

NOTES ON THE FRESH WATER-FISH OF MYSORE.

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The river Cauvery with its principal affluents like the Lokapavani, Shimsha, Kabini, Arkavati and Lakshmanathirtha, and the Thunga, Bhadra and Sharavati as well as the larger tanks in Hoskote, Sagar, Sorab, Bethamangala and Marikanive, abound in fish of sufficient interest to the sportsman, scientist and the consumer. So far as is known to the present writers no active measures, except a few game laws, have been taken to conserve the fisheries for the market, to arrest their decline or introduce new varieties of economic importance. The prevailing belief among the fishermen is that there is a progressive decline in the catches, and though there are no statistics either in support of this view, or in its refutation, still it is clear that the subject has not received that amount of attention which its importance deserves. It is evident that the clearing of forest tracts for the purposes of plantation must necessarily react upon the water system by choking up the tributaries of rivers and the more the country is brought under cultivation, the greater is the biological attention to be given to the habits and life history of food fishes. It is true that indiscriminate slaughter of fishes, at all times, especially during the breeding season, and the illegal employment of dynamite and narcotic poisons to secure extensive captures must ultimately deplete the country of all fish-fauna, and the regulations at present in force to prevent objectionable methods do not appear to us to have any biological basis. With an extensive system of artificial tanks, and other favourable conditions in Mysore, it seems to us that the possibilities of stimulating an independent fresh water-fish industry, are immense. It is just possible that if it were cultivated on more scientific lines, the industry ought to form a lucrative collateral occupation of the large masses of people who mainly depend on the fugitive results of cultivation for their sustenance.

The prevailing method of tank or river fishery is netting manipulated by one or four men according to size.

Angling is carried on, but the capture is too poor for marketable purposes. There are other methods like driving a team of buffaloes into the water, which, when they indulge in their customary solace, raise such a quantity of mud that the fish are asphyxiated and float on the surface. This is on a par with the use of explosives and poisons. No wonder that the captures, even by the use of hand-nets, are comparatively poor, because the operations are carried on during the daytime, when the fish unable to stand the glare and surface heat of the water, generally retire to the more sheltered positions, where they are inaccessible. Moreover, the fishermen do not go beyond knee-deep and they are unaccustomed to use rafts for the purpose.

These notes deal primarily with certain structural variations which have been observed in the examples taken from various places in Mysore and Coorg some years ago, and where possible, short references to their habits and life histories are appended. The following represents the list of specimens known to us, and we are aware that it may be very greatly extended if a more intensive collection were made :—

I. Order Physostomi.

I. Family Siluridæ.

1. *Clarias batrachus*, Linn.
2. *Saccobranhus fossilis*, Bloch.
3. *Wallago attu*, Bloch. and Schneid.
4. *Callichrous bimaculatus*, Bloch.
5. *Pseudotropius atherinoides*, Bloch.
6. *Macrones vittatus*, Bloch.
7. *M. cavasius*, H. Buch.
8. *M. punctatus*, Jerd.
9. *M. oculatus*, Cuv.
10. *M. keletius*, Cuv. and Vall.
11. *Rita hastatus*, Vall.
12. *Bagarius yarrellii*, Sykes.
13. *Glyptosternum lonah*, Sykes.
14. *G. madraspatanum*, Day.

II. Family Cyprinidæ.

15. *Botia striata*, Rao.
16. *Nemachilichthys shimogensis*, Rao.
17. *Lepidocephalichthys thermalis*, Cuv. and Vall.

II. *Family Cyprinidæ.*—(contd.)

18. *Nemachilus evezardii*, Hay.
19. *N. beavani*, Gunth.
20. *N. denisonii*, Day.
21. *N. pulchellus*, Day.
22. *Garra lamta*, H. Buch.
23. *G. bicornta*, Rao.
24. *Labeo calbasu*, H. Buch.
25. *L. potail*, Sykes.
26. *L. kontius*, Jerd.
27. *L. boggut*, Sykes.
28. *L. boga*, H. Buch.
29. *L. ariza*, H. Buch.
30. *Cirrhina cirrosa*, Bloch.
31. *C. brevidorsalis*, Day.
32. *Scaphiodon nashii*, Day.
33. *Catla catla*, H. Buch.
34. *Amblypharyngodon melettina*, Cuv. and Vall.
35. *A. mola*, H. Buch.
36. *Barbus tor*, H. Buch.
37. *B. neilli*, Day.
38. *B. sarana*, H. Buch.
39. *B. micropogan*, Cuv. and Vall.
40. *B. parrah*, Day.
41. *Nuria (Esomus) danrica*, H. Buch.
42. *Rasbora daniconius*, H. Buch.
43. *Rohtee neilli*, Day.
44. *R. cotio*, Buch.
45. *R. ogilbii*, Sykes.
46. *Barilius bendelisis*, H. Buch.
47. *Chela argentea*, Cuv. and Vall.
48. *Chela phulo*, H. Buch.
49. *C. clupeoides*, Bloch.
50. *C. bacaila*, H. Buch.

III. *Family Clupeidæ.*

51. *Clupea ilisha*, H. Buch.
52. *Notopterus notopterus*, Pallas.

IV. *Family Cyprinodontidæ.*

53. *Haplochilus melanostigma*, Mc. Cl.
54. *H. lineatus*, Cuv. and Vall.

V. *Family Scombrisocidæ.*

55. *Belone cancila*, H. Buch.

II. Order Acanthopterygii.

VI. Family Percidæ (Group Apogonina).

56. *Ambassis nama*, H. Buch.

VII. Family Rhyncobdellidæ.

57. *Mastacembelus armatus*, Lacep.
58. *M. pancalus*, H. Buch.

VIII. Family Ophiocephalidæ.

59. *Ophiocephalus striatus*, Bloch.
60. *O. punctatus*, Bloch.
61. *O. marulius*, H. Buch.
62. *O. gachua*, H. Buch.
63. *O. leucopunctatus*, Sykes.

IX. Family Cichlidæ (Chromides).

64. *Eetroplus suratensis*, Bloch.

We shall now proceed to indicate the diagnosis of each of these forms and note below them the local or individual variations which have come to our knowledge.

1. *Clarias batrachus*, Linn.

(*Clarias magur*, H. Buch. of the Fauna of British India.)

Tamil—*Karuḇḇu thēli* (thēli= scorpion, has reference to the poisonous pectoral spines); Telugu—*Marpoo*; Kan.—*Anai meenu*.

B. 9. D. 62-76. P. 1/8-11. V. 6. A. 45-58. C. 15-17.

The fish is called Anai meenu by fishermen on account of its amphibious life. This is very common in Mysore. As it possesses an accessory breathing organ, it lives for a considerable time out of water. This fish reaches a length of a foot and a half and its flesh is considered nourishing and invigorating.

2. *Saccobranchus fossilis*, Bloch.

Tamil—*Thēli*; Telugu—*Thēlu chāpa*; Kan.—*Chēlu meenu*.

B. 7. D. 6-7. P. 1/7. V. 6. A. 60-79. C. 19.

This is equally amphibious. It is prescribed for convalescents for its nourishing qualities. Its pectoral spine is dreaded by fishermen for causing poisonous wounds. It is never seen to burrow in the aquarium. It always assumes a vertical or slanting posture. The barbels are never seen to

be vibrating. They are attracted to food just as much by sight as by any other sense. They are caught on the hook in the tanks baited with a piece of red cloth or the wing of a butterfly. The powers of sight are very good but the eyes are small, a fact which is due perhaps to the animals spending the dry weather underground.

Local Variety.—The spine is distinguishable into Brachium and Antibrachium. The latter only is serrated. The antibrachium bent almost at right angles to the brachium. There is a short pectoral lobe between the spine and the pectoral fin. Head—the supra occipital crest prominent with two dark oval markings on either side, marking the dilated anterior extremity of the airsac.

In *Saccobranchus fossilis*, there are similar markings but they are not so conspicuous as in the above-mentioned variety. In *S. fossilis*, the airsac does not abut against the auditory capsule.

3. *Wallago attu*, Bloch. and Schneid.

Tamil—*Vālai* ; Telugu—*Wah-lah* ; Kan.—*Balai meenu*.

B. 19-21. D. 5. P. 1/13-15. V. 8-10. A. 86-93.

C. 17. Vert. 13/56.

This inhabits rivers and tanks where it is most destructive to smaller species. This predacious form is said to attain 6 feet but the commonest specimens are not more than four feet in length. They are good to eat. All these are foul feeders. They are very ferocious and when caught, make furious attempts to bite.

4. *Callichrous bimaculatus*, Bloch.

Tamil—*Chotah*, or *Chēla-wahlah* ; Telugu—*Dūka-dūmū* ; Kan.—*Godla* or *Balai meenu*.

B. 12. D. 4. P. 1/13. V. 8. A. 60-75. C. 17.

Day mentions that in examples of this fish, the character of the pectoral spine, whether smooth or serrated, is not a specific distinction. An examination of a recent collection of material obtained from several sources within the Province and also from Coorg, has led us to infer that there must be at least more than one local variety. Correlated with the character of the spine, whether smooth or serrated, is the pectoral spot, which is inconspicuous in the former case while it is very well seen in the latter.

The other points of differences refer to the number of dorsal and caudal fin rays, the proportionate length of the maxillary barbels and the relative width of the head to its length behind the angle of the mouth. Also in forms without a pectoral spot obtained from Coorg, the head and the neck are shot with a bright metallic yellow tint, and the whole ventral surface is covered with a dull pink. We are not yet in a position to affirm whether the above characteristics would, in themselves, be of specific value, because that involves an examination of the material taken from other parts of India.

The eggs of this fish are found floating in large numbers forming a wide irregular patch near the weedy margins of a tank and sometimes number some thousands. The female fish is invariably seen circling lazily immediately underneath the eggs. It is difficult to say whether the male exhibits any parental instinct, for none was found close by. The fish constructs no nest but spawns in the shallows of tanks overgrown with coarse grass and rushes to which the eggs get attached. They are pale yellow. The buoyancy of the eggs, as in similar cases, is due to a tiny oil globule which is opposite the germinal disc. As usual with fishes breeding near the tank margins the larvæ are hatched out within twenty-four hours after the fertilization of the ova and it is not unusual to find large numbers of freshly hatched young ones clinging to the weeds in another part of the tank. A few that were taken in the bottle were observed to adhere to the sides mainly near the surface of the water. When they float, they do so normally, not topsy-turvy because of the small quantity of oil contained in the yolkmass. The little larvæ are pale grey and measure 1.50 to 2.00 mm. At this stage, an open, slightly pigmented eye, a cement organ, lack of mouth, an entire caudal fin and a pulsating heart are the only characters to be detected. The caudal circulation is soon established but owing to the thickened nature of the yolk, the yolk sac circulation is not made out at any stage. It was found that to keep the larvæ in the improvised aquarium was almost impossible because they perished by numbers, so that to note the development of the external features in a chronological order, was out of the question, and the larvæ obtained from the tanks, four days after collecting the eggs, were found to have left the margin for the deeper parts and had attained to a length of 5.50 to 6.00 mm. The eyes were conspicuous with a bright yellow ring and the pectoral

fins had appeared. The larvæ kept under observation became somewhat white, dotted over the caudal region with pigment spots. They were fed on the plankton of the tank. About the seventh day when the larvæ measure about 7.50 mm., the caudal fin becomes forked, the dorsal is detached apparently by the absorption of the neighbouring membrane and the maxillary barbels appear.

They swarm on the surface of the water in glass jars and the slightest concussion sends them down in unison. The colour of the young fish is uniform white with a black line alongside the upper margin of the anal fin which is continuous with the caudal, which is interesting from the fact that it is a permanent adult feature of *C. gangeticus*, Pet. and *C. sindensis*, Day, and probably indicates a primitive organization.

From the time the larvæ have developed an open mouth and feed independently, the rate of growth varies in different individuals and their colouration also varies. A few are bright white with a pink ventral fin, and these are to be considered as the healthiest of the brood, for the other smaller ones continue to be dull or dirty white with a blackish band along the anal fin. It is interesting to note the fact that the maxillary barbels are, from their first appearance, kept in a state of incessant vibration. If weeds or vegetable detritus are put into the bottle where they are kept, they swarm after they have recovered from their fright, proceed to examine with their barbels the debris at different points and some of them try to hide within the mass, which also subserves as food.

It is not known how often the butter-fish,—as this species is called,—breeds in the year, and in Coorg, the breeding season would appear to fall between September to December. The adult fish has a good market both in Coorg and in Mysore.

5. *Pseudotropius atherinoides*, Bloch.

Tamil—*Nā Keliti*.

B. 6. D. 1/5-6/0. P. 1/7. V. 6. A. 33/41. C. 17.

Dr. Sunder Raj mentions a variety of this species which occurs in Madras, and which differ from Day's description in the absence of lateral bands. We have come across, in Mysore, with both kinds of forms, with and without the lateral bands. In some cases, the lateral dark bands, though present, are not very pronounced.

This is called the lady fish and it is far rarer than any of the siluroid.

6. *Macrones vittatus*, Bloch.

Tamil—*Keliti* ; Telugu—*Sukujellah* ; Kan.—*Jella*.

B. 10. D. 1/7/0. P. 1/9. V. 6. A. 9-12. C. 9.

This fish is very common in Mysore and is best known to the poorer classes of people. This is commonly called "fidler", because it is supposed to make a noise when irritated. The observation of the present writers on the habits of this species leads them to infer that the musical power of this fish is limited to a whirring noise which they can produce upon the slightest irritation, so that it is paying a doubtful compliment to the musical instrument when the name "Fidler" is applied to this fish. This irritable temper of *vittatus* enables it to attack fish of larger size. It is the chief food of the poorer classes.

The specimens we examined had only 9 rays in the caudal fin instead of 17 according to Day's description.

7. *Macrones cavasius*, Ham. Buch.

Tamil—*Solai Keliti* ; Telugu—*Nahra jella* ; Kan.—*Nar jella*.

B. 6. D. 1/7/0. P. 1/8. V. 6. A. 11-13. C. 16.

This species is also found abundantly in the Cauvery and Thunga. This is dreaded by the fishermen on account of the pectoral spine which is said to cause very painful wounds. It is not unusual to find this fish outside water, but it is assuming too much if we say that they breathe air direct. This is said to be a nourishing fish by Indians.

8. *Macrones punctatus*, Jerd.

Tamil—*Sholang Keliti*.

B. 11. D. 1/7/0. P. 1/7. V. 6. A. 11-13. C. 17.

This is also commonly found in the rivers Cauvery and Thunga.

9. *Macrones oculatus*, Cuv.

B. 10. D. 1/7/0. P. 1/6. V. 6. A. 11-13. C. 15.

This is found very commonly in the Kabini.

10. *Macrones keletius*, Cuv. and Vall.

B. 10. D. 1/7/0. P. 1/10. V. 6. A. 9-10. C. 17.

This fish seems to be restricted in its distribution, for we have not met with it in any other place except the Thunga, but seeing its rarity even in Madras, this fact may not be so surprising as it appears to us at first sight.

11. *Rita hastatus*, Vall.

B. 8. D. 1/6/0. P. 1/10. V. 7-8. A. 13-14. C. 17.

This fish also can be obtained in numbers from the Thunga. It is believed to live out of its element for a long time thus permitting its being carried in a fresh condition over long distances. Poorer classes eat this fish.

12. *Bagarius yarrellii*, Sykes.

Telugu—*Rahti Jellah*.

B. 12. D. 1/6/0. P. 1/12. V. 16. A. 13-15. C. 17.

This is found in the large rivers of Mysore. This is one of the ugliest of fishes. On account of its voracity and underhung mouth, it is frequently called the Freshwater Shark. This fish attains sometimes a size of 6 feet. It is one of the hardest to catch, because it usually escapes destroying the tackle.

13. *Glyptosternum lonah*, Sykes.

D. 1/6/0. P. 1/9. V. 6. A. 11-13. C. 15-17.

This fish is adapted for a life in rapid streams by the development of an adhesive apparatus on the undersurface of the body. This is a small fish not attaining a length more than half a foot. This is said to be not good eating.

14. *Glyptosternum madraspatanum*, Day.

B. 6. D. 1/6/0. P. 1/10. V. 6. A. 10-11. C. 17.

This is also a small fish not growing to a size more than five or six inches. This occurs like the previous species both in the Cauvery and Bhadra, and like it is not relished.

15. *Botia striata*, Rao.

D. 2/9. P. 13-14. V. 9. A. 1/7. C. 19.

This is a fish from the Thunga and is a new species not described by Day. This comes nearest to Day's *B. geto*.

Length of head 4, height $3\frac{1}{4}$, in the total length. Diameter of the eye, $5\frac{2}{3}$ in the length of the head, $3\frac{1}{3}$ diameters from end of snout, less than two diameters apart. Barbels 8. Spine slightly less than twice the diameter of the eye.

The shorter basal spine has a separate sheath. The dorsal fin commences further from the snout and less deep than the length of the pectoral. Scales moderate, none on the head. *Colour*—Body diversified by yellow and dark bands, the latter include narrow whitish bands in middle, occasionally broken into spots. The bands on the head and opercle are directed anteriorly and may or may not be confluent. Abdomen banded. All the fins with three black cross bars. Rarely a big circular black spot at the base of the upper caudal lobe.

16. *Nemachilichthys shimogensis*, Rao.

This fish obtained from the Thunga has proved to be a new species, coming nearest, however, to *N. rueppellii*, Day.

D. 12-13 (1/11-1/12). P. 12-13. V. 7-8. A. 7. C. 20-22.

Length of head $4\frac{1}{3}$ in the total length, eyes behind the middle of the length of head, rather small, one diameter apart. Barbels, 2 rostral and 1 maxillary pair, all equally developed. Upper surface of snout convex. Lower lip lobed or notched. Scales, small, cycloid. *Fins*—pectoral, shorter than the length of the head, a well developed fleshy lobe at the base of the pelvic fin, a deep groove between the vent and base of the anal fin. Lateral line fairly well developed anteriorly and incomplete behind. *Colour*—yellow on the sides and on the abdomen. 16-18 vertical bars continuous above. Secondary incomplete short bars frequently present. Occasionally the bars become V-shaped directed posteriorly, caudal lobed, 3-4 posteriorly directed V-shaped brown bars. A black spot at the base of the lower caudal lobe.

17. *Lepidocephalichthys thermalis*, Cuv. and Vall.

Tamil—*Asarai*.

B. 3. D. 8 (2/6). P. 7. V. 7. A. 7 (2/5). C. 16.

This is a small fish not attaining a size more than half a foot. This is the commonest loach in Mysore, found both in rivers and tanks where the bottom is sandy. It is apparently a burrowing fish, but the process of burrowing is not very

difficult to go through. A rapid dive into the sand, head foremost, is all that is necessary. The fish is fond of concealing its body in the sand, keeping only the snout outside. It is said that the animal is incapable of living only by means of branchial respiration, for at almost regular intervals, it seems to grow restless, comes up to the surface, swallows a bubble of air and goes down again. It lives for a long time out of water.

The fish, though small, is considered to possess very nourishing qualities.

18. *Nemachilus evezardii*, Hay.

B. 3. D. 2/7. P. 12. V. 8. A. 2/5. C. 17.

This is one of the commonest of the half a dozen species of *Nemachilus* found in Mysore. Bangalore abounds with them.

19. *Nemachilus beavani*, Gunth.

B. 3. D. 10 (2/8). P. 11. V. 7. A. 7 (2/5). C. 19.

This is found in Shimoga and Bangalore, but the specimens obtained from Shimoga seem to differ from Day's description of the species. It looks as though it is a distinct variety of *Nemachilus beavani*.

Local Variety.—

D. 9. P. 9. V. 7. A. 5. C. 19.

There are a row of white glands on the opercle in front of and behind the eye; the latter series confluent sometimes with the lateral line. This has not been mentioned in Day's description of *Nemachilus beavani*. The lower lip is thick, fleshy and bifid. There is an adipose lobe at the base of the pelvic fin. The lateral line is incomplete behind.

20. *Nemachilus denisonii*, Day.

B. 3. D. 10 (2/8). P. 11. V. 7. A. 7 (2/5). C. 17.

This is also known from Shimoga and Bangalore.

21. *Nemachilus pulchellus*, Day.

B. 3. D. 12 (2/10). P. 15. V. 9. A. 7 (2/5). C. 21.

This is a beautiful little loach but less commonly seen than the other species of *Nemachilus*. The colouration is gorgeous.

22. *Garra lamta*, H. Buch.

Tamil—*Kul korava*; Telugu—*Rathi koraka*; Kan.—*Pandi Pakke*.

D. 11. P. 15. V. 9. A. 7 (2/5). C. 17. L. 1. 32-36.

L. tr. 4-4 $\frac{1}{2}$ /5. Vert. 18-14.

This is the commonest of the species of *Garra*. This is found in the tanks and rivers of Mysore and Coorg. This fish exhibits extremes of individual variability. Still water or rapid torrents, shallow rock pools or deep cavernous pits in the beds of rivers act as modifying influences affecting chiefly the mental disc, the dorsal, the pectoral and the caudal fins and the eyes. A ventral adhesive sucker is seen in forms which live in rapid torrents while this apparatus is absent or inconspicuously developed in forms which inhabit tanks and other still waters.

We have come across with forms which vary very widely from the description of *Discognathus lamta* of Day, not only in the above-mentioned points, but also in some details of peculiarities. We shall proceed to describe one that strikes us as undoubtedly a local variety.

The dorsal fin rays in this form are ten (1/9) while Day describes 11 in *Discognathus lamta*. There are 13 rays in the pectoral fin while 15 are described in *Discognathus lamta*. The rays in the caudal fin show a variation between 15 and 17 while 17 is put down as the definite number by Day in *D. lamta*. The snout has two transverse grooves covered by folds of skin, points which are not mentioned by Day. The snout is covered by glands and spiny tubercles said to be present by Day only in forms from the Salt Range in the Punjab and from the Chumba State. The pectoral fins in this variety are longer than the head while in *D. lamta*, Day says that they are shorter than the head. The pectoral fin rays,—all of them,—are covered over by a layer of skin, while Day restricts this character to forms from rapid streams and that too only to a few outer pectoral rays. The caudal fin is strongly lobed in this form while Day describes the caudal to be "slightly lobed". Day makes no mention of the lobes at the base of the pelvic fin while they are well seen in this variety. There are two rounded lobes at the angles of the mouth while Day makes no reference to these in his *Discognathus lamta*.

Mohammadans do not eat this fish.

23. Garra bicornta, Rao.

This is a species new to Mysore and undescribed by Day in his *Fauna of British India*. This is known from the Thunga river.

D. 11 (2/9). P. 17. V. 12. A. 8 (1/7). C. 20.

L. l. 30-31. L. tr. $3\frac{1}{2}$ -4/ $3\frac{1}{2}$ -4.

The dorsal profile in front of the dorsal fin is broadly convex and behind the dorsal fin, it is nearly horizontal or only very gently slopes down to the caudal fin. Length of head $4\frac{1}{2}$, height 4 in the total length. Eyes situated in the commencement of the last one-third of the head whose height is two in the length. Diameter of the eye— $3\frac{3}{4}$ in the length of the head and two diameters apart. Interorbital space concave. Two hooklike processes in front of the eyes overhanging the snout. The terminal part of the snout raised and separated by a deep groove behind. Snout bears glands covered by spines or tubercles more or less aggregated in circular areas. The internarial portion slightly elevated and also bearing warty glands. *Fins*—Dorsal arises far in advance of the ventral and the margin deeply concave. The third and the few subsequent dorsal spines longer than height of the body. Pectorals either equal to, or slightly longer than the head. The anal deeply concave. Caudal lobed, the dorsal lobe being the longer. An adipose lobe at the base of the ventral fin. *Lateral line*—incomplete anteriorly. The posterior margin of the labial disc broad, and more or less rectangular. *Colour*—dark olive green above, yellow on the abdomen. Bases of lateral fins yellow or orange, and terminal parts black. A dark spot on the upper margin of the operculum sometimes caudal and ventral fins bright orange.

24. Labeo calbasu, H. Buch.

Tamil—*Sēl kendai*; Telugu—*Nallachapa*; Kan.—*Kari meenu*.

B. 3. D. 16-18. P. 19. V. 9. A. 7 (2/5). C. 19.

L. l. 40-44. L. tr. $7\frac{1}{2}$ /8.

This is very common in the large tanks all over Mysore. Like the other species of *Labeo*, the lips are thick and tuberculated being continuous at the angles of the mouth resembling the snout of *Suinæ*, hence the Mohammadans do not touch this and the previous genus *Garra*. It is a vegetable feeder and lives usually at the bottom of the tanks. The

young are better coloured than the well-grown fish. Though a little bony, this fish is very much esteemed as food. It grows to a length of 3 feet.

25. *Labeo potail*, Sykes.

B. 3. D. 13-14. P. 17. V. 9. A. 7 (2/5). C. 19.
L. l. 39-40. L. tr. 8/7.

This is a fish smaller than *L. calbasu* and very frequently seen in the markets of Mysore and Shimoga.

26. *Labeo kontius*, Jerd.

B. 3. D. 15-16. P. 15. V. 10. A. 7 (2/5). C. 19.
L. l. 38-41. L. tr. 7/8.

This fish is abundant in the Cauvery and grows to about two feet in length. In some cases the scales had a red centre.

27. *Labeo boggut*, Sykes.

B. 3. D. 11-12. P. 17. V. 9. A. 7 (2/5). C. 19.
L. l. 60-65. L. tr. 11-12/14.

It is a small fish not so common in Mysore as the other species of *Labeo*. But occasionally, a magnificent specimen will be found caught in the net. It is very gloriously coloured with a blend of silver, orange, dark and bluish grey. It only attains to a length of about a foot in size.

28. *Labeo boga*, H. Buch.

Tamil—*Kinda meen*; Telugu—*Ariza*.

B. 3. D. 11-13. P. 16. V. 9. A. 7 (2/5). C. 19.
L. l. 37-39. L. tr. 6½-7/7.

It is not very commonly seen in Mysore.

29. *Labeo ariza*, H. Buch.

B. 3. D. 11 (2/9). P. 18. V. 9. A. 7-8 (2-3/5). C. 19.
L. l. 38. L. tr. 6-7/8.

We have been able to get this animal till now only in the Cauvery. Our repeated attempts to locate them in the other rivers were not successful. But we hope that an attempt made in a different season will be attended with success. This fish attains a length of about 10 inches and is dull greyish white in colour.

30. *Cirrhina cirrosa*, Bloch.Tamil—*Ven Candi*; Telugu—*Aruzu*.B. 3. D. 17-19. P. 19. V. 9. A. 8 (3/5). C. 19.
L. l. 42-44. L. tr. 8/9.

This fish is fairly common throughout the South Indian rivers. The Cauvery and the Thunga give the markets a generous supply of this fish. It is a common saying among the rustics that but for the bony character of this fish, it would make an excellent dish. It is a very active fish.

31. *C. brevidorsalis*, Day.Tamil—*Meen Candee*.B. 3. D. 14 (3/11). V. 9. A. 7. L. l. 39-40. L. tr. 7-8/9.
Occurs in the Cauvery.**32. *Scaphiodon nashii*, Day.**B. 3. D. 14-15. P. 15. V. 9. A. 7 (2/5). C. 20.
L. l. 40-43. L. tr. 7/7.

This fish is common in Coorg but not so commonly seen in Mysore. But the Cauvery is not lacking in this fish.

33. *Catla catla*, H. Buch.

This corresponds to the *Catla buchmanii* of the *Fauna of British India*.

Telugu—*Botchee*.

It is not yet definitely ascertained whether this fish is found in Mysore. But some specimens which answer to the description have been captured, and till a fresh supply comes in, we are unable to affirm the statement.

34. *Amblypharyngodon melettina*, Cuv. & Vall.Tamil—*Odaree*; Kan.—*Paraga*.B. 3. D. 9-10 (2-3/7). P. 15. V. 9. A. 7-8 (2-3/5). C. 19.
L. l. 50-57. L. tr. 10/8.

This is said to be a good mosquito-destroyer.

35. *Amblypharyngodon mola*, Ham. Buch.Telugu—*Talla maya*.B. 3. D. 9. P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 65-75. L. tr. 12/12.

Not so common as the former species.

36. *Barbus tor*, H. Buch.Tamil—*Poo meen candee*; Telugu—*Pedda pakke*.

B. 3. D. 12 (3/9). P. 19. V. 9. A. 7-8 (2-3/5).

L. 1. 25-27. L. tr. 4/4.

The spine in the dorsal fin is strong and well developed. It reaches almost the tip of the snout. The colour of this fish is beautiful. This is found in Yedathore, Chunchunkatte and Ramanathapura. This is the "Mahseer" which is so famous among the sportsmen.

37. *Barbus neilli*, Day.

B. 3. D. 13 (4/9) P. 15. V. 10. A. 8 (3/5). C. 19.

L. 1. 24-26. L. tr. 4½/4.

Found in the Thunga. As popular with the fishermen as *B. tor*. It attains very large proportions weighing nearly 40 to 50 lbs.

38. *Barbus sarana*, H. Buch.Tamil—*Pungella*; Telugu—*Kannaku*; Kan.—*Gid pakke*.

B. 3. D. 11 (3/8). P. 15. V. 9. A. 8 (3/5). C. 19.

L. 1. 32-34. L. tr. 5½-6/6.

39. *Barbus micropogan*, Cuv. and Vall.Tamil—*Cotee candee*; Kan.—*Araj pakke*.

B. 3. D. 13 (4/9). P. 17. V. 10. A. 7-8 (2-3/5). C. 19.

L. 1. 39-41. L. tr. 6-7/7.

Mysore is known for its very large specimens of this fish. Especially the Cauvery supplies us a very large number of these fish.

40. *Barbus parrah*, Day.Kan.—*Pith pakke*.

B. 3. D. 11 (3/8). P. 15. V. 9. A. 8 (3/5). C. 19.

L. 1. 25-26. L. tr. 5/5.

This is a beautiful small fish found in Mysore and Coorg.

41. *Nuria danrica*, H. Buch.Tamil—*Paravoo*; Kan.—*Paraga pakke*.

B. 3. D. 8 (2/6). P. 15. V. 9. A. 8 (3/5).

L. 1. 30-34. L. tr. 5-6/3.

This is a small fish attaining a length of about 5 inches, better known in Madras than in Mysore. But in tanks, ponds

and small rivers, they are frequently seen on the surface. They are said to be active agents in destroying the mosquito larvæ on account of their surface feeding habits.

42. *Rasbora daniconius*, H. Buch.

Tamil—*Ovuree candee*; Kan.—*Neddean jubbu*.

B. 3. D. 9 (2/7). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 31-34. L. tr. $4\frac{1}{2}$ -5.

This is a shallow water form occurring in tanks and small ponds. It attains a length of about 8 inches, and probably is as useful as *Nuria danrica* in the direction of destroying mosquito larvæ.

43. *Rohtee neilli*, Day.

B. 3. D. 12 (4/8). P. 13. V. 10. A. 20 (3/17). C. 19.
L. l. 59. L. tr. 12/18.

This species is found in the Thunga river. We have got a specimen which though showing characters very closely resembling those of *Rohtee neilli*, yet seems to differ in some respects. We describe it as a variety.

Local Variety—

D. 11 (3/8). P. 15. V. 10. A. 20 (2/18). C. 20.
L. l. 58-59. L. tr. $12\frac{1}{2}$ /18 $\frac{1}{2}$.

Length of head $4\frac{3}{4}$ to 5, height of body 3 to $3\frac{1}{4}$ in the total length. Diameter of the eye, $2\frac{2}{7}$ in the length of the head, $\frac{5}{7}$ from the tip of the snout and 1 diameter apart. Profile over nape concave, gradually sloping up to base of osseous dorsal ray. *Barbels*—two pairs, half as long as diameter of eye. *Fins*—dorsal fin two-thirds of height of body, and the last osseous ray strong, doubly serrated, longer than the head. Pectoral longer than head. A deep axillary pit. *Lateral line*—strongly marked throughout. *Scales*—7 rows between the lateral line and base of ventral fin. *Scales*, regular. Free portion of tail higher than long. *Colour*—silvery grey.

Habitat—Shimoga. Thunga River.

It is quite possible that this form may prove to be a new species of *Rohtee*. But before making a thorough examination of some more forms of this kind, it is premature to venture any definite decision.

44. Rohtee cotio, H. Buch.

B. 3. D. 11-12 (3-4/8). P. 13. V. 10. A. 29-36. C. 19.
L. l. 55-70. L. tr. 9-15/14-21.

This is a form allied to the above species, and on account of its small size (about six inches) it is not very much prized as food like *R. neilli*. This form is abundant in the Thunga.

45. Rohtee ogilbii, Sykes.

B. 3. D. 11 (3/8). P. 15. V. 10. A. 16 (3/13). C. 20.
L. l. 55. L. tr. 13/11.

This fish also is found in the Thunga, but the specimens obtained from that part, seemed to exhibit certain variations.

Local Variety—

D. 11 (3/8). P. 15. V. 10. A. 16. C. 21.

The third dorsal osseous ray is serrated but covered by skin, and the terminal portion is soft and flexible.

46. Barilius bendelisis, H. Buch.

Tamil—*Marritan candee*.

B. 3. D. 9 (2/9). P. 15. V. 9. A. 9-10. C. 18.
L. l. 40-43. L. tr. 7-8/5.

Though not so very common as along the Western Coast, it is fairly well represented in the rivers and tanks of Mysore. This fish is noted for the differences in colour and some other minor details of external structure it exhibits as it gets older, and this has been the cause for the description of "Varieties" by many authors, most of which are simply the same animal in different stages of growth. But, there are a few varieties, which have now been considered to be distinct species, e.g., *B. cocsa*, and *B. chedra*. We have not been able to come across with any specimens answering to their description hitherto. The species is small attaining a length of about 5 inches.

47. Chela argentea, Cuv. and Vall.

Tamil—*Chava yekache*.

B. 3. D. 9-10. P. 15. A. 17-19. C. 19.
L. l. 43-45. L. tr. 6½-7/3.

This is commonly called "White Carp"; usually found in rivers and tanks. They are especially abundant in the

Thunga and the Cauvery rivers. The specimens obtained from the Thunga differed in certain respects from Day's description of *C. argentea*.

Local Variety—

D. 7-8. P. 12. V. 8-10. A. 14-15. C. 17-20.

The pelvic fins are bilobed. The pre-operculum bears a large or a small oval depression. The sub-opercular plates which vary in number from 6 to 8 are nearly equal on both sides. The pectoral fin is broadly lobed at the base.

48. *Chela phulo*, Ham. Buch.

B. 3. D. 9 (2/7). P. 13. A. 18-20. C. 19.

L. l. 80-87. L. tr. 12-15/6.

The specimens obtained from the Thunga river in Shimoga differed from Day's description of *C. phulo* in some respects.

Local Variety—

The number of rays in the caudal fin is 20. The length of head 7 to 8 in the total body length. Diameter of the eye— $2\frac{1}{4}$ times in the length of the head. There is a large pectoral fold and a similar pelvic fold. There are enlarged scales near the respective fins. An axillary pit and tile-like scales on the ventral surface between the pectorals. Colour is dark above, the snout is black, the dorsal, anal and caudal fins yellow, the latter tinged with brown.

49. *Chela clupeoides*, Bloch.

Tamil—*Vellichi*.

B. 3. D. 9. P. 13. V. 9. A. 13-15. C. 19.

L. l. 80-93. L. tr. 12-15/6.

This is essentially a pond fish. It is very rarely seen in rivers. It is a surface swimmer and feeder. It is a very active fish, said to feed only in the cooler parts of the day. When chased, it leaps out of water and is scared very soon. Its properties of feeding on the mosquito larvæ are questioned.

50. *Chela bacaila*, Ham. Buch.

B. 3. D. 9. A. 13-15. C. 19. L. l. 86-110.

L. tr. 17-19/6.

Though Day says that this fish is found in all parts of India except Malabar, Mysore, etc., this is seen in the Cauvery.

51. *Clupea ilisha*, H. Buch.Tamil—*Oolum* ; Telugu—*Palasa*.D. 18-19. P. 15. V. 9. A. 19-22. C. 19.
L. 1. 46-49. L. tr. 17-19.

This is the commonly called Sable fish or Hilsa. Though this fish is marine, it enters the rivers as soon as the monsoons commence, so that it is usual to find them at certain seasons in all the broad rivers of India. Occasionally specimens are reported from the Cauvery. They are very much prized as food.

52. *Notopterus notopterus*, Pallas.(Notopterus kapirot of *Fauna of British India*.)Tamil—*Chota Wallah* ; Telugu—*Wallak Thattah*.

B. 8. D. 7-8. V. 5-6. A. 100-110. C. 19.

This is the commonly called knife or razor fish. It is found in almost all the rivers of Mysore, but a variety of *N. notopterus* was also traced.

Local Variety.—

The length of head to height of body to length of body as, 26 : 60 : 185, while Day says the length of head is 5—5½, height of body 3½ to 4, in the total length. The dorsal profile very deeply convex, while the dorsal profile of head is concave. The dorsal profile is not so convex as in Day's description of *N. kapirot*. Again the latter character, *i.e.*, the concavity of the dorsal profile of the head is characteristic not so much of *N. kapirot*, but of *N. chitala*.

The abdominal margin in this form is not serrated in old specimens though there are about 30 serrations in the young. Day describes, in his *N. kapirot*, 28 serrations along the abdominal edge between the throat and insertion of the ventral fin. But in *N. chitala*, there are about 51 serrations. In this variety, there are found a pair of maxillary barbels, while Day makes no reference to these in his *N. kapirot*. The ventral fin in our form overlaps the anal while Day makes no mention of this fact. The pre-opercle is faintly serrated in the young and almost entire in the older specimens. Day makes no such difference between the younger and older specimens. He says that the pre-opercle is serrated. The muciferous crypts which Day refers to as well developed on

the head of *N. kapirat*, are absent from the head of the local variety.

The tank in the Government Gardens is the only place from which this fish can be obtained in Bangalore although this fish, and *N. chitala* occur in greatest profusion in all the principal tanks and rivers within the State.

A certain amount of cross-breeding between these two species must take place in nature, for that is how we can account for the presence of the above-mentioned peculiarities in the "Local Variety". Some of the examples of *Notopterus* *notopterus* that were obtained sometime ago from Bethamangala and Hoskote tanks showed, in addition to a more strongly marked convex dorsal profile and a smooth abdominal edge, a maxilla which reached behind the edge of the orbit and cheeks which were smooth and scaleless. A smooth abdominal edge and cheek are characters in which perhaps the hybrid differs from the mixed parents, while the other characters which are distinctly those of *N. chitala* are shared by the hybrid. But the most interesting feature of such a fusion is the development of a pair of maxillary barbels, already referred to, and the number of the fin rays, chiefly those of the anal and caudal, is variable within very wide limits often in excess of the numbers possessed by the two species.

There is nothing remarkable as regards the breeding habits of the knife fish as *N. notopterus* is called. The female closely accompanied by the male, deposits her eggs on the ledges of submerged rocks, stones or wood. They adhere firmly to one another and to the substratum, and the adhesive power is due to the thin film of water binding the broad surfaces of contact provided by the hardened, elastic gelatinous investment. When detached and spread on the surface of water in a glass tank, the eggs come together and are urged slowly towards the nearest side of the aquarium evidently under the influence of surface tension. The eggs are large, measuring 4 mm. and are pale orange coloured. The oil content is in an emulsified state and obscures the segmentation of the germinal disc. The gelatinous envelope is semi-circularly striated. As the eggs are laid in small clumps of twenty and thirty, the consequent failure of fertilization and death among them becomes extremely common. Such eggs are opaque white. It is said by fishermen that both

parents watch the eggs. The embryos were not fully formed till a whole day after the eggs were obtained and they could be noticed moving within the egg-membrane just before hatching. The external features of the freshly hatched larvæ are a pair of pigmentless eyes, no mouth, a cement organ on the head, and a continuous fin membrane. When the young ones attain to 5 to 6 mm. which they do in about four days, an open mouth is formed and respiratory movements commence. The notochord remains straight and the rudiments of the pectoral fin and pigmentation of the eye become established. Till this stage, the larvæ are translucent and later when they grow to 7.00 mm., the stellate cells become coloured and the skin is bronzed. The subsequent larval history consists in the growth of the dorsal fin while the subjacent continuous membrane is gradually absorbed, and at the same time, the primordia of the fin rays (except those of the pelvics which do not appear till after the 12th day), and the articulation of those of the anal fin and the convexity of the dorsal profile become manifest. The fry sink to the bottom of the aquarium as soon as they become coloured and remain feeding there rarely coming to the top. In spite of frequent renewal of water and a good supply of food in the form of vegetable debris from tanks, the larvæ never thrive in the aquarium. It was not possible to follow the sequence of development in nature as the eggs were laid far from the margin of the tank. Neither this species, nor its congener, *N. chitala*, is in great demand on the market because of the numerous bones.

53. *Haplochilus melanostigma*, Mc. Cl.

Tamil—*Munda Kanni*.

B. 4. D. 6-7. A. 20-24. C. 15. L. 1. 27. L. tr. 9-11.

This is a small fish frequently entering the inundated paddy fields. The male is larger than the female. The flat head and transverse mouth are adaptations to surface feeding and the species is a very well-known mosquito destroyer. This fish possesses remarkable powers of changing colour in accordance with its environment.

54. *Haplochilus lineatus*, Cuv. and Vall.

B. 5-6. D. 8-9. A. 15-17. C. 19. L. 1. 32-34. L. tr. 9.

It is possible that this fish also occurs in Mysore.

55. *Belone cancila*, H. Buch.Tamil—*Pissu Kolah* ; Kan.—*Kale Holaya*.

B. 3. D. 15-18. P. 11. V. 6. A. 16-18. C. 15.

We have come across a variety of *B. cancila*. This form seems to correspond to the variety which Day refers to in his *Fauna of British India*, as being found in Hardwar and in the Central Provinces. Day mentions the fact, that in this variety there is a hump on the back sometimes continued as an elevated ridge as far as the origin of the dorsal fin.

In the forms that we have obtained here, in addition to this hump on the back extending almost to the dorsal fin, there are other characters in which the variety differs from *B. cancila*. For instance, the rays in the ventral fin of *cancila* are said to be 6, but those of the variety range from 7 to 9. Again while the anal fin is said to have 16 to 18 rays in *B. cancila*, we have been able to make out only 9 rays in the anal fin of our form. While Day says that the eyes are situated 3 to $3\frac{1}{6}$ diameters from the hind edge of the opercle, in our form, the eyes are situated only two diameters from the hind edge of the opercle. There is a deep triangular nasal pit in front of the eyes for the lodgement of the nares, while Day makes no reference to this character in his *B. cancila*. The anal fin, as we have seen, is degenerate and the posterior anal and dorsal fin rays are free. The caudal fin is distinctly lobate. This fish is a voracious eater.

56. *Ambassis nama*, H. Buch.Telugu—*Akku rati*.

D. 7. 1/13-17. P. 13. A. 3/14-17. C. 17.

Though this fish is not very common in freshwater, we have got some specimens which show some differences from the description of *Ambassis nama* given by Day. In our specimens the canines so well seen in *A. nama* are entirely absent. The longest spine in the anal fin is not as long as the longest spine in the dorsal fin ; in fact it is far shorter. And we were not able to distinguish the coloured scapular patch in our specimens though they are very marked in *Ambassis nama*.

57. Mastacembelus armatus, Lacep.

Tamil—*Kal Aral*; Telugu—*Pamu chapa*; Kan.—*Havoo meenu*.

D. 32-39/74-96. P. 23. A. 3/75-88.

This is a fish very commonly found in the rivers and tanks of Mysore. It is interesting to note that differences in habitat are correlated with differences in colour and other external features. The specimens of *M. armatus* obtained from the river Thunga, differed from specimens of *M. armatus* obtained from local tanks. In the river specimens, there is no yellow streak on the head and no yellow dorsal band along the spines. In the tank specimens both these are markedly seen. In the river specimens, the angle of the pre-opercle is provided with a single denticulation and it is not unusual that this denticulation may ever be completely absent.

But in the specimens obtained from the tanks, two or sometimes, even three denticulations may be recognized at the angle of the pre-opercle. In the river forms, the three lobes of the snout are unequal, the dorsal one being very conspicuously prolonged, while in the tank specimens, the three lobes of the snout are equal or sub-equal. The colour in both these cases is very variable. The young forms from the river are olive-green with circular or hexagonal large blotches, while forms from the tanks have the cheeks, opercle and pectoral fins only strongly blotched.

The body of this fish is eel-like and it sometimes attains a length of about 2 feet. It is highly esteemed as food.

58. Mastacembelus pancalus, Ham. Buch.

Tamil—*Pil Aral*; Telugu—*Parparaal*.

D. 24-26/30-42. P. 19. A. 3/31-46. C. 12.

This form is allied to *M. armatus*. As we have not been able to get a good supply of this fish both from the rivers and tanks, we cannot say whether there are differences in structure and colour correlated with difference in habitat. Some of the specimens, we examined, were at any rate devoid of the vertical blotches of yellow and green.

This is a smaller fish than *M. armatus*.

59. *Ophiocephalus striatus*, Bloch.

Tamil—*Curuppa Verahl*; Telugu—*Sowarah*; Kan.—*Koochina meenu*.

D. 37-45. A. 23-26. L. 1. 50-57. L. tr. $4\frac{1}{2}$ -7/9-7.

They are very common in the rivers of Mysore and are amphibious so that they can live for a considerable time out of their element. The young of *O. striatus* are most brilliantly coloured with orange. This fish is extensively eaten.

60. *Ophiocephalus punctatus*, Bloch.

Tamil—*Maniang Koravai*; Telugu—*Muttah*; Kan.—*Beli Korava*.

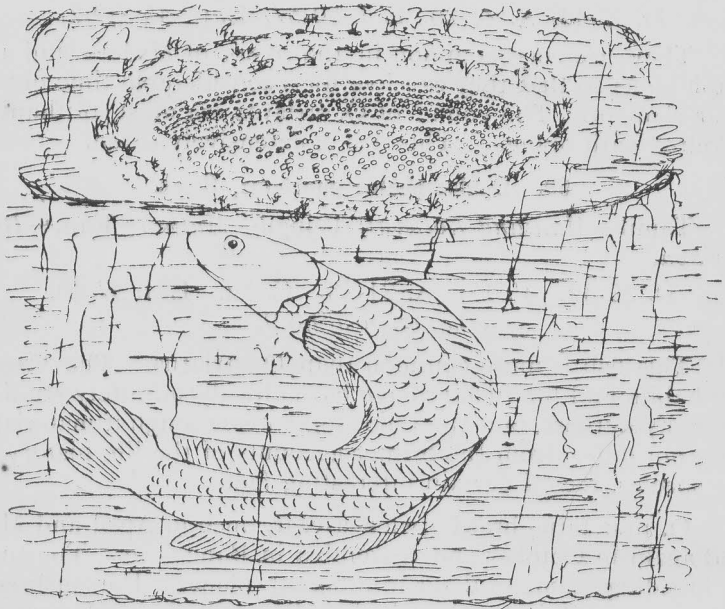
D. 29-32. P. 17. A. 21-23. C. 12. L. 1. 37-40.
L. tr. 4-5/9/6/9.

This fish is more common than *O. striatus*. The breeding habits and life history have been already minutely studied by many authors, and the following notes, though it materially does not differ from the former accounts of the life history of the species, record certain interesting facts.

O. punctatus breeds twice a year, once in April and May and again in October and November in Bangalore. The time of breeding seems to differ in different places. For instance, Dr. Sundara Raj says that the breeding periods in Madras are January and February, and July and August. It is interesting to note that the males during the breeding season are most gorgeously coloured. The head and body of the males we examined in April, were green suffused with yellow bearing slate-coloured marks. The fins, especially the dorsal, the caudal and the anal were bright blue with bright orange margins. Two fairly well developed antennary processes were also present. Though we are certain that this brilliant colouration in the males during the breeding season is not due to environmental influences, as specimens obtained from different sources resembled one another in this colouration scheme, it is possible to remark that this colouration in males is to be regarded as courtship colouration. Until other naturalists confirm this fact we cannot offer that explanation.

Another point about which there is a little controversy is the depth of water where the nest is constructed. Some are of opinion that the maximum depth in which the nest is built

is only two feet, while others opine that the nests are found as deep as 5 to 8 feet. It is our experience that the maximum depth where the nests are seen is about two feet.



A Female Snake-head (*Ophiocephalus punctatus*)
watching the egg mass.

The eggs which measure about 2 mm. are laid in thousands. Each egg has a gelatinous covering by which they adhere together, and an oil globule which has obviously a two-fold function. Firstly, the eggs are enabled to float, thereby coming immediately under the influence of the sunshine and warmth which hasten development and then they are protected against the attacks of organisms like zoothamnium and vorticella and fungi belonging to the genus *Achlya*. These enemies have been seen to cause extensive destruction of eggs which are deficient in the oil globule.

Though many authors are of opinion that the male also shows some parental instinct in guarding the eggs, we have not been able to see the male in many cases, anywhere near the nest. The only zealous caretaker of the spawn is the female, which is seen vigorously circling round below the patch of eggs, an action which has a two-fold function, that of

oxygenating the water, and a measure of centripetal influence in keeping the eggs together against wind and rain.

The time occupied between the deposit of the spawn and the hatching of the larvæ is about 36 hours, but sometimes, it is reduced to 24. The larvæ, after they are hatched, usually cling to the water weeds or the surface of the glass aquarium, a habit which recalls to us the same kind of thing in the anuran larvæ. The oil globule, which is still present on the ventral surface, makes the larvæ float topsy-turvy. The mouth is not yet formed, and the optic capsule is quite open. The little fry measure about 3.5 mm. to 4 mm.

The larvæ continue to float in this curious position till about two days after hatching, after which the oil globule divides into two and migrates to the dorsal surface. The stomodæum is formed in the position where the sucker was, while the optic capsule closes up. The caudal fin appears as a flatuenned portion of the continuous dorsal fin.

At this stage, large connective tissue corpuscles appear, and pigmentation begins. Numerous amœboid cells are also developed, which ingest the fine oil globules and carry them to the liver where they are stored. The larvæ still continue to draw on the nutrition contained in the yolk sac. The yolk sac circulation begins at this time and is perhaps the most fascinating object under the microscope. Later, when the proctodæum appears, the anus is noticed to be situated on a lobe on which the buds of the pelvic fin arise, resembling the condition common in the Batrachian tadpoles. This mode of origin of the pelvic fin is a feature of interest as it is in some measure opposed to the theory of their being detached portions of a continuous lateral fin.

The gill slits appear on the third day after hatching. The roots of the pelvic fins become recognizable towards the end of the sixth day. The young are black and an examination of the skin showed us a large number of ovoid mucus cells. The deflection of the notochord and the constriction of the caudal fin also manifest at this time, when the larvæ are able to swim at different levels. In almost all cases, a large white diamond shaped mark is to be recognized on the back sometime extending to the snout.

Specimens which are half an inch are rufous, with a bright golden band on the flanks. The mother protects them even

at that stage from the attacks of predatory fish like *Saccobranchus*.

Specimens over an inch are slate-coloured, and the golden band is replaced by an yellow streak.

61. *Ophiocephalus marulius*, H. Buch.

Tamil—*Poo verarl*; Telugu—*Pulu chapa*; Kan.—*Hoovina murl*.

D. 45-55. A. 28-36. L. l. 60-70. L. tr. $4\frac{1}{2}$ - $6\frac{1}{2}$ /13-11.

This fish is very common in Shimoga and attains about 3 feet in length and is considered to be fairly good eating.

62. *Ophiocephalus gachua*, Ham. Buch.

Tamil—*Para korava*; Telugu—*Kora motta*; Kan.—*Maha korava*.

D. 32-37. P. 15. A. 21-23. C. 12. L. l. 40-45.
L. tr. 3-4/7-6.

This fish, though it only attains a length of a foot, is very brilliantly coloured. Its habits resemble closely that of *O. punctatus*. It is not much in demand as food.

63. *Ophiocephalus leucopunctatus*, Sykes.

Telugu—*Sovara*.

D. 47-53. A. 28-35. L. l. 59-60. L. tr. $4\frac{1}{2}$ - $6\frac{1}{2}$ /13-11.

This is considered by some as a variety of *O. marulius*.

64. *Etroplus suratensis*, Bloch.

Tamil—*Pani shettai*; Kan.—*Bachenake meenu*.

D. 18-19/14-15. P. 17. A. 12-13/12-11. C. 16.

This is a very beautifully coloured fish found in tanks and lakes. It attains a foot in length and affords excellent eating. As it is a vegetable feeder, it is a very suitable fish for stocking tanks.

We have pleasure in thanking Dr. A. Subba Rao, D.Sc. (London), whose collection has been placed at our disposal and which we have utilized in the preparation of this paper.

List of References.

1. Day—*Fauna of British India—Fishes*. Vol. I.
 2. Day— Do. Vol. II.
 3. Day—*Fishes of India*.
 4. Day—*Fishes of Malabar*.
 5. Day—*Freshwater Fish and Fisheries of India and Burma*.
 6. Hamilton Buchanan—*Fishes of the Ganges*.
 7. Rao, C. R. Narayana—*Annals and Mag. of Nat. Hist.*, Vol. VI.
 8. Sundara Raj—*Freshwater Fish of Madras*, Records of the Indian Museum, Vol. XII, 1916.
 9. Sewell and Choudhuri—*Indian Fish of Proved Utility as Mosquito Destroyers*.
 10. Thomas—*Tank Angling*.
 11. Willy—*Spolia Zeylonica*, Vol. V, Vol. VI and Vol. VII.
-