

VI. *Fourth Contribution to the Ichthyology of Lake Tanganyika*¹.—*Report on the Collection of Fishes made by Dr. W. A. Cunningham during the Third Tanganyika Expedition, 1904–1905.* By G. A. BOULENGER, F.R.S., V.P.Z.S.

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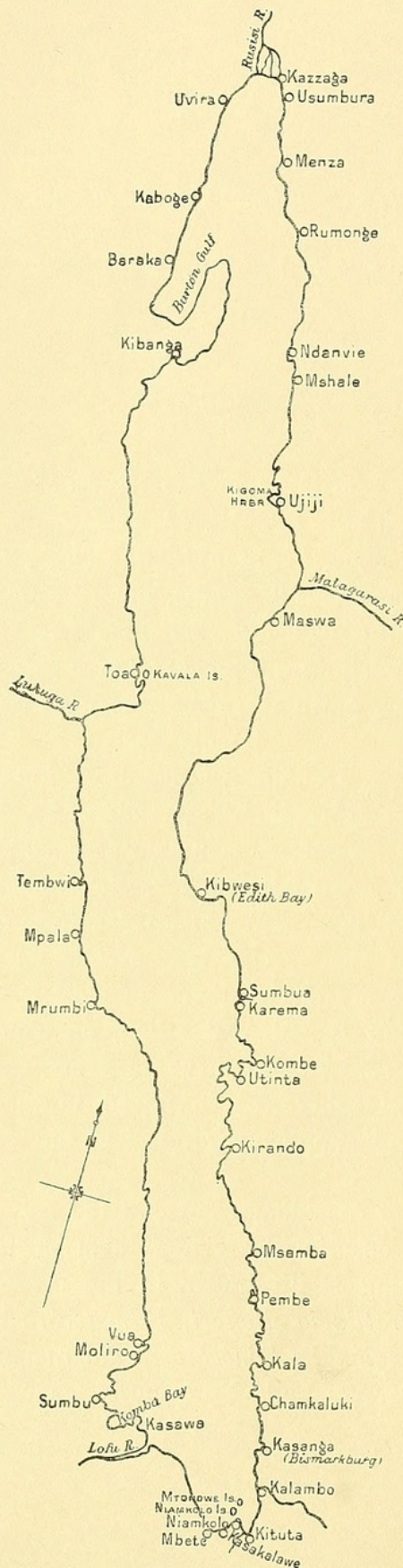
[PLATES XXX.–XLI.]

THE last expedition organised out of the funds remaining in the hands of the Tanganyika Exploration Committee was entrusted to Dr. W. A. Cunningham, who left London in March 1904, and returned home in June 1905. The total length of time spent on and around Tanganyika was about 8 months, and collections were made at a great number of localities, marked on the sketch-map on the next page, some of which appear here under a spelling somewhat different from that adopted by Mr. Moore and followed in the previous reports dealing with his results.

Speaking of the fishes alone, I may say that Dr. Cunningham has been highly successful in his efforts, and has fully justified the expectations entertained by the Committee who entrusted him with the mission of forming as complete a collection as possible of the animals and plants inhabiting the great lake. The series brought home by him is larger than any of those from that lake with which it has hitherto been my privilege to deal. The preservation of the specimens is excellent and their value is enhanced by a careful labelling of every one of them, in most cases accompanied by either sketches or notes concerning the life-coloration, on which I have largely drawn in preparing the present account. I have in every case reproduced the native names (mostly of the Ujiji fishermen) consigned in these notes, although in many cases such names appear to be applied regardless of the real specific characters.

Dr. Cunningham has also been so fortunate as to considerably extend the list of Cichlid fishes in which the parents protect their offspring by giving them shelter in the mouth and pharynx. This mode of nursing is illustrated, in the present collection, by examples of seven species, viz.:—*Paratilapia pfefferi*, *Pelmatochromis polylepis*, *Pelmatochromis pleurospilus*, *Enantiopus longianalis*, *Simochromis diagramma*, *Tilapia dardennii*, and *Eretmodus cyanostictus*. Mr. Moore had previously made us

¹ For the third contribution, cf. Tr. Z. S. xvi. 1901, p. 137.



acquainted with similar habits in *Enantiopus longianalis* and *Tropheus moorii*. I find in Dr. Cunningham's notes an interesting entry referring to this matter: "The natives say it is always the female, in the cases where one of the parents takes the eggs in the mouth." This is not only confirmed by the specimens in the collection, whenever I have been able to ascertain the sex, but agrees entirely with a statement made by me four years ago¹ to the effect that so far as I could speak from personal observation, having tested the sex of a great number of specimens of *Tilapia nilotica* and *strigigena* from the Nile, it is invariably the female who thus carries the eggs. This was in contradiction to statements made by Lortet and by Günther, who ascribed this habit to the male in the species of the same genus with which they had dealt. I have, however, since had occasion to examine the specimen of *Chromis (Tilapia) philander* sent by Mr. Nendick Abraham to Dr. Günther², and was able to satisfy myself from autopsy that it is a female and not a male; whilst Dr. Pellegrin has ascertained the female sex of a specimen with eggs in the mouth presented to the Paris Museum by Dr. Lortet as his *Chromis paterfamilias* (= *Tilapia simonis*). Further observations by Dr. Pellegrin³ on *Tilapia galilæa* and *Pelmatochromis lateralis*, by Mr. Schoeller on *Paratilapia multicolor*, and by myself on *Tilapia natalensis* have led to the same result. It therefore remains unproved whether in any of the African or Syrian Cichlids the buccal "incubation," as it has been called by Dr. Pellegrin, devolves on the male; the instances previously adduced

¹ 'The Field,' c. 1902, p. 33.

² Ann. & Mag. N. H. 1901, viii. p. 321.

³ Mém. Soc. Zool. France, xvi. 1904.

being either controverted or unsupported by the only reliable evidence—an examination of the genital glands¹.

In my last report I expressed the opinion that, notwithstanding the exertions of Mr. Moore and the officers in the service of the Congo Free State, not more than one-half of the species of Fishes existing in Lake Tanganyika was then known to Science. The valuable collection formed by Dr. Cunningham goes a long way towards the fulfilment of this prediction. Mr. Moore's first collection, made in 1895-96, contained about 90 Fishes, referred to 33 species, 25 of which were described as new. His second collection, made in 1899-1900, contained 180 examples of 48 species, 22 of which were new. Dr. Cunningham succeeded in bringing home 300 specimens, referred to 84 species, 27 of which are here described for the first time. No doubt many more species remain to be discovered.

The following Table, giving a complete list of the Tanganyika fishes, will show the order in which they have been discovered. Column 1 indicates the species discovered by Mr. Coode Hore and described by Dr. Günther in 1893; column 2 the species in Mr. Moore's first collection; column 3 those in the various small collections formed by the officers of the Congo Free State; column 4 those in Mr. Moore's second collection; and column 5 those in Dr. Cunningham's collection. The names of endemic genera and species are printed in italics.

¹ [Since the reading of this Report I have been able to considerably extend my observations on the nursing-habits of these fishes, and in every case the specimen carrying eggs or young in the mouth has proved to be of the female sex.

First, Mr. E. Degen has brought back from Lake Victoria a large and valuable series of Cichlid fishes, many of which represented new species which have been described in the 'Annals and Magazine of Natural History' for May 1906. The maternal solicitude was observed in three species, viz.:—*Haplochromis ishmaeli*, *Paratilapia serranus*, and *Tilapia martini*.

Secondly, Lord Walsingham, when at Biskra in February and March last, was so kind as to collect for me a large number of *Haplochromis desfontainesii* in a tepid spring at Ain Oumash, and most of the females, which do not appear to reach so large a size as the males, had the mouth and pharynx full of eggs or embryos. The egg of this fish is not perfectly round, the upper pole being somewhat pointed; the vitelline sac, when hanging from the embryo, is pyriform in shape.

And, thirdly, Dr. Günther has been so good as to hand over to me, for the British Museum, a further series of *Tilapia philander*, together with some *T. natalensis*, which he had received from the Rev. N. Abraham, several of which have eggs in the mouth as well as in the genital glands.—23.6.06.]

	1.	2.	3.	4.	5.
POLYPTERIDÆ.					
1. Polypterus congicus Blgr. 1898	*	*
LEPIDOSIRENIDÆ.					
2. Protopterus æthiopicus Heck. 1851	*
MORMYRIDÆ.					
3. Marcusenius tanganicus Blgr. 1906	*
4. Mormyrus longirostris Peters, 1852	*
CLUPEIDÆ.					
5. Pellonula miodon Blgr. 1906	*
CHARACINIDÆ.					
6. Hydrocyon lineatus Blkr. 1863	*	*	*	*
7. Alestes macrophthalmus Gthr. 1867	*	*	*	*
8. „ rhodopleura Blgr. 1906	*	*	*	*
9. Citharinus gibbosus Blgr. 1899	*	*
CYPRINIDÆ.					
10. Labeo cylindricus Peters, 1852	*
11. Varicorhinus tanganicæ Blgr. 1900	*	*
12. Barbus platyrhinus Blgr. 1900	*	*
13. „ serrifer Blgr. 1900	*	*
14. „ tropidolepis Blgr. 1900	*	*	*
15. Barilius moorii Blgr. 1900	*	*
16. „ tanganicæ Blgr. 1900	*	*
17. Neobola minuta Blgr. 1906	*
SILURIDÆ.					
18. Clarias robecchii Vincig. 1893	*	*
19. „ liocephalus Blgr. 1898	*	*
20. Dinotopterus cunningtoni Blgr. 1906	*
21. Chrysichthys cranchii Leach, 1810	*	..	*
22. „ myriodon Blgr. 1900	*	*	*
23. „ brachynema Blgr. 1900	*	*
24. „ sianenna Blgr. 1906	*
25. Phyllonemus typus Blgr. 1906	*
26. Auchenoglanis occidentalis C. & V. 1840	*	*	*	*
27. Amphilius platychir Gthr. 1864	*	*
28. Synodontis granulatus Blgr. 1900	*	*
29. „ multipunctatus Blgr. 1898	*	*	*	*
30. „ melanostictus Blgr. 1906	*
31. Malopterurus electricus Gm. 1789	*	*	*	*
CYPRINODONTIDÆ.					
32. Haplochilus pumilus Blgr. 1906	*
33. „ tanganicus Blgr. 1898	*	*	..	*

	1.	2.	3.	4.	5.
SERRANIDÆ.					
34. <i>Lates microlepis</i> Blgr. 1898	*	*	*	*
35. „ <i>angustifrons</i> Blgr. 1906	*
CICHLIDÆ.					
36. <i>Lamprologus brevianalis</i> Blgr. 1906	*
37. „ <i>tetracanthus</i> Blgr. 1899	*
38. „ <i>elongatus</i> Blgr. 1898	*	*	..	*
39. „ <i>cunningtoni</i> Blgr. 1906	*
40. „ <i>tremocephalus</i> Blgr. 1899	*	..	*
41. „ <i>mondabu</i> Blgr. 1906	*
42. „ <i>modestus</i> Blgr. 1898	*	*	..	*
43. „ <i>multifasciatus</i> Blgr. 1906	*
44. „ <i>lemairii</i> Blgr. 1899	*	*	*
45. „ <i>hecqui</i> Blgr. 1899	*	*	*
46. „ <i>moorii</i> Blgr. 1898	*
47. „ <i>callipterus</i> Blgr. 1906	*
48. „ <i>reticulatus</i> Blgr. 1906	*
49. „ <i>calliurus</i> Blgr. 1906	*
50. „ <i>brevis</i> Blgr. 1899	*	..	*
51. „ <i>compressiceps</i> Blgr. 1898	*	*
52. „ <i>fasciatus</i> Blgr. 1898	*
53. „ <i>furcifer</i> Blgr. 1898	*	..	*	..
54. <i>Julidochromis ornatus</i> Blgr. 1898	*
55. <i>Telmatochromis vittatus</i> Blgr. 1898	*
56. „ <i>temporalis</i> Blgr. 1898	*	*	*	*
57. <i>Paratilapia frontosa</i> Blgr. 1906	*
58. „ <i>pfefferi</i> Blgr. 1898	*	*
59. „ <i>calliura</i> Blgr. 1901	*	..
60. „ <i>macrops</i> Blgr. 1898	*	*
61. „ <i>ventralis</i> Blgr. 1898	*	*
62. „ <i>dewindti</i> Blgr. 1899	*	..	*
63. „ <i>furcifer</i> Blgr. 1898	*	*
64. „ <i>stenosoma</i> Blgr. 1901	*	*
65. „ <i>leptosoma</i> Blgr. 1898	*	..	*	..
66. „ <i>nigripinnis</i> Blgr. 1901	*	..
67. <i>Bathybates ferox</i> Blgr. 1898	*	*	*	*
68. „ <i>fasciatus</i> Blgr. 1901	*	*
69. „ <i>minor</i> Blgr. 1906	*	*
70. <i>Haplotaxodon microlepis</i> Blgr. 1906	*
71. <i>Pelmatochromis polylepis</i> Blgr. 1901	*	*	*
72. „ <i>melanostigma</i> Blgr. 1906	*
73. „ <i>pleurospilus</i> Blgr. 1906	*
74. „ <i>rhodostigma</i> Blgr. 1906	*
75. „ <i>auritus</i> Blgr. 1901	*	*
76. <i>Ectodus descampsi</i> Blgr. 1898	*	..	*
77. <i>Enantiopus melanogenys</i> Blgr. 1898	*	..	*
78. „ <i>longianalis</i> Blgr. 1899	*	*	*
79. <i>Xenotilapia sima</i> Blgr. 1899	*	..	*
80. „ <i>ornatipinnis</i> Blgr. 1901	*	..
81. <i>Grammatotria lemairii</i> Blgr. 1899	*	..	*
82. <i>Trematocara marginatum</i> Blgr. 1899	*	*	..
83. „ <i>unimaculatum</i> Blgr. 1901	*	..
84. „ <i>nigrifrons</i> Blgr. 1906	*

	1.	2.	3.	4.	5.
CICHLIDÆ (continued).					
85. <i>Gephyrochromis moorii</i> Blgr. 1901	*	
86. <i>Tropheus moorii</i> Blgr. 1898	*	*
87. " <i>annectens</i> Blgr. 1900	*		
88. <i>Simochromis diagramma</i> Gthr. 1893	*	*	..	*	*
89. <i>Tilapia nilotica</i> L. 1757	*
90. " <i>burtoni</i> Gthr. 1893	*	..	*	..	*
91. " <i>latifrons</i> Blgr. 1906	*
92. " <i>horii</i> Gthr. 1893	*	..	*	..	*
93. " <i>dardennii</i> Blgr. 1899	*	*	*
94. " <i>labiata</i> Blgr. 1898	*	*	*	*
95. " <i>pleurotenia</i> Blgr. 1901	*	
96. " <i>trematocephala</i> Blgr. 1901	*	
97. " <i>microlepis</i> Blgr. 1899	*	*	*
98. " <i>boops</i> Blgr. 1901	*	
99. " <i>grandoculis</i> Blgr. 1899	*	..	*
100. <i>Petrochromis polyodon</i> Blgr. 1898	*	*
101. " <i>tanganicæ</i> Gthr. 1893	*	..	*	*	*
102. <i>Cunningtonia longiventralis</i> Blgr. 1906	*
103. <i>Asprotilapia leptura</i> Blgr. 1901	*	
104. <i>Eretmodus cyanostictus</i> Blgr. 1898	*	*	..	*
105. <i>Spathodus erythrodon</i> Blgr. 1900	*		
106. <i>Perissodus microlepis</i> Blgr. 1898	*			
107. <i>Xenochromis hecqui</i> Blgr. 1899	*	*	*
108. <i>Plecodus paradoxus</i> Blgr. 1898	*	..	*
MASTACEMBELIDÆ.					
109. <i>Mastacembelus frenatus</i> Blgr. 1901	*	
110. " <i>moorii</i> Blgr. 1898	*	*
111. " <i>cunningtoni</i> Blgr. 1906	*
112. " <i>ellipsifer</i> Blgr. 1899	*		
113. " <i>tanganicæ</i> Gthr. 1893	*	..			
114. " <i>teniatus</i> Blgr. 1901	*	*
115. " <i>ophidium</i> Gthr. 1893	*	*

A glance over this list shows that one of the six species discovered by Mr. Coode Hore (*Mastacembelus tanganicæ*) and six of those in Mr. Moore's first collection are unrepresented in the collections subsequently made.

Apart from many important additions to our knowledge, the collection now worked out calls for the following modifications to the conclusions previously arrived at as to the general character of this remarkable fish-fauna:—

Two new generic types of Siluridæ are here described, all previously known autochthonous genera falling under the family Cichlidæ.

One species of Cichlids, *Tilapia nilotica*, of wide distribution (Jordan, Nile, East and West Africa), previously known from Lake Kivu, is, with *T. burtoni*, also found in Lake Kivu, the only non-endemic species of that family the occurrence of which has been ascertained.

One species widely distributed in East Africa, *Labeo cylindricus*, is added to the list of Cyprinidæ, all previously known species being endemic. *Neobola*, ranging over North-east Africa and Lake Victoria, has yielded a third species representing this genus of Cyprinidæ in Lake Tanganyika.

An *Alestes* previously regarded, from insufficient material, as identical with a Nile and West-African species, is now found to be distinct. The Characinidæ can therefore no longer be said to be all non-endemic.

A small Cyprinodontid (*Haplochilus pumilus*) was discovered almost simultaneously by Dr. Cunningham in Lake Tanganyika and by Mr. E. Degen in Lake Victoria.

And, finally, representatives of two families widely distributed in tropical Africa, the *Mormyridæ* and the *Clupeidæ*, have been added. The discovery of *Mormyridæ* is of particular interest, as their supposed absence was regarded as a striking negative feature of the great lake.

These data, however, only further emphasize the truly African freshwater and modern character of the fauna of Lake Tanganyika, a subject with which I have fully dealt, from the ichthyological point of view, in an Address read at the British Association Meeting in South Africa last summer, and I have nothing to alter in the general conclusions I had arrived at before studying Dr. Cunningham's collection.

Dr. Cunningham supplies the following note on the methods of fishing observed by him:—"Almost the whole shore of this big lake is inhabited by a fishing population, and large quantities of fish of the most diverse kinds are obtained from the well-stocked water. The lake-shore inhabitants belong, however, to a number of different tribes, so that the methods of fishing adopted, and the kinds of fish most highly prized, vary somewhat in the different regions. While most, if not all, of the Tanganyika fish are good for food, the *Polypterus*, for instance, is not eaten by the Wajiji, and, on the other hand, the large Siluroids, with their rich oily flesh, are usually much valued by the natives for eating. Again, towards the north end of the lake, the small whitebait-like Clupeid, *Pellonula miodon*, is a particularly favourite dish.

"Perhaps the commonest method of fishing is by means of a net laid out from the shore in a semicircle and drawn in from both ends. In some cases this may be merely a flat wall of net-work, buoyed above and weighted below, though even then not more than three or four feet in depth, while in other cases it may be still shallower, but furnished at intervals with a series of pockets. On parts of the western shore a small and singularly inefficient net of this type is employed, consisting of but two such pockets of small dimensions in the middle, and on each side a long-shaped ring converted into a grating by flat strips of bark.

"Fishing is also carried on in many parts of the lake by the aid of a long line bearing a series of baited hooks at intervals. This is essentially in the nature of a surface-line, being buoyed at each end, and the line is baited overnight and hauled in in the morning. Fishing with rod and line is but little practised, and for this the natives

appear never to use a float, although that is the general custom on Victoria Nyanza. When using hook and line alone a bait of stiff paste is used, and it is especially Characinids which are caught in this manner.

"Torch-light fishing goes on to a considerable extent in various parts of the lake, the larger fish being speared and the smaller caught in hand-nets as they are attracted to the light. At the north end, in particular, an important fishery is carried on for 'dagaa,' a young Clupeid which swims in shoals. Owing to the scarcity of firewood, large bundles of dried reeds are tied together to form a gigantic torch, which projects over the bows of the canoe and is gradually pushed forwards as it burns away. The fish are netted and brought in large quantities to the native markets, while some are sun-dried and disposed of at considerable distances from the lake.

"Finally, there are different kinds of traps used around Tanganyika. Small conical wicker traps are placed in the rivers and streams, while across the latter, not far from the lake, may be built an elaborate system of traps and barriers to catch the fish proceeding down the stream. Out in the lake itself, particularly towards the southern end, large trilobed basket-traps are used for the purpose of catching the big Silurid 'singa.' The trap is suspended from a float, a few feet under the surface, and is baited with some vegetable substance. In certain districts a great number of such floats may be seen dotting the surface of a bay or inlet."

POLYPTERIDÆ.

1. POLYPTERUS CONGICUS Blgr.

A single male specimen, 620 millim. long, from Kituta. Native name *Munkunga*. Dr. Cunningham measured a larger specimen, 710 millim. long. The fish occurs also in the rivers.

14 spines in the dorsal; 56 scales in a longitudinal series, 46 round the body, 13 between the occiput and the origin of the dorsal. The azygous shield between the nasal bones is present. Dr. Cunningham describes the colour as greenish grey above, shading off to lighter below, belly with pinkish tinge; 8 or 9 black blotches along side of body; black spots on side of head; paired fins with dark spots.

LEPIDOSIRENIDÆ.

2. PROTOPTERUS ÆTHIOPICUS Heck.

One specimen, measuring 485 millim., taken in a native-made wicker trap, baited with vegetable matter, in the Kakonde River, near its mouth in Mtondwe Bay, was brought home by Dr. Cunningham, who also observed another specimen, measuring 970 millim., in a river at Moliro. The fish has not been found in the lake itself, and the natives, who call it *Sompo*, catch it in small muddy streams and say (at Mpala)

that they sometimes come across it when digging graves. It is much feared for its bite. Although captured by vegetable bait (*cassava*, a sort of tuber), a specimen opened by Dr. Cunningham contained partially digested fish in the stomach.

This is the first specimen from the borders of Lake Tanganyika which falls under the eyes of an ichthyologist, and it confirms the provisional identification of the species (see Boulenger, Poiss. Bass. Congo, p. 38). The specimen figured by Moore in his 'Tanganyika Problem,' p. 153, is from Lake Albert Edward. The following notes are taken from Dr. Cunningham's specimen:—

Depth of body $8\frac{1}{3}$ times in total length; length of head $4\frac{4}{5}$ times in distance from end of snout to vent; diameter of eye 13 times in length of head; dorsal fin originating a little nearer to vent than to occiput; 60 scales in a longitudinal series from the gill-opening to above the vent, 42 round the body; vent on the left side. Dr. Cunningham describes the coloration as "mottled grey and black, darker above; sinuous lines of brown on the dorsal region and on the tail; tail with large black blotches on a grey ground; belly mottled grey and flesh-colour, with a pinkish tinge all over."

MORMYRIDÆ.

3. MARCUSENIUS TANGANICANUS, sp. n. (Plate XXX. fig. 1.)

Depth of body $3\frac{1}{4}$ to $3\frac{1}{2}$ times in total length, length of head $4\frac{1}{3}$ to $4\frac{2}{3}$ times. Head as long as deep, not quite twice as long as broad; snout as long as or a little shorter than the eye, rounded, projecting beyond the mouth, which is small and a little anterior to the vertical of the nostrils; teeth bicuspid, 5 in the upper jaw, 6 in the lower; nostrils on a line with lower border of eye, nearer the latter than the end of the snout; eye $4\frac{1}{3}$ to $4\frac{1}{2}$ times in length of head, about once and $\frac{1}{2}$ in interocular width. Dorsal 31–34, considerably shorter than its distance from the head, anterior rays longest. Anal 23–25, originating below 8th to 10th rays of dorsal, equally distant from base of ventral and from root of caudal; anterior rays longest, especially in the males, in which the anterior half of the fin forms a rounded lobe. Pectoral pointed, as long as or a little shorter than the head, extending beyond base of ventral. Caudal fin scaly at the base, with pointed lobes. Caudal peduncle twice and $\frac{1}{4}$ to twice and $\frac{2}{5}$ as long as deep, a little shorter than the head. 65 to 67 scales in the lateral line, $\frac{17-19}{21-22}$ in a transverse series on the body, $\frac{12-15}{12-14}$ in a transverse series between dorsal and anal, 12 round caudal peduncle. Uniform greyish above, silvery white beneath; dorsal and anal fins whitish at the base, grey distally.

Total length 160 millim.

Two specimens from Sumbu, and one taken in a river at Msamba. Native name: *Zoveruz*.

This species is very closely allied to, and exactly intermediate between, *M. disco-rhynchus* Peters, from the Zambesi and Lake Nyasa, and *M. petherici* Blgr., from the

Nile. It differs from the first in the mouth being a little more anterior, in the shorter dorsal fin with 31–34 rays instead of 34–36, and in the depth of the caudal peduncle being contained less than twice and a half in its length; from the second in the caudal peduncle being more than twice as long as deep and surrounded by 12 scales instead of 14.

4. *MORMYRUS LONGIROSTRIS* Peters.

A single specimen, 330 millim. long, from Sumbu. Native name: *Domodomo*. Said to grow to nearly three feet. Dorsal 75, $5\frac{1}{2}$ times as long as anal; anal 18; 26 scales round caudal peduncle. Dr. Cunningham describes the coloration as "Grey above, lighter to white below, darker on top of head, with darker blotches along middle of side; tail darker, with some patches of red; two brown spots below the eye; ventrals reddish, grey distally."

M. longirostris, which is known from the Zambesi and the Congo, is so closely related to *M. caschive*, from the Nile, that it should perhaps be regarded as merely a variety of the latter.

CLUPEIDÆ.

5. *PELLONULA MIODON*, sp. n. (Plate XXX. fig. 2.)

Depth of body $4\frac{2}{3}$ to $5\frac{1}{2}$ times in the total length, length of head $3\frac{2}{3}$ to 4 times. Snout obtusely pointed, as long as the eye, the diameter of which is contained $3\frac{1}{3}$ to $3\frac{1}{2}$ times in length of head and equals once and $\frac{1}{2}$ to once and $\frac{2}{3}$ interorbital width; chin projecting beyond the snout; maxillary extending to below anterior border or anterior fourth of eye; teeth small, canines confined to anterior extremity of mandible. Gill-rakers long and slender, closely set, 35 to 40 on lower part of anterior arch. Dorsal 15–16, equally distant from centre or posterior border of eye and from root of caudal; longest rays about $\frac{1}{2}$ length of head. Anal 16–17, a long way behind the dorsal, nearer to root of caudal than to base of ventrals. Pectoral $\frac{3}{5}$ length of head, widely separated from the ventral. Ventral inserted below anterior third or middle of dorsal. Caudal deeply forked, with pointed lobes. Caudal peduncle once and $\frac{1}{2}$ to once and $\frac{2}{3}$ as long as deep. 45 to 48 scales in a longitudinal series, 14 in a transverse series; 19 or 20 keeled scutes between isthmus and ventrals, 10 or 11 between ventrals and anal. Olive above; silvery below, with a blue indistinct lateral band; dorsal and caudal greyish, other fins white.

Total length 140 millim.

Several specimens from Ndanvie, Tembwi, Vua, Mbete, Niamkolo Id., and Kasakalawa. Native names: *Lumbu*, *Sembe*, and *Dagaa*. This is, no doubt, the little fish "very like Whitebait" mentioned by Livingstone ('Last Journals,' vol. ii. p. 17) as the *Dagala* or *Nsipé* of Lake Tanganyika, which, in my previous ignorance of any sort of Clupeid in

that lake, I had suggested might be the Cyprinodont *Haplochilus tanganicus*. Whether the statement of the natives that it carries its eggs in its mouth is true or is based on confusion with some other fish cannot at present be decided; but the material at hand offers no evidence in its favour.

Stanley ('How I found Livingstone,' p. 530) also speaks of it as the *Dogara*, a species of whitebait, which is caught in great nets by the thousand and spread out in the sun to dry, and exported, salted, even as far as Unyanyembe.

The Clupeids are represented in the fresh waters of tropical Africa by three closely related genera: *Pellonula* Gthr., *Odaxothrissa* Blgr., and *Microthrissa* Blgr. Of the first, to which the Tanganyika fish belongs, two species only were known, inhabiting West Africa and the Congo. The principal characters distinguishing the three species with which we are now acquainted are contrasted in the following "key":—

- I. Dorsal 15–17, originating at equal distance from end of snout and from base of caudal fin, or a little nearer the latter; lower jaw projecting beyond the upper.
Depth of body not more than 4 times in total length; keeled ventral scutes 13–15 + 9–10; anal originating a short distance behind vertical of dorsal. *P. vorax* Gthr.
- Depth of body $4\frac{2}{3}$ to $5\frac{1}{2}$ times in total length; keeled ventral scutes 19–20 + 10–11; anal originating a long way behind dorsal *P. miodon* Blgr.
- II. Dorsal 13–14, originating much nearer end of snout than base of caudal fin; upper jaw projecting beyond the lower; keeled ventral scutes 12–13 + 12; anal originating a long way behind dorsal . . . *P. acutirostris* Blgr.

CHARACINIDÆ.

6. HYDROCYON LINEATUS Blkr.

Kituta. Native name: *Sokonto*.

7. ALESTES MACROPHthalmus Gthr.

Several specimens from Niamkolo, Mtondwe Bay, and Kituta. Native names: *Manji*, *Mianga*, and *Mowanzi*. Grows to a length of 560 millim.

8. ALESTES RHODOPLEURA, sp. n. (Plate XXX. fig. 3.)

Depth of body 4 times in total length, length of head 4 to $4\frac{1}{2}$ times. Head longer than deep, nearly twice as long as broad, its width much less than its length to the occiput; snout rounded, feebly projecting beyond the lower jaw, once and $\frac{1}{3}$ diameter of eye, which is 4 times in length of head; adipose eyelid very short; interorbital width nearly half length of head; maxillary not extending to below anterior border of eye; 18 teeth in the upper jaw, 8 in the outer row of the lower jaw; length of lower border of second suborbital equal to or a little more than diameter of eye.

Gill-rakers moderately long, 18 or 19 on lower part of anterior arch. Dorsal II 8, behind vertical of base of ventrals, originating much nearer root of caudal than end of snout, longest ray about $\frac{3}{4}$ length of head. Adipose fin small, about twice as far from rayed dorsal as from root of caudal. Anal III 12-13. Pectoral as long as head, not reaching ventral. Caudal forked. Caudal peduncle once and $\frac{2}{3}$ to twice as long as deep. Scales 28-29 $\frac{4\frac{1}{2}}{2\frac{1}{2}}$, 1 between lateral line and ventral. Olive-green above, silvery below, with an ill-defined pink band along each side, beginning on the gill-cover; a large blackish (in life dark greenish) patch on caudal peduncle and root of caudal.

Total length 300 millim.

Several specimens from Niamkolo, Mtondwe Bay, and Lofu. Native names: *Kolokolo* and *Kologo*.

This is the fish previously recorded by me, from a single badly preserved specimen, as *A. macrolepidotus* C. & V. But that species, of which I have examined over 100 examples from the Nile and from West Africa, has never more than 26 scales in the lateral line. *A. batesii* Blgr., from South Cameroon, agrees with the Tanganyikan species in the number of scales in the lateral line as well as in the number of anal rays, but there are two series of scales between the lateral line and the root of the ventral fin, the head is shorter in the adult, and the caudal peduncle is shorter, as in *A. macrolepidotus*. *A. grandisquamis* Blgr., from the Congo, and *A. brevis* Blgr., from Guinea, are other close allies of the Tanganyikan form, but both have a shorter head and a shorter caudal peduncle, and the first has 24 to 27 scales in the lateral line and 13 or 14 anal rays, the second 21 to 23 scales in the lateral line and 16 to 18 anal rays.

9. CITHARINUS GIBBOSUS Blgr.

Niamkolo. Native name: *Imbaza*.

Dr. Cunningham measured a large specimen, which had been speared by the natives; its total length was 540 millim.

CYPRINIDÆ.

10. LABEO CYLINDRICUS Peters.

Two specimens, both with 10 branched rays in the dorsal fin, from Utinta. Native name: *Bimanda*.

Grows, according to Dr. Cunningham, to a length of 360 millim.

"Dark olive-green to almost black above, lighter below, with the belly greyish; scales with darker outlines; all fins dark greenish black, darker between the rays."

L. cylindricus, which is very nearly related to the Nilotic *L. forskalii*, has a wide distribution in East Africa, from Abyssinia to the Zambesi.

In my first Report I had recorded a *Labeo* from Lake Tanganyika, on the evidence of a sketch made by Mr. Moore; but as no specimen had been preserved, the species could not be determined.

11. *VARICORHINUS TANGANICÆ* Blgr.

Two specimens from Niamkolo. Native name: *Imbara*.

Dr. Cunningham measured a specimen 463 millim. long. "Greenish brown above; paired fins and anal with a pinkish tinge."

This is the fish described by me as *Capoëta tanganicæ*. I have since had occasion to show that *Capoëta* is a synonym of *Varicorhinus* of Rüppell, which has priority.

12. *BARBUS SERRIFER* Blgr.

Kituta, in a swamp. Native name: *Palala*.

"Olive-green above, shading to silver below; a red spot on gill-cover immediately behind eye; blue-black spot at root of caudal; dorsal and caudal fins with distal third orange; paired fins and anal yellowish."

13. *BARBUS TROPIDOLEPIS* Blgr.

Niamkolo, Mbete, and Uvira. Native names: *Kaluka Matanda*, *Kitumbi Mbalaga*, and *Birigi*.

Dr. Cunningham notes that this fish grows to a length of 500 millim., and is often taken in rivers¹. The colour in fresh specimens is olive above, shading off to silvery or to light brownish-grey and silvery; paired fins and anal yellowish; the largest specimen preserved (measuring 290 millim.) had the raised lines on the body of a lighter olive and a red blotch at the tip of the spine of the dorsal fin. A smaller specimen (195 millim.) has a short anterior barbel on one side only.

14. *BARILIUS MOORII* Blgr.

Sumbu. Native name: *Kiriabakawba*.

The largest specimen measures 160 millim., and has 11 very distinct vertical dark bars on the side.

15. *NEOBOLA MINUTA*, sp. n. (Plate XXXII. fig. 1.)

Depth of body 6 times in the total length, length of head 5 times. Snout pointed, not projecting beyond the mouth, shorter than the eye, which is $3\frac{1}{3}$ times in length of head and equals interorbital width; mouth extending to below anterior border of eye; suborbital bones covering greater part of cheek. Dorsal II 7, originating further back than anal, at equal distance from head and from root of caudal, longest ray about

* Cf. M. Questiaux's notes on the habits of the *Mbiriki*, in Boulenger, Poiss. Bass. Congo, p. 228.

$\frac{1}{2}$ length of head. Anal II 18. Pectoral acutely pointed, as long as head, reaching root of ventral. Caudal deeply forked. Caudal peduncle twice as long as deep. Scales $37 \frac{7\frac{1}{2}}{1\frac{1}{2}}$, 1 between lateral line and root of ventral, 12 round caudal peduncle. Silvery, olive in the upper third.

Total length 26 millim. This, according to Dr. Cunningham, is the full size of the fish.

Several specimens were taken at Mbete, in shallow water, by means of a piece of calico held by two men. Native name: *Salala*.

The genus *Neobola* Vinciguerra is intermediate between *Barilius* Ham.-Buch. and *Chelæthiops* Blgr., differing from the former in the more posterior position of the dorsal fin, from the latter in the absence of a ventral keel and in the wider separation of the pectoral fins. Two species were known: *N. bottegi* Vincig., from Lake Rudolf, Gallaland, and Somaliland, and *N. argentea* Pellegr., from Lake Victoria.

The three species may be distinguished by means of the following characters:—

Anal 17–19, its origin corresponding to that of dorsal; lateral line 40–45;	
mouth extending to beyond vertical of anterior border of eye . . .	<i>N. bottegi</i> Vincig.
Anal 17–18, its origin corresponding to that of dorsal; lateral line 48–52;	
mouth extending to below anterior border of eye	<i>N. argentea</i> Pellegr.
Anal 20, originating in advance of dorsal; lateral line 37; mouth extending	
to below anterior border of eye	<i>N. minuta</i> Blgr.

SILURIDÆ.

16. *CLARIAS ROBECCHII* Vincig.

Niamkolo. Native name: *Pongo* or *Kambali*.

DINOPTERUS, g. n.

Intermediate between *Clarias* and *Heterobranchus*. Dorsal fin divided into a rayed and an adipose portion, but the latter not supported by produced neural spines. Temple unprotected by bone.

17. *DINOPTERUS CUNNINGTONI*, sp. n. (Plate XXXI.)

Depth of body $7\frac{1}{2}$ times in total length, length of head $3\frac{2}{5}$ times. Head extremely flattened, once and $\frac{1}{3}$ as long as broad, its upper surface covered with very thin skin and rugose with striæ radiating from the occipital region; frontal fontanelle large, twice and $\frac{1}{2}$ as long as broad, $\frac{1}{4}$ length of head; occipital fontanelle very small; a rather long and narrow occipital process; snout broad, truncate, not projecting beyond

the mouth; eye small, 3 times in length of snout, $7\frac{1}{2}$ times in interorbital width; nasal barbel $\frac{2}{3}$ length of head; maxillary barbel a little longer than head, reaching posterior third of pectoral; outer mandibular barbels once and $\frac{1}{2}$ as long as inner and nearly as long as head. Jaws with bands of minute villiform teeth; similar teeth form a rather broader crescentic band on the vomer. Gill-rakers very long and slender, closely set, about 110 on anterior arch. Dorsal with 53 rays, the posterior of which are the longest and measure about $\frac{1}{4}$ length of head; distance between first dorsal ray and occipital process $\frac{1}{3}$ length of head; adipose dorsal low and short, in contact with caudal. Anal with 43 rays, separated from the root of the caudal by a space equal to twice diameter of eye. Pectoral $\frac{1}{2}$ length of head; spine rather weak, not serrated, a little more than half length of fin. Ventral equally distant from end of snout and from root of caudal. Caudal rounded. Dark brown, almost black above, pinkish white beneath.

This remarkable fish is described from a single specimen, 500 millim. long, caught at Mpala in a floating basket-trap. Native name: *Singa*. Dr. Cunningham saw larger specimens, measuring 1020 and 1290 millim. A young specimen, 90 millim. long, was taken in a native trap at Mbete and is here figured (Plate XXXI. fig. d). The head is less depressed and the eyes are proportionally larger than in the adult; the ventrals are a little nearer the end of the snout than the root of the caudal.

This fish, although until now unknown to zoologists, has been alluded to by Burton ('The Lake Regions of Central Africa,' ii. p. 67) and by Stanley ('How I found Livingstone,' p. 530). The latter says: "The *Silurus* called by the Wajiji *Singa*, which grows, according to native report, to four and even six feet in length. The one I sketched was $38\frac{1}{2}$ inches long, and weighed $10\frac{3}{4}$ lbs., but was considered to be a small one. It is an extremely flat fish, of a dark brown colour on the back, and light brown, inclined to whiteness, on the belly." Coode Hore ('Tanganyika,' p. 150) also alludes to it as "the oily *Singa* (*Silurus*) of six feet in length." Cameron, on the other hand ('Across Africa,' i. p. 270), applies the name *Singa* to *Protopterus*: "In the afternoon I shot a large *Lepidosiren*, called by the natives *Singa*; but it was so loathsome to look at that no one would touch it, and the people declared it was poisonous."

18. *CHRYSICHTHYS BRACHYNEMA* Blgr.

A single specimen from Niamkolo. Native name: *Mondi* or *Nvulu*.

19. *CHRYSICHTHYS SIANENNA*, sp. n. (Plate XXXII. fig. 2.)

Depth of body $5\frac{1}{2}$ to 6 times in total length, length of head $4\frac{1}{2}$ times. Head moderately depressed, once and $\frac{2}{5}$ to once and $\frac{1}{2}$ as long as broad, smooth above; snout rounded, projecting a little beyond the lower jaw, $\frac{1}{3}$ length of head, about $\frac{2}{3}$ width of mouth; eye 4 to $4\frac{1}{2}$ times in length of head, once to once and $\frac{1}{3}$ in interorbital width; nasal barbel very thin, $\frac{1}{3}$ diameter of eye; maxillary barbel

once and $\frac{1}{5}$ to once and $\frac{1}{3}$ length of head; outer mandibular barbel nearly twice as long as inner and half length of head; vomero-ptyergoid teeth forming a long and narrow crescentic band; occipital process narrow, narrowly separated from the small interneural shield. Dorsal I 6, nearly twice as distant from the root of the caudal as from the end of the snout; spine serrated behind, $\frac{1}{2}$ length of head; longest soft rays $\frac{3}{5}$ to $\frac{2}{3}$ length of head. Adipose dorsal small, 2 to 3 times as long as deep its base 3 to 4 times in its distance from the rayed dorsal. Anal IV 10. Pectoral spine about $\frac{3}{5}$ length of head, feebly serrated on outer side, more strongly on inner side. Ventral not reaching anal. Caudal deeply forked, with pointed lobes, outer rays 3 to $3\frac{1}{2}$ times as long as the median. Caudal peduncle twice as long as deep. Colour in life olive above, shading to light grey and silver below; anterior edge of dorsal fin red, the tip black; maxillary barbels and ventral and caudal fins pinkish.

Total length 220 millim. Said not to grow larger.

Two specimens from Niamkolo and one from Mbete. Native name: *Sianenna*.

A very distinct species, to be placed near *C. furcatus* Gthr.

PHYLLONEMUS, g. n.

Allied to *Chrysichthys* Blkr., but without nasal barbels and with the maxillary barbel fringed on both sides by a leaf-like membrane in its distal part; only vomerine teeth on the palate.

20. PHYLLONEMUS TYPUS, sp. n. (Plate XXXII. fig. 3.)

Depth of body $5\frac{1}{2}$ times in total length, length of head $3\frac{1}{2}$ times. Head smooth, once and $\frac{1}{2}$ as long as broad; occipital process very short, widely separated from the dorsal; snout flat, broadly rounded, subtruncate, projecting very slightly beyond the mouth; eye $\frac{1}{4}$ length of head, equal to interorbital width; maxillary barbel once and $\frac{2}{3}$ as long as head, extending beyond extremity of pectoral; outer mandibular barbels as long as head, twice as long as inner; vomerine teeth in a short transverse series. Dorsal I 6, a little nearer end of snout than root of caudal; spine short and feeble; longest rays $\frac{2}{3}$ length of head. Anal 12, opposed to adipose dorsal, which is about $\frac{2}{3}$ as long as its distance from the rayed dorsal. Pectoral spine $\frac{1}{2}$ length of head, strongly serrated on its inner border. Ventral inserted a little behind vertical of dorsal, not reaching anal. Caudal peduncle a little longer than deep. Caudal deeply notched. Brown above, white below; maxillary barbels blackish at the end; dorsal dark brown, adipose dark brown, white behind; caudal brown, each lobe tipped with white; anal white, dark brown at the base; ventrals white.

Total length 73 millim.

A single specimen from Niamkolo. Native name: *Kapondo*.

21. *AUCHENOGLANIS OCCIDENTALIS*, var. *TANGANICANUS*. (Plate XXXIII.)

Depth of body 4 to $4\frac{1}{2}$ times in total length, length of head 3 times. Head once and $\frac{1}{2}$ as long as broad, coarsely granulate above; snout pointed, about $\frac{3}{5}$ length of head; diameter of eye 7 to 9 times in length of head, 2 to $2\frac{2}{3}$ times in interorbital width, which equals $\frac{1}{2}$ to $\frac{3}{5}$ length of snout; width of mouth about half that of head; lips thick, papillose; maxillary barbel about $\frac{2}{3}$ length of head, extending to posterior border of eye; outer mandibular barbel as long as or but slightly longer than maxillary, inner mandibular $\frac{1}{4}$ to $\frac{1}{3}$ length of head; præmaxillary teeth forming two small groups, which are longer than broad; mandibular teeth forming a band interrupted in the middle; occipital process broader than long, in contact with the large interneural shield. Humeral process small, acutely pointed. Dorsal I 7; spine rugose in front, not quite half length of head. Adipose fin $3\frac{1}{2}$ to $5\frac{1}{2}$ times as long as deep, narrowly separated from the rayed dorsal and from the caudal. Anal IV 8. Pectoral spine as long as dorsal, feebly serrated in front, strongly behind. Ventral not reaching anal. Caudal rounded or slightly notched. Olive or brownish grey above, with more or less distinct round darker spots, uniform white beneath; dorsal and caudal fins with numerous round dark spots.

Total length 350 millim.

I have previously recorded this species under the name of *Auchenoglanis biscutatus*. But the Tanganyikan specimens differ in the longer snout and the narrower interorbital space. They are hardly distinguishable from *A. occidentalis* C. & V., which inhabits the Nile, the rivers of West Africa, and the Congo, and has also been confounded with *A. biscutatus*. The above-given description is taken from two specimens from Kalambo and one from the middle of the lake (Moore Collection) and from one from Mtondwe Bay (Cunnington Coll.). Native name: *Poloko* or *Kavungwe*.

22. *SYNODONTIS MULTIPUNCTATUS* Blgr.

Niamkolo. Native name: *Kamwengwe*.

23. *SYNODONTIS MELANOSTICTUS*, sp. n. (Plate XXXIV.)

Body feebly compressed, its depth nearly equal to length of head and 4 times in total length. Head as long as broad, strongly granulate above, the rugosities extending on the snout; frontal fontanelle narrow; snout rounded, slightly longer than post-ocular part of head; eye supero-lateral, nearly 6 times in length of head, twice and $\frac{1}{2}$ interorbital width; occipito-nuchal shield obtusely tectiform; mouth with moderately developed lips; maxillary barbel once and $\frac{1}{4}$ as long as head, without fringe or border; mandibular barbels with long simple barbs, the outer nearly as long as the maxillary; præmaxillary teeth forming a broad band, about 15 irregular transverse series; movable mandibular teeth about 30, the longest $\frac{2}{5}$ diameter of eye. Gill-opening not extending below base of pectoral. Humeral process acutely pointed, without

keel, granulate above, striated below, not extending beyond vertical of occipito-nuchal shield. Skin slightly villose on the sides of the body. Dorsal I 7; spine strong, curved, nearly as long as head, striated, smooth in front, with a few very feeble and indistinct serræ behind; a filament terminates the spine. Adipose dorsal 4 times as long as deep, twice and $\frac{1}{2}$ as long as its distance from the rayed dorsal. Anal IV 7. Pectoral spine striated and strongly serrated on both sides, nearly as long as head. Ventral not reaching anal. Caudal deeply forked, upper lobe longer. Grey above, white beneath, closely dotted with black on the body as well as on the fins.

Total length 260 millim. Grows to 520 millim. according to Dr. Cunningham.

A single specimen from Lofu. Native name: *Kiyegeyege*.

Allied to *S. multipunctatus* Blgr., *zambesensis* Peters, and *punctulatus* Gthr. Distinguished by the almost total absence of serration on the back of the dorsal fin-spine, the presence of strong serræ on the outer border of the pectoral spine, and the villousities on the body. The eye is much smaller than in *S. multipunctatus*.

This species is also nearly related to *S. schall* Bl. Schn., in which the upper surface of the snout is smooth and the outer edge of the pectoral spine more feebly serrated.

24. MALOPTERURUS ELECTRICUS Gm.

Niamkolo. Native name: *Kunta*.

CYPRINODONTIDÆ.

25. HAPLOCHILUS PUMILUS, sp. n. (Plate XXXII. fig. 4.)

Depth of body $3\frac{2}{3}$ to $4\frac{1}{2}$ times in total length, length of head $3\frac{1}{2}$ to 4 times. Upper surface of head flat; snout shorter than the eye, the diameter of which is 3 times in length of head; lower jaw projecting beyond upper; interorbital space $\frac{2}{5}$ length of head. Dorsal 10–11, originating nearer to root of caudal than to occiput; posterior rays longest, $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Anal 14–15, originating at equal distance from eye and from root of caudal; posterior rays longest, about as long as dorsals. Pectoral $\frac{2}{3}$ length of head, reaching beyond base of ventral. Caudal rounded, nearly as long as head. Caudal peduncle once and $\frac{1}{3}$ as long as deep. Scales with the concentric striæ very indistinct, 27 to 29 in a longitudinal series, 7 in a transverse series. Yellowish, more brownish on the back, where the scales have darker outlines; fins purplish, without any markings.

Total length 34 millim.

Three specimens, taken shore-wading at Kituta. Native name: *Msipa*.—The same species has been obtained in Lake Victoria by Mr. E. Degen.

26. HAPLOCHILUS TANGANICANUS Blgr.

Several specimens from Niamkolo, Moliro, and Mpala. Native name: *Mishia*.

Grows to 135 millim. Dorsal and anal fins striated with dark and light lines.

SERRANIDÆ.

27. *LATES MICROLEPIS* Blgr. (Plate XXXV. fig. 2.)

Several specimens, measuring from 60 to 410 millim., from Niamkolo and Kituta. Native name: *Pamba* or *Sangala*.

Dr. Cunningham has taken a photograph of a specimen measuring 1.34 m.

28. *LATES ANGUSTIFRONS*, sp. n. (Plate XXXV. fig. 1.)

Depth of body $3\frac{1}{3}$ times in total length, length of head 3 times. Upper profile of head nearly straight; diameter of eye $4\frac{1}{2}$ times in length of head, once and $\frac{1}{3}$ in length of snout; interorbital space narrow, only $\frac{1}{2}$ diameter of eye; lower jaw projecting; maxillary extending to below centre of eye, the width of its distal extremity $\frac{1}{2}$ diameter of eye; præ- and suborbitals finely serrated; cheeks, opercles, and occiput covered with small scales; præopercular border forming nearly a right angle, finely toothed on its vertical limb, with three widely separated spines on its lower limb, and with a very strong spine at the angle; two strong opercular spines. 4 or 5 strong spines on the clavicle. 14 gill-rakers on lower part of anterior arch. Dorsal VII, I 12; third spine very strong, longest, about $\frac{1}{2}$ length of head; longest soft rays $\frac{1}{3}$ length of head. Anal III 8; spines short, second and third equal. Pectoral not quite $\frac{1}{2}$ length of head. Caudal rounded. Caudal peduncle once and $\frac{2}{3}$ as long as deep. Scales $125\frac{14}{38}$. Dr. Cunningham describes the coloration as of a yellowish tinge all over, darkish grey above, shading to almost white below; middle region of body faintly mottled with darker grey; ventral fins yellowish.

Total length 265 millim.

A single specimen from Niamkolo. Native name: *Pamba ekundu* (Red Pamba).

This species, although very closely related to the preceding, is easily distinguished from it by its much narrower interorbital region¹ and by the rounded caudal. According to Dr. Cunningham, the natives regard this fish as distinct in kind from *L. microlepis*, and they say it does not grow so large, the specimen here described being regarded by them as of the full size.

CICHLIDÆ.

29. *LAMPROLOGUS BREVIANALIS*, sp. n. (Plate XXXVI. fig. 1.)

Depth of body $3\frac{2}{3}$ times in total length, length of head 3 times. Snout pointed, a little longer than the eye, the diameter of which is contained $3\frac{1}{2}$ times in length of head and equals interorbital width; maxillary extending to below anterior border

¹ In the young *L. microlepis* the interorbital width equals at least $\frac{3}{5}$ the diameter of the eye, and it equals $\frac{3}{4}$ in a specimen nearly equal in size to the type of *L. angustifrons* (total length 245 millim.). An upper view of the head of this specimen is given on Pl. XXXV. fig. 2, for comparison. In a specimen 450 millim. long the interorbital width equals once and $\frac{1}{2}$ the diameter of the eye.

of eye; 8 rather large canine teeth in front of the upper jaw and 4 in the lower, followed by a moderately broad band of minute, villiform teeth; lateral teeth small; cheek naked, operculum scaly; pits of sensory canals very large. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XVIII-XIX 11, spines subequal from the eighth, $\frac{2}{5}$ length of head; longest soft ray $\frac{3}{5}$ length of head. Anal IV 7, fourth spine as long as longest dorsals. Pectoral rounded, $\frac{2}{3}$ length of head. Ventral reaching origin of anal. Caudal rounded. Caudal peduncle slightly longer than deep. Scales 40-43 $\frac{5-6}{12}$; lateral lines $\frac{23-29}{9-15}$. Brown, somewhat lighter beneath, with darker and lighter longitudinal streaks on the sides and five broad dark transverse bands; vertical fins with numerous round whitish spots.

Total length 83 millim.

A single specimen from Niamkolo. Native name: *Sietela*. A young specimen was obtained in Komba Bay.

Very closely allied to *L. tetracanthus* Blgr., with which it agrees in the short anal fin with only four spines. Distinguished by the larger mouth extending to below the anterior border of the eye, and by the absence of a whitish marginal band on the dorsal fin.

30. LAMPROLOGUS ELONGATUS Blgr.

This species, which was established on young specimens, proves to be the giant of the genus, exceeding *L. lemairii* in size. Three large specimens were brought home by Dr. Cunningham.

1. Niamkolo, off Mtondwe Island. Native name: *Kibua*. Total length 325 millim.

D. XVIII 11; A. V 9; Sq. 90 $\frac{11}{25}$; L. 1. $\frac{45}{26}$.

2. Sumbu. Total length 120 millim. D. XVII 10; A. V 8; Sq. 85 $\frac{11}{25}$; L. 1. $\frac{47}{24}$.

3. Niamkolo Bay, taken from an empty *Neothauma* shell, dredged in a few fathoms.

Total length 63 millim. D. XVIII 10; A. VI 8; Sq. 92 $\frac{11}{27}$; L. 1. $\frac{36}{15}$.

The cheek, which is naked in the young, is much deeper (3 times diameter of eye) and covered with very small scales in the adult. The depth of the body is contained from $3\frac{2}{3}$ to 4 times in the total length, the length of the head $2\frac{3}{4}$ to 3 times. Diameter of eye, in the adult, 8 times in length of head, 3 times in length of snout, once and $\frac{1}{2}$ in interorbital width; the band of minute teeth behind the canines is much broader than in the young, and the longest rays of the dorsal and anal fins measure nearly $\frac{2}{3}$ the length of the head.

Dr. Cunningham describes the adult, when fresh, as black with white mottling. The vertical fins are dark brown, with round light spots.

Dr. Cunningham has noted that the fish readily takes artificial spinning-bait.

31. *LAMPROLOGUS CUNNINGTONI*, sp. n. (Plate XXXVI. fig. 2.)

Depth of body $3\frac{3}{4}$ to $4\frac{1}{4}$ times in total length, length of head $3\frac{1}{3}$ times. Snout obtusely pointed, twice as long as eye, the diameter of which is contained 5 times in length of head, and once and $\frac{1}{4}$ in interorbital width; maxillary not extending quite to below anterior border of eye; 6 large canines in front of upper jaw, 4 in front of lower, followed by a rather broad band of minute, villiform teeth; lateral teeth small; cheek naked, its depth once and $\frac{1}{2}$ diameter of eye; operculum with a few scales. Gill-rakers short, 8 on lower part of anterior arch. Dorsal XX 10-11, spines increasing in length to the last, which measures about $\frac{1}{3}$ length of head; soft dorsal acutely pointed behind, longest ray measuring $\frac{2}{3}$ length of head. Anal V 7, last spine longest, as long as last dorsal ray; the fin pointed like the dorsal. Pectoral rounded, $\frac{3}{5}$ length of head. Ventral reaching vent or a little beyond. Caudal rounded. Caudal peduncle once and $\frac{1}{3}$ as long as deep. Scales 85-87 $\frac{8-10}{20-21}$; lateral lines $\frac{54-55}{26-35}$. Greyish brown above, white beneath; small light spots on the sides; very indistinct traces of five or six dark bars across the back; vertical fins brown, with rather indistinct small roundish light spots. Young with 7 or 8 regular dark bars on the body.

Total length 190 millim.

Two adult specimens from Moliro, native name *Msheshe*; and two young from Mbete, native name *Twinanzoli*.

This species is allied to *L. elongatus*, but easily distinguished by the rounded caudal fin, the shorter and fewer gill-rakers (8 instead of 12), and the more numerous spines in the dorsal fin (20 instead of 17 or 18).

32. *LAMPROLOGUS TRETOCEPHALUS* Blgr.

A single specimen from Kigoma. Native name: *Ndubu*. Total length 53 millim. D. XVII 10; A. V 6; Sc. 42 $\frac{7}{15}$; L. 1. $\frac{29}{10}$. Snout not longer than eye; canine teeth very small; ventral fin reaching beyond origin of anal.

33. *LAMPROLOGUS MONDABU*, sp. n. (Plate XXXVI. fig. 3.)

Depth of body $3\frac{2}{3}$ times in total length, length of head 3 times. Snout pointed, once and $\frac{2}{3}$ to twice as long as eye, the diameter of which is contained $4\frac{1}{2}$ to 5 times in length of head and equals or is slightly less than interorbital width; maxillary extending to halfway between verticals of nostril and eye; 6 large canines in front of each jaw, followed by a rather broad band of minute, villiform teeth; lateral teeth small; cheek naked, its depth once and $\frac{1}{3}$ diameter of eye; operculum with a few scales. Gill-rakers very short, 7 or 8 on lower part of anterior arch. Dorsal XIX 9; spines increasing in length to the last, which measures $\frac{2}{5}$ length of head; soft dorsal acutely pointed behind, longest ray measuring $\frac{3}{4}$ length of head. Anal V 7, last spine longest, $\frac{1}{3}$ length of head; the fin pointed like the dorsal. Pectoral rounded, $\frac{2}{3}$ length of head.

Ventral reaching origin of anal. Caudal slightly emarginate. Caudal peduncle as long as deep. Scales 42-46 $\frac{7-8}{13-14}$; lateral lines $\frac{25-27}{9-14}$. The coloration, in fresh specimens, as noted by Dr. Cunningham, varies from grey to olive, rather lighter below, but very uniform; dorsal edged with yellow, bluish in its upper portion, with yellow spots; upper half of caudal minutely spotted with yellow, lower half darker.

Total length 105 millim.

Two specimens. Native name: *Mondabu*.

Allied to *L. modestus*. Distinguished by the slightly emarginate caudal fin and the shorter mouth.

34. *LAMPROLOGUS MODESTUS* Blgr.

A young specimen from Komba Bay.

D. XX 8; A. VI 6; Sc. 36 $\frac{4}{13}$; L. 1. $\frac{19}{5}$. Yellowish, with 7 brown lines across the back.

35. *LAMPROLOGUS MULTIFASCIATUS*, sp. n. (Plate XXXV. fig. 3.)

Depth of body $3\frac{1}{4}$ to $3\frac{1}{2}$ times in total length, length of head $2\frac{3}{4}$ to 3 times. Snout obtusely pointed, as long as the eye, the diameter of which is contained $3\frac{1}{3}$ times in length of head and equals interorbital width; maxillary extending to below anterior border of eye, or a little beyond; 8 canine teeth in front of each jaw, outer very large, followed by a narrow band of villiform teeth; lateral teeth small; cheek naked, operculum scaly. Gill-rakers moderately long, 8 on lower part of anterior arch. Dorsal XVII-XVIII 8-9, spines subequal from the eighth or ninth, about $\frac{2}{5}$ length of head; longest soft ray $\frac{1}{2}$ length of head. Anal VI-VII 6, last spine slightly longer than longest dorsal. Pectoral rounded, $\frac{3}{5}$ length of head. Ventral nearly reaching origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales 35-38 $\frac{3-4}{10-11}$; upper lateral line short, 8-15, lower absent. Pale brown above, white beneath, with 16 or 17 very regular dark brown bars, the last 3 or 4 of which are on the caudal fin; dorsal fin with oblique dark brown bars.

Total length 34 millim.

Five specimens from Niamkolo Bay, dredged among shells in about 12 fathoms.

This little fish is easily distinguished from all its congeners by its elegant markings and by the total absence of the lower lateral line.

36. *LAMPROLOGUS LEMAIRII* Blgr.

Eight specimens from Niamkolo, measuring 102 to 220 millim. Native names: *Kibua*, *Miseke* or *Moseke*, *Sietela*.

Seven specimens have 19 spines and 7 soft rays in the dorsal fin, one has 18 spines and 8 soft rays; in the largest specimen the dorsal spines increase in length to the

last, which measures half the length of the head, and the pectoral fin measures two-thirds the length of the head. The anal spines number constantly 8; one specimen has 6 soft anal rays, the others having 5. The adult specimen is of a uniform dark brown; the other specimens, according to the collector's notes, were grey-brown or olive above, shading to white beneath, the scales of the upper parts dark-edged; the dark bars on the body less distinct than in the type specimen; the dorsal fin is tipped with black, the pectorals are olive and the ventrals black.

37. *LAMPROLOGUS HECQUI* Blgr.

Two specimens from Niamkolo Bay, taken in an empty *Neothauma* shell, and three from Mtondwe Bay. Total length 45-60 millim. Regarded by the native fishermen as adult, and called by them *Kitota*, *Nyonga*, and *Mpama*.

Depth of body $3\frac{1}{2}$ to $3\frac{2}{3}$ times in total length. Dorsal XVIII-XIX 8-9; anal VI-VII 7-8. Scales 52-56 $\frac{5-7}{15-17}$; lat. l. $\frac{25-36}{4-10}$. Gill-rakers rather long and slender, 12 to 15 on lower part of anterior arch. Grey above, lighter below, with 8 or 9 dark vertical bars on each side, or large blotches alternating with narrow bars; a more or less distinct dark round spot at the root of the caudal fin; vertical fins with dark bars; dorsal fin and upper part of caudal with a pale border faintly edged with black, as in *L. callipterus*.

38. *LAMPROLOGUS CALLIPTERUS*, sp. n. (Plate XXXVI. fig. 4.)

Depth of body equal to length of head, $3\frac{1}{3}$ to $3\frac{1}{2}$ times in total length. Snout obtusely pointed, once and $\frac{1}{2}$ as long as eye, the diameter of which is contained 4 times in length of head and hardly equals interorbital width; maxillary extending to below anterior border of eye; 6 or 8 large canines in front of each jaw, followed by a moderately broad band of minute, villiform teeth; lateral teeth small; cheek entirely naked or almost so; operculum with large scales. Gill-rakers rather long, 10 to 12 on lower part of anterior arch. Dorsal XVIII-XIX 9, spines increasing in length to the last, which measures nearly $\frac{1}{2}$ length of head; soft dorsal acutely pointed, longest ray $\frac{2}{3}$ to $\frac{3}{4}$ length of head. Anal VIII 7-8, last spine nearly as long as last spine of dorsal; the fin pointed like the dorsal. Pectoral rounded, about $\frac{2}{3}$ length of head. Ventral extending to origin of anal, or beyond. Caudal rounded. Caudal peduncle once and $\frac{1}{3}$ to once and $\frac{1}{2}$ as long as deep. Scales 38-40 $\frac{4}{10-11}$; lateral lines $\frac{24-25}{10-13}$. Brown or olive above, paler or whitish below, the scales edged with darker; dorsal fin with a yellow border finely edged with blackish, this border continued on the upper third of the caudal; vertical fins with numerous small round whitish spots.

Three specimens, measuring from 90 to 125 millim. The largest is from Mpala, the two others from Niamkolo. Native name: *Zagezi* and *Miseke* or *Moseke*.

Allied to *L. lemairii* and *L. hecqui*. Distinguished from the former by the longer gill-rakers, the broader interorbital space, fewer scales in a vertical series, and more numerous soft rays in the anal fin; from the latter by larger scales and 8 anal spines instead of 6 or 7.

39. *LAMPROLOGUS RETICULATUS*, sp. n. (Plate XXXV. fig. 4.)

Depth of body 4 times in total length, length of head $3\frac{1}{4}$ times. Snout pointed, as long as the eye, the diameter of which is contained $3\frac{1}{4}$ times in length of head and equals interorbital width; maxillary extending to below anterior fourth of eye; canines very small, followed by a narrow band of minute, villiform teeth; a few scales on the cheek; operculum with large scales. Gill-rakers short, 14 on lower part of anterior arch. Dorsal XIX 10, spines increasing in length to the last, which measures $\frac{1}{2}$ length of head; longest soft dorsal ray but slightly longer than longest spine. Anal VIII 8, last spine as long as last dorsal spine. Pectoral rounded, $\frac{3}{4}$ length of head. Ventral extending to origin of anal. Caudal truncate, slightly emarginate. Caudal peduncle once and $\frac{1}{2}$ as long as deep. Scales $39\frac{4}{13}$; lateral lines $\frac{27}{14}$. Brown, the scales edged with darker, forming a reticulate pattern; dorsal and anal fins dark brown, with oblique rows of round whitish spots; caudal fin brown, with numerous, rather indistinct light spots at the base, and an oblique whitish streak in the upper corner.

Total length 62 millim.

A single specimen from Vua. Native name: *Zagezi*, like *L. callipterus*.

Distinguished from *L. callipterus*, the young of which it resembles in coloration, by the truncate caudal fin and the smaller teeth.

40. *LAMPROLOGUS CALLIURUS*, sp. n. (Plate XXXV. fig. 5.)

Depth of body $2\frac{3}{4}$ to 3 times in total length, length of head 3 times. Snout obtuse, a little shorter than the diameter of the eye, which is $\frac{1}{3}$ length of the head and a little greater than interorbital width; maxillary extending to below anterior fourth of eye; outer canines strong, curved; a narrow band of minute, villiform teeth; cheek naked; operculum scaly. Gill-rakers long and slender, 14 to 16 on lower part of anterior arch. Dorsal XVII-XVIII 7; spines subequal from the eighth or ninth, measuring about $\frac{1}{2}$ length of head; soft rays a little longer. Anal VIII 6-8, last spine nearly as long as longest dorsal spines. Pectoral rounded, $\frac{2}{3}$ length of head. Ventral extending beyond origin of anal. Caudal truncate. Caudal peduncle a little deeper than long. Scales $35-36\frac{3-4}{12-13}$; lateral lines $\frac{15-23}{3-10}$. Yellow, brownish on the back, with rather indistinct darker bars across the back and across the caudal fin; a sharply defined black opercular spot, edged with silvery in front.

Total length 50 millim.

Three specimens, dredged among shells in about 30 fathoms at Tembwi.

Nearly allied to *L. brevis*. Differing in the truncate caudal and in the longer and more numerous gill-rakers.

41. *LAMPROLOGUS BREVIS* Blgr.

This species was founded on a single specimen, 35 millim. long, obtained by Captain Hecq at Albertville. The Cunningham collection contains two specimens, measuring 45 and 38 millim. respectively, from Rumonge, which agree very closely with the type, but show variation in the fin-rays, viz.:—D. XVII–XVIII 7; A. VII–VIII 6. Depth of body equal to length of head, 3 times in total length. 30 to 35 scales in a longitudinal series; scales on nape very small. Uniform brown above, whitish beneath; fins brown, without spots, dorsal tipped with black, ventrals black at the end; opercular black spot strongly marked.

42. *LAMPROLOGUS COMPRESSICEPS* Blgr.

A single young specimen from Niamkolo.

The number of species of *Lamprologus* now known from Lake Tanganyika amounts to 18, the principal characters of which are tabulated on p. 562.

43. *TELMATOCHROMIS TEMPORALIS* Blgr.

11 specimens from Kaboge, Mshale, Kituta, Mtondwe Bay, and Niamkolo Island. Native names: *Mbulila*, *Fisia* (young), and *Kamfoto* (young).

Dorsal XVIII–XX 7–10; Anal VI–VII 6–7; Sq. 40–47 $\frac{4-6}{14-15}$; L. 1. $\frac{14-27}{3-16}$.

Dr. Cunningham describes the adult as olive, with dark patches in dorsal region and irregular blotches on body and root of tail; the temporal band orange; dorsal fin spotted with yellow and white, and tipped with red; caudal and anal spotted with yellow and white. In the young the body may be crossed by dark bars; the temporal band is very distinct, and the bar at the base of the pectoral fin is edged with whitish behind.

44. *PARATILAPIA FRONTOSA*, sp. n. (Plate XXXVII. fig. 1.)

Depth of body twice and $\frac{1}{2}$ in total length, length of head nearly 3 times. Forehead gibbose¹, the head at the interorbital region as deep as the body; snout twice and $\frac{1}{3}$ as long as the eye, the diameter of which is contained $5\frac{1}{3}$ times in length of head and nearly twice in interorbital region; maxillary not extending to below anterior border of eye; 3 series of teeth in each jaw, outer large; 5 series of scales on the cheek; large scales on the operculum. Gill-rakers rather long, 13 on lower part of anterior arch. Dorsal XIX 8; spines increasing in length to the last, which measures a little

¹ Probably in adult males only.

Principal Characters of the Species of Lamprologus.

	Dorsal.	Anal.	Scales.	Gill-rakers.	Caudal.
<i>L. brevianalis</i>	XVIII-XIX 11	IV 7	40-43 $\frac{5-6}{12}$	9	Rounded.
<i>L. tetracanthus</i>	XX 10	IV 7	41 $\frac{8}{15}$	10	Rounded.
<i>L. elongatus</i>	XVII-XVIII 10-11	V-VI 7-9	85-95 $\frac{10-11}{22-28}$	12	Truncate.
<i>L. cunningtoni</i>	XX 10-11	V 7	85-87 $\frac{8-10}{20-21}$	8	Rounded.
<i>L. tretocephalus</i>	XVI-XVII 10-11	V 6	37-42 $\frac{7-8}{15}$	9	Rounded.
<i>L. mondabu</i>	XIX 9	V 7	42-46 $\frac{7-8}{13-14}$	7-8	Slightly emarginate.
<i>L. modestus</i>	XIX-XX 8-10	V-VI 6-7	36-40 $\frac{4-6}{12-14}$	7	Truncate.
<i>L. multifasciatus</i>	XVII-XVIII 8-9	VI-VII 6	35-38 $\frac{3-4}{10-11}$	8	Rounded.
<i>L. lemairii</i>	XVIII-XIX 7-8	VIII 5-6	40-48 $\frac{8-11}{16-18}$	9-10	Rounded.
<i>L. hecqui</i>	XVIII-XIX 8-9	VI-VII 7-8	52-57 $\frac{5-7}{15-17}$	12-16	Rounded.
<i>L. moorii</i>	XIX-XX 8-9	VII-VIII 6-7	33-35 $\frac{5-7}{11-12}$	9-10	Rounded.
<i>L. callipterus</i>	XVIII-XIX 9	VIII 7-8	38-40 $\frac{4}{10-11}$	10-12	Rounded.
<i>L. reticulatus</i>	XIX 10	VIII 8	39 $\frac{4}{13}$	14	Truncate.
<i>L. calliurus</i>	XVIII-XIX 8	VIII 6-8	35-36 $\frac{3-4}{12-13}$	14-16	Truncate.
<i>L. brevis</i>	XVII-XVIII 6-7	VII-IX 5-6	33-35 $\frac{3}{13}$	9	Rounded.
<i>L. compressiceps</i>	XX-XXI 6	X 5	32-33 $\frac{5}{12}$	15	Rounded.
<i>L. fasciatus</i>	XIX 8	X 6	46 $\frac{5}{10}$	12	Rounded.
<i>L. furcifer</i>	XIX-XXI 7-9	VI-VII 5-6	50-60 $\frac{6-8}{16-20}$	14-16	Deeply notched.

less than $\frac{1}{3}$ length of head; soft dorsal much produced, longest ray nearly as long as head. Anal III 7, third spine as long as, but stronger than, last dorsal, soft rays like those of dorsal. Pectoral acutely pointed, as long as head, reaching origin of anal. Ventral produced into a long filament, extending beyond origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales $36 \frac{5}{20}$; lateral lines $\frac{23}{15}$. Brownish above, whitish beneath, with six broad dark cross-bands, the last two on the caudal peduncle; a dark brown opercular spot and a large dark brown spot at the base of the pectoral fin; fins without markings.

Total length 255 millim.

A single specimen from Kigoma. Native name: *Ndubu*.

This species occupies an isolated position. The number of spinous rays in the dorsal fin exceeds that of any species previously described of the genus *Paratilapia*.

45. *PARATILAPIA PFEFFERI* Blgr.

Two specimens from Sumbu. Native name: *Kilomo*.

Dorsal XVI 9-10; Anal III 7-8; Scales 32-33 $\frac{3-4}{10}$; Lateral lines $\frac{22}{10-14}$. 3 or 4 series of scales on the cheek.

Dr. Cunningham has noted that the female nurses the embryos in her mouth. One of the specimens, measuring 72 millimetres, has a few large ova ($2\frac{1}{2}$ millim. in diameter) in the pharynx.

46. *PARATILAPIA VENTRALIS* Blgr.

Two specimens from Sumbu. Native name: *Lala*.

Dr. Cunningham describes the coloration as follows:—Blackish all over, but with blues and greens showing in places; dorsal fin light blue-green, tipped with blackish; anal similar, but with broader band of black; ventrals black, bright yellow and bifurcate at the end.

47. *PARATILAPIA DEWINDTI* Blgr.

One specimen from Sumbu and one from Lofu River. Native name: *Kisangi*.

Depth of body equal to length of head, twice and $\frac{3}{4}$ in total length. Lateral lines $\frac{30-34}{11-18}$. Described by Dr. Cunningham as dark olive above, silvery below, with five longitudinal stripes of violet alternating with stripes of yellowish; a black blotch on the gill-cover behind the eye; gular region yellowish; dorsal fin with brownish stripes and tipped with yellow; caudal with olive vertical bars; ventrals and anal blackish at the ends.

48. *PARATILAPIA FURCIFER* Blgr.

Two specimens from Niamkolo and two from Sumbu. Native names: *Liukonko* (plural *Makonko*) and *Lala*.

The largest specimen measures 135 millim., the types not exceeding 110 millim. In these large specimens the length of the eye equals that of the snout and the interorbital width and $\frac{1}{3}$ the length of the head. Dorsal XIII-XIV 12-14; Anal III 9; Scales 60-64 $\frac{5-6}{18}$; Lateral lines $\frac{50-58}{23-33}$.

Dr. Cunningham describes the colour as olive above, lighter to silvery below, with bright iridescent blues and greens; gill-cover yellow; dorsal and anal fins light iridescent violet, with oblique stripes of yellow passing into dark stripes posteriorly,

the rays tipped with black; caudal yellow, with dark dorsal and ventral margins; ventrals light bluish with some yellow stripes, the produced filaments tipped with yellow.

49. *PARATILAPIA STENOSOMA* Blgr.

A single specimen, measuring 240 millim., from Kaboge.

Dorsal XV 13; Anal III 14; Scales $69 \frac{6}{13}$; Lat. 1. $\frac{69}{36}$, the upper extending uninterrupted from above the operculum to the root of the caudal fin. 28 gill-rakers on lower part of anterior arch.

50. *BATHYBATES FEROX* Blgr.

Two specimens from Niamkolo and two from Kasakalawe. Native names: *Lilembela* (plural *Malambela*) and *Molirdi*.

These specimens measure 160 to 275 millim. and have the fin-formula: D. XIV 15, A. III 16-17. 14 or 15 gill-rakers on lower part of anterior arch. The length of the pectoral fin may not exceed $\frac{2}{3}$ that of the head.

51. *BATHYBATES FASCIATUS* Blgr.

A single specimen, measuring 335 millim., from Niamkolo. Native name: *Mishipa*.

Dorsal XVI 17; Anal III 17; 19 gill-rakers on lower part of anterior arch; Scales $150 \frac{11}{32}$; Lat. 1. $\frac{80}{48}$. Length of head $3\frac{1}{4}$ times in total length. Caudal peduncle twice as long as deep. The black basal band on the dorsal fin is absent.

52. *BATHYBATES MINOR*, sp. n. (Plate XXXVIII. fig. 1.)

Depth of body $3\frac{1}{2}$ to $3\frac{2}{3}$ times in total length, length of head $2\frac{3}{4}$ to 3 times. Snout with convex profile, slightly longer than the eye, the diameter of which is contained $3\frac{1}{2}$ to $3\frac{2}{3}$ times in length of head and slightly exceeds interocular width; maxillary extending to below anterior border of eye; teeth in 2 or 3 series in the upper jaw, in 2 in the lower; 5 series of small scales on the cheek. Gill-rakers rather short and thin, 12 on lower part of anterior arch. Dorsal XIII 15-16, deeply notched, the eighth to eleventh spines being only about half as long as the fifth and last, which are the longest and measure about $\frac{2}{7}$ length of head; longest soft rays $\frac{2}{5}$ to $\frac{1}{2}$ length of head. Anal III 16-17, longest soft rays $\frac{2}{5}$ to $\frac{1}{2}$ length of head. Pectoral pointed, $\frac{2}{3}$ length of head. Ventral not reaching vent. Caudal forked. Caudal peduncle $1\frac{1}{2}$ to $1\frac{2}{3}$ times as long as deep. Scales small and very irregular, 90-95 $\frac{9-10}{27-30}$; lateral lines $\frac{63-71}{37-39}$. Brown above, silvery on the sides and below; spinous dorsal black, white at the base; a black streak along the middle of the soft dorsal.

Total length 160 millim.

Two specimens from Kituta and Lofu. Native names: *Nswepa* and *Lulambi*. Also

some quite young specimens, 30 to 35 millim. long, from Mbete. Several specimens had previously been obtained by Mr. Moore on the Usambara market; but they were badly preserved, and I took them to be the young of *B. ferox*.

Pellegrin has placed *Bathybates* in his division "Opisthospondyli"¹. I can see no justification for this course, the vertebral column not differing notably from such forms as *Paratilapia robusta* and *longiceps*. *Bathybates* is more nearly related to *Paratilapia* than to any other genus, differing chiefly in the longer anal fin and in the dentition; this consists of an outer series of ankylosed teeth, behind which are one to three series of hinged depressible teeth. We are now acquainted with three species, the principal characters of which may be contrasted as follows:—

I. Spinous dorsal fin not notched, the posterior spines subequal; 3 or 4 series of teeth in the upper jaw, 3 in the lower.

D. XIV–XV 15–16; A. III 16–17; Sq. 78–100 $\frac{7-8}{35-38}$; 13–15 gill-rakers on

lower part of anterior arch; interocular width less than diameter of eye. *B. ferox* Blgr.

D. XVI 16–17; A. III 17–18; Sq. 140–150 $\frac{11}{25-32}$; 18–19 gill-rakers on

lower part of anterior arch; interocular width greater than diameter of eye *B. fasciatus* Blgr.

II. Spinous dorsal notched, the last spine twice as long as the antepenultimate; 2 or 3 series of teeth in the upper jaw, 2 in the lower.

D. XIII 15–16; A. III 16–17; Sq. 90–95 $\frac{9-10}{27-30}$; 12 gill-rakers on lower

part of anterior arch; interocular width slightly less than diameter of eye *B. minor* Blgr.

I may here add, as a correction to the original diagnosis of the genus, that well-preserved specimens show the maxillary bone not to be exposed when the mouth is fully closed.

HAPLOTAXODON, g. n.

Mouth nearly vertical, directed upwards, with a single series of small, equal, conical teeth. Maxillary exposed at the end. Body elongate, strongly compressed, covered

¹ So far as I am acquainted with the number of vertebræ in the African Cichlidæ, the following species only are to be referred to this division:—

<i>Enantiopus longianalis</i>	14+24=38.
<i>Xenotilapia sima</i>	13+22=35.
„ <i>ornatipinnis</i>	14+24=38.
<i>Grammatotria lemairii</i>	14+22=36.
<i>Trematocara unimaculatum</i>	12+19=31.
„ <i>nigrifrons</i>	13+16=29.
<i>Asprottilapia leptura</i>	15+20=35.

All*generic forms restricted, according to the present state of our knowledge, to Lake Tanganyika.

with small ctenoid scales; two lateral lines, the upper complete. Dorsal with 17 or 18 spines, anal with 3. Vertebrae 38 (19+19).

The presence of a single series of teeth distinguishes this genus from *Paratilapia*, with which it is connected by *P. stenosoma*.

53. *HAPLOTAXODON MICROLEPIS*, sp. n. (Plate XXXVIII. fig. 2.)

Depth of body $3\frac{1}{3}$ to $3\frac{1}{2}$ times as long as deep, length of head $3\frac{1}{2}$ to $3\frac{2}{3}$ times. Snout much shorter than the eye, chin very prominent; eye very large, $2\frac{3}{4}$ to 3 times in length of head (chin included), its diameter much greater than interocular width; maxillary not extending to below anterior border of eye; two series of scales on the cheek; opercle scaly. Gill-rakers long and slender, closely set, 18 to 20 on lower part of anterior arch. Dorsal XVII-XVIII 11-12; spines strong, equal in length from the 9th or 10th, $\frac{1}{2}$ length of head; longest soft rays about $\frac{2}{3}$ length of head. Anal III 9; spines very strong, 3rd longest, $\frac{1}{2}$ length of head. Pectoral acutely pointed, slightly shorter than head, not reaching origin of anal. Ventral produced into a filament extending a little beyond origin of anal. Caudal peduncle twice as long as deep. Caudal deeply notched. Scales 70-77 $\frac{6}{23-24}$; lateral lines $\frac{65-77}{36-44}$; 4 or 5 series of scales between the lateral lines in front. Olive or grey above, shading off to silvery white below; dorsal and caudal grey-brown, with yellowish-white large round spots; anal and ventrals white, tinged with yellow.

Total length 210 millim.

One specimen from Niamkolo (native name *Liukonko*, plural *Makonko*), one from Kasawa, and one from Kasanga (native name *Lukoko*).

54. *PELMATOCHROMIS POLYLEPIS* Blgr. (Plate XXXVII. fig. 2.)

Mtondwe Bay and Niamkolo, four specimens, measuring from 102 to 300 millim. Dr. Cunningham measured one of 435 millim. Dorsal XV 13-15; Anal III 8; gill-rakers 12-14 on lower part of anterior arch; Scales 58-67 $\frac{7-8}{3}$; Lateral lines $\frac{30-33}{41-44}$. In the largest specimen the snout is once and two-thirds as long as the eye, which is 4 times in the length of the head. The smallest specimen (here figured) is remarkable in having the 3rd to 5th spines of the dorsal longest, half the length of the head. The coloration is described by Dr. Cunningham as greyish or brownish grey above, white below, with or without five or six inconspicuous vertical darker stripes on the body; the markings on the dorsal fin brown; patches of red at the angle of the jaws and at the roots of the paired fins; a red vertical stripe on the gill-cover; anterior rays of dorsal tipped with red.

According to Dr. Cunningham, the female carries eggs in her mouth.

Native names: *Sanga* and *Kanga*.

55. PELMATOCHROMIS MELANOSTIGMA, sp. n. (Plate XXXIX. fig. 1.)

Depth of body $2\frac{3}{4}$ to $3\frac{1}{4}$ times in total length, length of head $2\frac{3}{4}$ to $2\frac{3}{4}$ times. Snout with more or less curved upper profile, as long as or a little shorter than the eye, which is $2\frac{3}{4}$ to 3 times in length of head and exceeds interocular width; mouth extending to below anterior border of eye; teeth forming a narrow villiform band, some on the sides of the lower jaw strongly enlarged; two series of scales on the cheek. Gill-rakers short, 10 to 12 on lower part of anterior arch. Dorsal XV–XVI 11–12; spines rather strong, equal in length from the sixth or seventh, $\frac{2}{5}$ to $\frac{1}{3}$ length of head; longest soft rays $\frac{1}{2}$ length of head. Anal III 6–7; third spine a little shorter than longest dorsals. Pectoral acutely pointed, slightly shorter than head, reaching origin of anal. Ventral reaching origin of anal or beyond. Caudal peduncle once and $\frac{1}{2}$ as long as deep. Caudal deeply notched. Scales finely denticulate, 34–48 $\frac{3\frac{1}{2}-4\frac{1}{2}}{11}$; lateral lines $\frac{30-35}{15-23}$. Dark olive above, yellow on the sides, lighter to silvery below; more or less regular longitudinal series of small black spots on the back and sides; a blackish opercular spot; a reddish spot below the eye; dorsal fin yellow, tipped with blackish, with black spots, which may form oblique series, and an orange marginal band in front; pectoral yellow; gular region and ventral fins orange. In other specimens the black spots are absent and the dorsal and anal may be broadly edged with black.

The vertebrae number 34 (16+18).

Total length 115 millim.

Two specimens from Uvira (native name *Mariongo*), one from Kaboge (same native name), five from Niamkolo (native name *Malenda* or *Marenda*), one from Lofu (same native name), and one from Kituta.

56. PELMATOCHROMIS PLEUROSPILUS, sp. n. (Plate XXXIX. fig. 2.)

Depth of body $3\frac{1}{2}$ times in total length, length of head $2\frac{3}{4}$ to 3 times. Snout with curved upper profile, as long as the eye, which is 3 times in length of head and a little exceeds interocular width; mouth not extending quite to below anterior border of eye; teeth forming a narrow villiform band; two series of scales on the cheek. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XII–XIII 12–13; spines equal in length from the fifth, $\frac{1}{3}$ length of head, soft rays not longer. Anal III 7–8; third spine as long as longest dorsals. Pectoral acutely pointed, slightly shorter than head, reaching origin of anal. Ventral reaching origin of anal. Caudal peduncle twice and $\frac{1}{2}$ as long as deep. Caudal deeply notched. Scales finely denticulate, 32–35 $\frac{2\frac{1}{2}}{10}$; lateral lines $\frac{22-28}{8-14}$. Olive above, silvery white beneath; a black opercular spot, followed by a series of six black spots along the side of the body; the back of the male shot with red; dorsal with blackish or brownish spots, tipped with black; dorsal and anal edged with orange, more conspicuously in the male than in the female; pectoral

yellow or orange; caudal with an orange band, with (♂) or without (♀) white and grey markings.

Total length 75 millim.

Three specimens from Mpala and three from Tembwi. Native name: *Sembe*.

The females carry eggs in the mouth.

57. *PELMATOCHROMIS RHODOSTIGMA*, sp. n. (Plate XXXIX. fig. 3.)

Depth of body $3\frac{1}{2}$ times in total length, length of head 3 times. Snout with slightly curved upper profile, as long as the eye, which is 3 times in length of head and slightly exceeds interocular width; mouth extending to below anterior border of eye; teeth forming a narrow villiform band, some enlarged and curved on the side of the lower jaw; two series of scales on the cheek. Gill-rakers short, 10 on lower part of anterior arch. Dorsal XIII 13-14, spines equal from the fifth, about $\frac{2}{3}$ length of head, soft rays not longer. Anal III 7-8, third spine as long as longest dorsals. Pectoral acutely pointed, as long as head, reaching origin of anal. Ventral reaching origin of anal. Caudal peduncle once and $\frac{1}{2}$ as long as deep. Caudal deeply notched. Scales finely denticulate, 34-35 $\frac{3\frac{1}{2}}{11}$; lateral lines $\frac{23}{8}$. Olive above, silvery white below; longitudinal series of pink dots on the body; throat pink; dorsal streaked with pink; pectorals and ventrals pink; a pink band on each lobe of the caudal.

Total length 75 millim.

Two specimens from Mshale. Native name: *Kasalu*.

This species is closely allied to the preceding. It differs in the enlarged teeth on the sides of the lower jaw and in the number of scales in a transverse series.

58. *PELMATOCHROMIS AURITUS* Blgr. (Plate XXXIX. fig. 4.)

Two adult specimens from the Kazzaga market, native name *Kibombobombo*; three young from Mshale, native name *Kanyamitenga*.

The coloration of the adult when fresh is described as light olive above, silvery below, with a good deal of yellow towards the tail; three or four longitudinal rows of iridescent bluish spots in the middle third of the body; dorsal and anal fins with white spots, the former tipped yellow and black; pectorals yellowish, ventrals white; caudal with white spots and yellow bars, and tipped blackish. Young specimens, measuring 65-70 millim. (Plate XXXIX. fig. 4), have very distinct silvery oblique stripes on the body; the dorsal and anal fins are uniform brown. The caudal fin of these young specimens is truncate, not emarginate.

I agree with Pellegrin in referring this species, originally described as a *Paratilapia*, to *Pelmatochromis*.

59. *ECTODUS DESCAMPSI* Blgr.

Three specimens from Sumbu. Native name: *Kasha*.

Total length 80 millim. In his notes Dr. Cunningham mentions that these are

apparently full-sized females, with eggs in the mouth. A few eggs, measuring 4 millim. in diameter, are still in the pharynx.

Dorsal XIII 5; Anal III 10-11; Scales 37-38 $\frac{3}{11}$; Lateral lines $\frac{27-31}{18-19}$; 17 gill-rakers on lower part of anterior arch. Vertebrae 36 (17+19).

This genus was established for two species, *E. descampsi* and *E. melanogenys*. The second differs, however, in having the inner rays of the ventral fin longest and the caudal vertebrae much more numerous than the præcaudals, characters which it shares with *Xenotilapia*; whilst in the first the outer soft rays of the ventral are, as usual, the longest, and the caudal vertebrae do not differ much in number from the præcaudals. I therefore propose a new genus, ENANTIOPUS, for *E. melanogenys* and its near ally *E. longianalis*.

60. ENANTIOPUS MELANOGENYS Blgr.

Two specimens, 70-75 millim. long, from Kigoma. Native name: *Mulunda*.

Dorsal XIV 15; Anal III 13; Scales 40 $\frac{3}{9-10}$; Lateral lines $\frac{22-27}{11-12}$; 11 or 12 gill-rakers on lower part of anterior arch.

61. ENANTIOPUS LONGIANALIS Blgr.

Three specimens from Mbete, native name *Kieta*; two from Moliro, native name *Karonda*; one from Rumonge and one from Sumbua. The last two, females, carrying eggs in the pharynx. These specimens measure 100 to 135 millim.

Dorsal XIV 16-17; Anal III 16-17; Scales 40-42 $\frac{3}{9}$; Lateral lines $\frac{25-29}{10-20}$; 12 or 13 gill-rakers on lower part of anterior arch.

The number of rays in the anal fin is quite sufficient for separating this species from the preceding.

62. XENOTILAPIA SIMA Blgr.

Two specimens, measuring 130 millim., from Niamkolo. Native name: *Mtununu*.

Dorsal XIV 14; Anal III 11; Scales 37-38 $\frac{3}{10}$; Lateral lines $\frac{25-26}{24-28}$; 10 or 11 gill-rakers on lower part of anterior arch. Dr. Cunningham describes the colour as delicate brownish above, silvery below; head dark above.

63. GRAMMATOTRIA LEMAIRII Blgr.

Two specimens from Niamkolo, native name *Mendi*, and one from Kasawa, native name *Lungi*. These specimens measure from 130 to 210 millim.

Dorsal XV 14-15; Anal III-IV 10-11; Scales 52-55 $\frac{4-5}{12-14}$; Lateral lines $\frac{41-43}{24-26}$; 10 or 11 gill-rakers on lower part of anterior arch. Dr. Cunningham describes the colour as uniform grey or delicate brownish above, silvery below; opalescent blues below

the eye and on the gill-cover; dorsal fin fringed with black. The vertebrae number 36 (14+22).

64. *TREMATOCARA NIGRIFRONS*, sp. n. (Plate XLI. fig. 1.)

Depth of body $3\frac{1}{2}$ times in total length, length of head 3 times. Snout with curved upper profile, a little shorter than the eye, which is twice and $\frac{3}{4}$ in length of head and a little exceeds interorbital width; mouth extending to below anterior fourth of eye; head naked, with large cavities as in the other species of the genus. Gill-rakers long and slender, closely set, 20 or 21 on lower part of anterior arch. Dorsal X 11-12; spines feeble, increasing in length to the last, which measures $\frac{2}{5}$ length of head; last soft rays a little shorter. Anal III 10; third spine as long as longest dorsal. Pectoral acutely pointed, a little longer than the head. Ventral not reaching origin of anal. Caudal with deep crescentic notch. Caudal peduncle once and $\frac{1}{2}$ as long as deep. Scales 29-30; upper lateral line 7-8; lower lateral line absent. Yellow; a blackish bar across the interorbital region; dorsal and anal fins with a blackish streak near the edge, which is white.

Total length 75 millim.

Two specimens from Sumbu. Native name: *Kilomo*.

This species is very closely allied to *T. marginatum* Blgr., from which it differs in the longer and much more numerous gill-rakers.

Dr. Pellegrin, in his Monograph of the Cichlidæ, p. 331, has expressed his doubts as to the distinctness of *T. unimaculatum* from *T. marginatum*. A renewed examination of the specimens in the British Museum has convinced me that these doubts are not justified. *T. unimaculatum* differs from *T. marginatum* in having a smaller eye, a narrower interorbital space, a strikingly longer caudal peduncle, much stronger dorsal and anal spines, more numerous gill-rakers (17 or 18 instead of 10 to 16), and fewer soft rays in the anal fin (7 or 8 instead of 10). Considering that I have before me three specimens of *T. marginatum* and ten of *T. unimaculatum*, I feel confident that such differences, occurring in combination, cannot be merely individual; and the fact that the largest specimen of the former species measures 63 millimetres (without caudal fin) and the smallest of the latter only 70, proves that they cannot be ascribed to age, as suggested by Dr. Pellegrin. The specimens are sufficiently well preserved to show that the second or lower lateral line is totally absent; its representation on Plate XVIII. fig. 3 of my third Report in these 'Transactions' is an error of the artist, which I unfortunately overlooked.

65. *TROPHEUS MOORII* Blgr.

A single specimen from Sumbu. Native name: *Kifuta*.

Dr. Cunningham describes its colour when fresh as: "Dark reddish-brown, with

some suggestion of green, especially posteriorly; scales in dorsal region outlined with darker; dorsal and anal fins dull red, tipped with black; ventrals dark but reddish."

66. *SIMOCHROMIS DIAGRAMMA* Gthr.

Numerous specimens, measuring from 75 to 185 millim., from Niamkolo, Sumbu, Vua, and Pembe. Native names: *Impuma*, *Mbarama*, *Modi*, *Tempendi*, *Kikalakala*.

A female, measuring 92 millim., carries a few embryos in the mouth, these measuring 10 millim. and the vitelline sac $3\frac{1}{2}$.

Dr. Cunningham has taken the following notes on fresh specimens:—"Olive above, lighter below, but with the scales in the dorsal region darker on the overlap; some 9 or 10 rather faint vertical darker stripes on the body; dorsal with brownish spots, tipped black; anal with dark red border and two red spots posteriorly; caudal darker in the posterior third." Other specimens, of the male sex, are "Greyish above, shading to lighter, almost white below; all scales with olive outlines; head dark above; pectoral and ventral fins with red upper margins; dorsal tipped red and black; anterior and lower margin of anal bright red, tipped with black." Females have the "Paired fins and the anal olive, the dorsal tipped yellow and black."

67. *TILAPIA NILOTICA* L.

A perfectly typical specimen from Lofu, measuring 310 millim., with dorsal XVII 12, anal III 10, and 23 gill-rakers on lower part of anterior arch. According to Dr. Cunningham, the fish grows to 390 millim. and occurs not only in Tanganyika itself but also in a small lake and in overflowed rivers near Kombe, on the east coast. Native name: *Kiumbwi*.

T. nilotica, which has a wide distribution in Africa and Syria, had not previously been recorded from further south than Lake Kivu, where specimens were collected by Mr. Moore.

68. *TILAPIA BURTONI* Gthr.

Several specimens from Kituta and Kakonde River, Mtondwe Bay. Native names: *Fwili* and *Sidia*.

69. *TILAPIA LATIFRONS*, sp. n. (Plate XL.)

Depth of body barely twice in total length, length of head $3\frac{1}{4}$ times. Profile of snout descending in a steep, straight line; eye twice in length of snout, 5 times in length of head, twice and $\frac{1}{4}$ in interorbital width; mouth extending to between nostril and eye; outer teeth strong, bicuspid, followed, after an interspace, by small tricuspid teeth forming 5 series in the upper jaw and 4 in the lower; 3 series of scales on the cheek; large scales on the opercle. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XVI 13; spines strong, increasing in length to the last, which measures $\frac{1}{2}$

length of head; median soft rays produced, longer than head. Anal III 11; spines stronger but shorter than dorsals, third $\frac{1}{3}$ length of head; median soft rays produced, like the dorsals. Pectoral acutely pointed, as long as head, not reaching origin of anal. Ventral reaching vent. Caudal peduncle deeper than long. Caudal truncate, slightly emarginate. Scales finely denticulate, $32 \frac{3}{12}$; lateral lines $\frac{21}{13}$. Olive-green above, the scales outlined with black, bluish green to white beneath; cheek and opercle mottled green and blue, with some black; a black opercular spot; dorsal black, with regular large round blue spots, towards the edge turning to yellow with white spots; anal and caudal similarly coloured, but the spots less distinct; pectorals brown, ventrals grey.

Total length 260 millim.

A single specimen from Kituta. Native name: *Ntunka*.

This fine *Tilapia* is allied to *T. melanopleura* A. Dum. (*lata* Gthr.), but the inter-orbital space is considerably broader, there are 11 soft rays in the anal instead of 9 or 10, and the markings on the fins are different.

70. *TILAPIA HORII* Gthr.

Two adult specimens, measuring 140 millim., from Niamkolo, native name *Songa Matete*, and one young, measuring 75 millim., from Sumbu, native name *Kilomo*. Two of these specimens have 8 soft rays in the anal fin. I no longer regard *T. rubropunctata* Blgr. as separable from *T. horii*.

71. *TILAPIA DARDENII* Blgr.

Five specimens, measuring 175 to 240 millim., from Niamkolo. Native names: *Sangani*, *Nkungula*, *Masangano*.

Females have the mouth and pharynx filled with eggs, 5 or 6 millim. in diameter.

72. *TILAPIA LABIATA* Blgr.

Three specimens, measuring 330, 190, and 95 millim. respectively; two from Niamkolo and one from the Kakonde River, running into Mtondwe Bay. Native name: *Kawbo* or *Dafwa*.

All three specimens have the produced lips characteristic of the species. Dorsal XVII 10-11; Anal III 7; 16 to 20 gill-rakers on lower part of anterior arch. Dorsal and anal with round reddish-yellow spots between the soft rays; a yellow spot on the middle of the ventral.

73. *TILAPIA MICROLEPIS* Blgr.

Two specimens, measuring 285 and 265 millim. respectively, from Niamkolo. Native name: *Kupi* or *Kuhi*.

Dr. Cunningham measured a specimen 610 millim. long, and notes that the fish is said to grow still larger.

74. *TILAPIA GRANDOCULIS* Blgr.

Three specimens from Niamkolo, native name *Weswa*, and one from Sumbu, native name *Kisangi*.

Dorsal XIII-XIV 13-14; Anal III 9; Scales 58-65 $\frac{5-6}{20-22}$; Lateral lines $\frac{53-55}{22-31}$; 14 to 16 gill-rakers on lower part of anterior arch. The ventrals do not extend beyond the origin of the anal.

Dr. Cunningham describes the coloration as dark olive-brown above, shading to lighter, with some yellow, below; a series of about five irregular blackish blotches on the side of the body; dorsal with yellow spots, tipped black; pectoral slightly, ventral strongly tinged with yellow; anal with yellow markings; proximal half of caudal darker than the rest.

75. *PETROCHROMIS POLYODON* Blgr.

Two specimens from Niamkolo and one from Pembe. Native names: *Infutu* and *Ilumbu*.

In the largest specimen, 170 millim. long, the depth of the body equals the length of the head, the diameter of the eye is contained nearly 5 times in the length of the head and once and $\frac{2}{3}$ in the interorbital width. There are 6 series of scales on the cheek, and 19 spines in the dorsal fin. Its colour when fresh is noted as "Greenish brown over most of the body, but a little lighter below, with a patch of rather darker colour at the edge of each scale." A smaller specimen is described as "Olive above, shading off to lighter and greyish below, scales outlined by rather darker shade; dorsal fin with reddish tinge in anterior region and tipped black; anal with several prominent spots of bright yellow; distal half of ventrals slightly reddish."

76. *PETROCHROMIS TANGANICÆ* Gthr.

One specimen from Niamkolo and one from Kituta. Native name: *Kilongo*.

CUNNINGTONIA, g. n.

Jaws with broad bands of minute, bristle-like teeth with incurved tricuspid crowns. Maxillary largely exposed at the end. Body moderately elongate, covered with small, feebly ctenoid scales; two lateral lines, the upper complete. Dorsal with 13 spines, anal with 3. Vertebrae 36 (18 + 18).

Agrees with *Petrochromis* in the dentition, differs in the maxillary bone being largely exposed when the mouth is closed.

77. CUNNINGTONIA LONGIVENTRALIS, sp. n. (Plate XLI. fig. 2.)

Depth of body equal to length of head, 3 times in total length. Snout broad, very convex, shorter than the eye, which is $2\frac{1}{2}$ times in length of head and equals interocular width; maxillary extending to below anterior border of eye; 2 or 3 series of small scales on the cheek; large scales on the opercle. Gill-rakers rather short, 13 on lower part of anterior arch. Dorsal XIII 13; spines weak, subequal from the 7th, nearly $\frac{1}{2}$ length of head; posterior soft rays produced, $\frac{3}{4}$ or $\frac{4}{5}$ length of head. Anal III 8-9; spines weak, 3rd $\frac{1}{3}$ length of head; soft rays produced like the dorsals. Pectoral acutely pointed, as long as head, reaching beyond origin of anal. Ventral produced into a very long filament, nearly twice as long as head. Caudal peduncle once and $\frac{1}{2}$ as long as deep. Caudal with deep crescentic notch. Scales $38\frac{4}{14-15}$; lateral lines $\frac{33}{15-18}$. Bluish black above, bright silvery beneath; fins blackish.

Total length 110 millim.

Two specimens from Niamkolo. Native name: *Kalilolilo*.

This fish bears a striking resemblance to *Tilapia boops* Blgr., in which, however, the dentition is very different and the maxillary bone is almost concealed when the mouth is closed, and the vertebræ are fewer (16 + 16).

78. ERETMODUS CYANOSTICTUS Blgr.

Two specimens from Niamkolo Bay and one from Sumbu. Native name: *Kamfoto*.

Dr. Cunningham describes the colour as dark brownish grey with a number of scattered spots of a brilliant blue.

The specimen from Sumbu, a female measuring 75 millim., contained developing embryos in the mouth; some of them dropped out before the specimen could be preserved.

79. XENOCROMIS HECQUI Blgr.

A single specimen from Moliro. Confounded by the natives with the following species under the name of *Komangingi*.

80. PLECODUS PARADOXUS Blgr.

Two specimens from Kasakalawe (native name *Nkanka*), two from Niamkolo (n. n. *Nswepa*), one from Sumbu and one from Moliro (n. n. *Komangingi*).

As this remarkable fish was only known from young and defective specimens, a new description from the material now at hand seems desirable.

Depth of body nearly equal to length of head, $3\frac{1}{2}$ to 4 times in total length. Snout short and convex, as long as the eye in the adult, shorter in the young; diameter of eye 3 to $3\frac{1}{2}$ times in length of head, once to once and $\frac{1}{3}$ in interorbital width; mouth

extending to below anterior fourth of eye; jaws strong, lips thick; 18 or 20 teeth in the upper jaw, 14 or 16 in the lower; interocular region scaly, convex; 3 or 4 series of scales on the cheek; larger scales on the opercle. 18 to 20 gill-rakers on lower part of anterior arch, the posterior rather elongate. Dorsal XIX-XX 11-13; spines rather strong, subequal from the 8th or 9th, $\frac{2}{5}$ to $\frac{1}{2}$ length of head; posterior soft rays longest, $\frac{3}{5}$ length of head. Anal III 12-13; spines very strong, third longest, $\frac{2}{5}$ to $\frac{1}{2}$ length of head. Pectoral acutely pointed, $\frac{3}{4}$ to $\frac{4}{5}$ length of head. Ventral not reaching anal. Caudal peduncle once and $\frac{2}{3}$ to twice as long as deep. Caudal with deep crescentic notch. Scales 75-78 $\frac{5-6}{18-19}$; lateral lines $\frac{58-66}{44-53}$; 5 series of scales between the lateral lines anteriorly. Olive-grey above, in the fresh condition, shading to whitish below, with 7 or 8 somewhat irregular, yellowish-brown longitudinal lines; two or three ill-defined dark brown bars across the back and a round spot at the root of the caudal fin sometimes present; a black opercular spot; dorsal and caudal fins brown, with round yellow spots.

Total length 290 millim.

The vertebræ number 38 (18+20). The occipital crest is very strong.

MASTACEMBELIDÆ.

81. MASTACEMBELUS MOORII Blgr.

Five young specimens, 40 to 70 millim. long, from Utinta, dredged among shells in about 15 fathoms. Native name: *Molombo*.

The dorsal spines number 26 or 27.

82. MASTACEMBELUS CUNNINGTONI, sp. n. (Plate XLI. fig. 3.)

Depth of body 10 to 11 times in total length, length of head 7 to $7\frac{1}{2}$ times. Vent equally distant from end of snout and from root of caudal fin, its distance from the head equal to $2\frac{1}{2}$ to $2\frac{3}{4}$ times length of latter. Snout 3 to 4 times as long as eye, ending in a trifid appendage which is a little longer than the latter; cleft of mouth extending to below nostril or not quite so far; a strong, erectile spine below the nostril; two strong præopercular spines. Dorsal XXIX 95-105, spines increasing in length; anal II 115-125, second spine equal to penultimate dorsal; both fins completely embracing the rounded caudal; the distance between the first dorsal spine and the head 3 to $3\frac{1}{2}$ times in length of latter. Pectoral twice and $\frac{1}{2}$ to 3 times in length of head. Scales very small, 26 to 28 between origin of soft dorsal and lateral line. Uniform brown above, or olive-brown mottled with darker, white beneath; caudal blackish, edged with orange.

Total length 580 millim.

Two specimens from Kituta, native name *Morobe*, and one from Kazzaga, native name *Molombo*.

Closely allied to *M. congieus* Blgr.; distinguished by the fin-formula and the coloration.

83. *MASTACEMBELUS TÆNIATUS* Blgr.

Two young specimens, 75 and 38 millim. long, one from Niamkolo Bay (native name *Morobi*), the other from Kasawa (native name *Molombo*).

The dorsal spines number 33 or 35.

84. *MASTACEMBELUS OPHIDIUM* Gthr.

A single specimen, measuring 330 millim., from Burton Gulf. Native name: *Molombo*.

Length of head $8\frac{1}{2}$ times in total length. 33 dorsal spines. Pale olive-brown above, with roundish spots of a dark brown; white beneath; dorsal and pectorals spotted with brown; anal and caudal of a light orange colour, unspotted.

We are now acquainted with 7 species of *Mastacembelus* from Lake Tanganyika. They may be distinguished as follows:—

I. Vent equally distant from end of snout and from root of caudal fin.

A. No præopercular spine.

Dorsal XVIII 85; Anal II 90 *M. frenatus* Blgr.

Dorsal XXV-XXVII 70-80; Anal II 70-80 *M. moorii* Blgr.

B. Two præopercular spines.

Dorsal XXIX 95-105; Anal II 115-125 *M. cunningtoni* Blgr.

II. Vent nearer caudal fin than end of snout.

A. One or two præopercular spines.

Dorsal XXXI 70; Anal II 70 *M. ellipsifer* Blgr.

Dorsal XXXVI-XXXIX 50-60; Anal II 50-60 *M. tanganica* Gthr.

B. No præopercular spine.

Dorsal XXXIII-XXXV 85; Anal II 85 *M. tæniatus* Blgr.

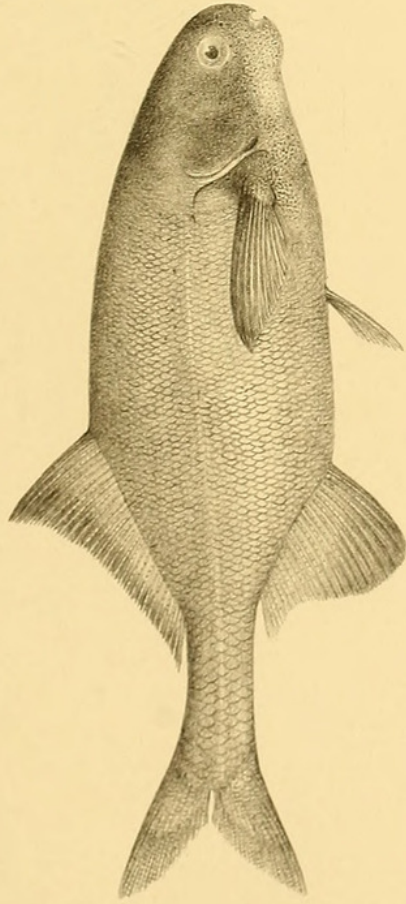
III. Vent nearer end of snout than caudal.

Dorsal XXX-XXXIII 100-120; Anal I 115-130 *M. ophidium*, Gthr.

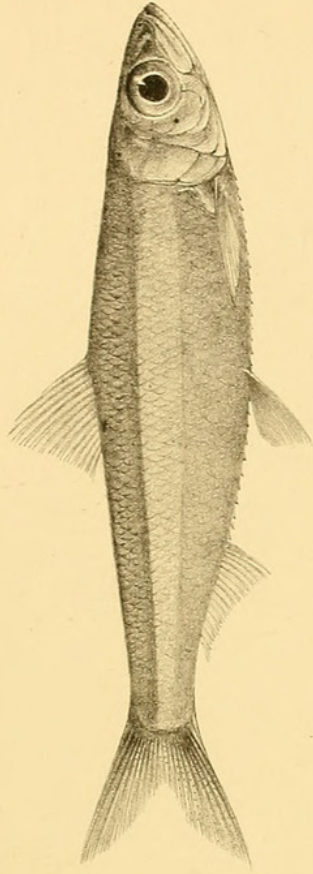
PLATE XXX.

PLATE XXX.

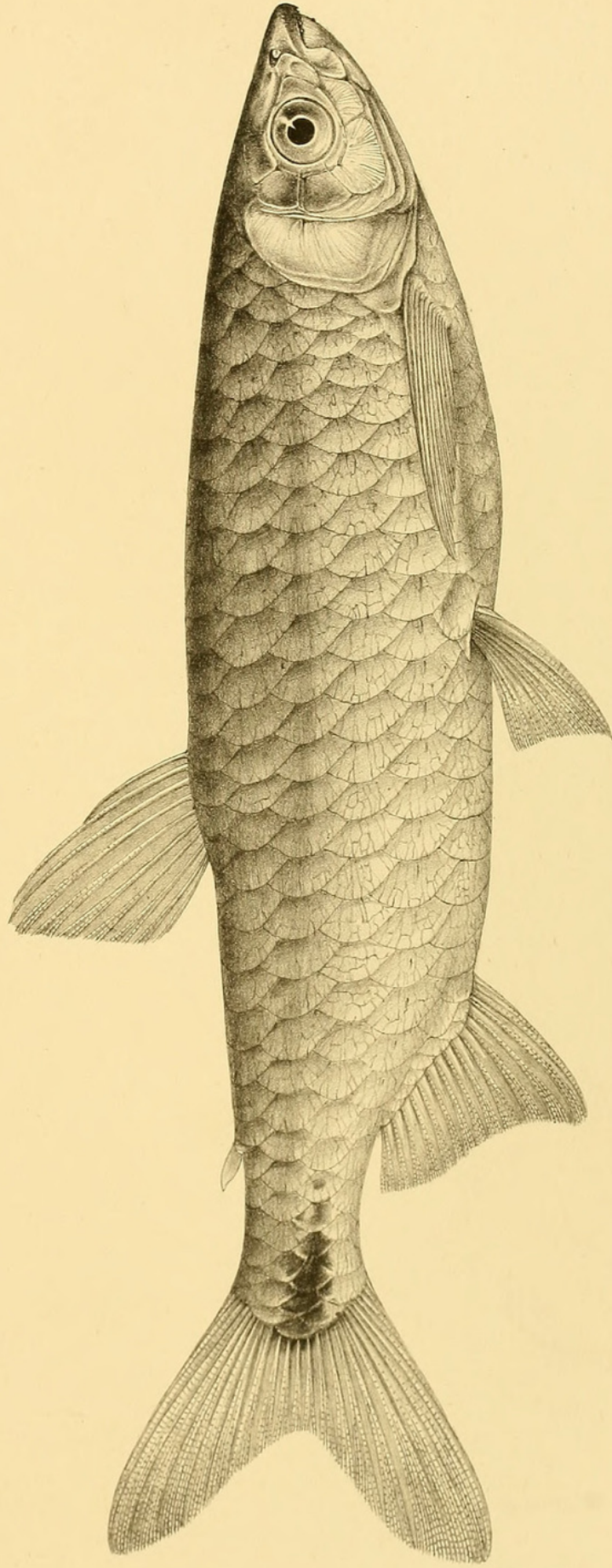
- Fig. 1. *Marcusenius tanganicus*, p. 545. $\frac{4}{5}$ nat. size.
2. *Pellonula miodon*, p. 546.
3. *Alestes rhodopleura*, p. 547. $\frac{3}{4}$ nat. size.



1.



2.



3.

J. Green del. et lith.

1. MARCUSENIUS TANGANICANUS. 2. PELLONULA MIODON. 3. ALESTES RHODOPLEURA.

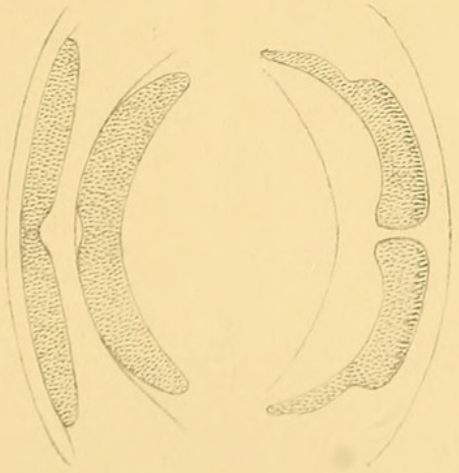
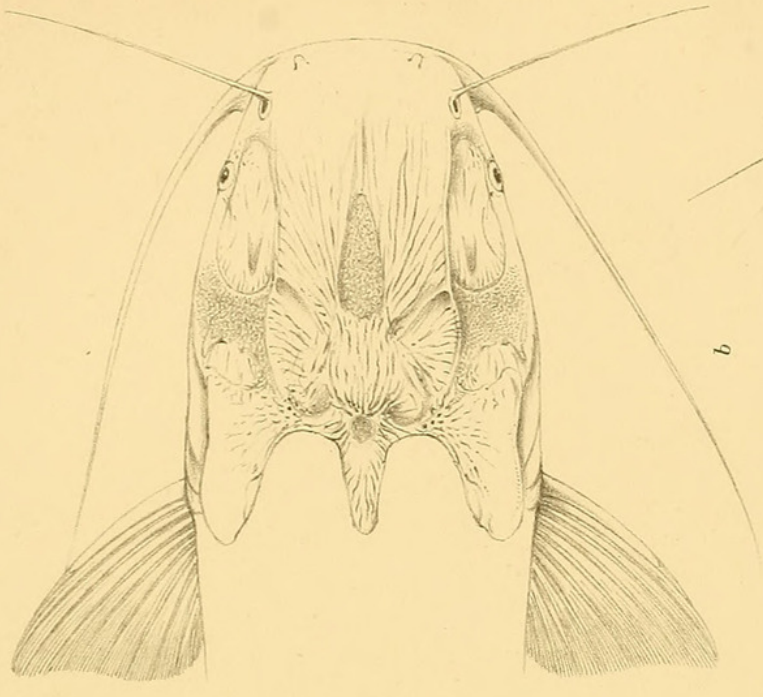
Bale & Danielsson, Ltd. imp.

PLATE XXXI.

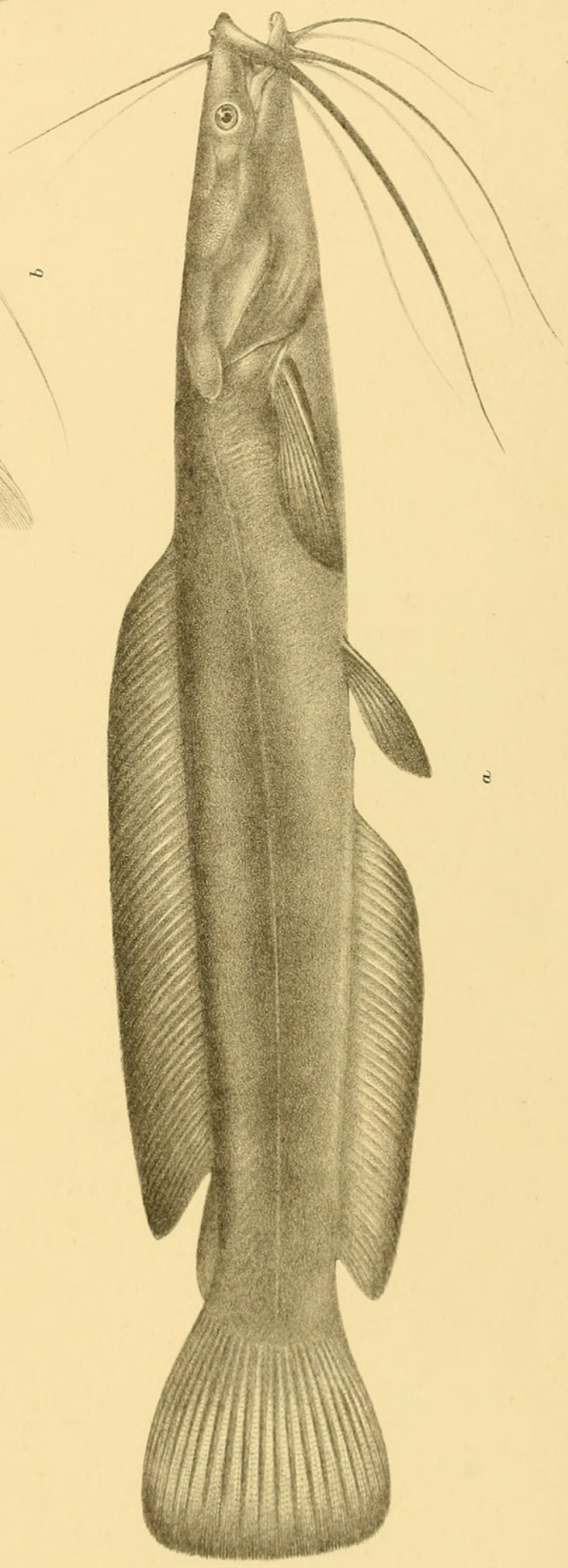
PLATE XXXI.

Dinotopterus cunningtoni, p. 550.

- a.* Adult, $\frac{1}{2}$ nat. size ; *b.* Upper view of head, $\frac{1}{2}$ nat. size ; *c.* Dentition, natural size ;
d. Young, natural size.



c



a

Bale & Danielsson, Ltd. imp.

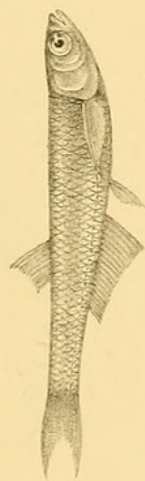
DINOPTERUS CUNNINGTONI.

J. Green del. et lith.

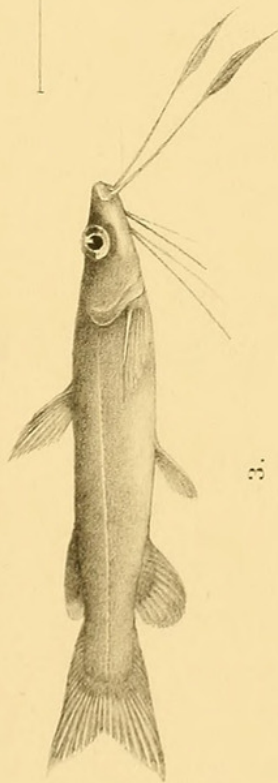
PLATE XXXII.

PLATE XXXII.

- Fig. 1. *Neobola minuta*, p. 549. Enlarged.
2. *Chrysichthys sianenna*, p. 551.
3. *Phyllonemus typus*, p. 552.
4. *Haplochilus pumilus*, p. 554.



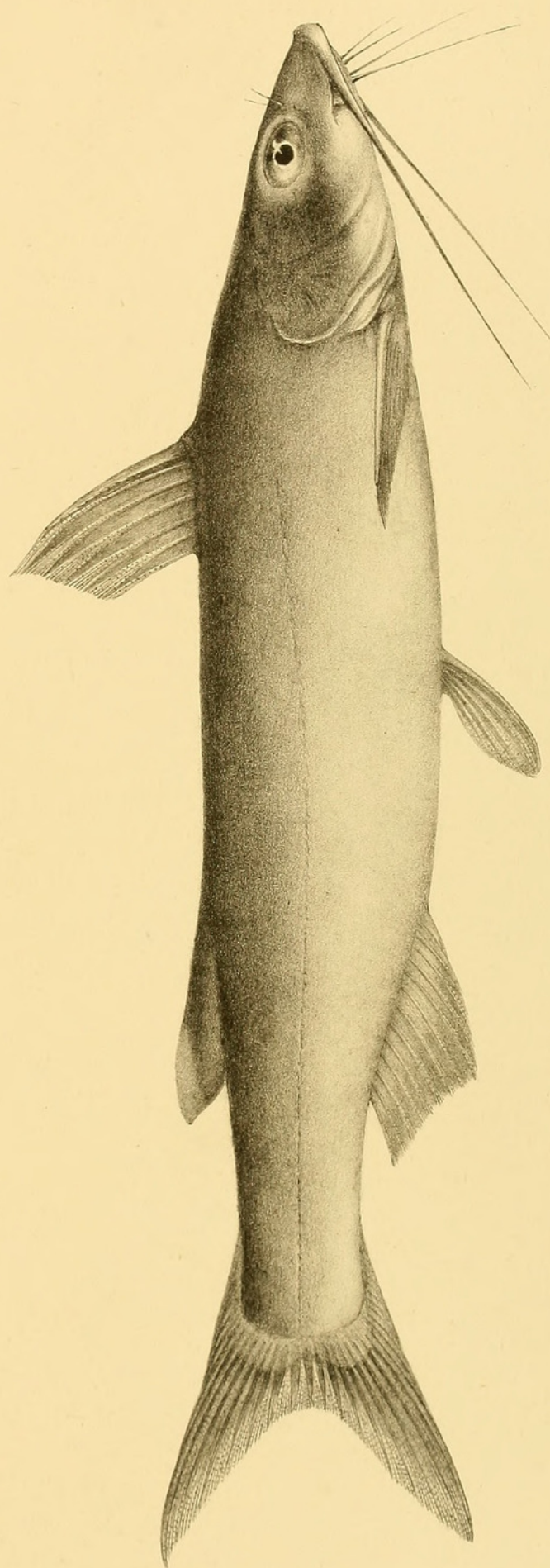
1.



3.



4.



2.

J. Green del. et lith.

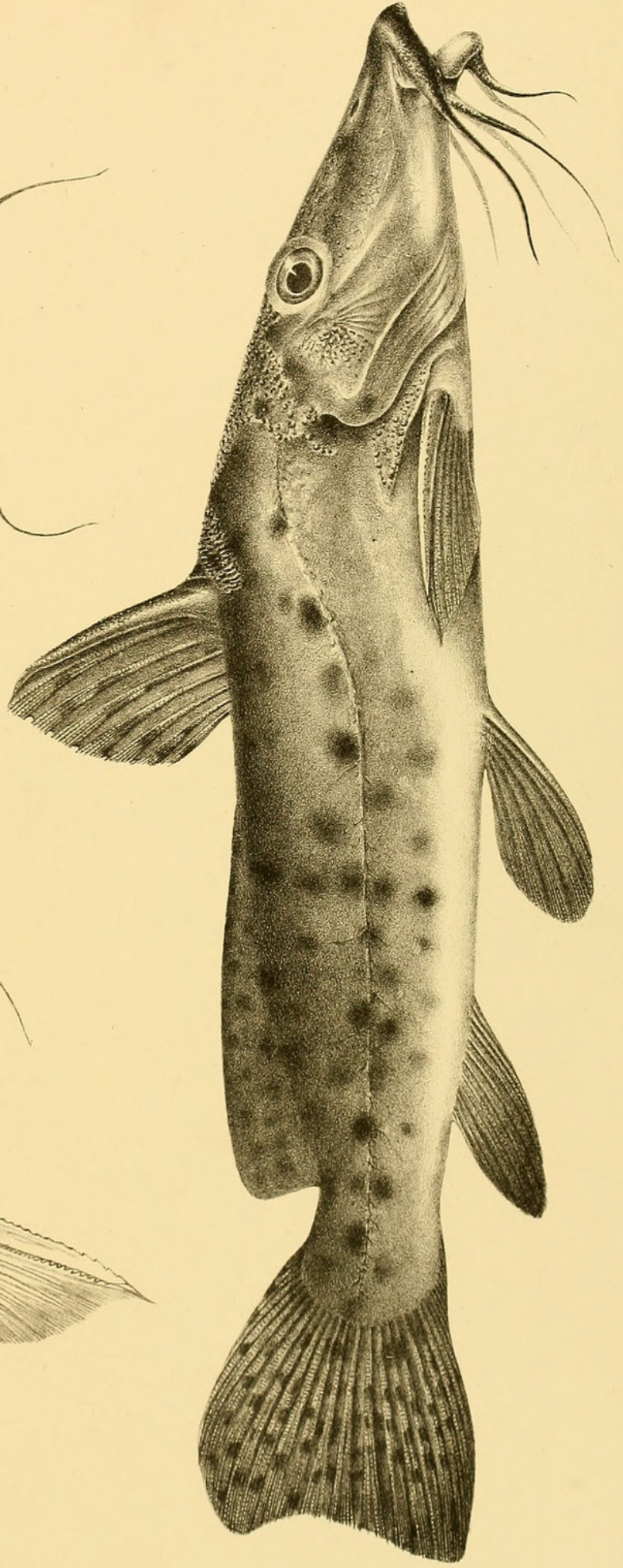
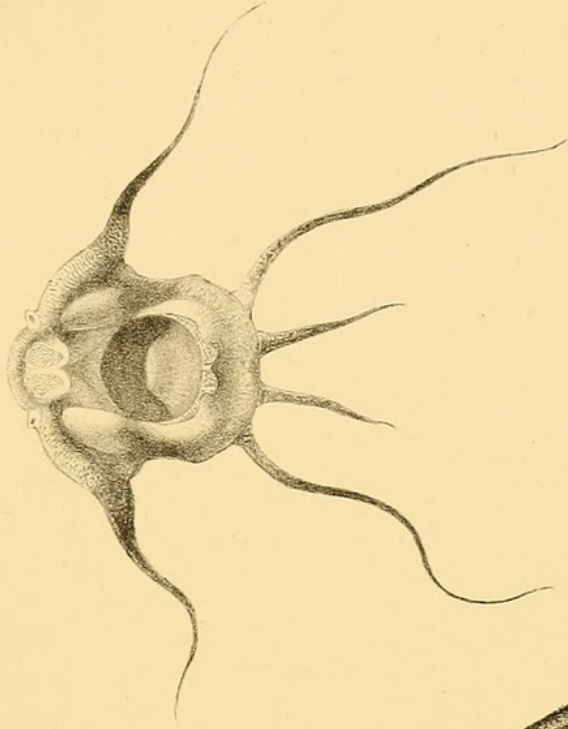
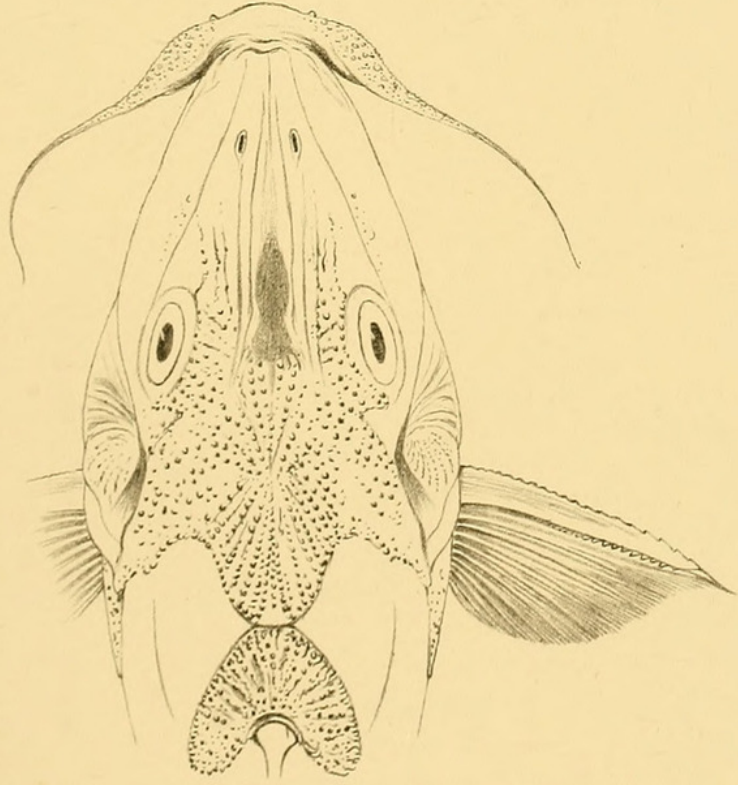
Bale & Danielsson lith. imp.

1. NEOBOLA MINUTA. 2. CHRYSICHTHYS SIANENNA. 3. PHYLLONEMUS TYPUS. 4. HAPLOCHILUS PUMILUS.

PLATE XXXIII.

PLATE XXXIII.

Auchenoglanis occidentalis, var. *tanganicanus*, p. 553,
with upper view of head and open mouth.



J. Green del. et lith.

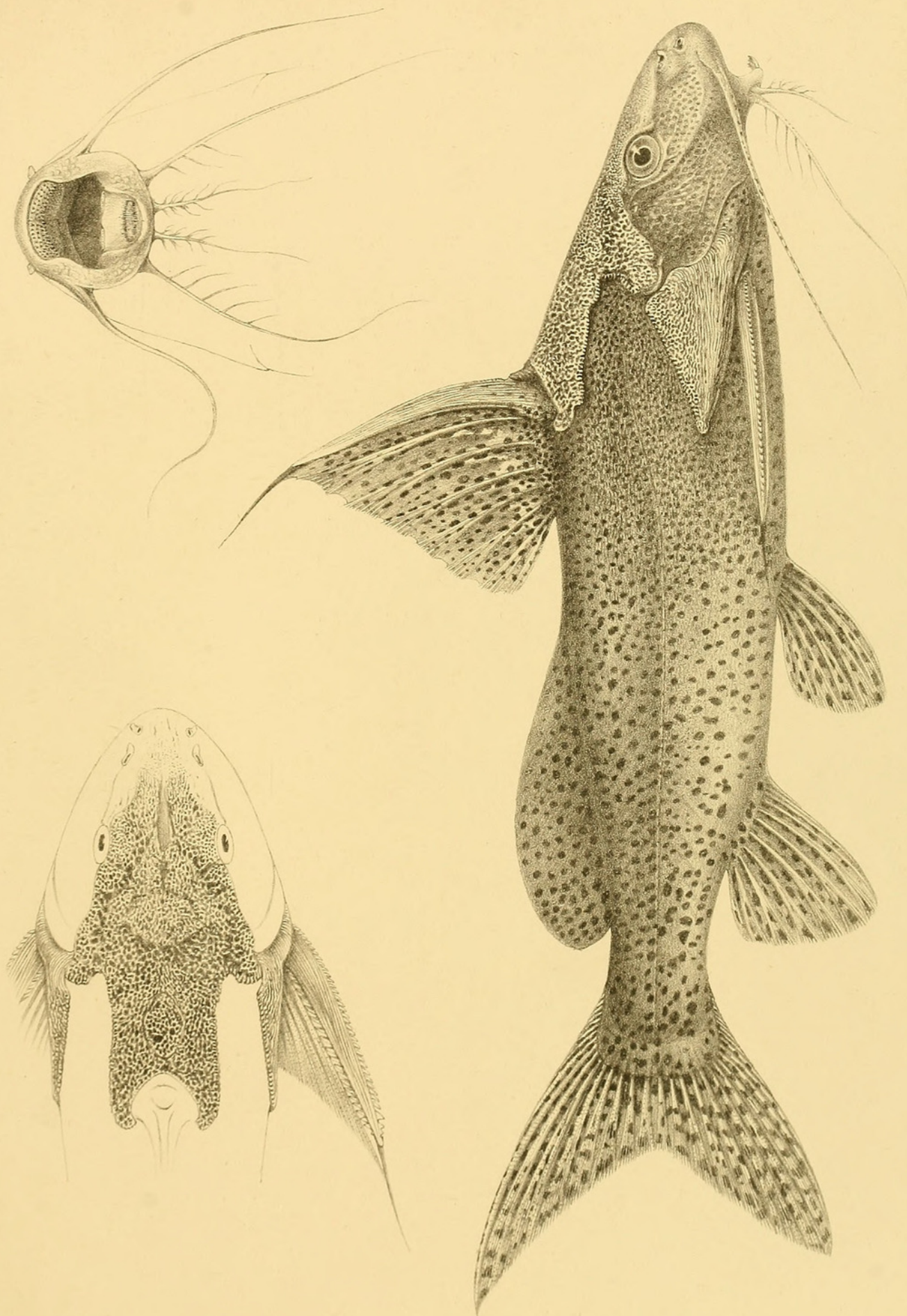
AUCHENOGLANIS OCCIDENTALIS, VAR. TANGANICANUS.

Bale & Danielsson, Lith. imp.

PLATE XXXIV.

PLATE XXXIV.

Synodontis melanostictus, p. 553,
with upper and lower views of head.
 $\frac{7}{8}$ natural size.



J. Green del. et lith.

SYNODONTIS MELANOSTICTUS.

Bale & Danielsson, Ltd. imp.

PLATE XXXV.

PLATE XXXV.

Fig. 1. *Lates angustifrons*, p. 555.

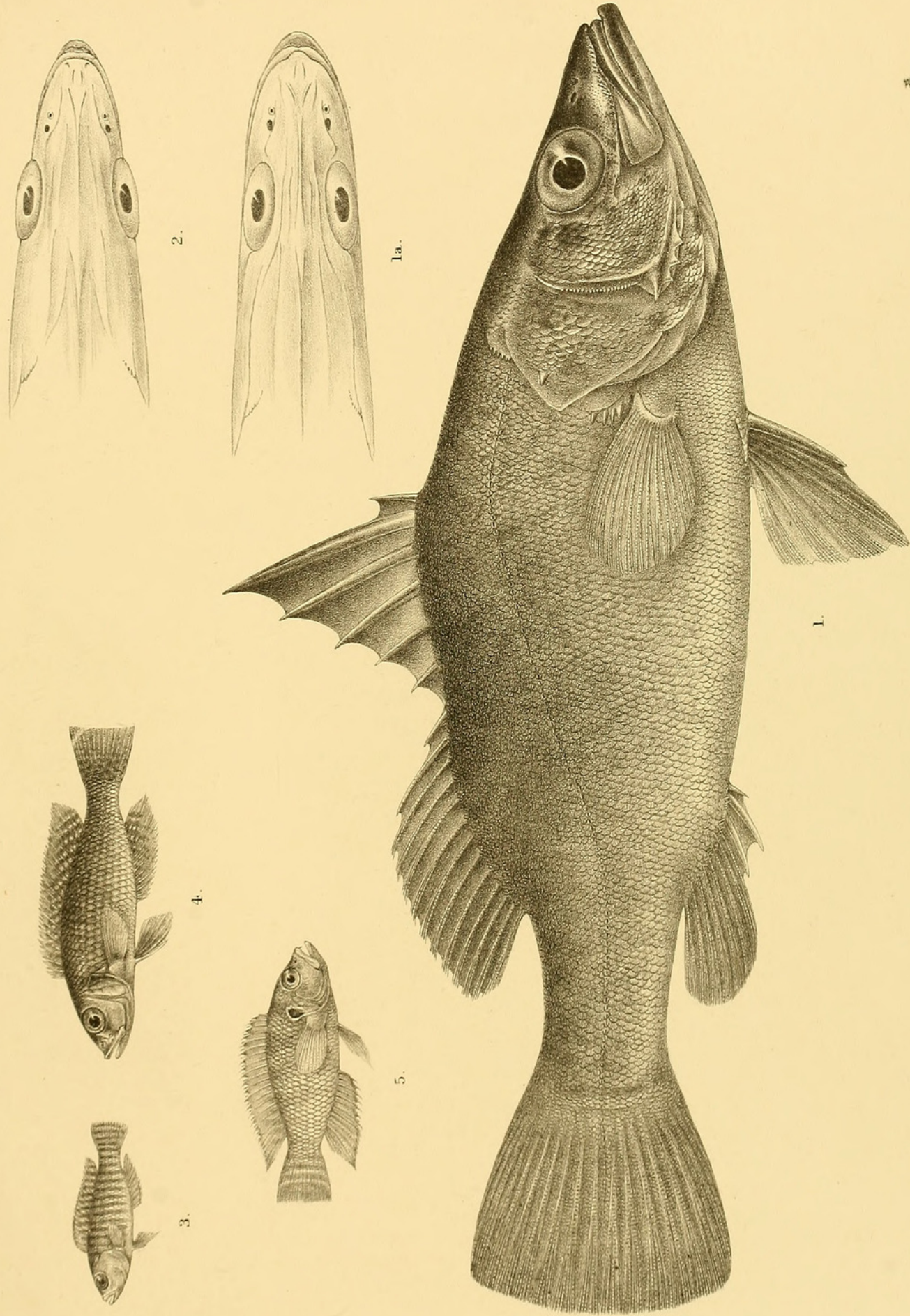
1 a. „ „ upper view of head.

2. „ *microlepis*, p. 555, upper view of head.

3. *Lamprologus multifasciatus*, p. 558.

4. „ *reticulatus*, p. 560.

5. „ *calliurus*, p. 560.



1. LATES ANGUSTIFRONS. 2. L. MICROLEPIS. 3. LAMPROLOGUS MULTIFASCIATUS.
4. L. RETICULATUS. 5. L. CALLIURUS.

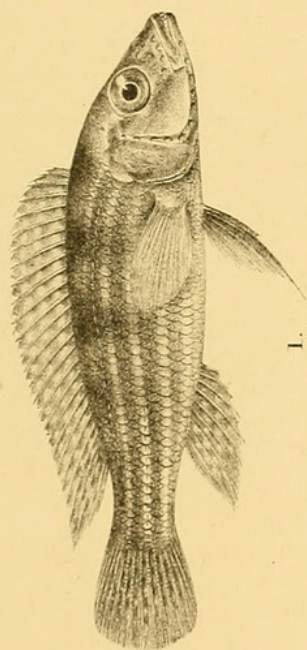
J. Green del et lith.

Bale & Danielsson, Lith. imp.

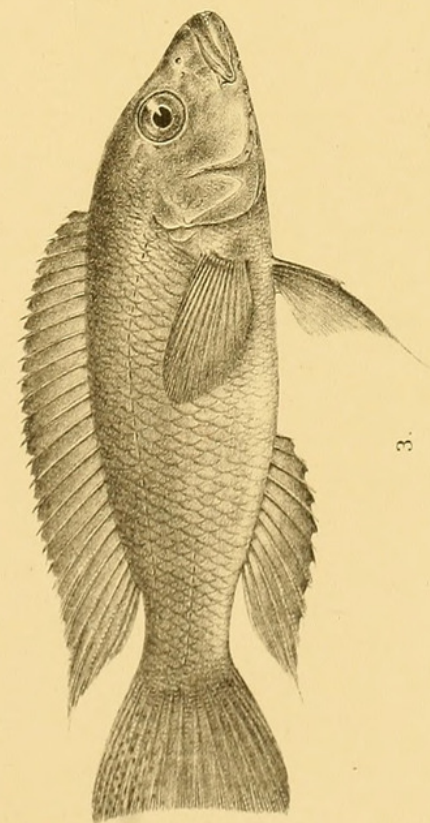
PLATE XXXVI.

PLATE XXXVI.

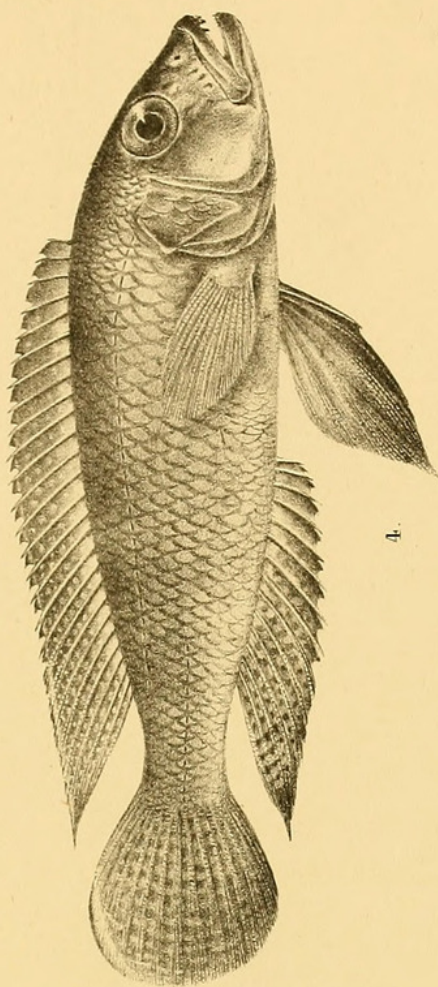
- Fig. 1. *Lamprologus brevianalis*, p. 555.
2. „ *cunningtoni*, p. 557.
3. „ *mondabu*, p. 557.
4. „ *callipterus*, p. 559.



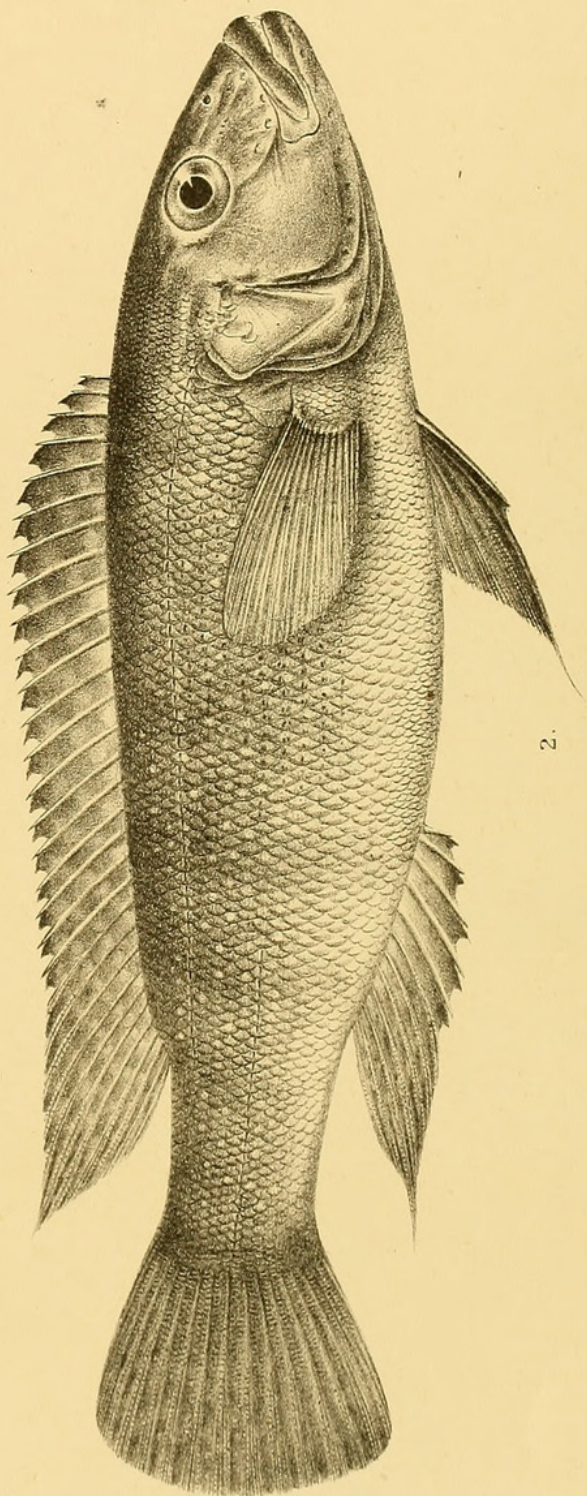
1.



3.



4.

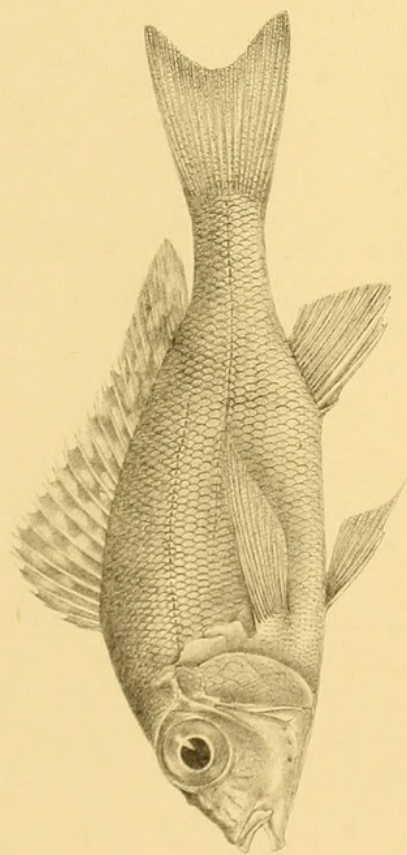


2.

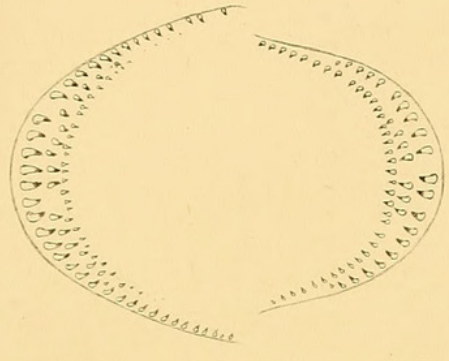
PLATE XXXVII.

PLATE XXXVII.

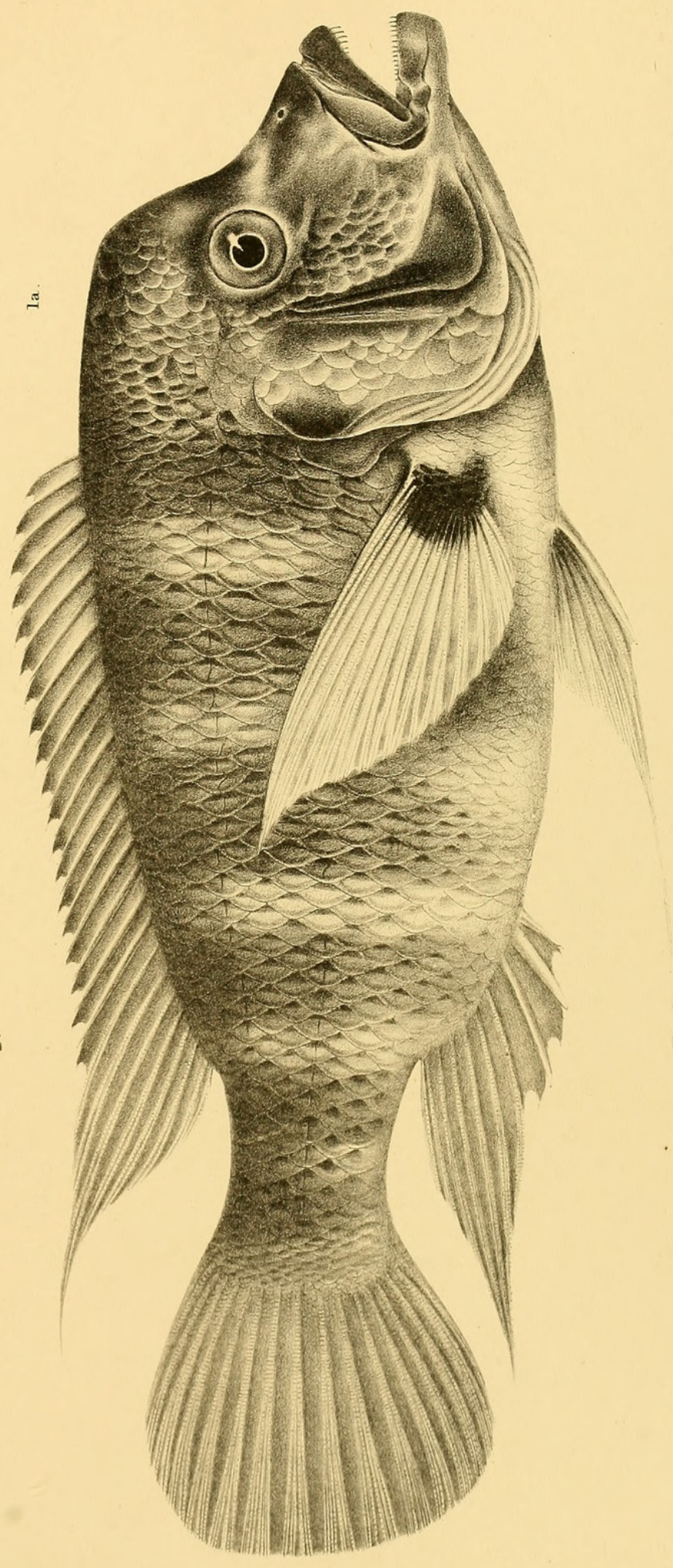
- Fig. 1. *Paratilapia frontosa*, p. 561. 1 *a*. Dentition.
2. *Pelmatochromis polylepis*, p. 566, young.



2.



1a.



1.

1. PARATILAPIA FRONTALIS. 2. PELMATOCHROMIS POLYLEPIS.

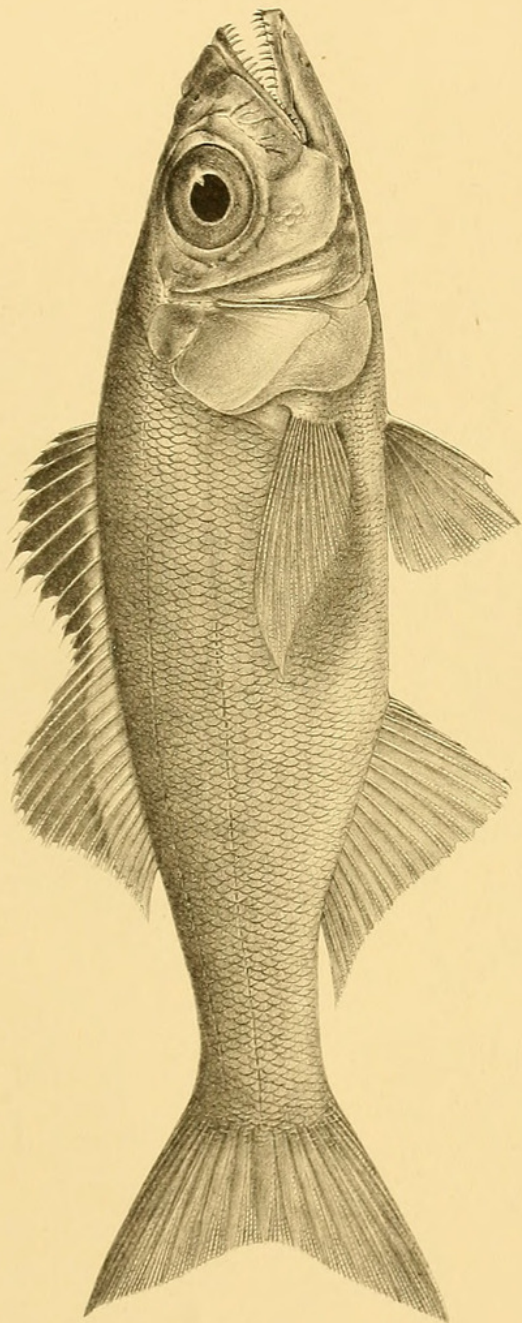
J Green del. et lith.

Bale & Darnley, Ltd. imp.

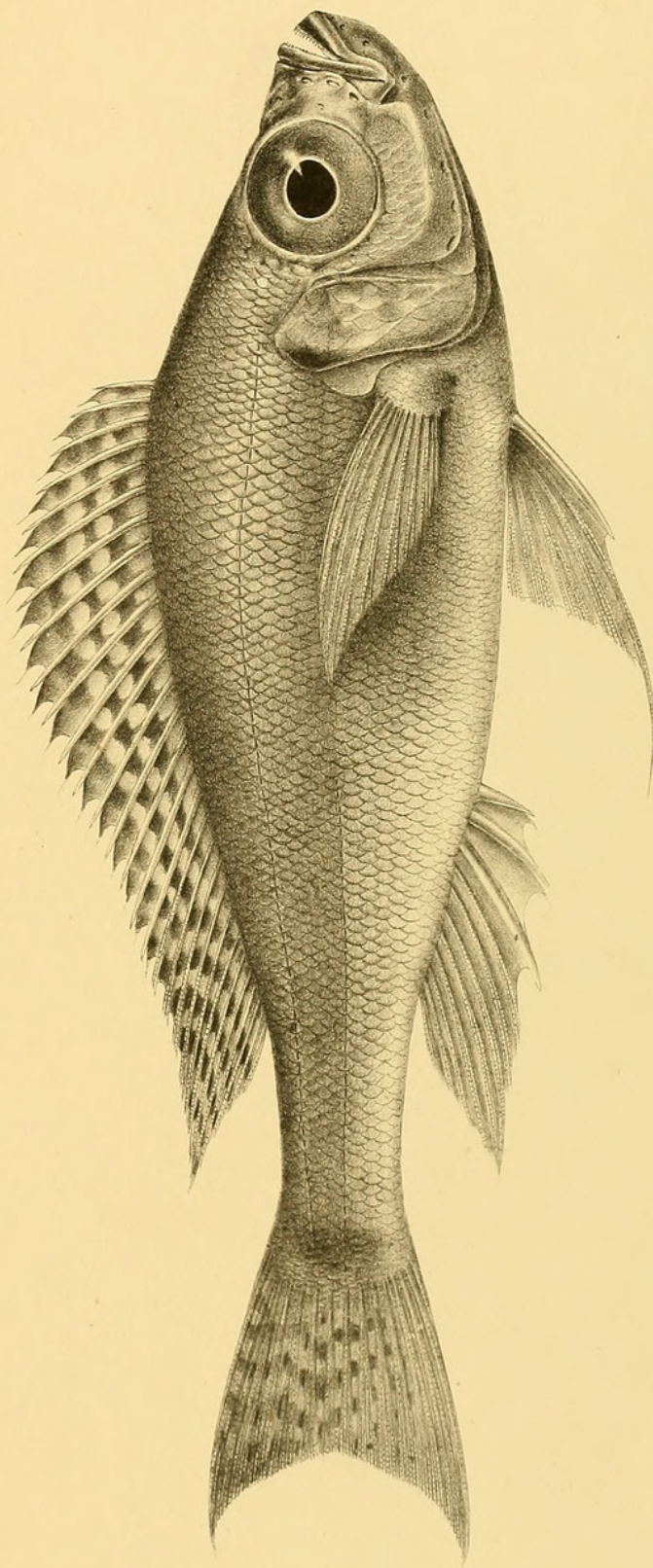
PLATE XXXVIII.

PLATE XXXVIII.

- Fig. 1. *Bathybates minor*, p. 564.
2. *Haplotaxodon microlepis*, p. 566.



1.



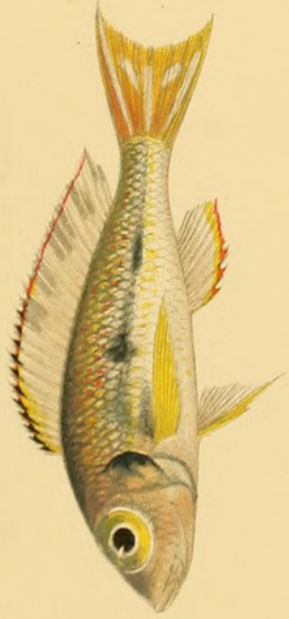
2.

1. BATHYBATES MINOR. 2. HAPLOTAENIODON MICROLEPIS.

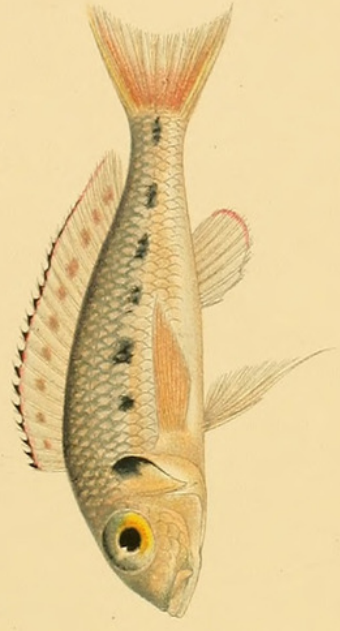
PLATE XXXIX.

PLATE XXXIX.

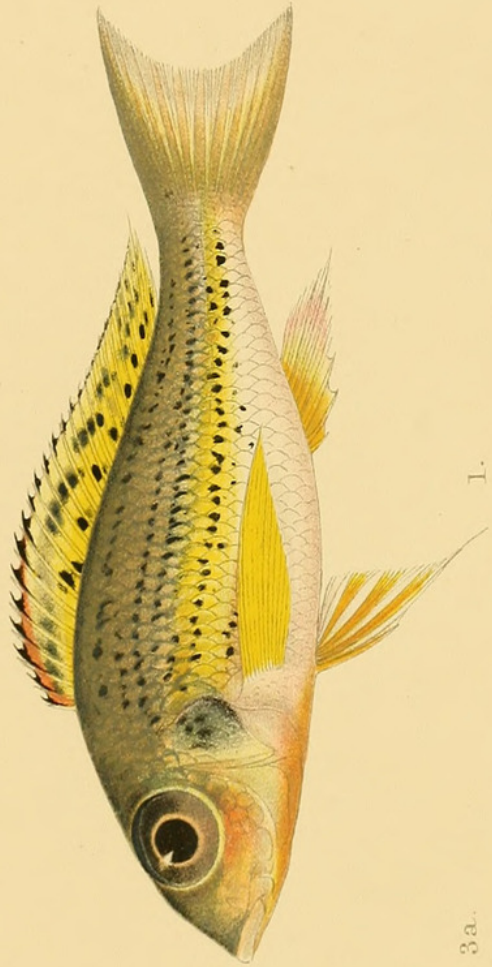
- Fig. 1. *Pelmatochromis melanostigma*, p. 567.
 2. „ *pleurospilus*, p. 567.
 3. „ *rhodostigma*, p. 568.
 3 a. „ „ lower surface of head and
 anterior part of body.
 4. „ *auritus*, p. 568, young.



2.



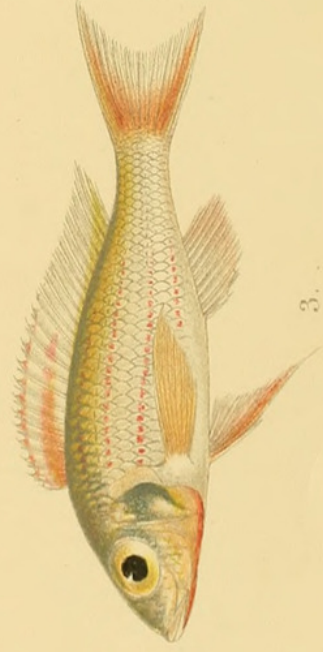
2a.



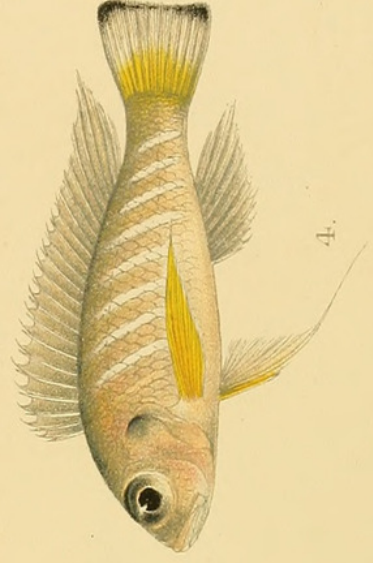
1.



3a.



3.



4.

1. PELMATOCHROMIS MELANOSTIGMA 2. P. PIEUROSPILUS 3. P. RHODOSTIGMA 4. P. AURITUS.

PLATE XL.

PLATE XL.

Tilapia latifrons, p. 571.

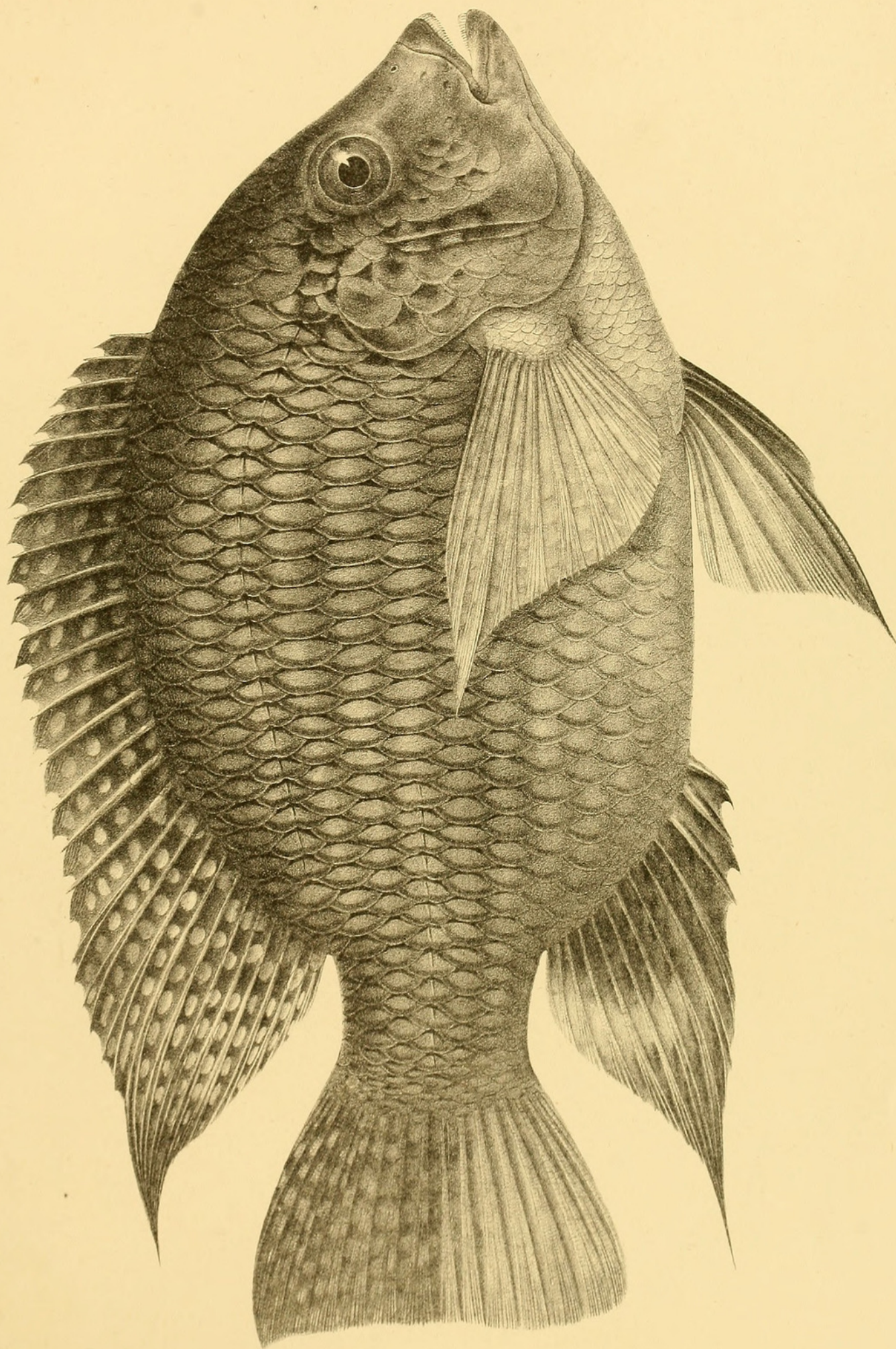
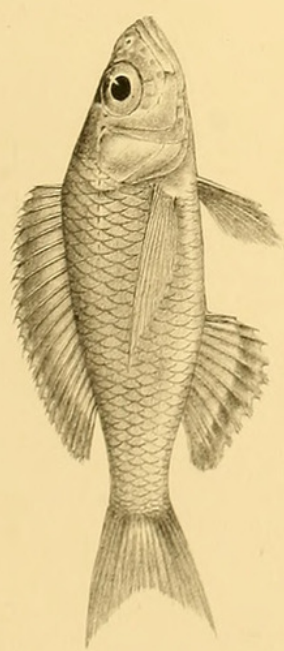


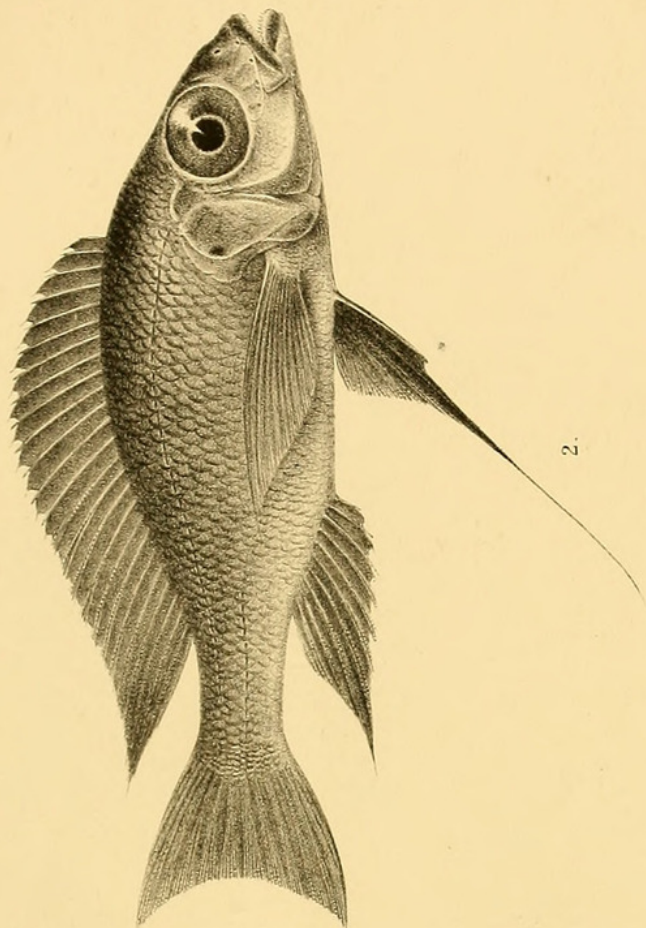
PLATE XLI.

PLATE XII.

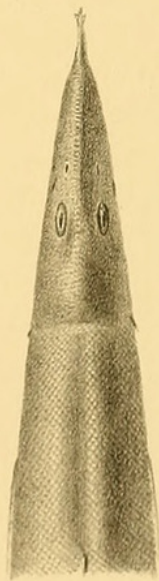
- Fig. 1. *Trematocara nigrifrons*, p. 570.
2. *Cunningtonia longiventralis*, p. 574.
3. *Mastacembelus cunningtoni*, p. 575. $\frac{3}{4}$ nat. size.
3 a. Ditto : upper view of head. $\frac{3}{4}$ nat. size.



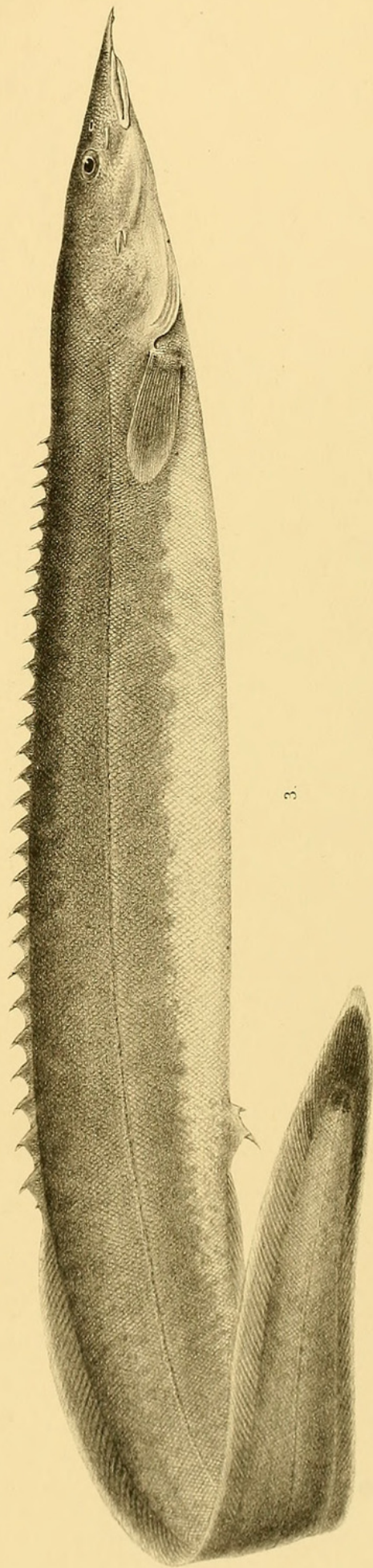
1.



2.



3a.



3.

J. Green del et lith.

Bale & Danielsson, Ltd. imp.

1. TREMATOCARA NIGRIFRONS. 2. CUNNINGTONIA LONGIVENTRALIS. 3. MASTACEMBELUS CUNNINGTONI.



Boulenger, George Albert. 1906. "Fourth contribution to the ichthyology of Lake Tanganyika. Report on the collection of fishes made by Dr. W.A. Cunnington during the Third Tanganyika Expedition, 1904-1905." *Transactions of the Zoological Society of London* 17, 537-600.

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