (Puntius) ticto</i> Ham.			25—47	3
<i>Barbus (Tor) khudrec</i> Sykes			20—68	27
<i>Garra mullya</i> (Sykes)			56—80	9
<i>Garra gotyla</i> (Gray)	..		63	1
<i>Nemachilus botius</i> (Ham.)			76	1

Mahabir nullah just behind the Rest House at Singanama on Pachmarhi-Piparia Road, 14 miles from Pachmarhi. 20. ii. 1941.

The nullah consists of small, isolated pools with a small trickle of water flowing in between them. The bottom consists of rocks and stones with patches of sand and darkish mud. The water is clear. There is no aquatic vegetation.

	Length in mm.	No. of specimens.
<i>Barilius bendelisis</i> Ham. ..		Several young specimens.
<i>Danio aequipinnatus</i> (McClell.)	42—75	30
<i>Rasbora daniconius</i> (Ham.)	49—91	17
<i>Barbus pinnauratus</i> (Day) ..	91	1
<i>Barbus (Puntius) dorsalis</i> (Jerdon)	50 & 64	2
<i>Barbus (Puntius) ticto</i> Ham.	40—66	5
<i>Garra mullya</i> (Sykes) ..	50 & 61	2
<i>Lepidocephalus guntea</i> (Ham.) ..	65	1
<i>Nemachilus dayi</i> Hora ..	38 & 45	2

Machhuasa or Machha stream about 1½ miles north of Piparia, and under Railway bridge close to Railway Station. 22 & 23. ii. 1941.

A small stream of clear water flowing slowly over a bed of sand and clay. The vegetation consists of algae and grasses.

	Length in mm.	No. of specimens.
<i>Barilius bendelisis</i> Ham. ..	45—71	14
<i>Brachydanio rerio</i> (Ham.) ..	22—30	43
<i>Rasbora daniconius</i> (Ham.) ..	69	1
<i>Barbus (Puntius) ticto</i> Ham. ..	25 & 27	2
<i>Lepidocephalus guntea</i> (Ham.)	45—71	19
<i>Nemachilus dayi</i> Hora	26—32	6

Stream near Mehra village, about 1½ miles from Itarsi. 24-26. ii. 1941.

It is a small sluggish stream running over a bed of gravel and mud. The banks are muddy and steep in places. The water is somewhat turbid and harbours large quantities of filamentous algae.

	Length in mm.	No. of specimens.
<i>Chela clupeoides</i> (Bloch) ..	63 & 74	2
<i>Laubuca laubuca</i> (Ham.)	56	1
<i>Brachydanio rerio</i> (Ham.) ..	25—28	11
<i>Danio aequipinnatus</i> (McClell.) ..	47	1
<i>Pisomus danricus</i> (Ham.)	37—44	25
<i>Rasbora daniconius</i> (Ham.)	41—67	14
<i>Barbus (Puntius) chrysopoma</i> (Jerdon)	117 & 126	2
<i>Barbus (Puntius) dorsalis</i> (Jerdon)	41	1
<i>Barbus (Puntius) sophore</i> Ham.	35—48	4
<i>Barbus (Puntius) ticto</i> Ham.	32—58	49
<i>Barbus (Puntius) titius</i> Ham.	59—81	9
<i>Barbus (Tor) khudree</i> Sykes ..	104	1
<i>Garra mullya</i> (Sykes)	63—94	5
<i>Labeo boggut</i> (Sykes) ..	86—97	3
<i>Rohtee cotio</i> (Ham.) ..	50—58	7
<i>Lepidocephalus guntea</i> (Ham.) ..	52—67	10
<i>Nemachilus dayi</i> Hora	37—54	4
<i>Mystus vittatus</i> (Bloch) ..	65—88	17
<i>Ophicephalus gachua</i> Ham.	67—130	4
<i>Ophicephalus punctatus</i> Bloch ..	80—145	9
<i>Glossogobius giuris</i> (Ham.)	28—65	24

Nerbudda river near Handia, about 13 miles north of Harda. 27 ii. 1941.

A large river of clear water, flowing over a bed of sand and clay. There is a large number of rocks and boulders on the bank with pools in between them. Near the edge, there is a growth of grasses and algae. The bottom of the pools is muddy.

	Length in mm.	No. of specimens.
<i>Barbus (Puntius) ticto</i> Ham.	13—22	12
<i>Barbus (Tor) khudree</i> Sykes	35—43	3
<i>Nemachilus dayi</i> Hora	26—39	4

Timarni nullah on the Timarni Road, a little south of Harda. 28. ii. and
2. iii. 1941.

The nullah forms a branch of the Ajnal river, and is a fairly large stream of clear water, flowing over a bed of clay mixed with sand and gravel. In some places the bottom is stony. The vegetation consisting of grasses and algae is quite abundant in the shallower parts of the stream. The banks are fairly steep.

	Length in mm.	No. of specimens.
<i>Barilius bendelisis</i> Ham.	32—111	14
<i>Brachydanio rerio</i> (Ham.)	26—31	3
<i>Danio aequipinnatus</i> (McClell.)	58	1
<i>Barbus (Puntius) chrysopoma</i> (Jerdon)	180	1
<i>Barbus (Puntius) conchoniis</i> (Ham.)	38—64	10
<i>Barbus (Puntius) dorsalis</i> (Jerdon)	76	1
<i>Barbus (Puntius) guganio</i> (Ham.)	33—41	11
<i>Barbus (Puntius) pinnauratus</i> (Day)	71—89	9
<i>Barbus (Puntius) ticto</i> Ham.	28—65	8
<i>Barbus (Puntius) titius</i> Ham.	84	1
<i>Barbus (Tor) khudree</i> Sykes	89—97	4
<i>Garra mullya</i> (Sykes)	45—90	7
<i>Labeo bogput</i> (Sykes)	.. 57—95	12
<i>Oreichthys cosuatus</i> (Ham.)	.. 28—44	5
<i>Rohtee cotio</i> (Ham.)	57—71	5
<i>Lepidocephalus guntea</i> (Ham.)	37	1
<i>Nemachilus dayi</i> Hora	.. 25—60	26
<i>Nemachilus botius</i> (Ham.)	.. 47	1
<i>Mystus vittatus</i> (Bloch)	.. 85—90	3
<i>Amblyceps mangois</i> (Ham.)	.. 23—44	6
<i>Xenentodon cancila</i> (Ham.)	76 & 108	2
<i>Mastacembelus armatus</i> (Lacép.)	95—148	4
<i>Mastacembelus pancalus</i> (Ham.)	.. 79—85	3
<i>Ophicephalus gachua</i> Ham.	132	1
<i>Radis budis</i> (Ham.)	.. 34	1
<i>Glossogobius giuris</i> (Ham.)	.. 38—107	3

Ajnal nullah near the Railway bridge about 2 miles south-west of Harda.
1. iii. 1941.

A fairly large stream of clear water, running between steep banks over a bottom consisting mostly of small pebbles, etc., mixed with

sand and mud. The current is fairly swift. Large masses of algae were found growing in the water.

		Length in mm.	No. of specimens.
<i>Notopterus notopterus</i> (Pallas)	..	200	1
<i>Barilius bendelisis</i> Ham.	..	..	Several young specimens.
<i>Danio aequipinnatus</i> (McClell.)		83	1
<i>Barbus (Puntius) dorsalis</i> (Jerdon)	..	71	1
<i>Barbus (Puntius) pinnauratus</i> (Day)	..	86	1
<i>Barbus (Puntius) ticto</i> Ham.		26—55	44
<i>Barbus (Tor) khudree</i> Sykes	..	71—142	8
<i>Garra mullya</i> (Sykes)	..	70—88	7
<i>Labeo hoggut</i> (Sykes)	..	105	1
<i>Lepidocephalus guntea</i> (Ham.)	..	44—57	3
<i>Nemachilus dazyi</i> Hora	..	27—60	14
<i>Nemachilus botius</i> (Ham.)	..	56—71	4
<i>Xenentodon cancila</i> (Ham.)	..	51	1
<i>Mastacembelus armatus</i> (Lacép.)	..	70—109	4
<i>Ophicephalus punctatus</i> Day	..	190	1
<i>Glossogobius giuris</i> (Ham.)	..	98	1

Midkul nullah near the Railway bridge, about 2 miles south-west of Harda.
3. iii. 1941.

The stream is about 40-60 feet wide and 2-5 feet deep. The current is sluggish and the vegetation consists of reeds, etc. The bottom consists of coarse sand and large stones here and there.

		Length in mm.	No. of specimens.
<i>Rasbora daniconius</i> (Ham.)	..	40	1
<i>Barbus (Puntius) guganio</i> (Ham.)	..	34—48	7
<i>Barbus (Puntius) pinnauratus</i> (Day)		80	1
<i>Barbus (Puntius) ticto</i> Ham.	..	22—51	7
<i>Barbus (Tor) khudree</i> Sykes	..	85	1
<i>Oreichtlys cosuatus</i> (Ham.)		30—45	11
<i>Nemachilus botius</i> (Ham.)	..	53—66	6
<i>Mystus vittatus</i> (Bloch)	..	84	1
<i>Laguria rebeiroi</i> Hora	..	24 & 28	2
<i>Mastacembelus armatus</i> (Lacép.)		88	1
<i>Nandus nandus</i> (Ham.)	..	108	1
<i>Badis badis</i> (Ham.)	..	18—46	6
<i>Glossogobius giuris</i> (Ham.)	..	37	1

Fishes purchased from markets at Sandia and Harda.

Purchased in the market at Sandia, on River Nerbudda, 12 miles from Piparia on 21. ii. 1941.

		Length in mm.	No. of specimens.
<i>Mystus cavasius</i> (Ham.)	..	108	1
<i>Mystus vittatus</i> (Bloch)	..	75—80	3

Purchased in the market at Harda on 28. ii. 1941.

		Length in mm.	No. of specimens.
<i>Rita pavementata</i> Val.	..	152—160	3
<i>Mastacembelus armatus</i> (Lacép.)	..	277	1

SYSTEMATIC ACCOUNT.

The collection under report comprises 1,167 specimens belonging to 40 species. The systematic position of the species is shown in the following table :

<p>Family NOTOPTERIDAE.</p> <p>1. <i>Notopterus notopterus</i> (Pallas).</p> <p>Family CYPRINIDAE.</p> <p>Subfamily ABRAMIDINAE.</p> <p>2. <i>Chela clupeoides</i> (Ham.).</p> <p>3. <i>Laubuca laubuca</i> (Ham.).</p> <p>Subfamily RASBORINAE.</p> <p>4. <i>Barilius bendelisis</i> Ham.</p> <p>5. <i>Brachydanio rerio</i> (Ham.).</p> <p>6. <i>Danio aequipinnatus</i> (McClell.).</p> <p>7. <i>Esomus danricus</i> (Ham.).</p> <p>8. <i>Rasbora daniconius</i> (Ham.).</p> <p>Subfamily CYPRININAE.</p> <p>9. <i>Barbus (Puntius) chrysopoma</i> (Cuv. & Val).</p> <p>10. <i>Barbus (Puntius) conchoniis</i> Ham.</p> <p>11. <i>Barbus (Puntius) dorsalis</i> (Jerdon).</p> <p>12. <i>Barbus (Puntius) guganio</i> (Ham.).</p> <p>13. <i>Barbus (Puntius) pinnauratus</i> (Day).</p> <p>14. <i>Barbus (Puntius) sophore</i> Ham.</p> <p>15. <i>Barbus (Puntius) ticto</i> Ham.</p> <p>16. <i>Barbus (Puntius) titius</i> Ham.</p> <p>17. <i>Barbus (Tor) khudree</i> Sykes.</p> <p>18. <i>Garra mullya</i> (Sykes).</p> <p>19. <i>Garra gotyla</i> (Gray).</p> <p>20. <i>Parapsilorhynchus tentaculatus</i> (Ann.).</p> <p>21. <i>Labeo boggut</i> (Sykes).</p> <p>22. <i>Oreichthys cosuatus</i> (Ham.).</p> <p>23. <i>Rohtee cotio</i> (Ham.).</p>	<p>Family COBITIDAE.</p> <p>24. <i>Lepidocephalus guntea</i> (Ham.).</p> <p>25. <i>Nemachilus botius</i> (Ham.).</p> <p>26. <i>Nemachilus dayi</i> Hora.</p> <p>27. <i>Nemachilus evezardi</i> Day.</p> <p>Family BAGRIDAE.</p> <p>28. <i>Mystus cavasius</i> (Ham.).</p> <p>29. <i>Mystus vittatus</i> (Bloch).</p> <p>30. <i>Rita parimentata</i> Val.</p> <p>Family AMBLYCEPIDAE.</p> <p>31. <i>Amblyceps mangois</i> (Ham.).</p> <p>Family SISORIDAE.</p> <p>32. <i>Laguvia ribeiroi</i> Hora.</p> <p>Family BELONIDAE.</p> <p>33. <i>Xenentodon cancila</i> (Ham.).</p> <p>Family MASTACEMBELIDAE.</p> <p>34. <i>Mastacembelus armatus</i> (Lacép.).</p> <p>35. <i>Mastacembelus pancalus</i> (Ham.).</p> <p>Family OPHICEPHALIDAE.</p> <p>36. <i>Ophicephalus yachua</i> Ham.</p> <p>37. <i>Ophicephalus punctatus</i> Bloch.</p> <p>Family NANDIDAE.</p> <p>38. <i>Nandus nandus</i> (Ham.).</p> <p>Family PRISTOLEPIDAE.</p> <p>39. <i>Badis badis</i> (Ham.).</p> <p>Family GOBIIDAE.</p> <p>40. <i>Glossogobius giuris</i> (Ham.).</p>
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Of the 40 species listed above, 26 belong to the order Cyprinoidea (22 Cyprinidae and 4 Cobitidae), 5 to the order Siluroidea (3 Bagridae, 1 Amblycepidae and 1 Sisoridae), while the remaining species are distributed among the families Notopteridae (1), Belonidae (1), Mastacembelidae (2), Ophicephalidae (2), Nandidae (1), Pristolepidae (1) and Gobiidae (1). With the exception of a few species of carp-minnows, all others are fairly well known and do not call for any comments from a systematic point of view. However, a few remarks are necessary on *Danio aequipinnatus* (McClelland), *Barbus (Puntius) chrysopoma* Cuv. & Val., *Nemachilus dayi* Hora, *Amblyceps mangois* (Ham.) and *Laguvia ribeiroi* Hora.

From a zoogeographical point of view the occurrence of *Amblyceps* and *Laguvia* in the Hoshangabad District shows the affinities of the fish-fauna of this region with that of the Assam Hills and the Eastern Himalayas. The former genus has been obtained from all the portions of the Satpura Trend surveyed by the Zoological Survey of India, while *Laguvia* was collected only in the Rajmahal Hills. The presence in

the collection of forms, such as *Barbus (Puntius) dorsalis* (Jerdon), *Garra mullya* (Sykes), *Parapsilorhynchus tentaculatus* (Ann.), *Labeo boggut* (Sykes), *Nemachilus dayi* Hora, *N. evezardi* Day and *Rita pavimentata* Val., shows that the fish-fauna of this part of the Satpuras is closely allied to the fauna of the Western Ghats. Some of these species, such as *Parapsilorhynchus tentaculatus*, *Nemachilus evezardi* and *Rita pavimentata*, were not found in the Sihawa range, Raipur District.¹ The remaining species are widely distributed in India and are, therefore, of little significance in a zoogeographical discussion. These studies have clearly shown that the Satpura Trend of mountains must have, at not a very remote period, acted as a highway for the dispersal of the Eastern Himalayan and Assam forms to the Western Ghats and that the Garo-Rajmahal Gap is only a comparatively recent feature in the physiography of India. Further, it is also clear that there must have been a continuity of waterways between the Western Ghats and the Satpuras of the Hoshangabad District not very long ago as can be inferred from a large number of identical species of limited range that are found in both the regions.

Though in his studies on 'The Distribution of Vertebrate Animals in India, Ceylon and Burma', Blanford² attached little importance to the distribution of freshwater fishes, it is significant that he had also come to similar conclusions as stated above from the distribution of other types of vertebrates. In describing the peculiarities of the fauna of the Indian Peninsula, he stated :

"The majority of the genera named are typically forest forms; the species of the Bihar-Orissa area are, with very few exceptions, the same as those of Malabar, and may have inhabited the whole of Southern India before the forests of the Deccan and Carnatic were cleared. One circumstance seems strongly to support this view. There are two kinds of *Anthracoceros* in India, one of which inhabits Ceylon and the Western or Malabar coast as far north as Ratnagiri, whilst the other inhabits the lower Himalayas and countries to the eastward. Neither is known to be found in the Deccan or Carnatic. The two meet in the Bihar-Orissa area, the Malabar form to the south, the Himalayan to the north. It is scarcely probable that the southern species would exist in the area unless it once ranged over the country intervening between Chutia Nagpur and Malabar. In the same manner the southern grackle (*Eulabes religiosa*) meets the Himalayan and Burmese grackle (*E. intermedia*) in the same area, but is not known to be met with in the Deccan or Carnatic tracts.

"That the differences between the Bihar-Orissa province and the adjoining provinces of the Indian Peninsula are not ancient is, I think, shown by the absence of distinctive genera amongst the reptiles and batrachia."

With regard to the value of freshwater fishes in zoogeographical studies, Blanford (*loc. cit.*, p. 343) stated :

"The evidence afforded by freshwater fishes varies so much with the presence or absence of suitable habitats, such as lakes and rivers, that it is generally, I think, only applicable to large areas."

The distribution of hill-stream fishes, such as *Amblyceps*, *Laguvia*, *Garra*, *Parapsilorhynchus*, *Nemachilus*, etc., can only take place along hill ranges, so there is hardly any necessity to contemplate vast level tracts of the country to be once covered with forests in order to explain the distribution of any genus occurring in the Peninsula of India on the one hand and the hills of Assam and the Eastern Himalayas on the other. Such a continuity of hill-ranges was provided by the once

¹ Hora, S. L., *Rec. Ind. Mus.* XLII, pp. 365-374 (1940).

² Blanford W. T., *Phil. Trans. Roy. Soc. London* (B) CXCIV, p. 392 (1901).

extensive Satpura Trend¹ which stretched from the Assam Himalayas in the east to the Western Ghats in the west. We believe that the Satpura Trend not only provided a highway for the dispersal of the so-called Malayan fishes to Peninsular India, but also served as a route for the forest-loving forms among other groups of vertebrates that show a similar discontinuous range of distribution.

Danio aequipinnatus (McClelland).

1878. *Danio aequipinnatus*, Day, *Fish. India*, p. 596, pl. cl., fig. 6.

In 1934, Hora and Mukerji² gave an artificial key to the species of *Danio* and distinguished three closely allied species by the following characters :

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| I. A well-defined black mark near upper angle of gill-opening. | | |
| A. Lateral bands breaking up anteriorly to form a mottled pattern. L. l. 37; L. tr. 10 ($7\frac{1}{2}/2\frac{1}{2}$) | .. | <i>D. strigillifer</i> Myers. |
| B. Lateral bands not breaking up anteriorly to form a mottled pattern. Several well marked and uniform lateral bands. L. l. 34-36, L. tr. 10 or 11 ($7\frac{1}{2}/2\frac{1}{2}$ or $8\frac{1}{2}/2\frac{1}{2}$) | | <i>D. aequipinnatus</i> ³
(McClelland). |
| II. Black mark near upper angle of gill-opening absent. | | |
| L. l. 32-34; L. tr. 11 ($8\frac{1}{2}/2\frac{1}{2}$) | .. .. . | <i>D. malabaricus</i> (Jerdon). |

In 1937, Hora⁴ recorded *D. strigillifer* Myers⁵ from Southern India and commented on the discontinuous range of distribution of the species. In the material under report we have all gradations of colour and scale counts and find that the three species mentioned above cannot be distinguished from one another on any reliable character and should, therefore, be regarded as identical. Recently Hora and Law⁶ found that the specimens of *Danio* from Travancore were *D. aequipinnatus* and that *D. malabaricus* must be regarded as a synonym of this species. The South Indian specimens of *D. aequipinnatus* grow to a larger size than those found in Northern India.

Barbus (Puntius) chrysopoma Cuvier and Valenciennes.

1878. *Barbus chrysopoma*, Day, *Fish. India*, p. 561.

Under the description of *Barbus pinnauratus*, Day (*loc. cit.*, p. 562) stated that "This form [*B. pinnauratus*] and *B. chrysopoma* may be merely varieties of a single species, while *B. sarana* is closely allied". According to Day's descriptions of *B. chrysopoma* and *B. pinnauratus*, the two species can be distinguished by the number of predorsal scales—12 in the former and 10 in the latter. Sundara Raj⁷, however, found

¹ Hora, S. L., *Rec. Ind. Mus.* XXXIX, p. 255 (1937); *Proc. Nat. Inst. Sci. India* IV, p. 405 (1938).

² Hora, S. L. and Mukerji, D.D., *Rec. Ind. Mus.* XXXVI, p. 134 (1934).

³ Mukerji (*Journ. Bombay Nat. Hist. Soc.* XXXVII, p. 76, 1934) has given reasons to show that Regan's *Danio browni* (*Rec. Ind. Mus.* I, p. 395, 1907) cannot be regarded as a species distinct from *D. aequipinnatus* (McClell.).

⁴ Hora, S. L., *Rec. Ind. Mus.* XXXIX, p. 10 (1937).

⁵ Myers, G. S., *Amer. Mus. Novitates*, No. 150, p. 1 (1924).

⁶ Hora, S. L. and Law, N. C., *Rec. Ind. Mus.* XLIII, p. 243 (1941).

⁷ Raj, B. Sundara, *Rec. Ind. Mus.* XII, p. 254 (1916).

that besides other characters there are 10 to 12 rows of predorsal scales in the specimens of *B. chrysopoma* from Madras and remarked :

“The above particulars show that Madras examples combine the characters of the three species, *B. sarana*, H. B., *B. chrysopoma*, C. and V., *B. pinnauratus*, Day, all of which according to the *Fauna of British India* may occur in Madras.”

In the limited series of specimens that we have examined, it has been possible to distinguish *B. pinnauratus* from *B. chrysopoma* by the number of predorsal scales, but there seems no doubt that the three species mentioned above along with *B. caudimarginatus* Blyth and *B. sewelli* Prashad & Mukerji form a series of very closely allied species, the specific limits of which are by no means well defined.

Nemachilus dayi Hora.

1935. *Nemachilus dayi*, Hora, *Rec. Ind. Mus.* XXXVII, p. 57.

1938. *Nemachilus dayi*, Hora, *Rec. Ind. Mus.* XL, p. 240.

1938. *Nemachilus dayi*, Das, *Rec. Ind. Mus.* XL, p. 447.

Nemachilus dayi is represented in the collection by a large number of young, half-grown and adult specimens. The colouration is very variable. In young specimens the lighter bands are almost as wide as the darker ones and the dorsal and caudal fins are provided with only a few rows of spots. The characteristic colouration of the species is assumed in specimens about an inch and a half in length. From the large series of specimens now examined, it seems that the examples referred by Das (*loc. cit.*, p. 446) and Hora¹ to *N. denisonii* are referable to this species.

Amblyceps mangois (Hamilton).

1933. *Amblyceps mangois*, Hora, *Rec. Ind. Mus.* XXXV, pp. 607-621, text-figs. 1-7.

1940. *Amblyceps mangois*, Hora, *Rec. Ind. Mus.* XLII, p. 374.

The occurrence of *Amblyceps mangois* in the streams of the Hoshangabad District is of special significance. During the survey of the Satpura Trend, it has been collected from all the hilly districts and its range has thus been extended considerably westwards.

The specimens under report are juvenile. The caudal fin is deeply forked and in some the lobes, especially the upper, are greatly drawn out and pointed. The adipose dorsal is relatively short and low.

Amblyceps mangois is found along the Himalayas, hills of Assam, Burma, Siam, the Malay Peninsula and the Satpura Trend of mountains.

Laguvia ribeiroi Hora.

1921. *Laguvia ribeiroi*, Hora, *Rec. Ind. Mus.* XXII, p. 741, pl. xxix, fig. 3.

1938. *Laguvia ribeiroi*, Hora, *Rec. Ind. Mus.* XL, p. 179, text-fig. 5.

Laguvia ribeiroi was originally described from a single specimen collected from the Khoila River, a tributary of the Tista River in the Jalpaiguri District. Two more specimens of this remarkable catfish were recorded from the Morel River in the Santal Parganas. The occurrence of the species in the Hoshangabad District is of great zoo-

¹ Hora, S. L., *Rec. Ind. Mus.* XLII, p. 373 (1940).

geographical interest as showing the probable continuity of the Satpura Trend of mountains with the hills of Assam and the Darjeeling Himalayas at a not very distant date.

It has been pointed out by Hora (*loc. cit.*, 1938) that *L. ribeiroi* can be readily distinguished from *L. shawi* by the nature of the dorsal spine which is serrated anteriorly in *L. ribeiroi* and is smooth in *L. shawi*. In the chest region, there are folds of skin which form an adhesive apparatus similar to that found in species of *Glyptothorax* Blyth. Recently, Hora and Gupta¹ described similar corrugations in *L. shawi*.

SUMMARY.

The collection comprises 40 already known species. A note on the physical features and ecological conditions of the area from which the collection was made is added. Short descriptions of localities with lists of fishes collected from each are also included. A reference is made to the zoogeographical distribution of *Amblyceps* and *Laguvia*, the Eastern Himalayan forms, and of *Parapsilorhynchus*, *Nemichilus evezardi*, *Rita pavimentata*, etc., of the Western Ghats. The significance of the Satpura Trend in the distribution of Malayan forms to Peninsular India is discussed. Notes are appended on *Danio aequipinnatus* (McClelland), *Barbus (Puntius) chrysopoma* Cuv. & Val., *Nemichilus dayi* Hora, *Amblyceps mangois* (Ham.) and *Laguvia ribeiroi* Hora.

¹ Hora, S. L. and Gupta, J. C., *Journ. Roy. As. Soc. Bengal* (3) VI, p. 5, 1940 (1941).