

**Article XXV.— FRESH-WATER FISHES OF THE CONGO BASIN
OBTAINED BY THE AMERICAN MUSEUM CONGO
EXPEDITION, 1909-1915.¹**

BY JOHN TREADWELL NICHOLS AND LUDLOW GRISCOM.

WITH FIELD NOTES BY THE COLLECTORS, HERBERT LANG AND JAMES P. CHAPIN.

PLATES LXIV-LXXXIII, 31 TEXT FIGURES, AND 3 MAPS.

Dr. G. A. Boulenger's recently completed Fresh-water Fishes of Africa ² has been used as a basis for the systematic part of this paper.

The four color-plates (Plates LXXX-LXXXIII) of thirteen species of fishes are successful reproductions from water-color sketches due to the artistic skill of Mr. J. P. Chapin. Painted in the field from living, freshly-captured specimens, their great value consists in their accuracy. In most cases the changes of color in dead fish are so rapid and so radical that often there is not even an indication left of their original beauty. After a long immersion in the preserving fluid some appear completely bleached. To give an idea of some of the difficulties an artist has to contend with, we might point out that in the forest regions the moisture was sometimes so great that during the process of painting these sketches had to be held over the fire, to dry one shade after the other so that the different colors would not flow together. It is interesting to note that they are the first records of this kind for fishes from the Congo basin. We regret that our limited funds would not allow the publication of 15 other equally interesting aquarelles.

The forty-one half-tones on Plates LXIV-LXXIX show the most interesting subjects of a collection of more than one hundred field photographs from freshly-killed specimens made by H. Lang, who has also contributed most of the color and field notes.

Thanks to the generosity of the Museum authorities, we are fortunate in being able to represent all of the new species in this collection by pen and ink drawings. Those of *Labeo sorex* and *Paratilapia xenodon* were made by Miss Ruth J. Powell, the one of *Labeo cyclopinnis* by Mr. Gerald H. Thayer, the remainder by Mr. Douglas B. Whitney. The black line under each text figure represents an inch length as measured on the specimen.

Only the strictly fresh-water fishes of the collection are included in this paper. They belong to the following families: Polypteridæ, Lepidosirenidæ,

¹ Scientific Results of the American Museum of Natural History Congo Expedition. Ichthyology, No. 1.

² George Albert Boulenger, F. R. S. Catalogue of the Fresh-water Fishes of Africa in the British Museum (Natural History). Vol. I to IV, 1909-1916.

Mormyridæ, Notopteridæ, Pantodontidæ, Clupeidæ, Characinidæ, Cypri-
nidæ, Siluridæ, Cyprinodontidæ, Serranidæ, Cichlidæ, Anabantidæ, Ophio-
cephalidæ, Mastacembelidæ and Tetrodontidæ.

Messrs. Lang and Chapin entered the Congo basin in June, 1909 and
left September, 1915. During this period they traversed the Belgian Congo
in its entire width from west to northeast. They also spent a few months
in the adjoining Egyptian Sudan where they repeatedly had the oppor-
tunity of observing the close relations of the Congo and Nile systems.

Everywhere Belgian officials generously accorded them invaluable
assistance. After establishing themselves in the different localities they
naturally became acquainted with many of the native chiefs whose good
will was also enlisted with satisfactory results.

The entire collection, consisting of close to 6000 fishes, includes 234
fresh-water forms, gathered in 23 localities (pp. 656-662). Among them
were 4 genera and 29 species (pp. 654-655) which are described here for the
first time. Eighteen species, known previously only from other African
rivers, were found to inhabit also the Congo system (p. 655).

Though a few fish were taken everywhere along their journeys the more
important material was fortunately gathered in the northeastern section of
the Congo basin which was ichthyologically the most interesting part
visited.

The collectors wish to express their deep gratitude for the kind encourage-
ment accorded in this work; first, to Professor Henry Fairfield Osborn,
President of the American Museum, under whose inspiring influence the
widespread activities of the Congo Expedition could be carried to such
satisfactory conclusion; secondly, to Professor Bashford Dean, to whom
they are under great obligation for his practical and material aid. His
continued interest in the ichthyological field-work contributed greatly to
make the final results so successful.

1. List of New Genera, and twenty-nine New Species with their Type Localities.

NEW GENERA.

1. *Microstomatichthyoborus*.
2. *Gnathobagrus*.
3. *Amarginops*.
4. *Acanthocleithron*.

NEW SPECIES.

1. *Marcusenius osborni*. Upper Congo.
2. " *retrodorsalis*. Niapu.
3. *Pellonula tenuis*. Stanleyville.
4. *Alestes carmesinus*. Zambi.
5. *Microstomatichthyoborus bashforddeani*. Poko.
6. *Distichodus langi*. Faradje.

7. *Labeo cyclopinnis*. Stanleyville.
8. *Labeo sores*. Stanleyville.
9. " *intermedius*. Stanleyville.
10. *Discognathus ornatus*. Stanleyville.
11. *Barbus atromaculatus*. Yakuluku.
12. " *rubripinnis*. Poko.
13. " *dolichosoma*. Avakubi.
14. " *candens*. Stanleyville.
15. *Barilius salmolucius*. Stanleyville.
16. *Engraulicypris conchicus*. Poko.
17. *Clarias zygouron*. Malela.
18. " *malaris*. Stanleyville.
19. *Eutropius gastratus*. Rungu.
20. *Gnathobagrus depressus*. Boma.
21. *Amarginops platus*. Stanleyville.
22. *Amphilius notatus*. Faradje.
23. *Synodontis tenuis*. Stanleyville.
24. *Acanthocleithron chapini*. Avakubi.
25. *Doumea alula*. Stanleyville.
26. *Haplochilus platysternus*. Stanleyville.
27. *Paratilapia longipinnis*. Coquilhatville.
28. " *xenodon*. Rungu.
29. *Lamprologus obliquus*. Stanleyville.

2. *Validity of the following Genera and Species is questioned.*

<i>Genera.</i>	<i>Referred to under:</i>
<i>Microthrissa</i>	<i>Pellonula congica</i>
<i>Pœcilothrissa</i>	" "
<i>Potamothrissa</i>	" "
<i>Cynothrissa</i>	" "
<i>Micralestes</i>	<i>Alestes liebrechtsii</i>
<i>Petersius</i>	" "
<i>Species</i>	<i>Referred to under:</i>
<i>Bryconathiops yseuxii</i>	<i>Bryconathiops microstoma</i>
<i>Labeo velifer</i>	<i>Labeo longipinnis</i>
<i>Barbus pleuropholis</i>	q. v.
<i>Haplochromis moffati</i>	<i>Haplochromis desfontainesii</i>
<i>Tilapia stigmatogenys</i>	<i>Tilapia williamsii</i>
<i>Nannochromis squamiceps</i>	q. v.

3. *The following Species are recorded for the first time from the Congo Drainage.*

<i>Mormyrops breviceps</i>	<i>Labeo ansorgii</i>
<i>Gnathonemus livingstonii</i>	<i>Discognathus dembeensis</i>
<i>Petersius occidentalis</i>	<i>Barbus musumbi</i>
<i>Labeo coubie</i>	<i>Clarias breviceps</i>
" <i>kirkii</i>	<i>Chrysichthys acutirostris</i>
" <i>forskalii</i>	<i>Arius africanus</i>
" <i>parvulus</i>	<i>Synodontis afro-fischeri</i>
" <i>chariensis</i>	<i>Tilapia acuticeps</i>
" <i>ogouensis</i>	<i>Haplochromis strigigena</i>

4. List of Localities, with names of the Species and Subspecies taken at each.

Avakubi.

<i>Polypterus ornatipinnis</i>	<i>Labeo parvulus</i>
<i>Mormyrops deliciosus</i>	“ <i>annectens</i>
“ <i>sirenoides</i>	“ <i>chariensis</i>
“ <i>attenuatus</i>	“ <i>parvus</i>
<i>Petrocephalus sauvagii</i>	“ <i>ogunensis</i>
“ <i>simus</i>	<i>Discognathus dembeensis</i>
<i>Marcusenius nigripinnis</i>	<i>Barbus caudovittatus</i>
“ <i>tumifrons</i>	“ <i>holotania</i>
“ <i>plagiostoma</i>	“ <i>pleuropholis</i>
“ <i>psittacus</i>	“ <i>dolichosoma</i>
<i>Myomyrus macrops</i>	<i>Barilius weynsii</i>
<i>Gnathonemus montei</i>	“ <i>ubangensis</i>
“ <i>greshoffi</i>	“ <i>salmolucius</i>
“ <i>mirus</i>	<i>Engraulicypris congicus</i>
“ <i>elephas</i>	<i>Chelæthiops elongatus</i>
“ <i>rhynchophorus</i>	<i>Clarias angolensis</i>
“ <i>ibis</i>	“ <i>bythipogon</i>
<i>Mormyrus bumbanus</i>	<i>Eutropius niloticus</i>
“ <i>ovis</i>	“ <i>grenfelli</i>
“ <i>caballus</i>	“ <i>debauwi</i>
<i>Pellonula tenuis</i>	<i>Schilbe congolensis</i>
“ <i>congica</i>	<i>Bagrus ubangensis</i>
“ <i>royauxi</i>	<i>Chrysichthys waganaari</i>
<i>Sarcodaces odoë</i>	“ <i>punctatus</i>
<i>Bryconæthiops microstoma</i>	“ <i>delhezi</i>
<i>Alestes liebrechtsii</i>	<i>Gephyroglanis longipinnis</i>
“ <i>imberi</i>	<i>Auchenoglanis occidentalis</i>
“ <i>grandisquamis</i>	“ <i>ballayi</i>
<i>Micralestes acutidens</i>	<i>Synodontis acanthomias</i>
“ <i>stormsi</i>	“ <i>depauwi</i>
“ <i>altus</i>	“ <i>greshoffi</i>
<i>Petersius caudalis</i>	“ <i>pleurops</i>
“ <i>woosnami</i>	“ <i>decorus</i>
“ <i>occidentalis</i>	<i>Euchilichthys guentheri</i>
<i>Eugnathichthys eetveldii</i>	“ <i>dybowskii</i>
“ <i>macroterolepis</i>	<i>Acanthocleithron chapini</i>
<i>Distichodus affinis</i>	<i>Doumea alula</i>
“ <i>maculatus</i>	<i>Malopterurus electricus</i>
“ <i>fasciolatus</i>	<i>Tilapia christyi</i>
“ <i>sexfasciatus</i>	<i>Haplochromis desfontainesii</i>
“ <i>lusosso</i>	<i>Pelmatochromis lateralis</i>
<i>Nannocharax fasciatus</i>	<i>Hemichromis fasciatus</i>
“ <i>elongatus</i>	<i>Lamprologus obliquus</i>
<i>Citharinus gibbosus</i>	<i>Anabas nanus</i>
<i>Labeo weeksii</i>	<i>Mastacembelus congicus</i>
<i>Labeo greenii</i>	

Bafwabaka.

Marcusenius nigripinnis	Synodontis depauwi
Barbus holotænia	Malopterurus electricus
" atromaculatus	Anabas nanus
Auchenoglanis ballayi	

Banana.

Protopterus dolloi

Basoko.

Pantodon buchholzi	Anabas nanus
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Bolobo.

Alestes macrolepidotus

Boma.

Odaxotrissa ansorgii	Chrysichthys furcatus
Distichodus affinis	" cranchii
Eutropius congolensis	Gnathobagrus depressus
" liberiensis	Auchenoglanis occidentalis
Chrysichthys acutirostris	

Coquilhatville.

Polypterus palmas	Schilbe mystus
Marcusenius plagiostoma	Synodontis alberti
" wilverthi	" notatus
Xenomystus nigri	Tilapia melanopleura
Bryconæthiops microstoma	Hemichromis fasciatus
Alestes bimaculatus	Anabas nigropannosus
Petersius hilgendorfi	Ophiocephalus obscurus
Mesoborus crocodilus	

Faradje.

Polypterus congicus	Gnathonemus petersii
" ornatipinnis	" monteiri
" palmas	" stanleyanus
Mormyrops deliciosus	" greshoffi
" breviceps	" tamandua
" sirenoides	" mirus
" microstoma	" elephas
" attenuatus	" rhynchophorus
Petrocephalus sauvagii	" ibis
" simus	" curvirostris
Marcusenius nigripinnis	Mormyrus bumbanus
" pulverulentus	" ovis
" plagiostoma	" caballus
" psittacus	Sarcodaces odoë
" wilverthi	Hydrocyon lineatus
Stomatorhinus microps	Bryconæthiops microstoma
Myomyrus macrodon	Alestes macrophthalmus
" macrops	" liebrechtsii

Faradje.

<i>Alestes imberi</i>	<i>Clarias angolensis</i>
“ <i>schoutedeni</i>	“ <i>bythipogon</i>
“ <i>macrolepidotus</i>	<i>Eutropius congensis</i>
“ <i>grandisquamis</i>	“ <i>niloticus</i>
<i>Micralestes acutidens</i>	“ <i>grenfelli</i>
<i>Petersius woosnami</i>	“ <i>gastratus</i>
“ <i>occidentalis</i>	<i>Schilbe mystus</i>
<i>Eugnathichthys eetveldii</i>	<i>Bagrus ubangensis</i>
“ <i>macroterolepis</i>	<i>Chrysichthys delhezi</i>
<i>Mesoborus crocodilus</i>	<i>Gephyroglanis longipinnis</i>
<i>Phago boulengeri</i>	<i>Amphilius notatus</i>
<i>Distichodus affinis</i>	<i>Auchenoglanis occidentalis</i>
“ <i>maculatus</i>	“ <i>ballayi</i>
“ <i>antonii</i>	<i>Synodontis acanthomias</i>
“ <i>fasciolatus</i>	“ <i>afro-fischeri</i>
“ <i>langi</i>	“ <i>depauwi</i>
“ <i>sexfasciatus</i>	“ <i>greshoffi</i>
<i>Distichodus lusosso</i>	“ <i>pleurops</i>
<i>Nannocharax elongatus</i>	“ <i>decorus</i>
“ <i>tænia</i>	<i>Chiloglanis batesii</i>
<i>Citharinus congicus</i>	<i>Euchilichthys guentheri</i>
“ <i>gibbosus</i>	“ <i>royauxi</i>
<i>Labeo weeksii</i>	“ <i>dybowskii</i>
“ <i>longipinnis</i>	<i>Doumea alula</i>
“ <i>macrostoma</i>	<i>Belonoglanis tenuis</i>
“ <i>falcipinnis</i>	<i>Malopterurus electricus</i>
“ <i>greenii</i>	<i>Haplochilus elegans</i>
“ <i>chariensis</i>	<i>Lates niloticus</i>
“ <i>parvus</i>	<i>Tilapia melanopleura</i>
<i>Discognathus dembeensis</i>	<i>Pelmatochromis lateralis</i>
<i>Barbus caudovittatus</i>	<i>Lamprologus obliquus</i>
“ <i>holotænia</i>	<i>Anabas nanus</i>
“ <i>atromaculatus</i>	<i>Ophiocephalus obscurus</i>
<i>Barilius kingsleyæ</i>	<i>Mastacembelus congicus</i>
<i>Clarias submarginatus</i>	<i>Tetrodon mbu</i>

Garamba.

<i>Alestes nurse</i>	<i>Barilius kingsleyæ</i>
<i>Mesoborus crocodilus</i>	<i>Tilapia melanopleura</i>
<i>Labeo parvus</i>	<i>Lamprologus obliquus</i>
<i>Barbus holotænia</i>	

Irebu.

Paratilapia longipinnis

Kwamouth.

Hydrocyon lineatus

Malela.

Eugnathichthys macroterolepis
 Clarias zygouron
 " bythipogon
 Channallabes apus

Chrysichthys ornatus
 Tilapia lepidura
 Ophiocephalus obscurus

Medje.

Barbus pleuropholis
 Barilius ubangensis
 Clarias angolensis

Haplochilus elegans
 Anabas nanus

Niangara.

Genomyrus donnyi
 Barbus fasolt
 " holotænia
 Barilius salmolucius
 Clarias angolensis

Schilbe congolensis
 Phractura scaphirhynchura
 Hemichromis fasciatus
 Anabas nanus
 Tetrodon mbu

Niapu.

Petrocephalus simus
 Marcusenius nigripinnis
 " osborni
 " retrodorsalis
 Myomyrus macrodon
 Gnathonemus moorii
 " petersii
 Micralestes altus
 Petersius woosnami
 Phago boulengeri
 Nannæthiops tritæniatus
 Nannocharax tænia
 Barbus holotænia
 " pleuropholis
 Barilius ubangensis

Clarias platycephalus
 " bythipogon
 Channallabes apus
 Eutropius grenfelli
 " debauwi
 Schilbe congolensis
 Chrysichthys ornatus
 Auchenoglanis ballayi
 Microsynodontis batesii
 Phractura scaphirhynchura
 Belonoglanis tenuis
 Hemichromis fasciatus
 Anabas nanus
 Mastacembelus congicus

Nouvelle Anvers.

Protopterus dolloi

Anabas nigropannosus

Panga.

Euchilichthys guentheri

Poko.

Mormyrops sirenoides
 " attenuatus
 Petrocephalus sauvagii
 " simus
 Marcusenius nigripinnis
 Gnathonemus petersii
 " monteiri
 " stanleyanus
 " greshoffi

Gnathonemus mirus
 " elephas
 " rhynchophorus
 " ibis
 Pellonula congica
 " royauxi
 Sarcodaces odoë
 Bryconæthiops microstoma
 Alestes macrophthalmus

Poko.

<i>Alestes longipinnis</i>	<i>Barbus rubripinnis</i>
“ <i>imberi</i>	<i>Barilius salmolucius</i>
“ <i>macrolepidotus</i>	<i>Engraulicypris conigicus</i>
“ <i>grandisquamis</i>	<i>Clarias bythipogon</i>
<i>Micralestes acutidens</i>	<i>Channallabes apus</i>
“ <i>altus</i>	<i>Eutropius debauwi</i>
<i>Petersius occidentalis</i>	<i>Schilbe congolensis</i>
<i>Eugnathichthys eetveldii</i>	<i>Ansorgia vittata</i>
“ <i>macroterolepis</i>	<i>Chrysichthys wagnaari</i>
<i>Mesoborus crocodilus</i>	“ <i>delhezi</i>
<i>Phago intermedius</i>	“ <i>thonneri</i>
<i>Microstomatichthyoborus bashforddeani</i>	<i>Synodontis pleuropis</i>
<i>Distichodus affinis</i>	“ <i>decorus</i>
“ <i>maculatus</i>	<i>Euchilichthys dybowskii</i>
“ <i>fasciolatus</i>	<i>Tilapia melanopleura</i>
“ <i>lusosso</i>	<i>Paratilapia macrocephala</i>
<i>Nannocharax elongatus</i>	<i>Hemichromis fasciatus</i>
“ <i>tænia</i>	<i>Tetrodon mbu</i>

Rungu.

<i>Mormyrops deliciosus</i>	<i>Labeo longipinnis</i>
“ <i>sirenoides</i>	“ <i>macrostoma</i>
“ <i>attenuatus</i>	“ <i>intermedius</i>
<i>Petrocephalus sauvagii</i>	“ <i>parvus</i>
<i>Marcusenius psittacus</i>	<i>Barbus musumbi</i>
“ <i>wilverthi</i>	<i>Barilius weynsii</i>
<i>Gnathonemus petersii</i>	<i>Clarias bythipogon</i>
“ <i>monteiri</i>	<i>Channallabes apus</i>
“ <i>stanleyanus</i>	<i>Eutropius grenfelli</i>
“ <i>rhynchophorus</i>	“ <i>gastratus</i>
<i>Sarcodaces odoë</i>	<i>Schilbe congolensis</i>
<i>Hydrocyon lineatus</i>	<i>Chrysichthys ornatus</i>
<i>Bryconæthiops microstoma</i>	“ <i>thonneri</i>
<i>Alestes liebrechtsii</i>	<i>Auchenoglanis ballayi</i>
“ <i>imberi</i>	<i>Synodontis acanthomias</i>
“ <i>schoutedeni</i>	“ <i>afro-fischeri</i>
“ <i>grandisquamis</i>	“ <i>depauwi</i>
<i>Micralestes altus</i>	“ <i>greshoffi</i>
<i>Petersius woosnami</i>	“ <i>pleuropis</i>
<i>Eugnathichthys eetveldii</i>	<i>Tilapia melanopleura</i>
“ <i>macroterolepis</i>	<i>Paratilapia xenodon</i>
<i>Mesoborus crocodilus</i>	<i>Pelmatochromis lateralis</i>
<i>Distichodus affinis</i>	<i>Hemichromis fasciatus</i>
“ <i>maculatus</i>	<i>Ophiocephalus obscurus</i>
“ <i>fasciolatus</i>	<i>Mastacembelus conigicus</i>
“ <i>sexfasciatus</i>	<i>Tetrodon mbu</i>
“ <i>lusosso</i>	

Stanleyville.

<i>Polypterus congicus</i>	<i>Eugnathichthys eetveldii</i>
" <i>ornatipinnis</i>	" <i>macroterolepis</i>
" <i>palmas</i>	<i>Distichodus maculatus</i>
<i>Mormyrops deliciosus</i>	" <i>antonii</i>
" <i>attenuatus</i>	" <i>atroventralis</i>
<i>Petrocephalus sauvagii</i>	" <i>fasciolatus</i>
" <i>ballayi</i>	" <i>sexfasciatus</i>
" <i>simus</i>	" <i>lusosso</i>
<i>Marcusenius nigripinnis</i>	<i>Nannocharax brevis</i>
" <i>tumifrons</i>	<i>Citharinus congicus</i>
" <i>plagiostoma</i>	" <i>gibbosus</i>
" <i>psittacus</i>	<i>Labeo weeksii</i>
" <i>wilverthi</i>	" <i>lineatus</i>
<i>Stomatorhinus humilior</i>	" <i>longipinnis</i>
" <i>microps</i>	" <i>coubie</i>
<i>Myomyrus macrodon</i>	" <i>macrostoma</i>
<i>Gnathonemus montei</i>	" <i>cyclopinnis</i>
" <i>stanleyanus</i>	" <i>sorex</i>
" <i>cyprinoides</i>	" <i>falcipinnis</i>
" <i>greshoffi</i>	" <i>kirkii</i>
" <i>tamandua</i>	" <i>forskalii</i>
" <i>mirus</i>	" <i>nasus</i>
" <i>elephas</i>	" <i>greenii</i>
" <i>rhynchophorus</i>	" <i>annectens</i>
" <i>ibis</i>	" <i>chariensis</i>
" <i>curvirostris</i>	" <i>intermedius</i>
" <i>numenius</i>	" <i>parvus</i>
<i>Mormyrus bumbanus</i>	" <i>ansorgii</i>
" <i>ovis</i>	<i>Discognathus ornatus</i>
" <i>caballus</i>	<i>Barbus fasolt</i>
" <i>rume</i>	" <i>holotænia</i>
" <i>proboscirostris</i>	<i>Barbus atromaculatus</i>
<i>Pellonula acutirostris</i>	" <i>pleuropholis</i>
" <i>tenuis</i>	" <i>candens</i>
" <i>congica</i>	<i>Leptocypris modestus</i>
" <i>royauxi</i>	<i>Barilius lujæ</i>
<i>Odaxothrissa losera</i>	" <i>weynsii</i>
<i>Sarcodaces odoë</i>	" <i>salmolucius</i>
<i>Hydrocyon lineatus</i>	<i>Chelæthiops elongatus</i>
" <i>goliath</i>	<i>Clarias platycephalus</i>
<i>Bryconæthiops microstoma</i>	" <i>malaris</i>
<i>Alestes macrophthalmus</i>	" <i>breviceps</i>
" <i>liebrechtsii</i>	" <i>angolensis</i>
" <i>imberi</i>	" <i>bythipogon</i>
" <i>macrolepidotus</i>	<i>Channallabes apus</i>
<i>Petersius woosnami</i>	<i>Heterobranchus longifilis</i>
" <i>occidentalis</i>	<i>Eutropius congensis</i>

Stanleyville.

<i>Eutropius niloticus</i>	<i>Synodontis decorus</i>
“ <i>grenfelli</i>	<i>Euchilichthys guentheri</i>
“ <i>gastratus</i>	“ <i>royauxi</i>
<i>Schilbe mystus</i>	“ <i>dybowskii</i>
<i>Parailia longifilis</i>	<i>Doumea alula</i>
<i>Bagrus ubangensis</i>	<i>Paraphractus tenuicauda</i>
<i>Chrysichthys brevibarbis</i>	<i>Belonoglanis tenuis</i>
“ <i>longibarbis</i>	<i>Malopterurus electricus</i>
“ <i>duttoni</i>	<i>Haplochilus platysternus</i>
“ <i>cranchii</i>	“ <i>elegans</i>
“ <i>punctatus</i>	“ <i>multifasciatus</i>
“ <i>delhezi</i>	“ <i>singa</i>
“ <i>ornatus</i>	<i>Lates niloticus</i>
“ <i>thonneri</i>	<i>Tilapia bouleengeri</i>
<i>Amarginops platus</i>	“ <i>dolloi</i>
<i>Gephyroglanis conigicus</i>	“ <i>melanopleura</i>
“ <i>longipinnis</i>	“ <i>acuticeps</i>
<i>Auchenoglanis occidentalis</i>	“ <i>williamsii</i>
“ <i>ballayi</i>	“ <i>stormsii</i>
<i>Arius africanus</i>	<i>Steatocranis gibbiceps</i>
<i>Synodontis acanthomias</i>	<i>Haplochromis strigigena</i>
“ <i>afro-fischeri</i>	“ <i>desfontainesii</i>
“ <i>depauwi</i>	<i>Nannochromis squamiceps</i>
“ <i>angelicus</i>	<i>Pelmatochromis lateralis</i>
“ <i>soloni</i>	<i>Hemichromis fasciatus</i>
“ <i>longirostris</i>	<i>Lamprologus obliquus</i>
“ <i>tenuis</i>	<i>Anabas nanus</i>
“ <i>greshoffi</i>	<i>Ophiocephalus obscurus</i>
“ <i>alberti</i>	<i>Mastacembelus conigicus</i>
“ <i>notatus</i>	<i>Tetrodon mbu</i>
“ <i>pleuropis</i>	“ <i>miurus</i>

Vankerckhovenille.

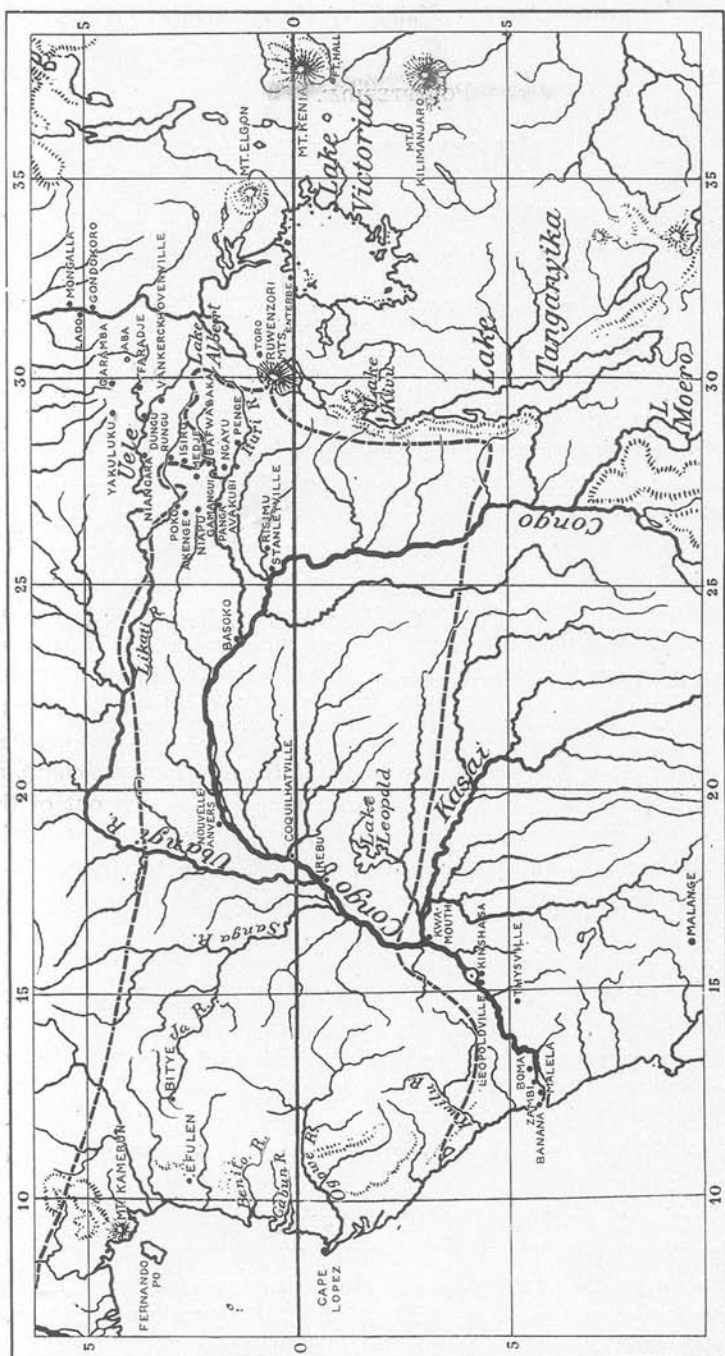
<i>Gnathonemus petersii</i>	<i>Ophiocephalus obscurus</i>
<i>Anabas nanus</i>	

Yakuluku.

<i>Bryconæthiops microstoma</i>	<i>Barbus atromaculatus</i>
<i>Micralestes stormsii</i>	“ <i>pleuropholis</i>

Zambi.

<i>Polypterus palmas</i>	<i>Chrysichthys cranchii</i>
<i>Gnathonemus leopoldianus</i>	<i>Haplochilus spilauchen</i>
“ <i>livingstonii</i>	<i>Tilapia lepidura</i>
<i>Xenomystus nigri</i>	“ <i>fasciata</i>
<i>Sarcodaces odoë</i>	<i>Hemichromis fasciatus</i>
<i>Alestes grandisquamis</i>	“ <i>bimaculatus</i>
“ <i>carmesinus</i>	<i>Anabas nigropannosus</i>
<i>Clarias bythipogon</i>	“ <i>conigicus</i>
<i>Channallabes apus</i>	<i>Ophiocephalus obscurus</i>
<i>Schilbe mystus</i>	



Map 1. Congo and Lake Region of Africa, showing all the localities where fishes were collected by the Congo Expedition, as well as some others mentioned in the present paper. The limits of the West African rain forest are indicated by a broken line.

POLYPTERIDÆ.

1. *Polypterus congicus* Boulenger.

About a dozen specimens, ranging from 8 to 26 inches in length, from Stanleyville and Faradje.

2. *Polypterus ornatipinnis* Boulenger.

Plate LXXXIII, Fig. 3 (colored).

Most of the *Polypterus* material belongs to this species. There are about 180 specimens, ranging in length from 2 inches to 2 feet, from Avakubi, Faradje and Stanleyville. The alleged differences between *weeksii* and *ornatipinnis* do not hold in this material. In those examined the dorsal spines are IX or X, scales 58 to 61, 38 to 44 around middle of body. The eye is $\frac{1}{3}$ to $\frac{1}{2}$ the interorbital. In marking and appearance most of the specimens resemble Boulenger's figure of *ornatipinnis*, in fact there is no specimen which resembles the figure of the type of *weeksii*. Otherwise we should consider *ornatipinnis* a synonym of it.

Concerning this species Mr. Lang says: "Despite its heavy scales this fish is very pliant and can twist like an eel, swimming in a similar manner. We have never seen the pectoral fins held like those of *Periophthalmus*, as they have so often been figured. When in use, both in and out of the water, the anterior paired fins are often spread horizontally, otherwise they lie against the side in the normal position. The two nasal tubes point forward and are often moved from side to side. An adult can be out of water at least two or three hours without detriment. In life the whole fish is covered with a slimy gelatinous coating obscuring the scales of the body and the plates of the head. When handled the series of dorsal spines, ordinarily depressed, is suddenly set erect with an accompanying backward jerk of the body and may seriously lacerate the hand of the captor. This species is often found in swamps, in inundated areas, up small brooks and about rocks in the main river. The very young are usually taken near grassy swamps where they swim about singly, their external gills continually in motion.

"The natives cook *Polypterus* in the hot ashes much as they do potatoes. When the fish is cooked the scales separate from the beautiful white meat. As regards flavor it is the best food fish in the Congo. The meat, though small in quantity, is firm, without any muddy taste, but has many bones. The smaller bones are eaten with the meat by the natives."

The following field notes accompany a color sketch by Mr. Chapin, of a Faradje specimen which is reproduced in this paper: "There seems to be but one species here, for all are alike in color, though the number of dorsal spines varies slightly. When fresh they are somewhat shiny but soon change in drying to dull gray."

3. *Polypterus palmas* Ayres.

Twenty-one specimens from 3 inches up to a foot in length,—2 from Faradje, 2 from Stanleyville, 1 from Coquilhatville, 15 from Zambi. From these figures we judge it the most abundant species in the lower river. "It is taken in numbers at Zambi with the seine in grassy swamps bordering the Congo."

LEPIDOSIRENIDÆ.

4. *Protopterus dolloi* Boulenger.

Only 4 specimens, three 2 or 3 feet in length from near Nouvelle Anvers, and 1 of about 9 inches from a papyrus swamp near Banana.

"At Nouvelle Anvers the natives bring *Protopterus* to market from nearby swamps, usually four or five fish alive in a pot with very little water. They are much afraid of being bitten by them. When one is thrown on the ground it is very active, wriggling like a snake, and progressing in like manner.

"The small one from Banana was taken at the end of the dry season and here it was said by natives that only those living in swamps which dried out completely are found buried in the dry mud, most of them remained active throughout the year. They brought in two others, but from fear of handling them these had been cut up with knives and were not kept as specimens.

"None were seen on the Uele or Ituri though natives spoke of their presence and described their habit of estivating."

MORMYRIDÆ.

5. *Mormyrops deliciosus* (Leach).

Plate LXIV, Fig. 1.

Numerous specimens from Stanleyville, Faradje, Rungu and Avakubi, from 2 inches up to over 2 feet in length. Specimens 4 inches or less in length from Avakubi, August and October; Faradje, December; Stanleyville, February and April.

Mr. Chapin made a color sketch of a 10 inch specimen from Avakubi

caught on a hook at night. Most of the head, the back and area at base of anal in this sketch are greenish yellow; otherwise the fish is pale purplish gray with a few faint irregular dusky scrawls on the side, the vertical fins dusky. Mr. Chapin's notes say that it is the slime that is yellow, and that there is no metallic luster save in the iris.

"Common in the long muddy stretches of the river. Probably does not occur in schools as only two or three would be killed by a single explosion of tonite. Though prized for food, the meat is musky and of not very good flavor.

"The young of various Mormyrids are very abundant in swamps at the edge of the rivers. Natives catch them in large quantities and use them for food, after boiling them whole and pounding them in mortars. They are rare in rocky or swift water, and apparently do not occur in the extreme head waters.

"All the Mormyrids are covered with a persistent gelatinous slimy skin which usually has a yellowish or purplish tint. When they are placed in formalin this skin separates and flakes off in shreds of about one mm. thickness.

"Mormyrids die more quickly than other Congo fishes out of water, or in tanks."

6. *Mormyrops breviceps* Steindachner.

A single fish 20 inches long from Faradje in February. We have compared it carefully with the type description and figure of Steindachner's Liberian fish, and although there are some differences, these seem to us within the range of individual variation. The head is longer ($4\frac{3}{4}$), inter-orbital broader ($6\frac{1}{4}$), ventral shorter ($3\frac{1}{3}$), more teeth ($\frac{26}{8}$).

7. *Mormyrops masulianus* Boulenger.

Five specimens, about 3 inches in length, from the Upper Congo (one of these from Bafwabaka). One specimen of 10 inches which we place here has the depth 7, as in *sirenoides*.

8. *Mormyrops sirenoides* Boulenger.

Several specimens from 5 to 20 inches in length from Avakubi, Faradje, Poko and Rungu.

9. *Mormyrops microstoma* Boulenger.

One specimen only, from Faradje.

10. **Mormyrops attenuatus** *Boulenger.*

Several specimens, 3 inches to over a foot in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. Five specimens, 4 to 7 inches long, from Faradje were dark purplish in color.

11. **Petrocephalus sauvagii** (*Boulenger*).

Several specimens from 2 to 6 inches in length from Avakubi, Faradje, Poko, Rungu and Stanleyville.

"Fishes of the genus *Petrocephalus* doubtless swim in schools as many are often taken at one time. They are found in deeper, more open water than *Mormyrops* and are less addicted to mud."

12. **Petrocephalus ballayi** *Sauvage.*

Twelve small specimens, 1 or 2 inches in length, from Stanleyville, April, from an affluent of the Tshopo River, "a clear, running forest brook, where they were numerous in a shaded pool under a tree. There were some small Labeos in the same place."

13. **Petrocephalus simus** *Sauvage.*

Plate LXXXII, Fig. 1 (colored).

Several specimens, 2 to 10 inches in length, from Avakubi, Faradje, Niapu, Poko and Stanleyville.

14. **Marcusenius nigripinnis** *Boulenger.*

Several specimens, one half inch to 3 inches in length, from Avakubi, Bafwabaka, Faradje, Niapu, Poko and Stanleyville.

15. **Marcusenius pulverulentus** *Boulenger.*

Four specimens 3 to 5 inches in length from Faradje.

16. **Marcusenius osborni** sp. nov.

Anal originating well in advance of dorsal. Teeth $\frac{1}{2}$. 14 scales around caudal peduncle. Depth $2\frac{4}{5}$. Dorsal 16. Snout deep and projecting. Mouth very small, its breadth about equal to diameter of eye.

The type, No. 6934, American Museum of Natural History, from the Uele River, but without specific data, is 57 mm. long to base of caudal. Depth $2\frac{4}{5}$ times in this measure. Body strongly compressed, the head less so, high and convex between the eyes. Snout deep, rounded, suggesting *Petrocephalus*. Head $3\frac{1}{2}$ in length. Eye equal to breadth of mouth and a little shorter than snout, its diameter contained 5 times in the length of head. Teeth feebly notched, $\frac{5}{8}$. Dorsal 16, origi-

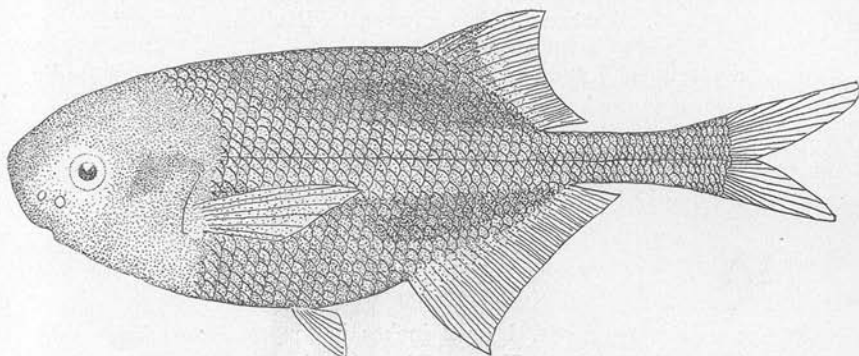


Fig. 1. *Marcusenius osborni*, type.

nating over 10th ray of anal. Anal 24, equidistant from root of ventral and of caudal. Caudal forked, its peduncle 3 times as long as deep. Fifty-eight scales in lateral line, about 14/14 in transverse series on body, 14 around peduncle. Dark purplish brown, paler greenish on the head and nape.

Besides the type there are two smaller specimens about an inch in length from Niapu.

An ordinary looking species, but rather well differentiated by its technical characters, comparable with *luysii* and *adpersus* on the one hand, *nigricans* and *isidori* on the other.

Named for Professor Henry Fairfield Osborn, President of the American Museum of Natural History to whose continuous and inspiring support is due in a large measure the great success of the Congo Expedition.

17. *Marcusenius retrodorsalis* sp. nov.

Close to *M. sphecodes*, but eye smaller, 4 times in interorbital; dorsal and anal placed much further back, so that dorsal origin is equidistant from tip of pectoral and base of caudal; caudal peduncle $2\frac{1}{2}$ times as long as deep; teeth $\frac{7}{8}$.

The type, our only specimen, No. 6933, American Museum of Natural History, Niapu, Congo, Nov. 1913, from a small forest brook tributary to the Bima River, measures 114 mm. in length to base of caudal; depth of body equal to length of head,

5 times in this measure. Head slightly longer than deep; snout rounded, $3\frac{1}{2}$ times length of head; mouth small, subinferior, its width $\frac{1}{5}$ length of head; teeth small, notched, 7 in upper jaw, 8 in lower; nostrils midway between eye and end of snout, the posterior on a line with lower border of eye; eye very small, $\frac{1}{3}$ length of snout, $\frac{1}{4}$ interorbital width. Dorsal 17, originating above 5th ray of anal, not $\frac{1}{2}$ as long as its

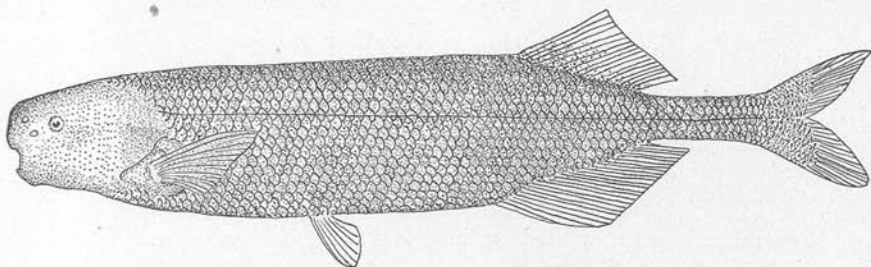


Fig. 2. *Marcusenius retrodorsalis*, type.

distance from head, its origin equidistant from tip of pectoral and root of caudal. Anal 24, much nearer root of caudal than base of ventral, about $1\frac{1}{2}$ as long as dorsal. Pectoral pointed, $\frac{2}{3}$ length of head, $1\frac{1}{2}$ length of ventral, not reaching base of latter. Caudal with pointed lobes. Caudal peduncle $2\frac{1}{2}$ times as long as deep. 67 scales in lateral line, 12 around caudal peduncle. Uniform brownish.

18. *Marcusenius tumifrons* Boulenger.

Several specimens, 2 to 6 inches in length, from Stanleyville and Avakubi.

19. *Marcusenius plagiostoma* Boulenger.

Several specimens, 1 to 6 inches in length, from Avakubi, Faradje, Stanleyville and Coquilhatville.

20. *Marcusenius psittacus* (Boulenger).

Plate LXIV, Fig. 2.

Numerous specimens, from 4 inches to over a foot in length, from Avakubi, Faradje, Rungu and Stanleyville; about $\frac{5}{8}$ of the total number are from Stanleyville.

"Taken in large numbers in rather deep, muddy water."

21. **Marcusenius wilverthi** *Boulenger.*

About half a dozen specimens, 6 inches to a foot long, from Faradje, Rungu, Stanleyville and Coquilhatville.

22. **Stomatorhinus humilior** *Boulenger.*

Four specimens, 3 or 4 inches long, from Stanleyville.

23. **Stomatorhinus microps** *Boulenger.*

Several specimens, one half an inch to 5 inches in length, from Faradje and Stanleyville.

24. **Myomyrus macrodon** *Boulenger.*

Several specimens, 1 inch to over a foot in length, from Faradje, Niapu and Stanleyville.

25. **Myomyrus macrops** *Boulenger.*

Plate LXIV, Fig. 3.

Several specimens, 2 to 9 inches long, from Avakubi, Faradje and the lower Congo. One 7 or 8 inches long from Faradje was grayish with a paler snout.

26. **Gnathonemus moorii** (*Günther*).

Four small specimens, 3 or 4 inches long, from Niapu and the Upper Congo.

27. **Gnathonemus petersii** (*Günther*).

Plate LXV, Fig. 2.

Several specimens, 4 inches to a foot in length, from Faradje, Niapu, Rungu, Poko and Vankerckhovenville.

"The mental appendage is not moved voluntarily, but is very flexible when struck against floating algæ, apparently with the purpose of detaching minute organisms which may then be sucked into the fish's small mouth."

28. **Gnathonemus leopoldianus** *Boulenger.*

One specimen, only 5 inches long, from Zambézi, taken with *Polypterus* in grassy swamps at the edge of the river.

29. **Gnathonemus livingstonii** *Boulenger.*

Five specimens, about 5 inches long, from Zambézi, taken with *Polypterus* in grassy swamps at the edge of the river. We have placed them with this East African species after due deliberation. They agree with it admirably.

30. **Gnathonemus monteiri** (*Günther*).

Plate LXV, Fig. 1.

One of the commonest members of the genus. Numerous specimens, 3 inches to over a foot in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. A very beautifully colored fish. One of the larger ones from Faradje, had the back and crown dark grayish green, changing to bronzy with blue reflections on the upper part of the sides, and to silvery with blue reflections on the lower part of same, the cheeks dotted with gray and with some golden on their lower part; iris silvery freckled with dark gray; caudal somewhat pinkish. Another over a foot in length from Rungu was silvery brownish green with golden reflections on the back. Mr. Chapin made a field sketch of an 11-inch specimen from Avakubi, which was silvery on the sides, yellow green along the back and top of the head; the upper part of the peduncle and most of the caudal lobes black. His notes say: "Caught on a hook. The yellow color of the back is of course in the slime. After the fish lay for some time exposed to the light, the skin of the throat, sides of head and belly became covered with tiny dusky spots."

31. **Gnathonemus stanleyanus** (*Boulenger*).

Several specimens, from 3 inches to over a foot in length, from Faradje, Poko, Rungu and Stanleyville. A specimen from Rungu was gray-green on the back with golden reflections, sides silvery with bluish reflections, silvery white below; another about 5 inches long had the general color silvery brownish green with golden reflections on the back.

32. **Gnathonemus cyprinoides** (*Linnæus*).

Five specimens, 2 to 7 inches in length, from Stanleyville.

33. **Gnathonemus greshoffi** (*Schilthuis*).

Several specimens, 3 to 6 inches in length, from Avakubi, Faradje, Poko and Stanleyville.

34. **Gnathonemus tamandua** (*Günther*).

Plate LXV, Fig. 3.

Several specimens, from an inch and a half to a foot in length, from Faradje and Stanleyville. One 6 inches long from Faradje was dark greenish with iris bronzy in color.

35. **Gnathonemus mirus** *Boulenger*.

Plate LXXXII, Fig. 1 (colored).

Several specimens, from 6 inches to almost 2 feet in length, from Avakubi, Faradje, Poko and Stanleyville. One from Faradje, according to Mr. Lang, was dark green above, lighter towards the snout, silvery gray on the sides, pinkish near the gill-covers. Fins grayish-green suffused with pinkish, tipped with yellowish. The opening of the mouth pinkish.

36. **Gnathonemus elephas** *Boulenger*.

Numerous specimens, from 1 inch to almost 2 feet in length, from Avakubi, Faradje, Poko and Stanleyville. Quite a number were killed with poison in the stony sections of the Dungu River at Faradje. Eaten extensively by white men.

37. **Gnathonemus rhynchophorus** *Boulenger*.

Plate LXV, Fig. 4.

Several specimens, 3 inches to a foot and a half in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. A large one from Avakubi had the color dusky brownish, greenish below, iris silvery; another large one from Faradje was purplish blue above, with yellowish slime at certain

places, purplish gray below. Others also from Faradje were purplish gray all over except for whitish areas on belly, and yellowish slime on head. One from Rungu was dark purplish in color. Mr. Chapin made a color sketch of one of about 10 inches from Avakubi, caught on a hook in the evening. The sides are ash gray, clouded with extensive areas of dark blue slate. The head, back and area at base of anal are dark olive green, vertical fins dusky olive. His notes say: "The greenish color of the back, etc., is as usual due to slime. No metallic reflections save in iris."

38. **Gnathonemus ibis** *Boulenger.*

Several specimens, from 6 inches to 2 feet in length, from Avakubi, Faradje, Poko and Stanleyville. One somewhat less than a foot long from Faradje was dark purple blue, nearly black, with a green tinge. The proportions of the snout are variable (generally longer and more slender in large specimens) and it is difficult to draw the line between *rhynchophorus* and *ibis*, which are at best closely related.

39. **Gnathonemus curvirostris** *Boulenger.*

Three specimens, a foot and a half to 2 feet in length, from Faradje and Stanleyville.

40. **Gnathonemus numenius** *Boulenger.*

Two specimens, 20 inches in length, from Stanleyville. The least depth of the snout is only 17 in its length instead of 20 as it should be according to Boulenger; the angle and general contour thereof however resemble *numenius*, with which species we have no hesitation in placing our specimens.

41. **Genyomys donnyi** *Boulenger.*

One, 18 inches long, from Niangara, taken with poison in a rocky stretch of river.

42. **Mormyrus bumbanus** *Boulenger.*

Several specimens, $2\frac{1}{2}$ inches to about a foot in length, from Avakubi, Faradje and Stanleyville.

43. **Mormyrus ovis** *Boulenger.*

Several specimens, 6 inches to a foot and a little over in length, from Avakubi, Faradje and Stanleyville.

44. **Mormyrus caballus** *Boulenger.*

Plate LXIV, Fig. 4.

Several specimens, 6 to 20 inches in length, from Avakubi, Faradje and Stanleyville. One about a foot and a half in length from Faradje had the following colors: Back dark greenish brown with golden reflections on sides. Mouth light gray. Ventral surface grayish white. Fins bluish gray.

"It doubtless swims in schools, as when taken with tonite a number would be killed at one explosion."

45. **Mormyrus rume** *Cuvier & Valenciennes.*

Two specimens, 9 to 18 inches long, from Stanleyville, taken in a rocky stretch of river.

46. **Mormyrus proboscirostris** *Boulenger.*

Four specimens, about 2 feet in length, from Stanleyville, taken in a rocky stretch of river.

NOTOPTERIDÆ.

47. **Xenomystus nigri** (*Günther*).

The specimens range from 3 to 8 inches in length. There are two from Coquilhatville and many from Zambi.

"Near Coquilhatville this species is abundant in the broad marshy expanses and frequently brought to market. At Zambi it was taken in grassy swamps at the edge of the river with *Polypterus* and Mormyrids."

PANTODONTIDÆ.

48. **Pantodon buchholzi** *Peters.*

A single specimen, 2 or 3 inches long, from Basoko.

"At Basoko, one of these remarkable fresh-water flying fish took a rather long skip over the water, startled by a native dugout that passed through the narrow lane between the shore and the steamer lying at her moorings. It looked peculiar, quite different from the smooth, silvery *Aleste*. Some species of this genus are often seen leaping in schools from the water as if to escape an enemy in hot pursuit. We were still wondering what fish

this was when another *Pantodon* rose and, badly frightened by the rapidly moving boat, landed on the level shore. There it struggled like any other fish on the beach and all its efforts with its strong caudal and broad pectoral fins could not raise it into the air again. This was the only occasion we met with this species."

CLUPEIDÆ.

49. *Pellonula vorax* Günther.

Two specimens, $2\frac{1}{2}$ inches long, from Poko.

50. *Pellonula acutirostris* Boulenger.

Nine specimens, about $2\frac{1}{2}$ inches long, from Stanleyville.

51. *Pellonula tenuis* sp. nov.

Origin of dorsal over or slightly in advance of that of ventral, its last ray far in advance of anal origin. Dorsal origin much nearer snout than caudal. Dorsal 14 to 15; anal 17 to 19. Depth to base of caudal $4\frac{2}{3}$ to $5\frac{3}{5}$. Scales about 43 to 45.

The type, No. 5842, American Museum of Natural History, from Stanleyville, April, 1915, is 67 mm. long to base of caudal; depth $5\frac{2}{5}$ in this measure; head $4\frac{3}{8}$; eye 3 in head; snout 3; interorbital 4; maxillary $2\frac{4}{5}$. Body compressed, not strongly

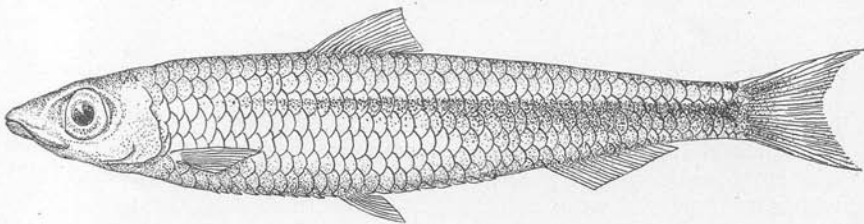


Fig. 3. *Pellonula tenuis*, type.

so, dorsal and ventral outlines similar. Jaws even, maxillary reaching front of eye. Adipose eyelid somewhat developed. Dorsal inserted much nearer snout than caudal, just in advance of ventral origin; its longest ray $1\frac{1}{2}$ in head. Pectoral $1\frac{1}{2}$, extending a little more than half way to ventral. Ventral 2; anal low, its longest ray 3. Caudal forked $1\frac{1}{3}$. Dorsal 14, anal 18. Scales 45, 8 longitudinal series between dorsal and ventrals. Ventral scutes low, those before ventrals very weak, 10 + 11. Conspicuous ramifying canals on opercle and shoulder. Teeth small

and weak. Color much as in *Pellonula congica*, marking less bold. Resembles *Pellonula obtusirostris* but is more slender.

Several specimens, about $2\frac{1}{2}$ inches long, from Avakubi and Stanleyville.

52. *Pellonula* (*Pœcilothrissa*) *congica* (Regan).

Dorsal originating slightly behind base of ventral, its last ray a little in advance of anal origin. Dorsal origin equidistant from snout and caudal. Dorsal 13 to 14, anal 18 to 20. Depth to base of caudal $3\frac{4}{5}$ to $4\frac{2}{5}$. Scales about 37.

A typical specimen, No. 5844, American Museum of Natural History, Stanleyville, April, 1915, is 60 mm. long to base of caudal; depth 4 in this measure; head $4\frac{1}{3}$; eye $2\frac{4}{5}$ in head; snout $3\frac{2}{5}$; interorbital $3\frac{1}{2}$; maxillary $2\frac{3}{5}$. Body strongly compressed, ventral outline the more arched. Jaws even, maxillary reaching front of

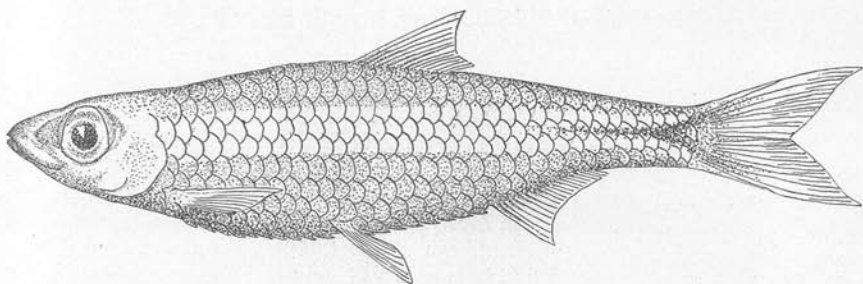


Fig. 4. *Pellonula congica* (Regan).

pupil. Adipose eyelid developed. Dorsal inserted equidistant from snout and caudal, slightly behind ventral base, its longest ray $1\frac{2}{5}$ in head. Pectoral $1\frac{2}{5}$ not reaching ventral. Ventral $1\frac{1}{2}$; anal low, its longest ray $2\frac{1}{4}$. Caudal forked, slightly longer than head. Dorsal 13, anal 19. Scales loosely attached, about 35; 8 or 9 longitudinal series between dorsal and ventrals; 10 + 9 strong ventral scutes. Conspicuous ramifying canals on opercle and shoulder. Teeth in jaws of moderate or small size, sharp and somewhat unequal. Color in alcohol, pale with a whitish lateral stripe, narrower at its greatest diameter than eye. A central dark streak on peduncle forking onto the bases of the caudal lobes.

Intermediate between *Pellonula* (*Microthrissa*) *royauxi* and *Pellonula vorax*, which latter it greatly resembles in appearance. The description of this species and of *Odaxothrissa ansorgii* by Boulenger raises the question of the validity of the genera *Pellonula*, *Microthrissa* and *Odaxothrissa*. A series of forms are now known from *Odaxothrissa losera* through *Microthrissa* to *Pellonula*. In our opinion the *Odaxothrissa* type should be recognized

generically but we have synonymized the intermediate *Microthrissa* with *Pellonula* to which it is very close.¹

We have numerous specimens of *Pellonula congica*, 1 to 2 $\frac{3}{8}$ inches long, from Stanleyville taken in February and April, 2 from Poko in August, and 6 from Avakubi in October.

"In the vicinity of Stanleyville fishes of the genus *Pellonula* occur in immense schools near shore where they are taken by the thousand in small seines. When alive they have a glass-like, translucent appearance. In preparing them for food natives scrape off the sharp ventral scutes, otherwise they eat them entire."

53. ***Pellonula (Microthrissa) royauxi*** (*Boulenger*).

Several specimens, 1 to 2 $\frac{5}{8}$ inches long, from Stanleyville, one from Avakubi and two from Poko. This material has the eye somewhat larger than described, 2 $\frac{3}{4}$ to 3 in head.

54. ***Odaxothrissa ansorgii*** *Boulenger*.

Two specimens, about 4 inches in length, from Boma, selected from a number in the market.

55. ***Odaxothrissa losera*** *Boulenger*.

Several specimens, 3 to 6 inches in length, from Stanleyville.

CHARACINIDÆ.

56. ***Sarcodaces odoö*** (*Bloch*).

Plate LXVIII, Figs. 1, 2.

Several specimens, 5 to 10 inches in length, from Avakubi, Faradje, Poko, Rungu, Stanleyville and Zambi. This fish seems to be very generally distributed but nowhere numerous; it occurs singly, not in schools. It is a good food fish. One 7 inches long from Faradje had the following colors: Back dark brown with beautiful emerald green reflections, especially on the

¹ This paragraph was written as it stands before we had seen Regan's paper on the Clupeid Fishes of the Genus *Pellonula*, etc., Ann. Mag. Nat. Hist., Feb. 1917. Our judgment would be not to recognize his genera *Pacilothrissa*, *Potamothrissa* and *Cynothrissa*, of all of which we have examined material.

somewhat paler sides; ventral surface silvery white; dorsal, caudal and anal fins medium brown dotted with dark brown; gill covers silvery with green reflection; iris dark brown, with silvery edge except posteriorly.

57. **Hydrocyon lineatus** Bleeker.

Plate LXVI, Fig. 1; Plate LXX, Fig. 1.

Several specimens, 1 inch to a little less than a foot in length, from Faradje, Kwamouth, Rungu and Stanleyville. One of the largest had the following colors: Back medium brown with somewhat lighter snout and blue silvery reflections; sides yellowish silvery, whitish near ventral surface; their whole length with black points and dark blue gray longitudinal markings. Iris yellowish, suffused with dark gray above and anteriorly. Dorsal pale brown, edged with red; adipose fin black with transparent base; caudal with the base at the middle dark; upper lobe transparent brownish with a broad red margin and narrow terminal black edge; lower lobe transparent gray, its margin vermilion; pectoral, ventral and anal transparent gray, chrome orange at the tips. A color sketch by Mr. Chapin shows a silvery fish, darker along the back, with narrow blue-gray longitudinal stripes, adipose fin dusky, others margined with red, almost the entire lower caudal lobe red.

"*Hydrocyon lineatus* is called water leopard by the natives, who are not afraid of it as it is not known to attack bathers, although its formidable dentition renders it dangerous to handle. It generally swims in schools, especially when young. At low water in March and April at Stanleyville many were taken in dip-nets along the rocky ledges as they came down stream with the current. These were all about 10 inches long."

58. **Hydrocyon goliath** Boulenger.

Seven specimens, 3 to 8 inches in length, from Stanleyville.

59. **Bryconæthiops microstoma** Günther.

Plate LXVII, Fig. 2; Plate LXXX, Fig. 2 (colored).

Bryconæthiops yseuxii BOULENGER.

Numerous specimens, one and a half to 5 inches in length, from Avakubi, Coquilhatville, Faradje, Niapu, Poko, Rungu, Stanleyville and Yakuluku.

One 3 or 4 inches long from Faradje had the following colors, according to Mr. Lang: Brownish, back with blue reflections; crown reddish brown; sides silvery yellow; ventral surface silvery; dorsal, anal and caudal fins dark gray, transparent; iris whitish, crossed by a vertical yellow and black bar. A fair proportion of the specimens have the black markings characteristic of the variety *boulengeri*. Several of the larger ones have the filamentous dorsal rays which are the chief character of *B. yseuxii*; others are intermediate in this respect and we do not consider *B. yseuxii* a valid species. *Bryconathiops* occurs in schools, and in Mr. Lang's judgment perhaps one in thirty individuals has long filamentous dorsal rays.

60. *Alestes macrophthalmus* Günther.

Plate LXVII, Fig. 1.

One of $2\frac{1}{4}$ inches from Stanleyville, April, one of $2\frac{1}{2}$ inches from Poko, August, and a 12-inch specimen from Faradje. Of this large one Mr. Lang says: "Some natives tried to catch these fish with nets. Each time they pulled the nets towards the shore the fish would leap about 4 feet above the surface of the water and perhaps 20 feet in distance, and they could not get a single one. Common close to the boulders in the river." He further notes that its color was as follows: A silvery sheen throughout; back and top of head dark greenish brown with blue reflections; sides silvery; ventral surface silvery with pink reflections; iris dark gray above, yellowish in the middle, then silvery, with an indefinite dark marking just below the pupil.

61. *Alestes liebrechtsii* Boulenger.

Several specimens, $2\frac{1}{2}$ inches to 2 feet in length, from Avakubi, Faradje, Rungu and Stanleyville. As there are specimens of 3 or 4 inches in length from Stanleyville in February and April, Rungu in June, and Avakubi in December, it doubtless breeds throughout the year, as very likely do most of the Congo fishes.

The teeth of the small specimens resemble those of *Micrallestes* more than those of the typical *Alestes*. From examination of our *Alestes*, *Micrallestes* and *Petersius* material we would say that the dental differences given for these genera are too variable to be of generic value. We recognize the genera, however, as we have not at present the opportunity to study the teeth as carefully as Boulenger has probably done, and for the sake of convenience.

This species and other Characins which resemble it closely are always

found in schools, and one frequently sees a school jump above the surface as though pursued by some larger fish.

62. **Alestes longipinnis** (Günther).

Several specimens, half an inch to 2 inches long, from Poko.

63. **Alestes nurse** (Rüppell).

Two specimens, about 5 inches long, from Garamba, taken in small brooks in the deeper pools left in the dry season.

64. **Alestes imberi** Peters.

Numerous specimens, $\frac{1}{2}$ to about 6 inches in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. They swim in schools and have the following colors: Above medium brown; sides and gill-covers silvery; ventral area white; top of head with a tinge of green; iris pale yellowish; a blackish patch near caudal; dorsal, caudal and anal fins with yellowish or reddish tints; adipose fin reddish; pectoral and ventral fins transparent, colorless. This species bites readily, and many are caught with worms for bait on small hooks (or thorns used as hooks).

65. **Alestes schoutedeni** Boulenger.

Four specimens, 4 or 5 inches long, from Rungu and Faradje. One from Rungu was silvery with a broad longitudinal dark band. One from Faradje had the back dark brown, dark gray irregular markings forming the lateral band, iris dark brown with an orange edge above.

The material which we place here should perhaps be described as a new species. Our specimens are shorter bodied (depth 3 or a trifle less) with lower scale-count (23 to 25).

66. **Alestes bimaculatus** Boulenger.

Two specimens, 2 to 3 inches long, from Coquilhatville. Vertical fins more or less red.

67. **Alestes macrolepidotus** (Cuvier & Valenciennes).

Several specimens, about 1 to 9 inches in length, from Bolobo, Faradje, Poko and Stanleyville.

A color sketch by Mr. Chapin of a 5-inch specimen from Faradje shows a silvery fish, brownish olive along the back, dorsal, adipose and caudal fins, and a stripe in the center of the anal mostly orange red, the margins of these fins and a streak up the center of the caudal to the peduncle more or less dusky.

"This and several related species of *Alestes* are commonly seen swimming in schools close to the surface, along the shores of the larger water-courses (Congo, Uele, Ituri). They attract attention by a conspicuous light buff spot on the back, in about the position of the adipose fin. Yet when taken out of the water no such marking is noticeable."

68. *Alestes grandisquamis* Boulenger.

Several specimens. They are from Avakubi, Faradje, Poko, Rungu and two from Zambi. They range from about 3 to 8 inches in length. A large one had caudal, dorsal, adipose fin and lower portion of anal pinkish. Another of about 7 inches had the tip of snout above dark blue gray, top of head dark brown, back light brown, the brown of the upper parts turning to silvery on the sides, and the ventral surface whitish. Dorsal brownish with pink on the edges, caudal bright pink fading on the edges; pectoral, ventral and anal fins whitish, the pectorals exteriorly edged with gray. Below the eye silvery and the lower portion of the gill-covers pinkish. Iris bright yellow above turning to silvery below.

69. *Alestes carmesinus* sp. nov.

Scales 24; dorsal originating decidedly behind last ventral ray; breadth of head equal to distance from end of snout to occiput; anal III, 11; depth $2\frac{5}{8}$; lower sides and cheeks rose red.

The type, No. 6330, American Museum of Natural History, our only specimen, from Zambi, June, 1915, measures 160 mm. in length to base of caudal; depth $2\frac{5}{8}$ times in this measure, head $3\frac{3}{5}$ times. Head $1\frac{1}{2}$ times as long as broad, $1\frac{1}{4}$ times as long as deep; distance between end of snout and occiput slightly exceeding width of head; snout slightly projecting beyond lower jaw, $1\frac{1}{3}$ times as long as eye; eye lateral, its diameter 4 times in length of head, $2\frac{1}{4}$ times in interorbital width; adipose eyelid moderately developed; interorbital width $\frac{1}{2}$ length of head; maxillary reaching to under nostril, not nearly to anterior border of eye; 16 teeth ($\frac{5}{8}$) in upper jaw, 10 ($\frac{3}{8}$) in lower; lower border of second suborbital equal to diameter of eye; gill rakers rather short and slender, 15 on lower part of anterior arch. Dorsal II 8, originating well behind vertical of base of ventrals, nearer caudal than occiput; first branched ray longest, $\frac{3}{4}$ length of head; Anal III 11, longest ray $\frac{1}{2}$ length of head. Pectoral $\frac{3}{4}$ length of head, not reaching ventral. Caudal forked, with round lobes. Caudal peduncle a little deeper than long. Scales 25, 1 between lateral line and root of ven-

tral. Color dark along the back, pale below, a black humeral spot and a black blotch on peduncle extended forward to below dorsal as a vague dark stripe; lower sides and cheeks rose red.

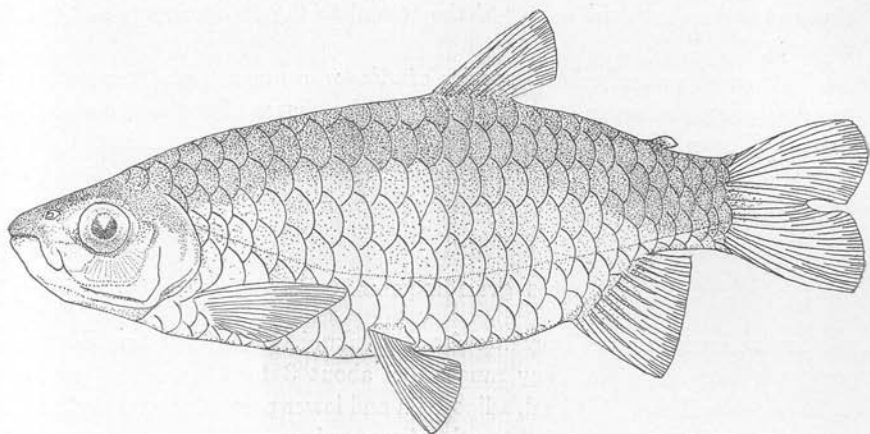


Fig. 5. *Alestes carmesinus*, type.

This species is allied to *A. grandisquamis* and *A. brevis*, being deeper than the former, with shorter anal and more numerous scales than the latter. The specimen was taken with the seine in a swampy place associated with *Polypterus*, etc.

70. *Micralestes acutidens* (Peters).

Numerous specimens, an inch to 3 inches in length, from Avakubi, Faradje and Poko.

71. *Micralestes stormsi* Boulenger.

Three specimens, 2 or 3 inches long, from Avakubi and Yakuluku.

72. *Micralestes altus* Boulenger.

Plate LXXXII, Fig. 2 (colored).

Several specimens, 1 to 2½ inches in length, from Avakubi, Niapu, Poko and Rungu. There is no question that our material is referable to *Micralestes altus* as described and figured by Boulenger, but we cannot find the conical teeth supposed to be present in the lower jaw and would have referred it to *Petersius*. One from Avakubi had the belly orange red.

73. **Petersius hilgendorfi** Boulenger.

One specimen, of 4 inches, from Coquilhatville which agrees well in technical characters with the description of this species, although differing in its color, which is well preserved, as follows: General color dark orange red, paler on the belly; dorsal, caudal, front of anal and outer edge of ventral, red; adipose fin, central caudal rays, posterior part of anal, anterior edge of pectoral, and bold vertical bar above pectoral, black; outer margin of caudal pale

74. **Petersius caudalis** Boulenger.

Five specimens, 1 or 2 inches long, from Avakubi.

75. **Petersius woosnami** Boulenger.

Several specimens, 1 to 3 inches long, from Avakubi, Faradje, Niapu, Rungu and Stanleyville. Before being transferred from formalin to alcohol some of them had caudals more or less red margined with black.

76. **Petersius occidentalis** Günther.

Many specimens, $\frac{1}{2}$ to 3 inches long, from Stanleyville and a few from Avakubi, Faradje and Poko. Numerous in pools of small brooks. In formalin, a black dorsal tip and subtending yellow cross-bar were usually conspicuous; the former persists in alcohol.

Evidently one of the most abundant small fishes at Stanleyville, and it is very surprising not to find it previously recorded from the Congo, *occidentalis* being described from the Gold Coast.

In our material we find 18 or 19 rays in the anal, which is less than described but agrees with the figure. The depth of our specimens varies from $2\frac{1}{2}$ to $3\frac{2}{3}$. In some (probably males) the front of the anal is high and rounded as in the figure, in others low. Among the largest are females with eggs, from Stanleyville in April.

77. **Eugnathichthys eetveldii** Boulenger.

Plate LXVIII, Fig. 4.

A few specimens, about 3 to 14 inches in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. One about a foot in length from Poko had the following colors, according to Mr. Lang: Greenish brown above; sides

silvery; top of head dark gray, slightly pinkish posteriorly. A number of irregular dark gray markings on the upper half of the body; those on the back tinged with greenish. Cheeks and ventral surface silvery with pinkish tint. Dorsal yellowish with dark horizontal bars. Tail pearl gray with dark bars. Pectoral and ventral fins orange; anal with a faint yellowish tinge; iris silvery white, dark above, slightly purplish below.

78. **Eugnathichthys macroterolepis** *Boulenger*.

Plate LXVIII, Fig. 3.

Several specimens, 1 to 6 inches in length, from Avakubi, Faradje, Malela, Poko, Rungu and Stanleyville. Mr. Chapin made a color sketch of one 8 inches long from Avakubi taken in a fish trap placed with the opening down stream between the rocks in rapids. It is dull greenish above, silvery on the side, whitish below, dorsal, adipose and caudal straw yellow. Two rows of roundish spots as large as eye on the upper side, bold stripes across the dorsal fin and caudal lobes, and the top of the adipose black. Fishes of the genus *Eugnathichthys* are common, occurring singly.

79. **Mesoborus crocodilus** *Pellegrin*.

Plate LXVI, Fig. 3; Plate LXXI, Fig. 2.

Ten specimens, 5 to 10 inches in length, from Coquilhatville, Faradje, Poko and Rungu. Three of 6 or 7 inches from the first-named locality have the dorsal and caudal orange in color, the back tinged with the same. One taken at Garamba was lost.

80. **Phago intermedius** *Boulenger*.

Five specimens, about 5 inches long, from Poko. Taken with the seine under overhanging trees in the Bomokandi River.

81. **Phago boulengeri** *Schilthuis*.

Plate LXVI, Fig. 4.

A few specimens from Faradje and Niapu, $1\frac{1}{2}$ to 4 inches long, according to Mr. Lang "of pale gray and whitish transparent appearance."

Microstomaticthyoborus gen. nov.

Upper jaw freely movable upwards; gill-membranes free from the isthmus; scales small, ciliated; lateral line along the middle of the side; a single series of small, broad bicuspid teeth in each jaw; dorsal origin slightly in advance of origin of ventral; snout pointed, jaws even, mouth not nearly reaching eye; a scaly process at the base of the ventrals; body elongated, compressed.

This genus is evidently a small, weak-mouthed derivative of *Ichthyoborus*-like fishes. It stands intermediate between these and Pellegrin's *Hemistichodus vaillanti*.

82. **Microstomaticthyoborus bashforddeani** sp. nov.

The type, our only specimen, No. 6329, American Museum of Natural History, from Poko, August 1913, measures 63 mm. in length to base of caudal; depth $4\frac{1}{2}$ times in this measure; head $3\frac{2}{3}$ times; snout pointed; jaws equal; maxillary extending $\frac{2}{3}$ of the way to eye; snout equalling eye, which is $3\frac{1}{2}$ times in length of head and greater than interorbital width; about 12 teeth on each side in each jaw, equal in

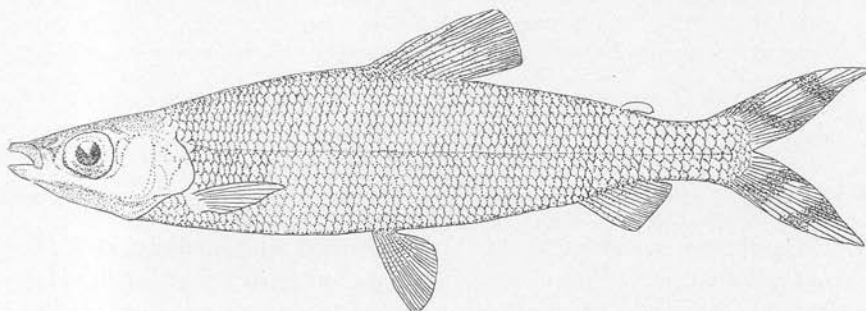


Fig. 6. *Microstomaticthyoborus bashforddeani*, type.

size; gill rakers moderately short and slender, few and widely spaced, 10 on lower limb of anterior arch. Dorsal II 11, originating at equal distance from end of snout and root of caudal, longest ray $\frac{2}{3}$ length of head; anal 12; pectoral and ventral fins equal, $\frac{1}{2}$ length of head. Caudal deeply forked, with pointed lobes, half covered with scales. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales 67, 8 between lateral line and root of ventral. Lobes of the caudal with oblique black bars. Alcoholic specimen otherwise unmarked.

We take pleasure in naming this interesting species for Prof. Bashford Dean, of the American Museum of Natural History.

83. *Nannæthiops tritæniatus* Boulenger.

Five specimens, an inch and a half long, from Niapu.

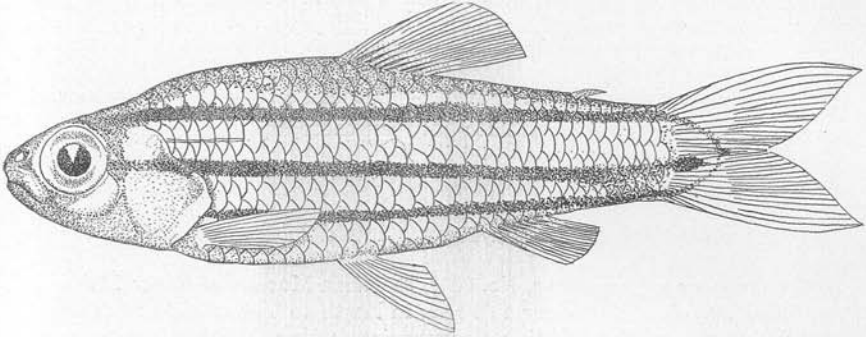


Fig. 7. *Nannæthiops tritæniatus* (Bouleng.).

84. *Distichodus affinis* Günther.

Plate LXVI, Fig. 2.

Several specimens, 1 inch to about 6 inches in length, from Avakubi, Faradje, Rungu and Poko, also a small one from Boma and three others from the lower Congo. In one of an inch and a half from Poko the following bright colors persist: Front margin of dorsal black; an area behind the margin, base of anal in front and ventral, except for a pale edge, vermilion; a faint vermilion tinge at base of caudal. Large ones, five or six inches long, from Faradje in December had the general color silvery gray to greenish brown above, whitish silvery below, many of the scales with dark gray pattern at edges. They were common in schools of fifteen to twenty, in comparatively clear water near the edge of the river, swimming near and apparently feeding from the surface.

85. *Distichodus maculatus* Boulenger.

Several specimens, from 2 inches to about a foot in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. Small ones, 3 inches or less, are from Stanleyville in February and April, Rungu in June, Avakubi in August,

indicating at least a very prolonged spawning season. A large one from Faradje in December was gray brown above; sides silvery with darker markings; ventral surface whitish; dorsal fin gray with irregular dark markings; adipose fin dark gray; upper half of caudal fin pale grayish green, the posterior two thirds of the lower half reddish; pectoral, ventral and anal fins colorless. These fish swim near the bottom in small schools, and occur in fairly deep pools. Their yellowish fatty meat, of a rather unpleasant flavor, is relished by the natives.

86. ***Distichodus antonii* Schilthuis.**

Three specimens, $1\frac{1}{2}$ to 2 feet long, and a half dozen small ones $1\frac{1}{4}$ to 2 inches; one of the large ones from Faradje, the others from Stanleyville.

87. ***Distichodus atroventralis* Boulenger.**

Four small specimens, 1 to $1\frac{3}{4}$ inches, from Stanleyville, April, resemble the young of *sexfasciatus* except that their black cross-bars are narrower and the anal pale.

88. ***Distichodus fasciolatus* Boulenger.**

The most abundant of the genus, especially at Stanleyville, and very variable. Numerous specimens, 1 inch to 2 feet in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. Those 3 inches and under are from Stanleyville and Avakubi in February, Stanleyville in April, Poko and Avakubi in August, indicating at least a very prolonged spawning season. Occurs in schools, most often in the deeper muddy parts of the river near the bottom. Its meat, which resembles that of *maculatus*, *sexfasciatus*, and *luciosus*, is relished by the natives. Its habits are very like those of these last two species, and the three are often taken together.

89. ***Distichodus langi* sp. nov.**

Plate LXIX.

Scales 71; snout deeper than long, feebly compressed; dorsal 27; anal 13; inter-orbital width equal to length of snout; 12 scales between lateral line and ventral; depth $2\frac{1}{4}$ to base of caudal; base of dorsal twice as long as its distance from adipose fin.

The type, No. 5915, American Museum of Natural History, Faradje, December 1912, is 510 mm. to base of caudal; depth $2\frac{1}{4}$ times in this measure, head 5 times.

Head $1\frac{2}{3}$ times as long as broad; snout feebly compressed, rounded, about equal to postocular part of head, about $2\frac{1}{2}$ times diameter of eye; eye $5\frac{1}{4}$ times in length of head; interorbital width $2\frac{1}{3}$ times in length of head; maxillary extending to below nostrils; teeth in two series in each jaw, those of the inner very small, 16 in outer series. Dorsal 27, its origin much nearer occiput than caudal, its base twice as long as its distance from adipose fin, the longest ray only $\frac{3}{4}$ length of head. Anal 13, its base much shorter than that of dorsal. Pectoral shorter than head. Caudal forked with obtusely rounded lobes. Caudal peduncle $1\frac{1}{3}$ times as deep as long. Scales 71, 12 between lateral line and ventral.

The collector, Mr. Lang, in whose honor this species is named, supplies the following notes on its coloration and habits: "Fins dark slate color; under surface white; back and sides grayish with silvery blue and purple reflections; top and sides of head dull, dark greenish; gill-covers silvery with pale purple reflections; iris dark brown with some red above. Evidently swimming in schools, as five of them have been killed by one explosion."

Besides the type we have one other specimen with the same data measuring 325 mm.

This species is closely related to *D. mossambicus*, from which it differs in the greater breadth of the head, less slender snout, smaller eye, position of the nostril, less high dorsal, and coloration.

90. ***Distichodus sexfasciatus*** Boulenger.

Several specimens, about $1\frac{1}{2}$ to 8 inches in length, from Avakubi, Faradje, Rungu and Stanleyville.

91. ***Distichodus lusosso*** Schilthuis.

Plate LXXX, Fig. 3 (colored).

Several specimens, $1\frac{1}{2}$ feet down to 3 inches in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville.

92. ***Nannocharax brevis*** Boulenger.

Two specimens, $1\frac{1}{2}$ inches long, from Stanleyville, taken in a small forest brook, which we place with this species have a higher scale count (42) than given by Boulenger.

93. ***Nannocharax fasciatus*** Günther.

A half dozen specimens, 2 or 3 inches long, from Avakubi.

94. ***Nannocharax elongatus*** Boulenger.

A half dozen specimens, 2 to 4 inches long, from Avakubi, Faradje and Poko.

95. ***Nannocharax tænia*** Boulenger.

A half dozen specimens, $1\frac{1}{2}$ to 3 inches long, from Poko, Faradje and Niapu. Those from Poko were taken in a forest river, from Niapu in a small forest brook.

96. ***Citharinus congicus*** Boulenger.

A dozen specimens, $\frac{1}{2}$ inch to 20 inches long, three from Faradje, the others from Stanleyville.

97. ***Citharinus gibbosus*** Boulenger.

Plate LXVII, Fig. 1.

Several specimens, 1 inch to a little less than a foot long, from Avakubi, Faradje and Stanleyville. One of 3 inches was silvery throughout, light brown above. Fishes of the genus *Citharinus* are generally distributed throughout the river. Large schools of young occur in the headwaters and swampy places, even papyrus swamps.

CYPRINIDÆ.

98. ***Labeo weeksii*** Boulenger.

Several specimens, about 1 to 10 inches in length, from Avakubi, Faradje and Stanleyville.

99. ***Labeo lineatus*** Boulenger.

Several, 1 inch to about 15 inches in length, from Stanleyville. One of $6\frac{1}{4}$ inches when transferred from formalin had rows of orange spots between the bold, black longitudinal stripes, fins dark wine red. Boulenger describes the lips of *lineatus* as without plicæ, like those of *weeksii*. Our two large ones ($6\frac{1}{4}$ and 15 inches) have the lips with plicæ, but we think our identification is correct.

100. **Labeo longipinnis** Boulenger.

Plate LXXIII.

Labeo velifer BOULENGER.

Three specimens from Stanleyville, $1\frac{1}{2}$ to 6 inches long; and others 8 or 9 inches to over 2 feet (*velifer*) from Stanleyville, Faradje (one) and Rungu (one, the largest). We are convinced that *velifer* is the adult of *longipinnis*, the barbels becoming obsolete and disappearing with age. One a foot long has a rudimentary barbel.

The largest (Rungu, June), about 28 inches, had the following colors: General color a beautiful pink, each scale with an emerald green edge, the back darker throughout, somewhat purplish. The dorsal fin dark blue gray with paler areas, especially the rays, the caudal dark blue gray, somewhat purplish, pectoral and ventral grayish above, paler below; anal fin dark blue gray with lighter base. Top of head purplish gray, snout pale gray and white, cheeks white, gill covers gray. Breast and belly whitish with a few greenish tints. Iris silvery with pale orange tints.

In Faradje this species is caught by natives in traps set between the rocks of rapids. Like all the *Labeos*, it is good eating.

101. **Labeo coubie** Rüppell.

Two specimens, about 5 and 8 inches long, from Stanleyville. Evidently a widely distributed fish, which it is not surprising to find in the Congo.

102. **Labeo macrostoma** Boulenger.

Plates LXXI and LXXIV.

Five specimens, about 3 inches to a foot and a half long, one from Faradje, the others from Stanleyville. Another of about 3 feet from Rungu was photographed and not preserved. General color grayish purple with pinkish tints and greenish bases to the scales, lower sides and ventral surface white. Tip of snout whitish. Fins more or less yellowish.

103. **Labeo cyclopinnis** sp. nov.

A small barbel on each side; inner surface of lips with transverse plicæ; eyes perfectly lateral; dorsal with concave upper edge; depth of body $3\frac{1}{2}$ times in length to base of caudal; dorsal strongly falcate, the longest ray $1\frac{1}{2}$ to 2 times length of head,

anterior margin strongly curved; 20 scales around caudal peduncle which is much deeper than long.

The type, No. 6296, American Museum of Natural History, from Stanleyville, February 1915, is 119 mm. in total length; depth $3\frac{1}{6}$ times in this measure, head $3\frac{2}{3}$ times, $1\frac{2}{3}$ times as long as broad; snout rounded, its length $\frac{1}{2}$ that of head; eye perfectly lateral, $3\frac{1}{2}$ times in length of head; interorbital width $2\frac{1}{8}$ times in length of head; width of mouth with lips $2\frac{1}{4}$ times in length of head; lips with transverse plicæ;

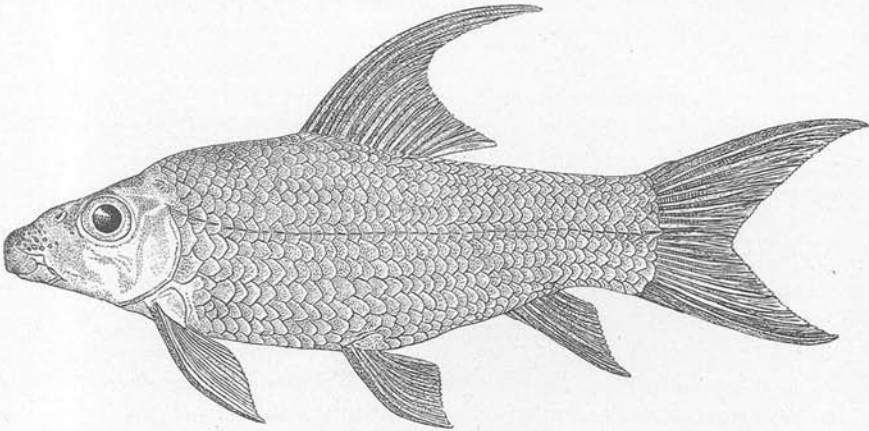


Fig. 8. *Labeo cyclopinnis*, type.

lower lip with a fringe of conical papillæ; rostral flap large, with denticulate edge; a small barbel in the corner of the mouth. Dorsal III 11, nearer caudal than end of snout, falcate, longest ray $1\frac{3}{4}$ times length of head. Anal III 5, extending beyond root of caudal. Pectoral $\frac{4}{5}$ length of head, not reaching ventral, the first ray of which falls below 5th branched ray of dorsal. Caudal deeply emarginate, crescentic when fully spread out. Caudal peduncle much deeper than long. Scales 40, $5\frac{1}{2}$ between lateral line and root of ventral, $7\frac{1}{2}$ between lateral line and dorsal origin, 20 around caudal peduncle. Olive above, lighter below; fins grayish; an indistinct darker area on the peduncle.

Besides the type we have four other specimens, slightly smaller with the same data.

This species is most closely related to *L. neumanni* and *L. gregorii*, from which it differs in the high dorsal and deep caudal peduncle.

104. *Labeo sorex* sp. nov.

Eyes exceedingly small; a small barbel; lips with transverse plicæ; eyes supero-lateral; dorsal with concave upper edge; with 9 branched rays; 20 scales around caudal peduncle.

The type, our only specimen, No. 5941, American Museum of Natural History, Stanleyville, February 1915, is 352 mm. to base of caudal; depth $4\frac{1}{2}$ in this measure; head 5 times, its width slightly less than its length; snout blunt, with a sharply upturned knob at its end, which is continuous with the large rostral flap in front and separated by a deep groove from the head behind; eye minute, supero-lateral, 13 times in length of head, 7 times in interorbital width; width of mouth with lips $\frac{2}{3}$ length of head; lips with transverse plicæ, the lower with a fringe of small papillæ,

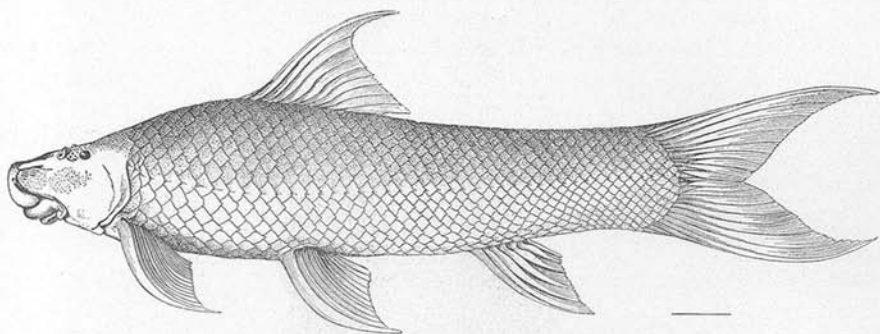


Fig. 9. *Labeo sorex*, type.

and with broad irregular crenulations behind; edge of rostral flap feebly denticulate; a small barbel; spiny tubercles or their crater-like pits on snout, cheeks and whole top of head. Dorsal III 10, somewhat falcate, much nearer end of snout than caudal, longest ray $1\frac{1}{2}$ times length of head. Anal III 5, not quite reaching caudal. Pectoral as long as head, not reaching ventral, the first ray of which is below 5th soft ray of dorsal. Caudal deeply notched, crescentic. Caudal peduncle a little longer than deep. Lateral line poorly developed. Scales 45, 6 between lateral line and root of ventral, 20 around caudal peduncle. Uniform brownish olive, lighter below.

This aberrant form is remarkable for its minute eye, which readily distinguishes it from all other African *Labeos*. We suspect that the small eye is correlated with more or less burrowing habits, an hypothesis borne out by the smooth, callous anterior surface of the snout. It has apparently been derived from the *falcipinnis-kirkii* group, than which it has a larger number of scales.

105. *Labeo falcipinnis* Boulenger.

Three large specimens, about 2 feet in length, from Faradje and Stanleyville. If we are correct in our identification of one of the two Stanleyville specimens the species is a variable one. This fish differs from the others in lack of tubercles on the snout, shorter dorsal rays, more anterior pectorals and the proportion of the eye, which is also more lateral. The width of its mouth is contained three times in the head.

106. **Labeo kirkii** *Boulenger.*

A specimen 20 inches long from Stanleyville. The species was described from East Africa.

107. **Labeo forskalii** *Rüppell.*

Three specimens, one about 3, the others 7 or 8 inches long, from Stanleyville. Previously known from the Nile drainage. The related forms *falcipinnis*, *kirkii*, and *forskalii* seem specifically separable; as we have all three from Stanleyville they are not geographically separable.

108. **Labeo nasus** *Boulenger.*

A half dozen specimens, 4 or 5 inches long and one of about 14 inches, from Stanleyville.

109. **Labeo greenii** *Boulenger.*

Plate LXXV, Fig. 1.

Several specimens, 2 inches to a foot in length, from Avakubi, Faradje and Stanleyville. One from Faradje had the following colors: Above dark grayish green with bluish reflections, upper half of sides the same, lower half silvery, each scale with a pink cross stripe, ventral surface whitish. A color sketch by Mr. Chapin of another, 14½ inches long, shows a fish without metallic color, the sides green, each scale with a pink center, a large black blotch on the peduncle, ventral surface dull whitish, caudal fin bluish, other fins and head brownish, the fins all tipped with dull salmon.

110. **Labeo parvulus** *Gilchrist & Thompson.*

A half-dozen specimens, 6 inches or so in length, from Avakubi. A color sketch by Mr. Chapin shows a uniform slaty blackish fish, with fins of the same color, the iris with red. Our identification of this material with the South African species is perhaps open to question, but it differs from the other Congo forms and we find no good characters to separate it from *parvulus*.

111. **Labeo annectens** *Boulenger.*

Several specimens, about 3 to 5 inches long, one from Stanleyville, the others from Avakubi.

112. *Labeo chariensis* Pellegrin.

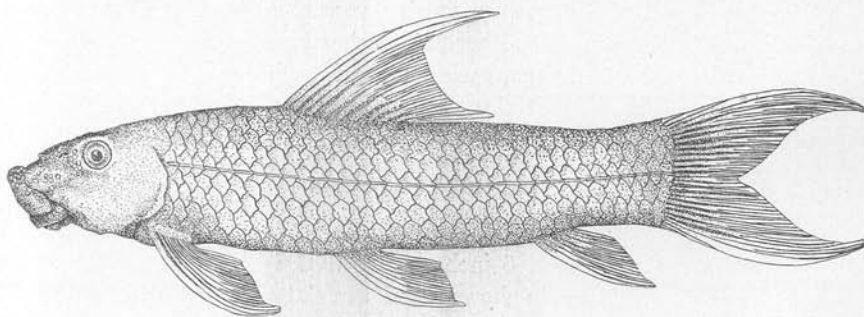
Plate LXXV, Fig. 2.

Nine specimens, about 5 inches to a foot long, from Avakubi, Faradje and Stanleyville. One of these, about 10 inches long, from the Dungu River at Faradje, when placed alive in a basin of water kept close to the bottom with the ventral and pectoral fins spread. The species was said by natives to feed on grass on the submerged rocks. In color the back was dark grayish green, nearly black, with bluish reflections; sides of head dark grayish blue; sides dull silvery gray with bluish edges on the scales; iris dark brown with a narrow silvery ring about the pupil; dorsal fin gray; caudal fin brownish with a tinge of red; pectorals and ventrals grayish green. Previously known from Cameroon and the Gold Coast.

113. *Labeo intermedius* sp. nov.

A small barbel on each side of the mouth; lips with transverse plicæ; eyes supero-lateral; dorsal with concave upper edge; 12 scales around caudal peduncle, which is but slightly longer than deep; longest dorsal ray $1\frac{2}{3}$ times as long as head; eye $2\frac{1}{3}$ times in interorbital width; depth 5 times in length to base of caudal.

The type, No. 6032, American Museum of Natural History, Stanleyville, February 1915, is 178 mm. to base of caudal; depth 5 times in this measure, head $4\frac{1}{5}$ times;

Fig. 10. *Labeo intermedius*, type.

head $1\frac{1}{2}$ times as long as broad; snout very prominent, upturned, with numerous tubercles; eye supero-lateral, in second half of head, 5 times in length of head, $2\frac{1}{3}$ times in interorbital width; inner surface of lips with numerous transverse plicæ; a minute barbel, hidden in the folds at the side of the mouth. Dorsal II 10, falciform, deeply notched, anterior rays prolonged, $1\frac{2}{3}$ times length of head. Anal II 5. Pectoral a little shorter than head, not reaching ventral. Caudal deeply forked, cres-

centic when spread. Caudal peduncle a little longer than deep. Scales 35, 3 between lateral line and root of ventral, 12 around caudal peduncle. Olive brown, lighter below.

This species closely resembles *L. chariensis*, from which it differs in the slenderer body and greater interorbital width.

There is one other specimen, $4\frac{1}{2}$ inches long, from Rungu.

114. ***Labeo parvus*** Boulenger.

Plate LXXXI, Fig. 2 (colored).

A small, abundant species. Numerous specimens, $\frac{1}{2}$ to about 7 inches in length, from Avakubi, Faradje, Garamba, Rungu and Stanleyville.

One 4 or 5 inches long from Faradje kept the following bright colors; A broad black band from snout to caudal with paler bands above and below; dorsal tipped with orange; ventrals and pectorals suffused with red. Field color notes on another of about the same size also from Faradje are: Back yellowish brown; head above dark gray; sides yellowish, except a dark gray longitudinal band along the middle, darker near the tail.

The following note accompanies a color sketch by Mr. Chapin reproduced in this paper: "I have seen this fish alive in the Dungu and Uele Rivers about the rocks at low water. The blackish stripe is conspicuous."

115. ***Labeo ogunensis*** Boulenger.

Five specimens, from 4 to 6 inches long, from Avakubi. They agree with the description of *ogunensis* from Lagos except for the head which is a little longer, contained 4 times in the length instead of $4\frac{1}{2}$.

116. ***Labeo ansorgii*** Boulenger.

A single small specimen, an inch and a half long, from Stanleyville. The species is described from Angola.

117. ***Discognathus dembeensis*** (Rüppell).

A half dozen specimens, 2 to 4 inches in length, from Avakubi and Faradje. It is interesting to find this species, known from Nile and East African drainage, in the headwaters of the Congo.

118. *Discognathus ornatus* sp. nov.

Pupil of eye in the middle of the length of head; mental disk well developed; eye lateral, visible from below; barbel minute; ventrals below middle of dorsal; caudal peduncle $1\frac{1}{2}$ times as long as deep; scales 37; a black and white banded caudal.

The type, our only specimen, No. 6135, American Museum of Natural History, Stanleyville, February 1915, is 30 mm. long to base of caudal; body compressed, its depth $6\frac{1}{2}$ times in this measure; head depressed, $1\frac{1}{2}$ times as long as broad, its length $4\frac{1}{4}$ times in total length; snout rounded, interorbital region nearly flat; eye lateral, in middle of head, its diameter 4 times in length of head and $1\frac{1}{2}$ times in interorbital width; width of mouth $\frac{1}{3}$ length of head; lips well developed, the lower forming a fold

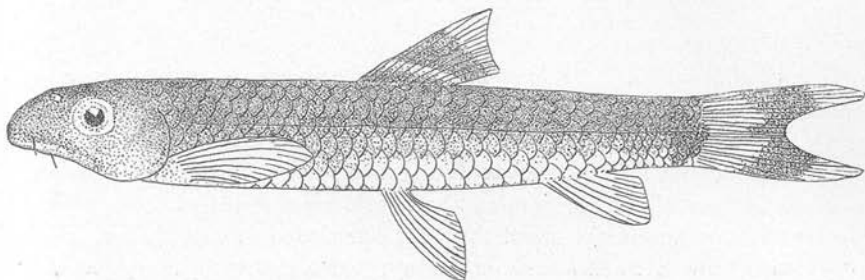


Fig. 11. *Discognathus ornatus*, type.

embracing a mental disk, which is broader than long; two small barbels on each side, the anterior not more than $\frac{1}{2}$, the posterior not more than $\frac{1}{3}$ diameter of eye. Dorsal III 7, equally distant from eye and caudal, emarginate, longest ray slightly shorter than head. Anal II 5. Pectoral a little shorter than head, widely separated from ventral, which is situated below middle of dorsal. Caudal deeply emarginate. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales 37, 3 between root of ventral and lateral line, 16 around caudal peduncle. Dusky olive above, yellowish below; cheeks, opercle and sides below lateral line thickly speckled with minute dark spots; dorsal black at base, and a broad black bar across the middle; base of caudal and tips of lobes pale, otherwise black; other fins pale; a black blotch on the caudal peduncle at base of caudal.

This species differs from *D. dembeensis* by its lateral eye and from *D. vinciguerræ* and *D. makiensis* by the smaller barbels. The coloration which would separate it readily from any species may be a juvenile character.

119. *Barbus fasolt* Pappenheim.

Plate LXXII.

Two specimens, 5 inches long, from Niangara have a slightly larger eye than the description of *fasolt*, which is to be expected from their much

smaller size than specimens described. Posterior barbel about equal to eye in length. We prefer to place them here rather than to describe them as new, as also a large specimen about 2 feet long from Stanleyville. This latter has a high scale-count, 28 or 29, and approaches *cookei* in some other respects. We also identify provisionally as *fasolt* a large specimen from Faradje, with a deep peduncle, of which only photographs were preserved. Probably too many species of this form of *Barbus* are recognized, owing to considerable individual variation.

120. ***Barbus caudovittatus*** Boulenger.

Nine specimens, about $\frac{1}{2}$ inch to 8 inches in length, from Avakubi and Faradje.

121. ***Barbus holotænia*** Boulenger.

Plate LXXXI, Fig. 1 (colored).

Evidently one of the commonest of the genus. Specimens about $1\frac{1}{2}$ to 5 inches in length are from Avakubi, Bafwabaka, Faradje, Garamba, Niangara, Niapu and Stanleyville. Occurs in schools at the edge of the river and is caught by native boys on small iron barbless hooks.

122. ***Barbus musumbi*** Boulenger.

Three specimens, 2 or 3 inches long, from Rungu. These differ slightly in proportion of eye (not shorter than snout) and caudal peduncle (not "slightly longer than deep"), and in color in that they have a dark bar behind opercle, from the $3\frac{1}{2}$ inch *musumbi* described from Angola. These are minor differences and we prefer to place them here than to describe them as new.

123. ***Barbus atromaculatus*** sp. nov.

Scales with radiating canals; last simple ray of dorsal not enlarged or serrated; two barbels on each side; dorsal with 8 branched rays; base of ventral below anterior rays of dorsal; pectoral not reaching ventral; scales 25-31; posterior barbel $\frac{4}{5}$ - $1\frac{2}{3}$ times diameter of eye; caudal peduncle $1\frac{1}{2}$ to 2 times as long as deep; mouth terminal.

The type, No. 6295, American Museum of Natural History, from Yakuluku, November 1911, is 49 mm. to base of caudal; depth $3\frac{1}{2}$ in this measure, head 4 times. Snout rounded, equalling eye, which is 3 times in length of head, and equals the inter-orbital width; mouth narrow, terminal; lips feebly developed; two barbels on each side, the anterior much shorter than eye, the posterior $\frac{4}{5}$ diameter of eye. Dorsal III, 8, its origin equally distant from end of snout and from caudal, border slightly concave; last simple ray not enlarged, not serrated, about as long as head. Anal III

5, not reaching caudal. Pectoral $\frac{4}{5}$ length of head, not reaching ventral; base of the latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales 26, with radiating canals, 2 between lateral line and ventral, 12 around caudal

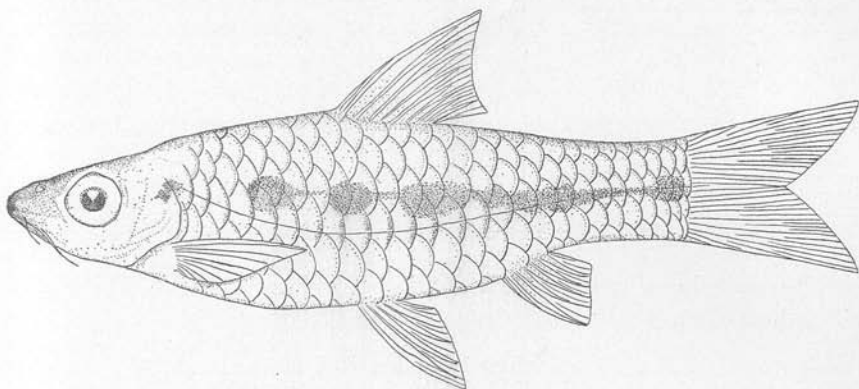


Fig. 12. *Barbus atromaculatus*, type.

peduncle. Yellowish; fins pale; some of the scales along lateral line dark at the base; a series of 3-7 black spots on each side, connected by a dark lateral streak, all but the last above the lateral line; a black spot at the root of the dorsal and anal; a black stripe around the snout, extending nearly to the eyes.

Besides the type we have other specimens as follows: Four specimens, Lower Congo; five specimens, Yakuluku, November 1911; one specimen, Niapu, November 1913; seven specimens, Faradje, January 1913; one specimen, Bafwabaka, January 7, 1910; six specimens, Stanleyville, April 1915; one specimen, Stanleyville, February 1915.

This very variable species is closely related to *B. lineomaculatus* from South East Africa. Some of the slender young can scarcely be differentiated from it by any technical characters. Grown fish have a much deeper peduncle, and the bold diagnostic color pattern is fairly constant. The conspicuous black spot at the origin of the anal seems not to have been described in other related *Barbus*.

The collector, Mr. Lang, writes that this species was caught in swamps away from the main rivers.

124. *Barbus pleuropholis* Boulenger.

Several specimens, 1 or 2 inches long, from Avakubi, Medje, Niapu, Stanleyville and Yakuluku. All are pale in alcohol, the scales of the upper

parts outlined in dark. When changed from formalin two or three specimens had an orange spot with a black front margin behind the opercle, the unpaired fins rose colored.

Examination of ten from Stanleyville in April, tabulated below, shows a scale variation of 21 to 24 and an increase of depth with age. From this it seems probable that *pleuropholis* is the young of *congicus*.

Length to base of caudal	Depth	Scale count
37 mm.	2.8	23
33	3.1	22
32	3.0	24
32	3.1	23
31	3.3	23
31	3.2	21
30	3.1	22
29	3.2	22
24	3.4	22
23	3.4	22

125. ***Barbus rubripinnis*** sp. nov.

Scales radiately striated; last simple dorsal ray not bony or serrated; a single barbel on each side; dorsal with 8 branched rays; barbel $\frac{1}{2}$ diameter of eye; depth 4 times in length to base of caudal; dorsal bright red, tipped with white.

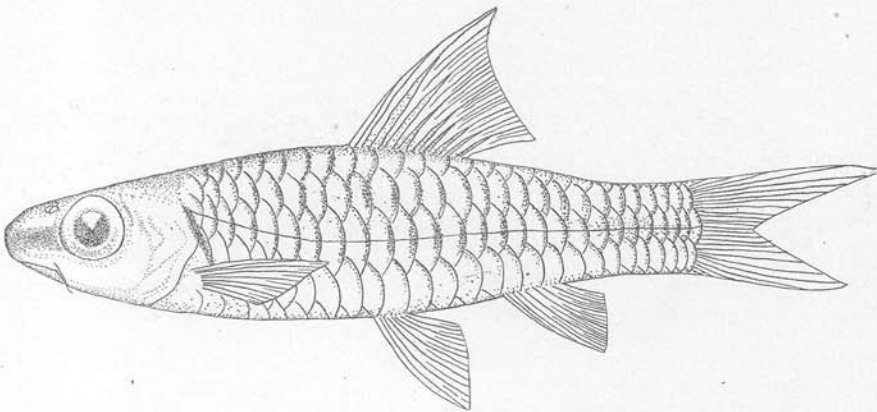


Fig. 13. *Barbus rubripinnis*, type.

The type, the only specimen, No. 6328, American Museum of Natural History, from Poko, July 1913, measures 42 mm. in length to base of caudal; depth 4 times in this measure; head $3\frac{2}{3}$ times. Snout rounded, $3\frac{1}{4}$ times in length of head; eye

3 times in length of head, interorbital width $3\frac{1}{2}$ times; mouth subinferior; lips moderate; a single slender barbel on each side, $\frac{1}{2}$ diameter of eye. Dorsal III 8, equally distant from posterior margin of eye and caudal; last simple ray not enlarged or spine-like, equal to head. Anal III 5, not reaching caudal, its longest ray $\frac{3}{5}$ head. Pectoral shorter than head, not reaching ventral, which it equals in length and which is under the middle of the dorsal and just reaches origin of anal. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales radiately striated, 27, $1\frac{1}{2}$ between lateral line and ventral. Scales of the back and sides outlined with black punctulations; a black stripe from snout to eye, and a narrow black oblique bar, under the margin of the opercle; dorsal bright red, tipped with white.

Though with but a single barbel, this species seems more closely allied to the two-barbeled forms. It is notable for the deep, narrow scales on the sides.

126. *Barbus dolichosoma* sp. nov.

Scales with radiating canals; last simple ray of dorsal not enlarged or serrated; 2 barbels on each side; dorsal with 8 branched rays; base of ventral below anterior rays of dorsal; posterior barbel $1\frac{1}{3}$ times eye; pectoral not reaching ventral; scales 24; mouth inferior; caudal peduncle $1\frac{1}{2}$ times as long as deep; last simple ray of dorsal thicker than first branched ray; depth $4\frac{1}{4}$.

The type, our only specimen, No. 6137, American Museum of Natural History, Avakubi, December 1913, is 52 mm. to base of caudal; depth $4\frac{1}{4}$ in this measure;

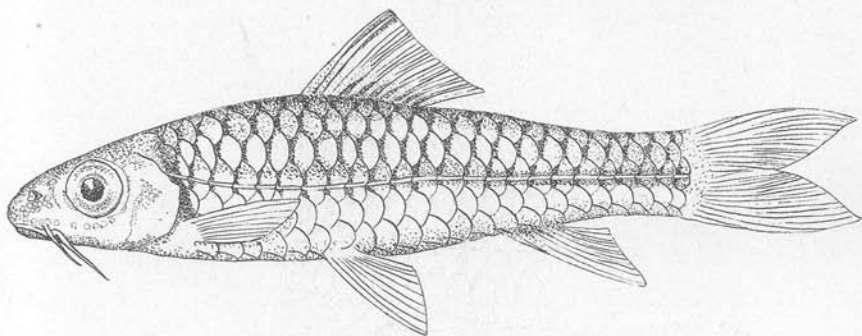


Fig. 14. *Barbus dolichosoma*, type.

length of head 4 times; snout rounded, as long as eye, which is 3 times in head, and equals interorbital width; mouth inferior, small; two barbels on each side, the posterior $1\frac{1}{3}$, the anterior $\frac{4}{5}$ times the diameter of eye. Dorsal III 8, nearer occiput than caudal, border very slightly concave; last simple ray not spiny, not serrated, slightly thicker than first branched ray, shorter than the head. Anal III 5, not reaching caudal. Pectoral $\frac{3}{4}$ length of head, not reaching ventral; base of latter below anterior

rays of dorsal. Scales radiately striated, 24, 2 between lateral line and root of ventral, 10 around caudal peduncle. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Olive green, lighter below; scales on the back and sides each with a black basal bar; a black bar behind the opercle.

This species is much more slender than its nearest allies. Taking into account its coloration and technical characters, it seems to be a well marked species for the genus.

127. *Barbus candens* sp. nov.

Scales radiately striated; last simple ray of dorsal not enlarged, not serrated; a single barbel; lateral line reduced to a few tubules; dorsal with 7 branched rays; pectoral not reaching ventral; depth $2\frac{2}{3}$; three large black spots on sides.

The type, No. 6046, American Museum of Natural History, Stanleyville, April 1915, is 26 mm. to base of caudal; depth $2\frac{2}{3}$ in this measure, head $3\frac{1}{2}$ times. Snout rounded, slightly shorter than eye, which is 3 times in head, and about equals inter-

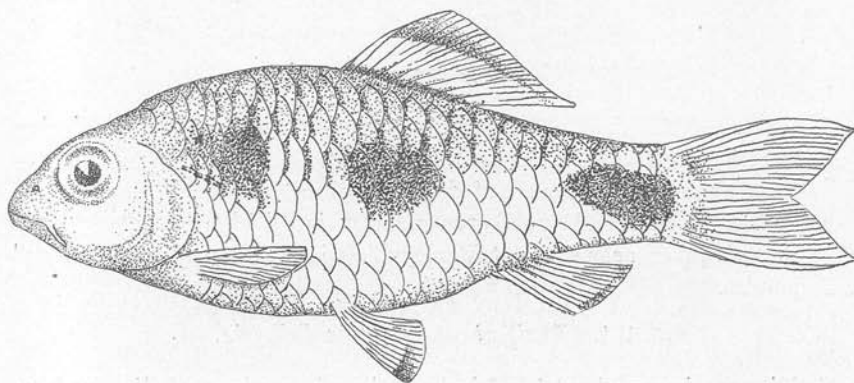


Fig. 15. *Barbus candens*, type.

orbital width; mouth small, terminal; a single barbel on each side. Dorsal III 7, equally distant from occiput and caudal, border straight; last simple ray not enlarged, not serrated, $\frac{2}{3}$ length of head. Anal III 5, not reaching caudal. Pectoral shorter than head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales radiately striated, 23, 2 between lateral line series and ventral, 10 around caudal peduncle. Lateral line reduced to 3 tubules. Olive above, paler below, yellowish above anal; dorsal scales with dark basal bars; 3 black blotches on side, posterior larger, oval and below center of peduncle; dorsal white, black basally, with a black margin and pale tipped; ventrals and anal cherry red tipped with black; a black stripe across the snout.

Besides the type we have 54 specimens from 14 mm. to 26 mm., all with the same data. They were taken in a small shaded forest brook, an affluent of the Tshopo River.

It is remarkable that this very distinct and beautiful little species has been so long overlooked in the comparatively well-known Stanleyville area.

128. **Leptocypris modestus** Boulenger.

Numerous specimens, $2\frac{1}{2}$ to about 4 inches in length, from Stanleyville in February and April. The largest ones are deeper than described, one especially $3\frac{3}{4}$ inches to base of caudal having the depth 4 in that measure. Schools taken near shore with *Barilius weynsii* and Pellonulas.

129. **Barilius lujæ** Boulenger.

Two specimens, 3 or 4 inches long, from Stanleyville.

130. **Barilius weynsii** Boulenger.

The most abundant of the genus. Numerous specimens, 2 to 5 inches in length, from Avakubi, Rungu and Stanleyville. A few have a narrow dark streak on the upper part of the side; when transferred from formalin many had the back and caudal orange, latter tipped with dusky.

Schools taken near shore at Stanleyville with *Leptocypris modestus* and Pellonulas.

131. **Barilius ubangensis** Pellegrin.

Nine specimens, about 1 to 5 inches in length, one from Medje, one from Niapu, the remainder from Avakubi.

132. **Barilius salmolucius** sp. nov.

Last ray of dorsal distinctly behind origin of anal; scales 45-46; anal with 13 branched rays; snout long, $1\frac{1}{4}$ to 2 times (in largest specimen) as long as eye, projecting slightly beyond the mouth; head large, exceeding the depth of the body; a series of vertical black blotches along the side.

The type, No. 6052, American Museum of Natural History, Stanleyville, February 1915, is 107 mm. long to base of caudal. Depth of body 5 times in this measure, length of head $3\frac{1}{4}$ times. Head $2\frac{1}{2}$ times as long as broad; snout pointed, slightly projecting beyond mouth, $1\frac{1}{2}$ times as long as eye, which is contained 5 times in length of head; interorbital width a little greater than diameter of eye; mouth extending almost to below posterior border of eye; no barbels; suborbital bones nearly entirely

covering the cheek, the second narrow and not extending posteriorly beyond anterior quarter of eye. Gill-rakers few and short. Dorsal III 8, the posterior ray distinctly behind the origin of anal, originating midway between posterior border of eye and root of caudal; first branched ray longest, $\frac{3}{5}$ length of head. Anal III 13, first branched ray longest, $\frac{1}{2}$ length of head. Pectoral acutely pointed, $\frac{2}{3}$ length of head, not reaching ventral; latter much shorter, not reaching vent. Caudal forked, with pointed lobes. Caudal peduncle 2 times as long as deep. Scales with radiating striae, 46, $8\frac{1}{2}$ between lateral line and origin of dorsal, $2\frac{1}{2}$ between lateral line and origin of ventral, 16 around caudal peduncle. Greenish, lighter below; 6 large square dark blotches along sides of body; fins whitish, the dorsal faintly tipped with dusky.

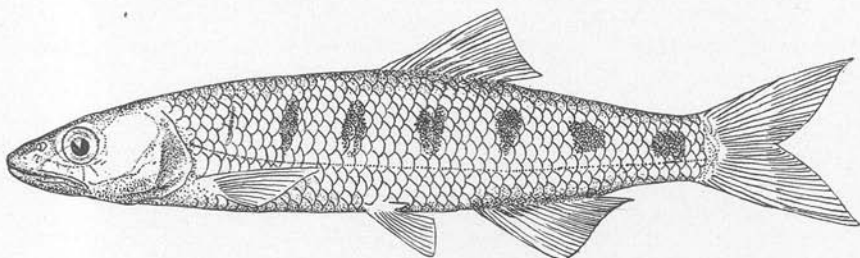


Fig. 16. *Barilius salmolucius*, type.

Besides the type we have 6 other specimens, 4 from Niangara, $3\frac{1}{2}$ –5 inches long, one from Avakubi, 4 inches long; one $3\frac{1}{2}$ inches from Poko, which show the following range in measurements. Depth $4\frac{1}{2}$ – $5\frac{1}{4}$; head $2\frac{1}{2}$ –3; eye 4–5; longest branched anal ray $\frac{1}{2}$ – $\frac{2}{3}$ length of head; caudal peduncle $1\frac{3}{4}$ –2 times as long as deep.

This species is most closely allied to *B. loati* but has fewer scales. It is notable among members of this genus for the great length of the head in proportion to the depth, though in lesser degree than *B. longirostris*.

133. *Barilius kingsleyæ* Boulenger.

Two specimens, 2 and 5 inches long, from Faradje and Garamba respectively.

134. *Engraulicypris congicus* sp. nov.

Anal originating slightly in advance of dorsal, with 19–22 rays; scales 38–41; cleft of the mouth extending to below pupil; dorsal origin decidedly nearer caudal than head; caudal peduncle $1\frac{1}{2}$ times as long as deep.

The type, No. 6294, American Museum of Natural History, Poko, August 1913, is 51 mm. long; depth $4\frac{1}{2}$ in this measure, length of head $4\frac{1}{2}$ times; eye equals inter-

orbital width, $3\frac{1}{2}$ times in length of head; snout moderately pointed, projecting slightly beyond lower jaw, its length equal to eye; maxillary extending to below middle of eye, contained 2 times in the head. Dorsal II 7, originating further back than anal, nearer caudal than head by a distance slightly greater than diameter of eye; longest ray a little more than half length of head; Anal II 20; pectoral acutely

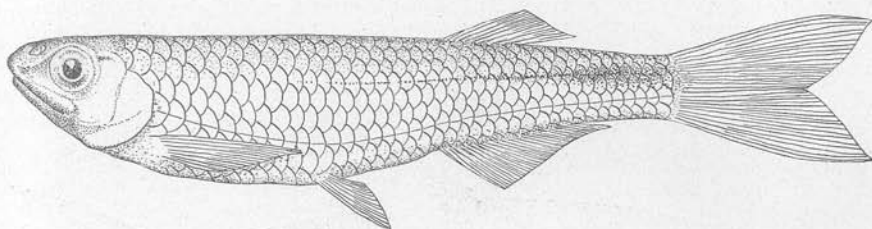


Fig. 17. *Engraulicypris congicus*, type.

pointed, reaching root of ventral, about as long as head. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales 38, between lateral line and root of ventral $1\frac{1}{2}$, $6\frac{1}{2}$ between lateral line and dorsal, 12 around caudal peduncle. Coloration pale, darker on the back.

Besides the type we have one specimen slightly smaller with the same data, one slightly smaller and two slightly larger from Avakubi, December 1913. This species, the first of the genus to be recorded from the Congo, is closely related to *E. minutus*, from which it differs in the slightly greater scale count, less slender peduncle, etc.

135. ***Chelæthiops elongatus*** Boulenger.

Five specimens, 2 or 3 inches long, one from Stanleyville, the others from Avakubi.

SILURIDÆ.

136. ***Clarias lazera*** Cuvier & Valenciennes.

One specimen a foot and a half long from the Upper Congo.

137. ***Clarias zygouron*** sp. nov.

Ventral fins about midway between end of snout and root of caudal or slightly nearer latter; dorsal and anal broadly adnate to and confluent with the caudal.

The type, the only specimen, No. 6698, American Museum of Natural History, from Malela, July 1915, measures 83 mm. in length to base of caudal; depth $5\frac{3}{5}$ times in this measure; head to tip of occipital process $3\frac{2}{5}$ times. Head $1\frac{1}{3}$ times as long as broad, its upper surface smooth; occipital process angular; frontal fontanelle elliptical, 3 times as long as broad, 4 times in length of head; eye 3 times in length of snout, $5\frac{1}{2}$ times in interorbital width; with a free border; width of mouth nearly equal to interorbital width; band of premaxillary teeth 4 times as long as broad; vomerine teeth forming a narrow, crescentic band, which at its broadest point is as

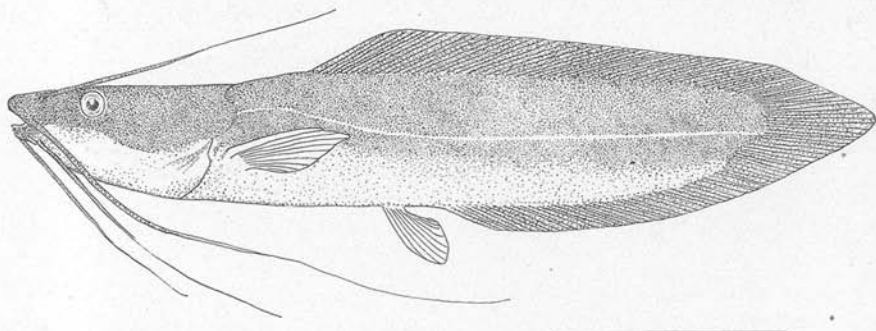


Fig. 18. *Clarias zygouron*, type.

broad as premaxillary band; nasal barbel $1\frac{1}{3}$ length of head; maxillary barbel $2\frac{1}{3}$ times length of head; outer mandibular barbel $1\frac{1}{3}$ times as long as inner, which is equal in length to the head. Gill-rakers moderately long, slender, 17 on anterior arch. Dorsal about 47, its distance from occipital process $\frac{1}{3}$ length of head, adnate to and confluent with caudal. Anal about 40, adnate to and confluent with caudal. Pectoral $\frac{2}{3}$ length of head, the spine feebly serrated on its outer border, and strongly on the inner, $\frac{3}{4}$ the length of the fin. Ventrals about half-way between end of snout and root of caudal. Caudal bluntly pointed, $\frac{1}{2}$ length of head. Dusky olive above, paler below; fins except ventrals dark.

138. *Clarias platycephalus* Boulenger.

Several specimens, from about 4 to 15 inches in length, from Niapu and Stanleyville.

139. *Clarias malaris* sp. nov.

Ventral fins midway between end of snout and root of caudal; nasal barbel shorter than head; 67 gill-rakers on anterior arch; maxillary barbel much longer than head; a blackish malar stripe on each side.

The type, No. 6441, American Museum of Natural History, from Stanleyville, April 1915, measures 293 mm. in length to root of caudal; depth of body $6\frac{1}{5}$ times in this measure, length of head (to end of occipital process) $3\frac{1}{3}$ times. Head $1\frac{2}{3}$ times as long as broad, its upper surface granulate; occipital process angular; frontal

fontanelle elliptical, somewhat sole-shaped, 5 times as long as narrowest breadth, 4 times in length of head; occipital fontanelle small, in advance of occipital process; eye $3\frac{1}{2}$ times in length of snout, 6 times in interorbital width; width of mouth nearly equal to interorbital width; band of premaxillary teeth 5 times as long as broad; vomerine teeth sub-granular, forming a crescentic, continuous band which is broader than premaxillary band; nasal barbel $\frac{6}{11}$ length of head, not quite reaching gill opening; maxillary barbel $1\frac{1}{2}$ length of head, extending beyond tip of pectoral fin; outer mandibular barbel nearly twice length of inner which measures $\frac{2}{3}$ length of

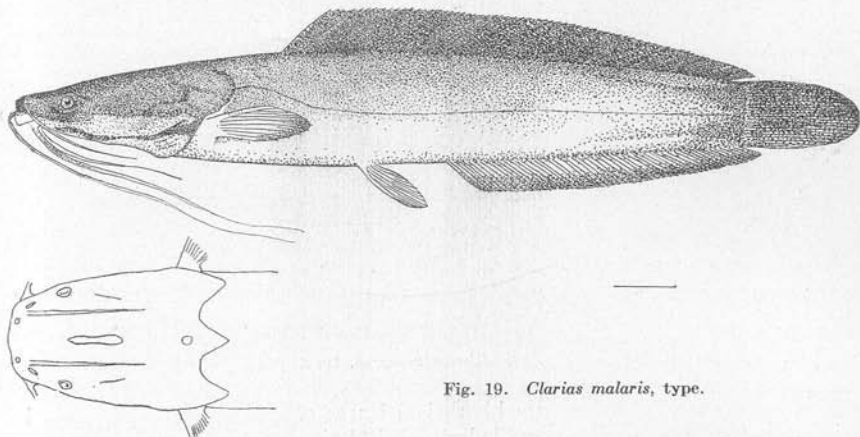


Fig. 19. *Clarias malaris*, type.

head. Gill-rakers rather short, 67 on anterior arch. Dorsal 68, its distance from occipital process $\frac{1}{5}$ length of head, its distance from caudal $1\frac{1}{2}$ times diameter of eye. Anal 50, narrowly separated from caudal. Pectoral $\frac{4}{5}$ length of head, the spine feebly serrated on the outer border and $\frac{2}{3}$ the length of the fin. Ventrals slightly nearer end of snout than root of caudal. Caudal $\frac{1}{2}$ length of head. Upper parts dark, lower parts pale, sharply differentiated on the head; a black malar stripe on each side, starting below the eye and extending to the end of the gill-cover, separated by a broad pale stripe from the dark of the top of the head; caudal and anal light basally, dark terminally; dorsal dark; pectorals and ventrals light, the former tipped with dusky.

Besides the type we have 5 other specimens of this distinctively colored *Clarias* from Stanleyville, February 1915.

140. *Clarias submarginatus* Peters.

One specimen 10 inches long from Faradje.

141. *Clarias breviceps* Boulenger.

One specimen a foot or more long from Stanleyville.

142. ***Clarias angolensis* Steindachner.**

Several specimens, 1 to about 10 inches long, from Avakubi, Faradje, Medje, Niangara and Stanleyville.

143. ***Clarias bythipogon* Sauvage.**

Several specimens, 2 inches to 1 foot in length, from Avakubi, Faradje, Malela, Niapu, Poko, Rungu, Stanleyville and Zambi. A sketch by Mr. Chapin of one 6 inches in total length from Avakubi shows the following colors: Dark purplish gray, cheeks, paired fins, lower surfaces, margin of dorsal, base of anal, center of caudal, and ill defined band across peduncle dull yellowish. Two longitudinal areas on side of head dusky. Sides and dorsal obscurely mottled with dusky and finely speckled with white.

We have classified our *Clarias* by Boulenger's Key into the species listed above. On account of the considerable individual variation and the often obscure specific characters we are not satisfied with this classification of our material, but are at a loss to substitute a better one. The two species which we have described as new are the best marked that the material under consideration affords.

"Fishes of the genus *Clarias* are common in swampy places, small brooks and muddy pools, rather than open river stretches. Usually caught by damming off pools under the banks, and bailing them out with large leaves. They are among the best food fish of the Congo."

144. ***Channallabes apus* (Günther).**

Numerous specimens, from about 4 to 16 inches in length, from Malela, Niapu, Poko, Rungu, Stanleyville and Zambi. Found in much the same localities as *Clarias*.

145. ***Heterobranchus longifilis* Cuvier & Valenciennes.**

Plate LXX, Fig. 2; Plate LXXVI, Fig. 1.

Five specimens, 5 inches to 1 foot in length, from Stanleyville, also two larger ones from which photographs, skeleton and accessory respiratory organs were preserved.

"Caught on set-lines baited with balls of manioc. A logy, inert sort of fish, which is very good eating."

146. **Eutropius congensis** (*Leach*).

Our specimens range from about 6 to 10 inches in length. Several are from Stanleyville, two from Faradje and two from Boma.

147. **Eutropius niloticus** (*Rüppell*).

We have a dozen specimens, about 6 inches to a foot in length, from Avakubi, Faradje and Stanleyville which are referable to this species rather than to *grenfelli*; probably the one merges into the other.

A color sketch by Mr. Chapin shows a uniform olive-green fish, darker on the back whitish on the belly. His notes say: "The skin of the body, though soft, has a silvery luster, but is covered all over with yellowish slime."

148. **Eutropius grenfelli** *Boulenger*.

Numerous specimens, from about 4 inches to over a foot in length, from Avakubi, Faradje, Niapu, Rungu and Stanleyville. The number of anal rays is very variable, going as low as 44, several specimens having between that number and as high as 50.

"Fishes of the genus *Eutropius* are generally distributed throughout the river and forest streams, sometimes occurring in very large schools."

149. **Eutropius liberiensis** *Hubrecht*.

Nine specimens, from about 4 inches to a foot in length, from Boma we refer to this species. They have the anal count 45 to 50, the nasal barbel from the length of the eye to much longer, $\frac{1}{3}$ that of the head.

150. **Eutropius debauwi** *Boulenger*.

Four small specimens, 2 or 3 inches long, from Avakubi, Niapu and Poko.

151. **Eutropius gastratus** sp. nov.

Lower jaw extending forward quite as far as the snout; base of dorsal partly in advance of base of ventrals; spine of dorsal not longer than head; pectoral not reaching anal; maxillary barbel longer than outer mandibular; nasal barbel longer than eye; anal 53; depth of body $2\frac{3}{4}$ times in length to base of caudal.

The type, No. 6404, American Museum of Natural History, from Rungu, June 1913, measures 320 mm. in length to base of caudal. Depth of body $2\frac{3}{4}$ times in this measure; length of head $4\frac{2}{3}$ times. Head $1\frac{1}{5}$ times as long as broad; snout broad,

not projecting beyond lower jaw, 2 times as long as eye; eye perfectly lateral, 6 times in length of head, 4 times in interorbital width; width of mouth almost equalling interorbital width; vomero-palatine teeth forming an uninterrupted band, as broad as the band of premaxillary teeth. Nasal barbel $1\frac{1}{2}$ times as long as eye; maxillary barbel $\frac{3}{5}$ length of head; inner mandibular $\frac{1}{2}$ length of outer, which is a little shorter than maxillary barbel. Gill-rakers moderately long, widely set, 8 on lower part of anterior arch. Dorsal I 6, partly in advance of ventrals, originating $1\frac{3}{4}$ times as far from root of caudal as from end of snout; its spine slender, very feebly serrated behind,

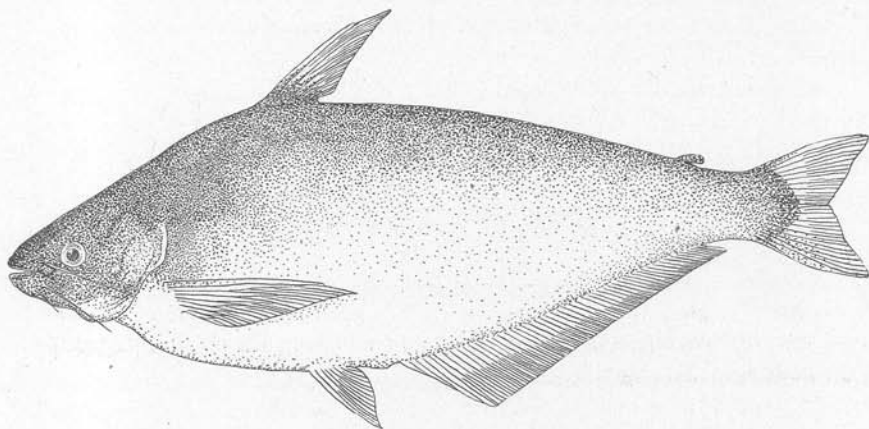


Fig. 20. *Eutropius gastratus*, type.

about $\frac{1}{4}$ length of head. Anal 53, 4 anterior rays simple, the following gradually decreasing in length. Pectoral not reaching origin of anal, its spine serrated on inner side, as long as head. Caudal forked, with pointed lobes. Caudal peduncle not quite as long as deep. Dull silvery or light bluish gray; back, head and large area on sides between dorsal and pectoral fins dark brownish olive; a dark humeral blotch; fins light, except caudal, which is dark basally.

Besides the type we have two other specimens, 11 and 13 inches respectively, from Faradje, collected in March and December, 1912. Their color is a uniform brownish, darker on the back. The species is readily distinguished from all other members of the genus by its great depth of body. Another specimen colored like the type measures 15 inches, from Stanleyville, February 1915.

152. **Schilbe mystus** (*Linnaeus*).

Numerous specimens, about 2 to 8 inches in length, from Stanleyville and one each from Coquilhatville, Faradje and Zambi. Although referable to *mystus* they have the profile in most cases as described for *uranoscopus*.

153. **Schilbe congolensis** *Steindachner*.

Ten specimens, from about 4 to 7 inches in length, from Avakubi, Niangara, Niapu, Poko, Rungu and near Bolobo. The Rungu specimen of about $5\frac{1}{2}$ inches was freckled all over with dark gray, with yellowish and silvery tints on the sides. Head dark brown, also spotted. Iris dark gray.

154. **Ansorgia vittata** *Boulenger*.

A single specimen, $3\frac{1}{2}$ inches long, from Poko.

155. **Parailia longifilis** *Boulenger*.

A single specimen, 2 inches long, from Stanleyville.

156. **Bagrus ubangensis** *Boulenger*.

Several specimens, from about 3 to 14 inches in length, from Avakubi, Paradje and Stanleyville.

157. **Chrysichthys acutirostris** *Günther*.

A single specimen, 6 inches long, from Boma. Though described from Angola it is not surprising to find this species in the lower Congo.

158. **Chrysichthys furcatus** *Günther*.

A dozen specimens, about 8 to 14 inches long, from Boma.

159. **Chrysichthys brevibarbis** (*Boulenger*).

Two large ones about 2 feet long and a small one of 4 inches from Stanleyville. One of about 22 inches without specific data has the maxillary barbel only $\frac{2}{3}$ head and the caudal lobes too short (these may have been broken off).

"Fish of the genus *Chrysichthys* are among the best food-fishes in the Congo. Some of them reach a large size. They are usually taken on set lines and hooks baited with balls of manioc, sometimes captured with poison. They are often caught in the rapids or stony stretches of the river. They are probably quite omnivorous and are noted for their fondness for human excrement."

160. ***Chrysichthys longibarbis*** (*Boulenger*).

Two about a foot long from Stanleyville.

161. ***Chrysichthys duttoni*** *Boulenger*.

One 10 inches long from Stanleyville.

162. ***Chrysichthys wagenaari*** *Boulenger*.

Plate LXXVII, Fig. 2.

Two about 12 to 16 inches long from Avakubi and Poko.

163. ***Chrysichthys cranchii*** (*Leach*).

Specimens are from about 3 to 18 inches long, several from Stanleyville and Boma, two from Zambi.

164. ***Chrysichthys punctatus*** *Boulenger*.

Specimens are from about 4 to 14 inches long, several from Stanleyville, three from Avakubi.

165. ***Chrysichthys delhezi*** *Boulenger*.

Ten specimens, from about 5 inches to a foot in length, from Avakubi, Faradje, Poko and Stanleyville.

166. ***Chrysichthys ornatus*** *Boulenger*.

A dozen specimens, from about $1\frac{1}{2}$ to 7 inches in length, from Malela, Niapu, Rungu and Stanleyville.

167. ***Chrysichthys thonneri*** *Steindachner*.

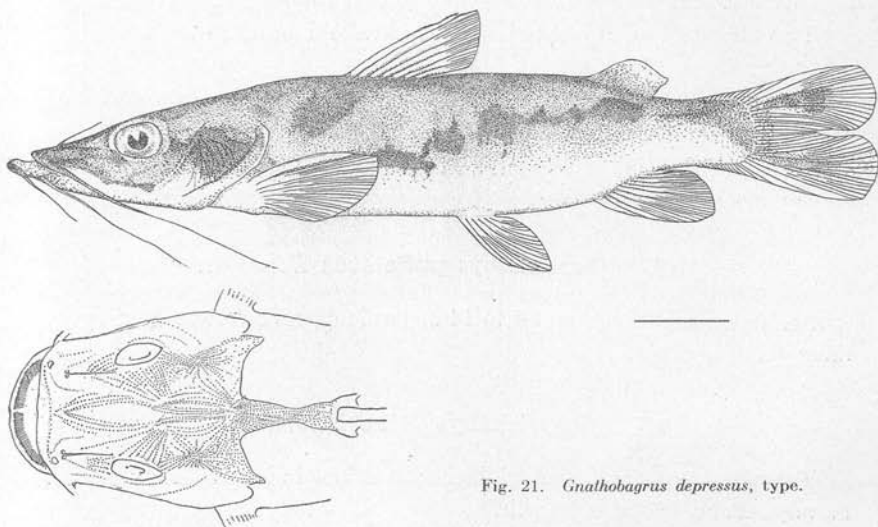
Five specimens, about 5 to 9 inches in length, from Poko, Rungu and Stanleyville.

***Gnathobagrus* gen. nov.**

Close to *Chrysichthys*, but head remarkably depressed and strongly striated; lower jaw strongly projecting, so as to expose almost its entire band of villiform teeth.

168. *Gnathobagrus depressus* sp. nov.

The type, No. 6647, American Museum of Natural History, from Boma, June 14, 1915, measures 195 mm. in length to root of caudal; depth $5\frac{1}{5}$ times in this measure; head 3 times. Body cylindrical, flattened below from nape to ventrals, compressed posteriorly. Head strongly depressed, rugose and striated, the upper profile concave in front of the eye, $1\frac{1}{3}$ times as long as broad; occipital process rather narrow, united with the small interneural shield; snout broad and depressed, $1\frac{4}{11}$ length of head, the lower jaw strongly projecting, the projecting part nearly $\frac{1}{3}$ length of snout; eye 5 times in length of head, 2 times in interorbital width; width of mouth a little more than $\frac{1}{2}$ length of head, greatly exceeding interorbital width; premaxillary band of teeth almost straight, 6 times as long as broad; vomero-ptyergoid teeth forming a

Fig. 21. *Gnathobagrus depressus*, type.

long, narrow, crescentic band, discontinuous in the middle; nasal barbel very slender, nearly equalling diameter of eye; maxillary barbel equalling length of head; outer mandibular barbel twice as long as inner and $\frac{2}{3}$ length of head. Gill-rakers rather short and stout, 12 on lower part of anterior arch. Dorsal I 6, rather small, originating nearer snout than root of caudal; spine strong, very feebly serrated on inner side and at tip on outer side, $\frac{1}{2}$ length of head; first soft ray longest, $\frac{3}{8}$ length of head. Adipose dorsal $2\frac{1}{2}$ times as long as deep, its base shorter than that of the rayed dorsal, from which it is separated by a space equal to 2 times its base. Anal 11, 8 rays branched. Pectoral spine $\frac{1}{2}$ length of head very feebly serrated on outer side, strongly on inner side. Caudal deeply forked with rounded lobes, longest rays twice length of median. Caudal peduncle $1\frac{1}{2}$ times as long as deep. General ground color dark olive brown above, becoming light below, irregularly speckled, spotted and clouded with blackish and buffy; a large blackish spot on the gill-cover; caudal fin with a large dark spot on each lobe; other fins light.

Besides the type we have another specimen of the same size, taken in the same locality a day later.

Amarginops gen. nov.

Body elongate and strongly depressed, broader than deep except posteriorly from anal region, the peduncle strongly compressed. Dorsal and anal fins short, the former consisting of a spine and 6 soft rays, widely separated by the elongation of the posterior body from a very small adipose fin. Pectoral fin with a spine. Ventral fin with 6 soft rays inserted behind the vertical of the dorsal fin. Caudal fin very slightly emarginate, almost truncate. Body and fins covered with thin, lax skin, which also extends across the eye. Four pairs of barbels. Head flat, the eyes superior. Lower jaw strongly projecting, exposing most of its teeth. Nostrils well separated from each other. Jaws with a band of villiform teeth. Two narrow crescentic bands of teeth in the roof of the mouth separated by a narrow space. Gill-membranes free, deeply notched.

This remarkable aberrant genus is most closely related to *Chrysichthys* and *Gnathobagrus*. The latter in regard to its depressed head and projecting lower jaw may be regarded as a specialized *Chrysichthys*. *Amarginops*, a more specialized or degenerate form, has less pronounced affinities with *Chrysichthys*. The depressed, flat body, the lax skin even covering the eyes, and the subtruncate caudal may very well be degenerations due to long residence in the mud at the bottom of the rivers where it occurs. It is unfortunate that we have no notes on the habits of this interesting fish. Mr. Lang tells us that 8 or 9 of them were caught by natives in a trap in a backwater of the Congo.

169. **Amarginops platus** sp. nov.

The type, No. 6528, American Museum of Natural History, from Stanleyville, February 1915, is 170 mm. in length to base of caudal; depth $9\frac{1}{4}$ times in this measure, length of head $3\frac{1}{2}$ times. Head depressed, almost flat $1\frac{1}{4}$ times as long as broad, its greatest depth less than $\frac{1}{3}$ its length, almost smooth above; occipital process narrow, narrowly separated from the small interneural shield; a small round bony projection above the humeral process on each side; snout broad and flat, $\frac{1}{3}$ length of head, the lower jaw strongly projecting; eye covered with skin, 9 times in length of head, 3 times in interorbital width; width of mouth more than $\frac{1}{2}$ length of head, nearly twice the interorbital width; premaxillary band of teeth almost straight, 5 times as long as broad; nasal barbel equalling diameter of eye; maxillary barbel less than half length of head; outer mandibular barbel nearly twice length of inner and equalling maxillary barbel in length; a big fold of loose skin at each corner of the mouth, permitting it to lie very widely opened. Gill-rakers long, slender and closely set, 12 on lower part of anterior arch. Dorsal I 6, rather small, originating twice as far from root of caudal as from end of snout; spine small, blunt and rather stout, not serrated, a little more than $\frac{1}{4}$ length of head; fourth soft ray longest, nearly $\frac{1}{2}$ length of head.

Adipose dorsal very small, about as long as deep, just equal to eye, originating over first anal rays, its base only $\frac{1}{3}$ that of rayed dorsal from which it is separated by a space equal to 11 times its base. Anal 12. Pectoral spine small, stout and curved,

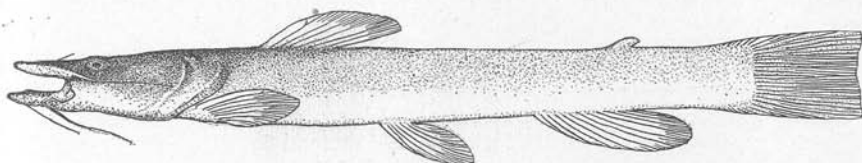


Fig. 22. *Amarginops platus*, type. Lateral view.

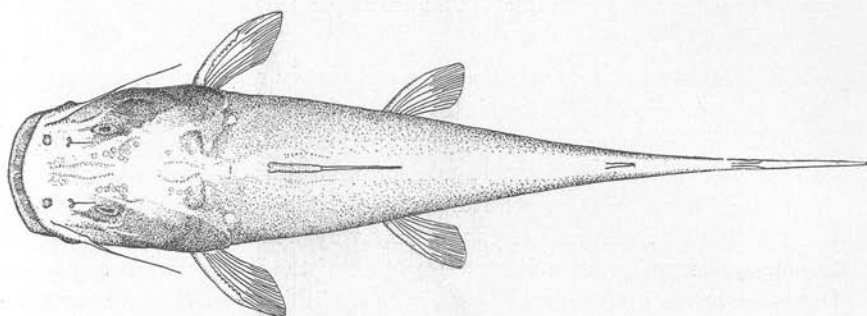


Fig. 23. *Amarginops platus*, type. Dorsal view.

strongly serrated on inner side, a little more than $\frac{1}{3}$ length of head. Caudal slightly emarginate, sub-truncate. Caudal peduncle twice as long as deep. Olive brown or gray above, whitish beneath.

Besides the type we have another specimen of the same size and with the same data.

170. *Gephyroglanis congicus* Boulenger.

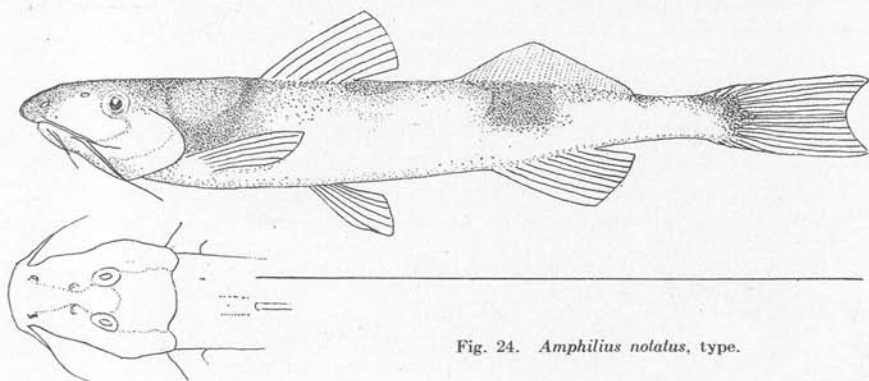
A half dozen large specimens between 1 and 2 feet in length from Stanleyville, caught in the rapids or stony stretches of the river. A good food fish.

171. *Gephyroglanis longipinnis* Boulenger.

A dozen small specimens about 1 to 5 inches in length and one larger one of 14 inches from Stanleyville, one small one each from Avakubi and Faradje.

172. *Amphilius notatus* sp. nov.

The type, No. 6711, American Museum of Natural History, from Faradje, January 1913, measures 30 mm. in length to base of caudal, depth $6\frac{1}{2}$ times in this measure, head $4\frac{1}{2}$ times. Head $1\frac{1}{2}$ times as long as broad; snout obtusely pointed, $\frac{1}{2}$ length of head; eye without a free border, $5\frac{1}{2}$ times in length of head, its diameter about equal to interorbital width; posterior nostril more distant from anterior nostril

Fig. 24. *Amphilius notatus*, type.

than from eye; barbels all slender and simple; maxillary barbel about $\frac{1}{2}$ length of head, outer mandibular $\frac{3}{4}$. Gill-membranes narrowly attached to the isthmus. Dorsal 7, much nearer end of snout than root of caudal. Second dorsal large, with distinct rays, 4 times as long as deep, about $1\frac{1}{2}$ times as long as its distance from first dorsal, and twice the base of that fin. Anal 9. Pectoral $\frac{3}{4}$ length of head, without a spine. Ventral $\frac{2}{3}$ length of head, below center of first dorsal. Caudal with crescentic notch. Caudal peduncle from axil of anal $3\frac{1}{2}$ times as long as deep. A large black blotch between margin of gill-cover and front of first dorsal; another from front of second dorsal to middle of side; a third on upper base of caudal; two smaller spots on the back intermediate between these three.

Apparently close to *A. angustifrons* Blgr., but adipose fin rayed, gill-membranes narrowly attached to the isthmus, and posterior nostril rather near eye. These characters would ordinarily be of generic significance, but our little fish has so close a resemblance to *A. angustifrons* that we prefer to place it in *Amphilius*.

173. *Auchenoglanis occidentalis* (Cuvier & Valenciennes).

Plate LXXV, Fig. 3.

Numerous specimens, from about 1 inch to 2 feet in length, from Ava-kubi, Faradje, Stanleyville and Boma. One from Faradje had the following colors: Dark brownish green above, separated into blotches on sides

by pale creamy reticulations; dorsal dark greenish brown with pale reticulation; breast bluish white; a pale brown ring about the dark brown iris. This species is notable for its wide range.

174. **Auchenoglanis ballayi** (*Sauvage*).

Several specimens, from about 1 inch to 1 foot in length, from Avakubi, Bafwabaka, Faradje, Niapu, Rungu and Stanleyville. One from Rungu had the following colors: Dark blue gray above, paler on lower sides, and whitish on ventral surface; back and sides covered with a dull yellowish slime which gives the live fish a greenish gray color; 7 rows of black spots. Two of about 9 inches from Faradje were: Above pale yellowish brown with dark spots, some purplish, on sides; and dark greenish brown, whitish below, with pale reddish brown towards the anal fin, 7 rows of black dots running transversely, besides a few black dots behind the skull.

175. **Arius africanus** (*Günther*).

One specimen, about 14 inches long, from Stanleyville. This specimen from the Congo fits very well the description of *africanus*, from East Africa, except that the patches of pterygoid teeth are somewhat broader than figured by Boulenger, the pectoral spine longer than the dorsal spine, and both perhaps more strongly serrate. Very likely the Congo fish is separable as a geographic race, but we have not sufficient material to determine this satisfactorily. It is at least very close to *africanus*.

176. **Synodontis acanthomias** *Boulenger*.

Numerous specimens, about 5 inches to 1½ feet long, from Avakubi, Faradje, Rungu and Stanleyville. One from Rungu was dark greenish gray above with numerous dark blue-gray spots; yellowish on the sides and below. In life the body and spines of the head have a heavy jelly-like coating which gives a greenish gray color. Beneath this, the color is yellowish. Common in rocky parts of the river at Stanleyville.

177. **Synodontis afro-fischeri** *Hilgendorf*.

Five specimens, about 3 to 9 inches in length, from Faradje, Rungu, and Stanleyville, agree with this species described from Lake Victoria.

178. ***Synodontis depauwi* Boulenger.**

Several specimens, about 1 to 7 inches long, from Avakubi, Bafwabaka, Faradje, Niapu, Rungu and Stanleyville. One about 6 inches long, from Faradje, kept alive in a dish of water, remained close to the bottom and its barbels were kept in constant motion. Others similarly confined in a tank came to the surface; they held the maxillary barbels either at right angles to the body or backward, the longer mandibular barbels extending horizontally forward, and the shorter hanging down. There were tadpoles in the tank with them, and some of these were sucked in by the catfish. The natives catch them with pieces of worms. When taken in the hand they at once set their pectoral spines firmly.

179. ***Synodontis angelicus* Schilthuis.**

Two specimens, 6 or 8 inches long, from Stanleyville, taken in the rapids.

180. ***Synodontis soloni* Boulenger.**

Three specimens, 5 or 6 inches long, from Stanleyville.

181. ***Synodontis longirostris* Boulenger.**

Several specimens, 6 inches to 2 feet in length, from Stanleyville. One a foot long has the snout and lips remarkably spongy and expanded, the fleshy part projecting at least an inch beyond the mouth, and at first sight was thought to be a distinct species or even genus. Its agreement with *longirostris* in other respects, however, and the fact that a 2 foot specimen shows an intermediate condition convince us that it is the same.

182. ***Synodontis tenuis* sp. nov.**

Humeral process pointed, without spines; spinous dorsal not serrated in front; maxillary barbel $\frac{3}{4}$ length of head; snout much longer than postocular part of head; movable mandibular teeth 15; depth $5\frac{1}{2}$.

The type, the only specimen, No. 6535, American Museum of Natural History, from Stanleyville, measures 102 mm. in length to base of caudal; depth $5\frac{1}{2}$ in this measure, head $3\frac{3}{4}$. Head $1\frac{2}{3}$ times as long as broad, rugose above from between the eyes; snout obtusely pointed, twice as long as postocular part of head; eye superolateral, 3 times in length of head, slightly greater than interorbital width; lips moderately developed; premaxillary teeth forming a short broad band; movable mandibular teeth about $\frac{1}{4}$ diameter of eye, 15 in number. Maxillary barbel weakly margined,

$\frac{3}{4}$ length of head, reaching root of pectoral spine; outer mandibular barbel not quite twice as long as inner; both with short and mostly bifid branches. Gill opening not extending downwards beyond root of pectoral spine. Occipito-nuchal rough like the occiput, convex or bluntly angled, longer than broad, with bluntly pointed posterior processes; humeral process rugose, with a slight keel, much longer than broad, pointed, not extending as far back as occipito-nuchal process. Dorsal 17; spine

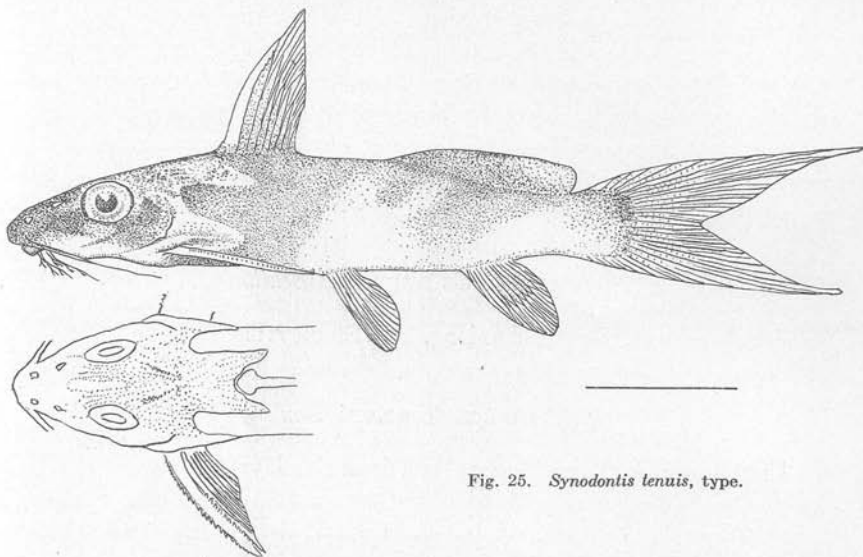


Fig. 25. *Synodontis tenuis*, type.

feebly curved, about $\frac{3}{4}$ length of head, striated, smooth in front, with a few serrations behind. Adipose dorsal 6 times as long as deep, twice as long as its distance from rayed dorsal. Anal III 9; pectoral spine slightly longer than dorsal, very strongly serrated on both sides. Ventral not reaching anal. Caudal very deeply forked, with slender pointed lobes, the upper the longer. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Irregularly blotched; caudal faintly spotted with blackish.

This is a very slender species, suggesting the young of *S. acanthomias* and *longirostris*, from which various points of difference separate it.

183. *Synodontis greshoffi* Schilthuis.

Several specimens, about 3 to 6 inches in length, from Avakubi, Faradje, Rungu and Stanleyville.

184. *Synodontis alberti* Schilthuis.

Specimens are about $2\frac{1}{2}$ to 6 inches long; several from Stanleyville, one from Coquilhatville. Those from Stanleyville were taken in the rapids.

185. ***Synodontis notatus* Vaillant.**

Specimens $1\frac{1}{2}$ to $3\frac{1}{2}$ inches in length from Stanleyville (4), and one from Coquilhatville; they have the humeral process bluntly pointed instead of rounded behind; they are obviously young, however, and in other respects match the description of *notatus* so exactly that we prefer to refer them to this species rather than to describe them as new.

186. ***Synodontis pleurops* Boulenger.**

Plate LXXVI, Fig. 2.

Several specimens, about 1 to 8 inches in length, from Avakubi, Faradje, Poko, Rungu and Stanleyville. In color they are dark with vermiform lighter marking on the sides; this is different from the color given for *pleurops*, but in other respects they agree so well with that species that we have no hesitation in referring them to it. Young ($2\frac{1}{2}$ inches) are quite different in appearance from the adult. They have the humeral process bluntly pointed with a feeble keel; caudal fin long and slender; adipose comparatively small; head between the eyes broad and flat. One of about 6 inches from Poko was dusky greenish brown with many irregular yellowish markings. Three to 5 inch specimens from Faradje were caught among the rocks. A color sketch by Mr. Chapin of a 7 inch specimen from Faradje shows a dark olive colored fish, the fins and spots and vermiculations on the sides yellow, the top of the dorsal and a stripe in the center of each caudal lobe dusky.

187. ***Synodontis decorus* Boulenger.**

Plate LXXXI, Fig. 4 (colored).

Several specimens, about 4 to 10 inches in length, from Avakubi, Faradje, Poko and Stanleyville. Most of them have parallel black longitudinal stripes on the sides instead of the spots figured by Boulenger. One about 10 inches long from Poko had the ground color dark pinkish gray. One of the same size from Faradje was grayish above and on the sides, with blue reflections on the back and silvery reflections below, the caudal fin whitish with black markings, bordered with pink.

188. ***Microsynodontis batesii* Boulenger.**

One about 2 inches long from Niapu, taken at low water in a small shady forest river.

189. **Chiloglanis batesii** Boulenger.

Several specimens from the "Lower Congo" and two from Faradje, $\frac{1}{2}$ to 1 inch long.

190. **Euchilichthys guentheri** (Schilthuis).

Plate LXXIX, Fig. 2.

Several specimens, about 4 inches to 2 feet in length, from Avakubi, Faradje, Panga and Stanleyville. Proportions vary with age, thus a large one 18 inches long has the depth only $5\frac{3}{4}$ (instead of 7) the eye $11\frac{1}{2}$ in head (instead of 10) $6\frac{1}{2}$ in interocular width (instead of 5) and the adipose fin $5\frac{1}{2}$ times in its distance from the dorsal (instead of 4). Fishes of this genus usually occur in rapids clinging to mossy stones. The larger ones clear smooth snail-like tracks through the moss-like water plants.

191. **Euchilichthys royauxi** Boulenger.

Several small specimens, about 1 to 5 inches in length, from Stanleyville and Faradje, and a large one of 18 inches from Stanleyville. The latter has somewhat different proportions, namely depth $4\frac{1}{2}$, eye 10 in head, 5 in interocular.

192. **Euchilichthys dybowskii** (Vaillant).

Plate LXXVI, Fig. 3.

Several specimens, about 2 to 4 inches long, from Avakubi, Faradje, Poko and Stanleyville.

We quote from Mr. Chapin's notes concerning the specimens from Avakubi, his colored field sketch of which is published in this paper. "Two examples were brought alive in a basin where they stuck fast to the smooth enamel surface. When thus attached, the water for respiration enters by the back of the mouth, and the movement of the gills often makes the whole fish quiver or move slightly back and forth. Natives say they cling to rocks and eat algæ. They can swim rapidly. The mouth is here drawn as though slightly extended; while sucking it of course contracts. The color is changeable and may become somewhat lighter than the sketch."

Acanthocleithron gen. nov.

Body moderately elongate, slightly compressed; anterior dorsal ending over the ventrals, formed of a strong spine and 7 branched rays; second dorsal fin with very fine soft rays, their bases concealed by adipose tissue. Pectoral fin with a strong

spine; ventral with 7 rays. A cephalo-nuchal bony shield. Humeral process short and rounded. A bony projection forming a short, stout, sharp, backwardly directed spine just above and anterior to the base of the pectoral spine. Mouth subinferior, small, without labial folds; small conical teeth in both jaws, none on the palate. A maxillary and 2 mandibular barbels on each side, the latter with slender branches. Nostrils remote from each other, each with a valve, the posterior larger; eye moderate, with a free border. Gill-openings rather large, the membrane narrowly attached to the isthmus.

This genus is most closely related to *Mochocus* from which it differs in the following important particulars: (1) The spinous projection above the base of the pectoral spine. (2) The eye with a free border. (3) The greater slenderness of the adipose rays and their bases covered with adipose tissue. (4) The short rounded humeral process. Other characters of minor importance which distinguish it from the two known species of *Mochocus* are the shorter maxillary barbel and the much longer adipose fin. The coloration and general habitus are remarkably like *M. brevis*. So far, known only from Avakubi, Upper Congo.

193. ***Acanthocleithron chapini* sp. nov.**

The type, No. 6548, American Museum of Natural History, from Avakubi, August 1913, measures 55 mm. in length to base of caudal. Depth of body 6 times in this measure, head $4\frac{1}{2}$ times. Head depressed, but little longer than broad; eye supero-lateral, with a free border, 4 times in length of head, $1\frac{1}{2}$ times in interorbital

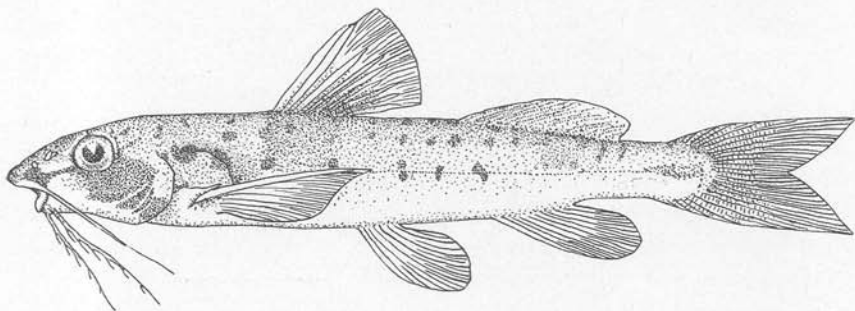


Fig. 26. *Acanthocleithron chapini*, type.

width. Barbels moderately long and slender, maxillary slightly longer than head; mandibular barbels shorter with slender simple branches. Occipito-nuchal shield longer than broad, with very short posterior processes. A short, rounded humeral process. Anterior dorsal I 7, much nearer end of snout than root of caudal; spine $\frac{2}{3}$ length of head, not serrated; second dorsal with numerous fine rays, its base 5 times

as long as high, much greater than base of first dorsal, $1\frac{1}{2}$ times as long as its distance from the first dorsal. Anal 10. Pectoral spine longer than dorsal spine, as long as head, entire on outer border, very strongly serrated on inner border, reaching base of ventral. Ventral origin equally distant from end of snout and root of caudal; not reaching anal. Caudal forked, the lobes equal. Caudal peduncle twice as long as deep. Pale yellowish or grayish olive above, lighter below, speckled and marbled with blackish; two more or less regular dark bands across the back, one under each of the dorsal fins, a dark spot on the caudal peduncle, fins yellowish.

Besides the type we have four other specimens of the same size from the same locality, collected in August, September and December, 1913.

We take much pleasure in naming this interesting species for Mr. James P. Chapin.

194. *Doumea typica* Sauvage.

One 3 inch specimen without specific data, probably from Faradje or Stanleyville.

195. *Doumea alula* sp. nov.

Head $1\frac{1}{4}$ times as long as broad; snout $1\frac{2}{3}$ times as long as postocular part of head; space between 2 nostrils less than from anterior to end of snout, and much less than distance from posterior nostril to eye; caudal peduncle 3 times as long as deep, only $\frac{1}{3}$ of total length to caudal base.

The type, No. 6531, American Museum of Natural History, from Stanleyville, February 1915, measures 110 mm. in length to base of caudal; depth of body 7 times

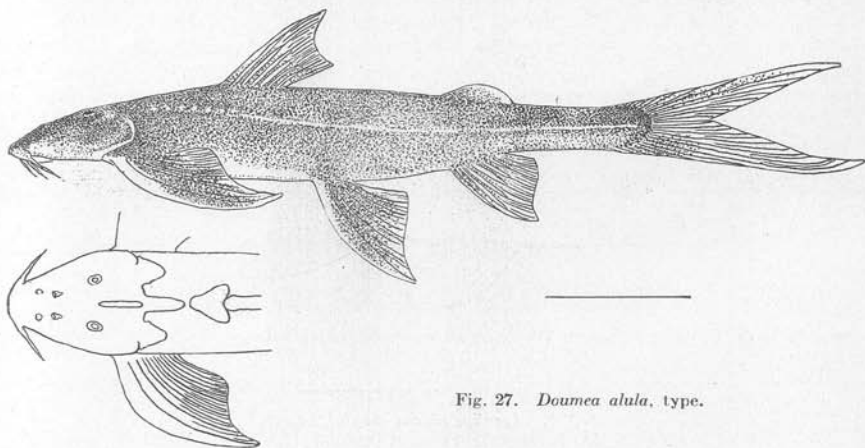


Fig. 27. *Doumea alula*, type.

in this measure; head 5 times; head strongly depressed, with slightly rugose occiput, covered with thin skin, $1\frac{1}{4}$ times as long as broad; snout bluntly pointed, projecting a little beyond mouth, $1\frac{2}{3}$ times as long as postocular part of head; space between the

2 nostrils less than distance from anterior nostril to end of snout, and much less than space between posterior nostril and eye; latter directed upwards, 8 times in length of head, 2 times in interorbital width. Maxillary barbel $\frac{1}{2}$ length of head, mandibular barbels shorter still. Occipital process narrow, nearly 3 times as long as broad, narrowly separated from interneural shield. First dorsal I 6; first ray a little shorter than head; border of fin concave. Anal II 7. Pectoral $1\frac{1}{2}$ times length of head, not reaching ventral; latter $1\frac{1}{2}$ times head, extending beyond origin of anal. Caudal deeply forked, lower lobe the longer, $1\frac{2}{3}$ times head. Caudal peduncle 3 times as long as deep, $\frac{1}{5}$ the total length. Brownish above, lighter beneath; ill-defined yellowish bars across the back, extending down the sides; head much darker; lobes of caudal dark on the outer side; light on the inner; pectoral and ventrals dark above, tipped with whitish, lower surfaces yellowish, with white outer margins and a broad, subterminal dusky bar; dorsal and anal light with an indistinct dusky terminal bar.

Besides the type we have four other specimens as follows:

- 1 juvenile $1\frac{1}{2}$ inches, Lower Congo (exact locality unknown).
- 1 adult 5 " Faradje, December 1912.
- 1 " 6 " Avakubi, September 13, 1913.
- 1 young 1 " Faradje, January 1913.

This species is readily distinguishable from *typica* and *angolensis* by its stouter, shorter peduncle, different head proportions and coloration. Its discovery together with the single *typica* in the collection, greatly extends the range of the genus northward.

196. **Phractura scaphirhynchura** (*Vaillant*).

Several specimens about 3 to 6 inches long from Niapu and Niangara.

197. **Paraphractura tenuicauda** *Boulenger*.

Three specimens, about 4 to 6 inches long, from Stanleyville. Caught near shore with small hooks by native boys close to rocks in swift water.

198. **Belonoglanis tenuis** *Boulenger*.

A half dozen specimens, about 3 to 7 inches long, from Faradje, Niapu and Stanleyville. Those from Faradje were blasted from the muddy Garamba River with tonite.

199. **Malopterurus electricus** (*Gmelin*).

Plate LXXVII, Fig. 1.

A dozen specimens, $2\frac{1}{2}$ inches to a foot in length, from Avakubi, Bafwabaka, Faradje and Stanleyville. Speaking of the use of poison in fishing

by the natives at Faradje (Copeia, December 1915) Mr. Lang says: "While we were standing on a rock, a boy had thrown out with a painful yell, a small specimen of an electric catfish (*Malopterurus electricus*). To prevent its struggling back into the water, I stepped on it and was greatly surprised to receive through a one-third inch heavy leather sole, a shock that made me withdraw my foot quickly. I pushed the fish into a hole and Mr. Chapin and myself marveled that such a small specimen could store enough electricity to repeat this performance at least ten times through wet soles.

"Many tribes do not eat this fish, which has a thick, rather loose, blubber-like skin [native men fear that to do so would be detrimental to their virility] but I have heard from white men that it is excellent eating, after the removal of its electric hide."

CYPRINODONTIDÆ.

200. *Haplochilus platysternus* sp. nov.

Dorsal 9; scales 28; dorsal originating above posterior third or fourth of anal; caudal rounded, not longer than head; body very compressed; preventral area swollen in adults; depth of body $2\frac{3}{4}$ in length to base of caudal.

The type, No. 6299, American Museum of Natural History, from Stanleyville, April 1915, is 33 mm. to base of caudal; depth $2\frac{3}{4}$ times in this measure, head 4 times.

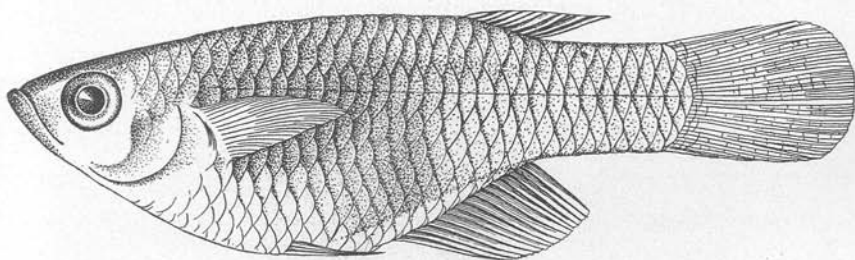


Fig. 28. *Haplochilus platysternus*, type.

Head flat above; body much compressed; preventral area swollen and compressed; snout short and broad, shorter than eye; mouth directed upwards, lower jaw projecting; eye nearly 3 times in head, but little shorter than postocular part of head, $1\frac{1}{2}$ times in interorbital width. Dorsal 9, originating twice as far from snout as from root of caudal, above posterior fourth of anal. Anal 15. Pectoral $\frac{2}{3}$ length of head extending beyond root of ventral; latter very small, much nearer end of snout than

root of caudal. Caudal rounded, slightly shorter than head. Caudal peduncle nearly twice as long as deep. Scales 28 in longitudinal series, 20 around the body in front of ventrals; no lateral line pits. Pale yellowish brown, most of the scales with a dark basal bar; a fine blackish line runs along the side of the body posteriorly; a dark cloudy area back of the gill-covers; fins grayish.

Besides the type, we have 38 other specimens, all from Stanleyville, taken in small forest brooks affluent to the Tshopo, collected between February and April 1915, measuring about 20 to 35 mm.

This distinct little *Haplochilus* is remarkable for its great depth anteriorly compared with its slender caudal peduncle, and its very compressed body.

201. ***Haplochilus elegans*** *Boulenger*.

Several specimens, from $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, from Stanleyville, Faradje and Medje. The single Faradje specimen was taken in a swamp, among water plants.

202. ***Haplochilus spilauchen*** (*Dumeril*).

A single specimen $2\frac{1}{2}$ inches long from Zambi, taken in grassy swamps bordering the river.

203. ***Haplochilus multifasciatus*** *Boulenger*.

Several specimens, 1 or 2 inches long, from Stanleyville, taken in pools in a clear running forest river, affluent of the Tshopo.

204. ***Haplochilus singa*** *Boulenger*.

About a dozen, 1 or 2 inches long, from Stanleyville, taken in the same places as the above.

SERRANIDÆ.

205. ***Lates niloticus*** (*Linnaeus*).

Plate LXXVIII, Fig. 1.

Seven specimens, about 6 to 16 inches long, from Faradje and Stanleyville. By white men this is considered the best food fish of the Congo. Common everywhere in the larger rivers from Faradje to Zambi. Small individuals are seldom seen.

CICHLIDÆ.

206. **Tilapia andersonii** (*Castelnau*).

A single specimen, $2\frac{1}{2}$ inches long, from the Upper Congo.

207. **Tilapia lepidura** *Boulenger*.

Three small specimens, about 2 to 4 inches long, from Malela and Zambi.

208. **Tilapia boulengeri** *Pellegrin*.

Numerous specimens, about 1 to 7 inches in length (mostly under 3 inches), from Stanleyville.

209. **Tilapia dolloi** *Boulenger*.

Nine specimens, about 4 to 6 inches long, from Stanleyville.

210. **Tilapia melanopleura** *Dumeril*.

Plate LXXX, Fig. 1 (colored).

Numerous specimens, about $\frac{1}{2}$ to 10 inches in length, from Avakubi, Coquilhatville, Faradje, Garamba, Poko, Rungu and Stanleyville.

211. **Tilapia tholloni** (*Sauvage*).

Three specimens, about 4 to 6 inches long, from the Lower Congo.

212. **Tilapia christyi** *Boulenger*.

A single specimen, 4 inches long, from Avakubi. It has the dorsal XV 11; anal III 8; caudal peduncle much deeper than long.

213. **Tilapia fasciata** (*Perugia*).

Two specimens 2 or 3 inches long from Zambi.

214. **Tilapia acuticeps** (*Steindachner*).

Seven small specimens, 1 or 2 inches long, from Stanleyville. Evidently a widely distributed species, as the Congo is north of its previously known range.

215. **Tilapia williamsi** (Günther).

A single specimen $1\frac{1}{2}$ inches long from Stanleyville. Its dorsal has 17 spines and it has 31 scales. *Tilapia stigmatogenys* is doubtfully distinct from *williamsii*.

216. **Tilapia stormsii** Boulenger.

Numerous specimens, about $\frac{1}{2}$ to $3\frac{1}{2}$ inches long, from Stanleyville. They have the caudal truncate or sub-truncate rather than rounded, otherwise agree admirably with the description of this species. When changed from formalin to alcohol they were beautifully marked with golden yellow and a little red and purple. A specimen had back of eye to snout purple, upper iris yellowish-green, lower red. Maxillary, pectoral and sides yellow. Obscure diffuse dusky cross-bands on the sides. Upper edge of caudal and stripes on dorsal yellow. Tips of spines black. In alcohol there is usually a dusky shade from the nape to the snout and maxillary, and an obscure dark band formed by blackish spots from near the opercle to the peduncle, a paler band above it.

217. **Steatocranus gibbiceps** Boulenger.

Four specimens, between 1 and 3 inches long, from Stanleyville.

218. **Haplochromis strigigena** (Pfeffer).

A single specimen, about 2 inches long, from Stanleyville. This species, previously known from the Nile and East Africa, seems distinct from the following.

219. **Haplochromis desfontainesii** (Lacépède).

Haplochromis moffati CASTELNAU.

Ten specimens, about $1\frac{1}{2}$ to 5 inches long, from Avakubi and Stanleyville; 3 from Stanleyville are referable to *moffati*; three from Stanleyville and 4 from Avakubi to *desfontainesii*. We do not consider the two species distinct.

220. **Paratilapia macrocephala** Boulenger.

A single small specimen $1\frac{1}{2}$ inches long from Poko.

221. *Paratilapia longipinnis* sp. nov.

10-12 gill-rakers on lower part of anterior arch; premaxillary processes moderate, not extending to between the orbits; caudal pointed, scaly; ventral, anal and dorsal fins with some of their soft rays exceedingly long and filamentous.

The type, No. 6298, American Museum of Natural History, from Coquilhatville, May 17, 1915, is 111 mm. in length to base of caudal; depth $2\frac{1}{3}$ times in this measure, length of head $2\frac{1}{4}$ times. Head twice as long as broad; snout moderately pointed, with a straight upper profile, as long as broad, shorter than postocular part of head; eye 4 times in length of head, nearly twice in interorbital width; mouth moderately protractile, not extending to below anterior border of eye; premaxillary processes

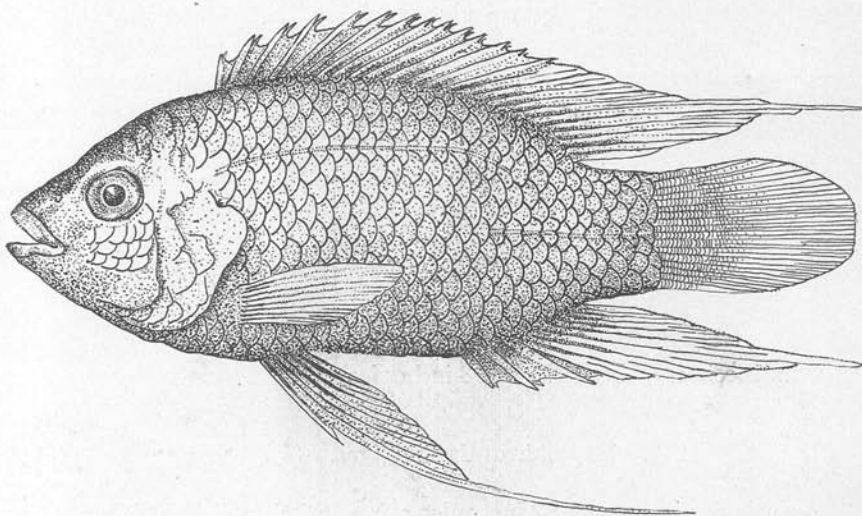


Fig. 29. *Paratilapia longipinnis*, type.

moderate, not extending to between the orbits; teeth forming broad villiform bands, outer teeth larger but very small, about 60 in the upper jaw; 4 series of scales on the cheek. Gill-rakers moderately long, 11 on lower part of anterior arch. Dorsal XIV 11; spines increasing in length to the last, which measures $\frac{1}{2}$ length of head; middle soft rays very much produced, filamentous, reaching end of caudal. Anal III 9, the third spine shorter but stouter than last dorsal spine; middle soft rays very much produced, filamentous, reaching end of caudal. Pectoral $\frac{3}{4}$ length of head, not extending to vertical of origin of anal. Ventral with the outer rays much produced, filamentous, extending beyond root of caudal. Caudal pointed, scaly. Caudal peduncle $\frac{3}{4}$ as long as deep. Scales all cycloid, 28; lateral lines $\frac{18}{10}$. Blackish, more or less uniform, with 5 indistinct dark cross bars, and a black opercular spot; fins blackish, the soft rays of dorsal and anal indistinctly spotted.

Besides the type we have 14 other specimens with the same data, and two others from Irebu, December 17, 1914. They exhibit the following range of measurements: length to base of caudal 70 mm. to 115 mm.; depth $2\frac{1}{3}$ – $2\frac{1}{2}$ times in this measure; gill-rakers 10–12; Dorsal XIV 10–11; anal III 8–9; scales occasionally denticulate, 26–28. The length of the filamentous rays of the various fins also varies slightly, due probably to wear or breaking.

This very distinct species is easily distinguished by its pointed, scaly caudal, and the long rays of its dorsal, anal and ventral fins. The dentition most closely resembles that of *P. polyodon*.

222. *Paratilapia xenodon* sp. nov.

With 9 gill-rakers on lower part of the anterior arch; premaxillary processes moderate, not extending to between the orbits; caudal rounded, scaly; some of the pharyngeal teeth with spherical crowns; depth of body $2\frac{1}{4}$ times in length to base of caudal; snout longer than postocular part of head; teeth in villiform bands.

The type, No. 6299, American Museum of Natural History, from Rungu, June 1913, is 297 mm. in length to base of caudal; depth $2\frac{1}{4}$ times in this measure; head

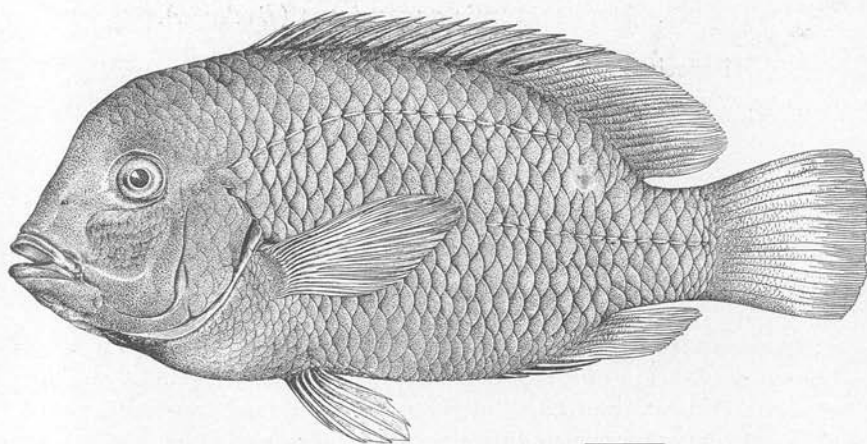


Fig. 30. *Paratilapia xenodon*, type.

3 times. Head $1\frac{3}{4}$ times as long as broad, upper profile elevated, concave in front of the eyes, very high between them; greatest depth of head exceeding its length; snout rounded, as long as broad, slightly longer than postocular part of head; eye 5 times in length of head, 2 times in interorbital width, much less than preorbital depth; mouth not extending to below anterior border of eye; teeth in broad villiform bands, minute, conical, incurved; outer series of upper jaw larger, about 50; 5 or 6

series of scales on the cheek, width of scaly part greater than diameter of eye. Some of the pharyngeal teeth with spherical crowns. Gill-rakers very short, knob-like or anvil-like, 9 on the lower part of anterior arch. Dorsal XIV 15, spines increasing slightly in length to the last, which is $\frac{2}{3}$ length of head; longest soft ray about $\frac{1}{2}$ length of head. Anal III 9, third spine $\frac{1}{2}$ length of head. Pectoral $\frac{3}{4}$ length of head, not reaching vertical from origin of anal. Ventral reaching vent; caudal rounded, scaly. Caudal peduncle slightly longer than deep. Scales feebly denticulate, 29; lateral lines $\frac{19}{13-15}$. Uniform dark pinkish gray in life.

Besides the type we have 5 other specimens, all with the same data, measuring from 165 mm. to 235 mm.

This aberrant *Paratilapia* is remarkable for its dentition, which is apparently intermediate between *P. polyodon* and *Platytaeniodus*. It fits exactly into neither, however, and might be regarded as generically separable. The classification of the Cichlidæ, however, is admittedly unsatisfactory, many of the genera founded on abnormal dentition being open to criticism. This being the case, another genus, founded on no better characters, would merely add to the already overburdened nomenclature, so the authors prefer to place this species provisionally in *Paratilapia*, to await the revision of the family, which seems so necessary.

223. *Nannochromis squamiceps* (Boulenger).

Several specimens, about 1 to 3 inches long, from Stanleyville. We consider this species doubtfully distinct from *dimidiatus*.

224. *Pelmatochromis lateralis* Boulenger.

Plate LXXVIII, Fig. 2, 3.

Several from 1 to about 10 inches in length from Avakubi, Faradje, Rungu and Stanleyville. Specimens from Rungu, June, were silvery gray, with more or less greenish reflections above, and more or less plain silvery below, one of them with a narrow golden line around the pupil. A specimen of about 7 inches from Faradje, December, was pearl gray and greenish above in more or less longitudinal stripes, whitish below, silvery throughout. Dorsal fin transparent gray with bright blue reflections on the spines and brownish red longitudinal markings. Caudal fin grayish edged with red on the lower half. Pectoral fin transparent gray. Ventral and anal fins pale blue gray, the former with red markings anteriorly. Top of the head in front of the eyes dark gray. Gill-covers yellowish and an area behind the head dusky yellowish gray. Some red markings between ventral and pectoral fins.

Specimens under 2 inches are from Faradje in December and February and Stanleyville in April. Others from 2 to 3 inches are from Stanleyville and Faradje in February, Faradje in March, Stanleyville in April and Rungu in June. We think there is some evidence here for a fall or winter spawning season. This species varies greatly in depth and in the outline of the profile which may be straight or convex.

225. ***Hemichromis fasciatus* Peters.**

Numerous specimens, about 1 to 6 inches in length, from Avakubi, Coquilhatville, Niangara, Niapu, Poko, Rungu, Stanleyville and Zambi. Specimens 2 inches and less in length are pretty well scattered through the year, February (Avakubi), April (Stanleyville), June (Zambi), November (Niangara), December (Avakubi). Mr. Chapin made a color sketch of a small one $3\frac{1}{2}$ inches long from Avakubi. It is dark green, somewhat mottled, including the fins with the exception of the ventrals. With 5 black blotches on the side. The ventral, extreme edge of the dorsal and upper caudal angle, breast, narrow longitudinal streaks on the flanks and points about the mouth and lower gill covers are red.

226. ***Hemichromis bimaculatus* Gill.**

Eight specimens, 2 or 3 inches long, from Zambi.

227. ***Lamprologus obliquus* sp. nov.**

Caudal rounded, sub-acuminate. Usually 6, sometimes 7 anal spines. Scales 32 to 38. Upper anterior and lower posterior lateral lines well developed. About 6 short gill-rakers on lower part of anterior arch. Depth in length to base of caudal 4 to 5. Eye in snout 1 (inch specimen) to 2 ($2\frac{3}{8}$ to 3 inch specimens). More or less distinct dark, broad cross-shades, and edges of scales dark, forming conspicuous narrow bars crossing the sides obliquely downward and backward.

The type, No. 5829, American Museum of Natural History, is 77 mm. long to base of caudal; depth $4\frac{1}{2}$ in this measure; head 3; eye $4\frac{1}{2}$ in head; snout $2\frac{3}{8}$; inter-orbital $5\frac{1}{2}$, maxillary $2\frac{3}{8}$. Body moderately compressed, its greatest depth at the nape, which is slightly swollen, ventral outline horizontal. Profile moderately oblique and convex to the nape, the dorsal outline thence drops in a very gentle convex curve to the front of the peduncle, the upper and lower outlines of which are about straight and parallel. Lower jaw slightly projecting, maxillary barely reaching front of eye. Dorsal inserted $\frac{1}{2}$ as far from snout as from base of caudal, continuous, the spines low, graduated, the last 3 in head, longest ray $1\frac{1}{2}$. Pectoral $1\frac{3}{8}$, ventral $1\frac{3}{8}$, just reaching vent. Anal similar to posterior dorsal, its last spine $3\frac{3}{8}$, its longest ray $1\frac{3}{8}$. Caudal sub-acuminate $1\frac{1}{2}$. Dorsal XIX 8. Anal VI 6. Scales ctenoid, 33, 26

in the upper anterior lateral line, 17 in the lower posterior. About 9 longitudinal series of large scales, the scales on the front of the back and on the belly much smaller and irregularly placed. Head naked, villiform bands of conical teeth in jaws, an outer series of larger conical curved brown-topped teeth in front of them, 3 on either

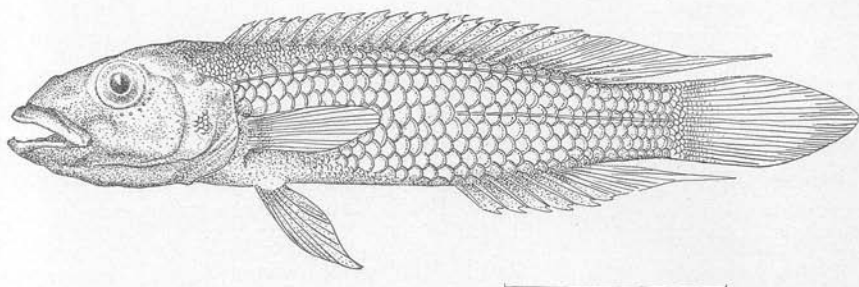


Fig. 31. *Lamprologus obliquus*, type.

side, the outer somewhat larger in the upper jaw; 2 on either side, the inner one rather small the outer large and canine-like, in lower jaw. A dark stripe back of the eye and blotch on opercle, edges of scales dark, pectoral pale, caudal with narrow dark bars extending obliquely downward and forward. Other fins blackish.

This species has a smaller eye than *congolensis*, *tumbanus* and *mocquardii* and is notably more slender than the two former.

There are over 200 specimens from $\frac{1}{2}$ to over 4 inches in length from Avakubi, Faradje, Garamba and Stanleyville.

ANABANTIDÆ.

228. *Anabas nigropannosus* (Reichenow).

Five specimens from Coquilhatville, one from Nouvelle Anvers, and several from Zambi. They range from about 3 to 6 inches in length.

229. *Anabas congicus* (Boulenger).

A single specimen 2 inches long from Zambi.

230. *Anabas nanus* (Günther).

Numerous specimens, about 1 to 3 inches in length, from Avakubi, Bafwabaka, Basoko, Faradje, Medje, Niangara, Niapu, Stanleyville and Vankerckhovenville. Some of these from Faradje in January were caught in swamps.

OPHIOCEPHALIDÆ.

231. **Ophiocephalus obscurus** *Günther.*

Plate LXXXI, Fig. 1; Plate LXXXIII, Fig. 1 (colored).

Several specimens, from about 2 inches to 2 feet in length, from Coquilhatville, Faradje, Malela, Rungu, Stanleyville, Vankerckhovenville and Zambi. We publish a color sketch by Mr. Chapin, who says that when seen in the water from above it shows a remarkable resemblance to *Polyp-terus*.

MASTACEMBELIDÆ.

232. **Mastacembelus congicus** *Boulenger.*

Plate LXXIII, Fig. 1 (colored).

One hundred or more specimens, about $1\frac{1}{2}$ to 18 inches in length, from Avakubi, Faradje, Niapu, Rungu and Stanleyville.

The few which are 3 inches and under were taken in January (Faradje, Niapu) and February (Faradje), perhaps indicating a definite spawning season. According to Mr. Lang's observation on two live ones about 8 inches long from Faradje, they keep the mouth slightly open, the slender snout slightly curved downward and the body in graceful curves, and can swim forward by moving the pectoral fins very rapidly. One of them had 3 neuropterous larvæ in its stomach. Our specimens of *Mastacembelus* vary greatly in color, but we find only the single species represented. We publish a color-sketch by Mr. Chapin, who says that in life the dorsal spines are usually not erected.

TETRODONTIDÆ.

233. **Tetrodon mbu** *Boulenger.*

Plate LXXIX, Fig. 1.

Eight specimens, 3 to 17 inches in length, from Faradje, Niangara, Poko, Rungu and Stanleyville. One of about 3 inches from Faradje was dark greenish brown above with yellow reticulations, yellow below lighter near the throat, caudal fin yellowish and brown, others transparent. In normal condition it measured 20 mm. in diameter, when inflated 52 mm. It made a rasping noise. When in the water the 2 small protuberances

near nostril were erect, the pectoral fins moved very rapidly in undulations, the caudal fin was usually held contracted, though sometimes spread. *Tetrodon* is considered poisonous and not eaten by the natives of the north-eastern Congo basin, excepting old men of the Mangbetu who eat them after skinning and removing the viscera. In this tribe they are supposed not to be detrimental to old men. The skin of *T. mbu* is used by the natives for polishing wood.

234. *Tetrodon mlurus* Boulenger.

Several specimens, 1 to about $3\frac{1}{2}$ inches long, from Stanleyville. When inflated the children sometimes use them to play ball with.

SPECULATIONS CONCERNING THE ORIGIN OF THE AFRICAN ICHTHYFAUNA.

Our knowledge of African fresh-water fishes has now undoubtedly reached a point where speculations as to their origin are justifiable. This does not mean that the authors consider that all the forms are known. Far from it. Unquestionably many species and possibly genera still remain undiscovered. It is, however, very doubtful if any such discovery would appreciably alter our general conception of the relationships of the fauna.

The evidence available for these speculations is first the distribution of African and closely related forms in other parts of the world, and secondly the distribution of fossils. Other things being equal, it is most likely that those families exhibiting the greatest diversity of structure and specialization, and whose range is the widest in Africa, appeared there first. The fact, for instance, that African Siluridæ exhibit a greater diversity of structure than their relatives the Characinidæ is evidence that they reached Africa first; although (as science is quite unable to show that their rates of development were the same) the evidence is not conclusive. In many instances palæontology has proved that the present distribution of a given group is not necessarily an indication of where it originated, the camels and horses being excellent illustrations. The best thing we can do therefore is to present what evidence there is for each family, and what conclusions and interpretations might logically be inferred from such evidence.

Polypteridæ.

This family, characteristic of west tropical Africa, is found nowhere else in the world. Crossopterygians were however abundant in palæozoic times, and continued in the northern hemisphere into the Cretaceous.

Bearing in mind the fact that at this time three quarters of the northern hemisphere was under water, and that there was probably a great antarctic continent (evidenced by the distribution of *Galaxias*, etc., and fossils), it seems safe to suppose that this group originated or entered fresh water in the south, and that their descendants, the Polypteridæ, have at least been in Africa for countless ages.

Lepidosirenidæ.

This family is now confined to tropical South America and Africa with the related *Neoceratodus* in Australia. Fossil Dipnoi are abundant in the northern hemisphere in palæozoic and secondary formations, and have recently been found in Antarctica. This argues strongly for their origin in a former Antarctic continent, Gondwanaland, and their gradual spreading northward. Their survival in isolated tropical stations is explained by the continuance of favorable climatic conditions, which apparently existed in the northern hemisphere in former ages when they flourished there, and the end of which conditions resulted in their early extinction. Unquestionably a very ancient group in Africa.

Malacopterygii.

Osteoglossidæ
Mormyridæ
Notopteridæ
Pantodontidæ

Phractolæmidæ
Kneriidæ
Cromeriidæ

With the exception of *Notopterus* and the Osteoglossidæ, no fossils of these families are known. *Notopterus* has been found in the Tertiary of Sumatra, and Osteoglossidæ in the Eocene of Wyoming and Sheppey. The present distribution of these families shows conclusively that they are isolated cases of survival. This is confirmed by the fact that Malacopterygian fossils of families now extinct were abundant in the Jurassic and of wide-spread distribution. To quote from Alexander Meek:¹ "These and other Teleosts appeared in the northern hemisphere about the time Gondwanaland was being lost. The relationships of some of their predecessors in the formations of the north are not yet clear, but they are believed in all cases to be Proostean. This and the fact that the pioneers of the Cretaceous were recognizable as family types, many of which are still living (ex. Elopidae), go to show that Teleosts originated in the south." Knowing nothing to the contrary it seems most reasonable to suppose Teleosts of marine origin,

¹ The Migrations of Fish. London, 1916.

but there is much to be said in favor of Meek's reasoning, as applied to Malacopterygii. Granting for the moment that they originated in the north, they must have reached Africa certainly before they became extinct in the northern hemisphere. It is highly improbable that they could have done so, because even so late as Eocene times, most of Northern Africa was under water, and a gigantic Mediterranean three times as wide as it is now stretched all the way to the Bay of Bengal. In any event these peculiar fishes have been in African waters for a very long period of time.

Ostariophysi.

Characinidæ.—Today Characins are abundant in tropical America and tropical Africa. They are found nowhere else, and as they are diversely specialized in each continent, it may safely be presumed that they have occupied them for a long period of time. The only fossil known is a member of an existing genus *Tetragonopterus*, from the Tertiary of San Paulo, Brazil. There is, therefore, absolutely no fossil evidence as to their place of origin.¹ The probabilities will be discussed later on.

Siluridæ.—Taking up the fossil evidence first, we are struck by the fact that there are no pre-Tertiary ones. The oldest are all related to the marine *Arius*. Otherwise there is nothing until late Tertiary, where remains are fairly numerous. It is remarkable, however, that all these fossils are either referable to living genera or closely related to them. *Clarias* and *Heterobranchus* for instance have been found in the Lower Pliocene of India. As regards existing species the family is largely tropical in distribution. Of the 9 subfamilies into which it is divided, one is marine (*Plotosus*), 3 are purely Neotropical; *Malopterurus* is confined to tropical Africa; the Clariinæ center around the Indian Ocean region, the Silurinæ have a similar distribution but have spread to Europe and China; the Bagrinæ are most abundant here also, but a large number are found in North America, and a few in Northern Asia; the Doradinæ are confined to the tropical regions of both hemispheres. This distribution would seem to indicate a southern origin, borne out by the fact that the northern fossils are all of recent date and do not indicate that the family was any more abundant in the north formerly than now.

Cyprinidæ.—This is the predominant family of fresh-water fishes in the northern hemisphere, over 2000 species being recognized. To be noted especially is the fact that they are absent entirely from South America and Australia. The northern hemisphere was fully occupied during the Ter-

¹ See however the following paper by C. R. Eastman (Art. XXVI, pp. 757-760).

tiary period, as an abundance of fossil material proves. Remains in the Oligocene and Miocene deposits of Europe, Nevada and Sumatra are referred to living genera and in many cases to living species. They were apparently forced south to a great extent by the Ice Age. Four subfamilies are recognized: (1) the Cyprininae, with about the same range as the family, and to which all but one of the African species belong; (2) Catostominae, North American, with the exception of 3 or 4 which have reached Northern Asia; (3) Cobitidinae, Europe, Asia and Abyssinia; (4) Homalopterinae, a small, aberrant group found in India, China and Malaya. With this evidence and the fact that they greatly predominate in Northeastern and Eastern Africa, we have no hesitation in saying that they reached that continent comparatively recently from Europe and Asia from a north-easterly direction.

The problem of the origin of the Ostariophysi is perhaps the most difficult one in fresh-water fishes, as what evidence we have is contradictory. The present distribution of the Characins and Silurids, and the recentness of the fossils of the latter point towards a southern origin for these two families; the Cyprinids are, we think, the key to the situation. Meek, believing in a southern origin for the first two families on the evidence stated above, argues as follows for the southern origin of the Cyprinidæ: "The loaches come nearest to the catfishes, and from the distribution of these, and the above consideration, it may be said that the Cyprinidæ originated in the south and appeared in the north in the Tertiary period." The writers are however quite unable to accept this view. It would, as a result, be quite impossible to account for their absence from South America and Australia. No other family of fish whose origin is undoubtedly southern, or even presumably so, are absent from these two regions. The distribution of all the living Malacopterygians is an excellent case in point. Furthermore a study of our table of distribution will show conclusively that the African members of the family came from the north. It is in the northern hemisphere then that we must look for the origin of this family.

What is to become then of the Characins and the Silurids? The writers refuse to grant that two families of the same suborder would originate independently in different parts of the earth. All three families originally sprang from a common ancestor, and the place of origin of all three families was probably in a general way the same. They are admittedly of recent origin and all ancient fish have been common or abundant in the northern hemisphere during Palæozoic and Secondary time. The Ostariophysi probably originated here and then spread southward supplanting older and more primitive forms. The Siluridæ reached South America and Africa first, developing to a greater extent in the former continent,

where there were fewer primitive fishes to compete with. The fact that many of them were adapted to a marine life may well have hastened their spread. The Characins came next. The Cyprinidæ undoubtedly moved south last, the Ice Age possibly providing an important impetus. These have entirely failed to reach South America and the Australian region.

Galaxiidae.—There are no fossils. The present distribution of this family points to an origin in Gondwanaland. They were put by Boulenger in the suborder Haplomi, but Regan has recently shown their affinities to be with the Salmonidæ, showing them to be more primitive than formerly believed. This would fit into our belief that primitive fresh-water fishes originated in the south, and the more recent fishes in the north.

Acanthopterygii.

Osphromenidæ
Anabantidæ

Ophiocephalidæ
Mastacembelidæ

These peculiar families have a remarkable distribution. They are all confined to southeastern Asia, Malaya and tropical Africa, where they predominate in the west tropical region. Of these *Ophiocephalus* alone has furnished fossils from the Pliocene of the Siwalik Hills in India. As far as living genera and species go, these families are much more abundant in Asia and Malaya. They probably originated there and worked east to Africa, isolated species in Syria and Afghanistan serving as connecting links. In Africa they exist only in the west tropical region and the Upper Nile where conditions parallel those of southern Asia and Malaya in so far as climate is concerned.

Cichlidæ.—The distribution of this family in Africa cannot be compared with that of any other fresh-water group. About three-quarters of the genera center around the great central lakes, and the remaining quarter are wide-ranging and characteristic of no particular region. *Tilapia* is particularly remarkable, 2 species reaching Syria, 2 Madagascar and several are found in various hot springs and mineral lakes in East Africa. Outside of Africa the family is found only in tropical America, although fossils from the Eocene of Green River and Utah point to a more extended northward distribution when the climate was warmer. Their nearest living allies are the Pomacentrids and related salt-water fishes found throughout tropical seas wherever there are coral reefs. The presence of several Cichlids in Madagascar and their known indifference to brackish water suggest that they were originally of marine origin, descended perhaps from Pomacentrids or a common ancestor and had specialized or differentiated to some extent before leaving the sea. To account for their origin in any other way would

necessitate giving them an extreme antiquity, as Madagascar has certainly been separated from Africa since the middle of the Secondary period. Their close relationship to various Perciform fishes on the other hand places them as recent and specialized.

Résumé.—The fresh-water Crossopterygians, Dipnoi and Malacopterygians are very ancient fish which probably originated in the south and have been present in Africa a very long time. The Ostariophysi are of comparatively recent northern origin, and invaded Africa from the north; the Cyprinidæ unquestionably so, and most recently. Various Acanthopterygians are not native to Africa but reached that continent from the Orient, with the exception of the Cichlids, which were of marine tropical origin and became adapted to a fresh-water existence in various parts of Africa and elsewhere at about the same time.

AFRICAN FRESH-WATER ICHTHYFAUNÆ.

With the completion of Vol. IV of Boulenger's invaluable 'Catalogue of fresh-water Fishes of Africa' it is possible to gain a comprehensive view of their general distribution for the first time. Wallace's discussion of Africa in his classic work, 'Geographical Distribution of Animals,' virtually omits the fishes from consideration, as at the date of his writing they were very imperfectly known. The great strides made in African ichthyology in the last 25 years now make it possible to use the fishes as important collateral evidence in the fascinating problem of African Zoögeography.

As the easiest way of presenting the facts, the writers have prepared a table (pp. 746-752) of the distribution of all the strictly fresh-water families and genera. A few words of explanation about this table are necessary. The continent has been divided into 6 sections of unequal size, and the number of species in each section of every genus has been given. These sections, and the regions to be made from them, will be fully discussed later. A column has also been supplied for the total number of species in each genus. In many cases it will be seen that the sum of the species in the 6 sections exceeds the total number of species in Africa. This means that one or more species of a given genus are widely distributed, occurring in two or more of the sections. It will also be noted that several families, included in Boulenger's Catalogue, have been omitted. These are of two classes, first, marine families, with peculiar genera or species occurring exclusively in fresh-water; second, marine families, some species of which occur occasionally up the mouths of the larger rivers. Such are regarded in this paper as of recent adaptation to a new environment, and are omitted because they have no

bearing upon the principles of distribution to be laid down. In the case of the great central lakes, no little difficulty has been experienced in deciding to what section their fish fauna belongs. For instance, a fish confined to Lake Tanganyika has closely related species in west and southeastern Africa. Into which region should this fish go? The writers have, therefore in certain cases, been somewhat arbitrary, and are aware that an opposite opinion might be maintained with as good cause.

A careful study of these tables shows that from a general standpoint the fresh-water fishes of Africa have the following arrangement geographically:—

1. The fishes of northwest Africa are closely related to those of Europe.
2. The fishes of west tropical Africa (from the Niger to Angola, and east to the high central mountains or the central lakes) are very distinct and either confined to that region or related to South America, Australia and Southeastern Asia. This region is by far the richest in Africa, containing more than half of all the recorded African species.

3. The fishes of the Nile basin and Ethiopia are either most closely related to northern or Asiatic forms or else to west tropical forms. For a considerable period of time there must have been a water connection of some sort between the Nile basin and west tropical Africa. In fact our collector, Mr. Lang, states that in the extreme Upper Congo near Garamba he found a swamp draining both ways during the height of the rainy season. This fact must be borne in mind if the distribution of fish in Africa is to be understood, and it is well proved as follows:

- a. There are nearly 100 species of fish common to the Nile basin and west tropical Africa. Very few of these reach East Africa and none South Africa.

- b. Fish of probable northern or oriental origin are commoner in the Nile basin, East and South Africa than in west tropical Africa where they occur in reduced numbers, usually in the northern or extreme northeastern sections of the regions.

4. The fishes of East Africa (excluding the Nile drainage and south to the Limpopo River) are few in numbers comparatively and exhibit a close relation to those of the Nile basin. A very few west tropical African forms which have reached the Nile basin have succeeded in establishing themselves further south in East Africa, arriving there undoubtedly by the same means used by fish of northern or Asiatic origin. The fish fauna of South Africa is poor and limited, most closely related to that of eastern Africa and the Nile basin. It does not constitute a separate faunal region for fresh-water fishes.

5. Madagascar has no real ichthyological affinities with Africa.

The boundaries of these 5 regions are approximately shown on the accompanying map. A word, however, must be said about the great central lakes. The difficulties encountered have already been alluded to. Suffice it to say that the authors here consider their regional affinities to be as follows: Lakes Victoria and Albert Edward are undoubtedly homologous in their ichthyofauna with the Nile basin. Lakes Bangweolo and Moero should unquestionably be included in west tropical Africa. Lake Nyassa,



Map 2. Africa, indicating the divisions used in the discussion of the ichthyofauna.

southeast of Lake Tanganyika, is best put in the East African region. Lake Tanganyika is the great problem, and the writers do not believe it can definitely be assigned to any one region. Boulenger, in his 'Poissons du Bassin du Congo,' includes it in west tropical Africa (its present direct water connection is with the Congo drainage through the Lukuga River at high water) although in his preface he calls it "un bassin à part." This treatment, however, is quite impossible. The lake is extremely rich in forms. Excluding a large number of peculiar genera for the moment, our

treatment has been as follows: Those species whose relatives are predominately west tropical African have been classed in that region, and those whose relatives are predominately east African have been put in the latter region. In the case of peculiar genera, all families except the Cichlidæ, were characteristic of one region or the other (usually west tropical) and they have been classed accordingly. In the Cichlidæ, however, which do not predominate in any one region, and where no less than 23 genera are confined to this lake, it has been impossible to decide, and we have arbitrarily placed them in the East African region. Aware, however, that others might think differently we have in every case indicated their restricted range in the table.

The various families of fresh-water African fish fall conveniently into 3 general groups:

1. Fish of primitive or specialized structure, which either originated in Africa or have survived there only. It is highly important from the standpoint of zoögeography to note that all such are practically confined to west tropical Africa, a few species only appearing in the Nile basin or East Africa.

2. Families of the *present*, with tropical range only. These too are either confined to west tropical Africa or predominate there enormously. The Characinidæ are the best example.

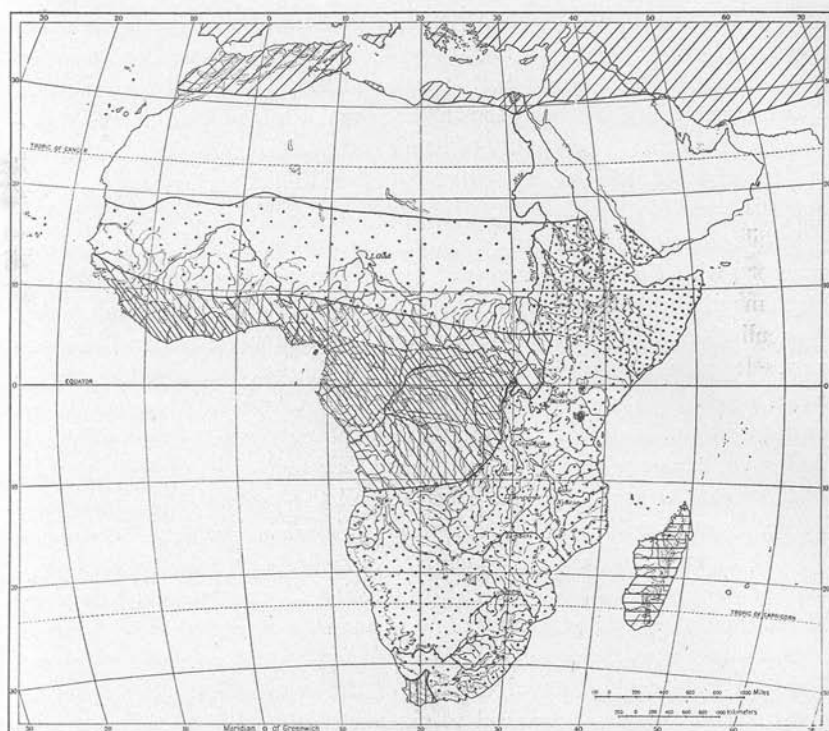
3. Families of cosmopolitan distribution, well represented in the northern hemisphere and of possible northern origin; also various genera of undoubted northern origin. These seem invariably to have entered Africa from the northeast. They predominate in the Nile basin and East Africa, reaching South Africa, but are much more poorly represented in west tropical Africa. Various genera of Cyprinidæ furnish the best example.

It remains to compare our regions, which are as yet purely ichthyological, with the division of the continent by biogeographers who have availed themselves of all the available evidence furnished by the plant and animal kingdoms. It is therefore interesting to note that our regions are in entire accord with those of biogeography. Northwest Africa can be eliminated as being obviously holarctic, the evidence supplied by its fishes being as good as that by any other forms of life; Wallace divides the remainder of the continent into 3 regions, West Africa, East Africa and South Africa. Madagascar and the Mascarene Islands constitute his fourth sub-region. The fact that we separate the Nile basin and northeast Africa is largely a matter of convenience, as their ichthyfauna and flora is a mixture of holarctic, east African and west tropical forms, which is easily accounted for as explained above. A much more recent map showing biogeographical regions on the evidence of the flora as studied by Engler has been worked out by our colleagues at the American Museum of Natural History who are

especially interested in African faunæ (Messrs. Lang and Chapin and Dr. Bequaert). Our West African region for the fish includes the forest region and the comparatively open belts north and south of it. Wallace's South African region has now been shown to be much less marked than he supposed by the discovery of many of its alleged peculiar forms in East Africa, and the terrestrial faunæ accord very well with the regions on this map which is based on floræ.

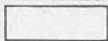
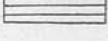
While therefore our ichthyological regions are to all intents and purposes in accord with the latest findings of biogeographers there is one difference which may be emphasized. South and East Africa contain a large number of peculiar forms of plant and animal life, found nowhere else in the continent. It might therefore be expected that the fish fauna of this region would also contain some at least of the peculiar African families and genera. Nothing is further from the facts. The poverty-stricken fish fauna is obviously nothing more than a diminished representation of Nile basin and west African forms. With one exception all the peculiar African families are purely west tropical. This exception is *Galaxias*, confined to the region of Cape Town, a limited area which Engler makes a separate region on the basis of its aberrant flora. Recent exploration of west tropical Africa has also shown an increasing number of peculiar forms of animal life other than fish. In fact it is probable that West Africa should now replace South Africa as the peculiar faunal division of that continent. Just how this should modify themes advanced to explain the South African fauna and flora by a vast Antarctic continent which connected South Africa, southern South America and Australia, it is at present difficult to say; Meek in 'The Migrations of Fish' collects all the evidence and argues strongly for this Antarctic continent, Gondwanaland, which served, he says, as an ancient center of distribution for most of the living fresh-water fishes. He particularly included those families belonging in our first two classes. If South Africa was a part of Gondwanaland it is certainly curious that these peculiar families should be entirely absent except for *Galaxias*.

The explanation is to our minds largely a geological and climatological one. The existence of Gondwanaland is generally admitted to explain not only present day facts of distribution, but also is largely proved by the fossils recently brought back from Antarctica. The fish remains from the Beacon Sandstone of Antarctica are of the same nature as those laid down in similar deposits of river and lake origin in Russia and Scotland. The plant remains also testify to this land connection. The famous Permian *Glossopteris* flora of the Damuda beds in India, the coal deposits of Australia, and the Ecca beds of South Africa has been found in Antarctica, a flora which also extended north to Russia and Siberia in the Permian and persisted in tropical situations as remote as Mexico and China in Mesozoic



BOTANICAL REGIONS OF AFRICA

after ENGLER

- | | |
|---|--|
| I. MEDITERRANEAN REGION |  |
| II. NORTH AFRICAN-ARABIAN DESERT REGION |  |
| III. ETHIOPIAN REGION | |
| A. SAVANNAH PROVINCE | |
| 1. SUDANESE SUBPROVINCE |  |
| 2. NORTHEASTERN SUBPROVINCE |  |
| 3. EASTERN & SOUTHERN SUBPROVINCE |  |
| B. WESTERN FOREST PROVINCE |  |
| Extent of Rain Forest indicated thus |  |
| IV. SOUTHWESTERN CAPE REGION |  |
| V. MALAGASY REGION |  |

times. We also know that Graham Land in Antarctica possessed a rich Jurassic flora.

Turning now to geological conditions in Africa it should be noted that practically the whole continent south of the Sahara so far as known is Permian, Triassic and Jurassic. Tertiary deposits are very rare. It should also be noted that the more primitive and ancient African fishes are almost all *Crossopterygii*, *Dipnoi*, or *Malacopterygii*, which reached their maximum development during these geological periods. In the words of Meek: "In the southern hemisphere swamps and fresh-water conditions generally have apparently persisted from a period even before Gondwanaland disappeared and Antarctica lost its connection with Australia and America, and have allowed of the survival of primitive types." The absence of these primitive types from South Africa might be explained by gradual desiccation of climate in some way correlated with the considerable geographic changes. We know that the ancient *Glossopteris* flora required a humid, moist climate. These primitive fishes therefore would either have become extinct in South Africa or have found some means to migrate to more congenial conditions, namely those at present prevailing in west tropical Africa. The absence of fossils is easily accounted for by the rarity of Tertiary or Quaternary deposits.

The present flora and fauna of South Africa support this view. The flora of the region around Cape Town, already alluded to, may be regarded as a survival of ancient conditions, borne out by the fact that certain species and genera still exist in scattered localities further north and east. The present flora of the rest of South and East Africa has been shown by Engler to be exclusively of oriental or northern origin. Dr. Bequaert tells us that many modern Hymenoptera occur only south of the Orange River. The fishes are obviously of northern or Asiatic origin, as are largely the birds, and without going into details, the findings of palæontology render it very doubtful if the ancestors of any of the present East and South African mammals originated there.

To recapitulate briefly, the available facts indicate that the most ancient and primitive types of fishes originated in South Africa or some southern continent of which it was a part, as evidenced by their fossil remains. That these types became extinct there due to a steady desiccation of climate, and their least differentiated descendants still exist around Cape Town and in west tropical Africa where favorable conditions for their existence have persisted. The present fauna and flora of Africa excluding these primitive types are comparatively recent and derived from northern or oriental sources.

Due to the absence of mountain barriers, and the close approximation of the river systems much of this recent derived fauna and flora is found in west tropical Africa.

*Distribution of African Fishes.*¹

	World Range	Total no. of African species	N. W. Africa	Nile & N. E. Africa	East Africa	South Africa	West Tropical Africa	Madagascar & Mascarene Islands
<i>Polypteridæ</i>	{ Nile & Tropical Africa							
Polypterus		12	0	3	0	0	11	0
Calamichthys		1	0	0	0	0	1	0
<i>Lepidosirenidæ</i>	{ Tropical Africa & S. America							
Protopterus		3	0	1	1	0	2	0
<i>Mormyridæ</i>	{ Nile & Tropical Africa							
Mormyrops		19	0	3	1	0	17	0
Petrocephalus		13	0	5	2	1	9	0
Isichthys		1	0	0	0	0	1	0
Marcusenius		30	0	4	1	2	25	0
Stomatorhinus		6	0	0	0	0	6	0
Myomyrus		2	0	0	0	0	2	0
Gnathonemus		33	0	3	3	1	30	0
Genyomyrus		1	0	0	0	0	1	0
Mormyrus		16	0	4	2	2	10	0
Hyperopisus		1	0	1	0	0	1	0
Gymnarchus		1	0	1	0	0	1	0
<i>Notopteridæ</i>	{ S. E. Asia & Tropical Africa							
Notopterus		1	0	0	0	0	1	0
Xenomystus		1	0	1	0	0	1	0
<i>Osteoglossidæ</i>	{ S. America Australia East Indies Africa							
Heterotis		1	0	1	0	0	1	0
<i>Pantodontidæ</i>	{ West Tropical Africa							
Pantodon		1	0	0	0	0	1	0

¹ See Map No. 2, p. 741.

World Range		Total no. of African species	N. W. Africa	Nile & N. E. Africa	East Africa	South Africa	West Tropical Africa	Madagascar & Mascarene Islands
<i>Clupeidæ</i>								
Pellonula	Tropical Africa	6	0	0	0	0	6	0
Odaxothrissa		2	0	0	0	0	2	0
Microthrissa		2	0	0	0	0	2	0
<i>Salmonidæ</i>	{ Mostly holarectic							
Salmo		1	1	0	0	0	0	0
<i>Phractolæmidæ</i>	{ West Tropical Africa							
Phractolæmus		1	0	0	0	0	1	0
<i>Kneriidæ</i>								
Kneria	Tropical Africa	3	0	0	1	1?	2	0
Xenopomathichthys		2	0	0	1	0	1	0
<i>Cromeriidæ</i>	White Nile							
Cromeria		1	0	1	0	0	0	0
<i>Characinidæ</i>	{ Central & S. America, Tropical Africa							
Sarcodaces		1	0	0	0	0	1	0
Hydrocyon		5	0	3	1	1	5	0
Bryconæthiops		1	0	0	0	0	1	0
Alestes		31	0	6	4	2	26	0
Micralestes		7	0	1	1	1	7	0
Petersius		15	0	0	2	0	13	0
Eugnathichthys		2	0	0	0	0	2	0
Paraphago		1	0	0	0	0	1	0
Mesoborus		2	0	0	0	0	2	0
Phago		3	0	0	0	0	3	0
Neoborus		2	0	0	0	0	2	0
Ichthyoborus		1	0	1	0	0	0	0
Hemistichodus		1	0	0	0	0	1	0
Microstomatichthyoborus		1	0	0	0	0	1	0
Nannæthiops		2	0	1	0	0	2	0
Neolebias		4	0	0	0	0	4	0

Distribution of African Fishes.—(Continued.)

World Range		Total no. of African species	N. W. Africa	Nile & N. E. Africa	East Africa	South Africa	West Tropical Africa	Madagascar & Mascarene Islands
Distichodus		19	0	4	2	0	16	0
Nannocharax		11	0	1	0	0	10	0
Xenocharax		2	0	0	0	0	2	0
Citharidium		1	0	0	0	0	1	0
Citharinus		5	0	2	1	0	5	0
<i>Cyprinida</i>								
Labeo	S. Asia & Africa	51	0	6	13	10	29	0
Discognathus	S. Asia & Africa	8	0	3	5	0	2	0
Varicorhinus	S. W. & Cent. Asia & Africa	16	1	0	5	2	8	0
Barbus	Asia & Africa & Europe	249	13	54	66	48	76	0
Rasbora	E. & S. E. Asia & Africa	1	0	0	1	0	0	0
Leuciscus	Holarctic	2	2	0	0	0	0	0
Leptocypris	Congo	1	0	0	0	0	1	0
Barilius	China & S. E. Asia Nile & Trop. Africa	22	0	2	6	1	15	0
Engraulicypris	Nile & Trop. Africa	6	0	2	2	1	1	0
Chelethiops	Nile & Congo	2	0	1	0	0	1	0
Nemachilus	Europe, Asia & Africa	1	0	1	0	0	0	0
<i>Silurida</i>								
Clarias	Cosmopolitan S. E. Asia, Syria Africa	39	0	5	5	4	27	0
Allabenchelys	W. Tropical Africa	3	0	0	0	0	3	0
Clariallabes	W. Tropical Africa	2	0	0	0	0	2	0
Gymnalabes	W. Tropical Africa	1	0	0	0	0	1	0
Channallabes	W. Tropical Africa	1	0	0	0	0	1	0
Heterobranchus	Malay Archipel. Africa	3	0	1	1	0	3	0

	World Range	Total no. of African species	N. W. Africa	Nile & N. E. Africa	East Africa	South Africa	West Tropical Africa	Madagascar & Mascarene Islands
Dinotopterus	Lake Tanganyika	1	0	0	0	0	1	0
Eutropius	Nile & Trop. Africa	16	0	1	2	0	14	0
Shilbe	Nile & Trop. Africa	4	0	2	1	0	3	0
Ansorgia	W. Trop. Africa	1	0	0	0	0	1	0
Siluranodon	Nile	1	0	1	0	0	0	0
Physallia	Trop. Africa	5	0	2	0	0	3	0
Parailia	W. Trop. Africa	2	0	0	0	0	2	0
Bagrus	Nile & Trop. Africa	7	0	4	2	0	2	0
Chrysichthys	Nile & Trop. Africa	26	0	2	0	0	24	0
Gnathobagrus	W. Trop. Africa	1	0	0	0	0	1	0
Amarginops	W. Trop. Africa	1	0	0	0	0	1	0
Clarotes	Nile & Trop. Africa	1	0	1	1	0	1	0
<i>Siluridae</i>								
Gephyroglanis	Trop. & S. Africa	7	0	0	0	1	6	0
Phyllonemus	Lake Tanganyika	1	0	0	0	0	1	0
Leptoglanis	Trop. Africa	2	0	0	1	0	1	0
Amphilius	Trop. Africa	14	0	1	6	0	8	0
Paramphilius	Senegal	1	0	0	0	0	1	0
Parauchenoglanis	W. Trop. Africa	3	0	0	0	0	3	0
Auchenoglanis	Nile & Tropical Africa	10	0	2	0	0	10	0
Notoglanidium		2	0	0	0	0	2	0
Niauchenoglanis	All confined to Africa	1	0	0	0	0	1	0
Ancharius		2	0	0	0	0	0	2
Arius		6	0	0	1	0	4	1
Synodontis		63	0	13	6	0	49	0
Microsynodontis		1	0	0	0	0	1	0
Chiloglanis		7	0	2	3	0	2	0
Euchilichthys		4	0	0	0	0	4	0
Atopochilus		2	0	0	0	0	2	0
Acanthocleithron		1	0	0	0	0	1	0

Distribution of African Fishes.—(Continued.)

World Range		Total no. of African species	N. W. Africa	Nile & N. E. Africa	East Africa	South Africa	West Tropical Africa	Madagascar & Mascarene Islands
Mochocus		2	0	2	0	0	0	0
Doumea		3	0	0	0	0	3	0
Phractura		7	0	0	0	0	7	0
Paraphractura		1	0	0	0	0	1	0
Trachyglanis		1	0	0	0	0	1	0
Belonoglanis		1	0	0	0	0	1	0
Andersonia		1	0	1	0	0	0	0
Malopterurus		1	0	1	0	0	1	0
<i>Galaxiidae</i>								
Galaxias	Seas & fresh waters of S. Africa, S. South Amer., N. Zea- land & nearby isl., Australia & Tasmania	2	0	0	0	2	0	0
<i>Nandidae</i>	{ West Africa Southeast Asia, South America							
Polycentropsis		1	0	0 *	0	0	1	0
<i>Cichlidae</i>	{ Africa, Syria India, Ceylon & Trop. America							
Tilapia		96	0	15	42	4	40	2
Petrochromis	Lakes Tangan- yika & Nyassa	5	0	0	5	0	0	0
Cunningtonia	Lake Tanganyika	1	0	0	1	0	0	0
Simochromis	"	1	0	0	1	0	0	0
Tropheus	"	2	0	0	2	0	0	0
Asprotilapia	"	1	0	0	1	0	0	0
Labochilotes	"	1	0	0	1	0	0	0
Doeimodus	Lake Nyassa	1	0	0	1	0	0	0
Steatocranus		1	0	0	0	0	1	0
Haplochromis		16	0	11	5	1	4	0
Paratilapia		56	0	17	24	0	14	1
Nannochromis		3	0	0	0	0	3	0

World Range		Total no. of African species	N. W. Africa	Nile & N. E. Africa	East Africa	South Africa	West Tropical Africa	Madagascar & Mascarene Islands
Pelmatochromis		39	0	6	8	0	25	0
Platytaeniodus	Lake Victoria	1	0	1	0	0	0	0
Hemichromis		2	0	1	0	0	2	0
Champsochromis	Lake Nyassa	3	0	0	3	0	0	0
Bathybates	Lake Tanganyika	6	0	0	6	0	0	0
Haplotaxodon	"	1	0	0	1	0	0	0
Cyrtocara	Lake Nyassa	1	0	0	1	0	0	0
Ectodus	Lake Tanganyika	1	0	0	1	0	0	0
Enantiopus	"	2	0	0	2	0	0	0
Stappersia	"	1	0	0	1	0	0	0
Xenotilapia	"	2	0	0	2	0	0	0
Grammatotria	"	1	0	0	1	0	0	0
Trematocara	"	3	0	0	3	0	0	0
Gephyrochromis	"	1	0	0	1	0	0	0
Lamprologus	"	27	0	0	0	0	27	0
& Congo								
Julidochromis	Lake Tanganyika	1	0	0	1	0	0	0
Telmatochromis	"	2	0	0	2	0	0	0
Bayonia	Victoria Nile	1	0	1	0	0	0	0
Hemitilapia		3	0	2	1	0	0	0
Chilochromis		1	0	0	0	0	1	0
Corematodus		1	0	0	1	0	0	0
Eretmodus	Lake Tanganyika	1	0	0	1	0	0	0
Spathodus	"	1	0	0	1	0	0	0
Perrisodus	"	1	0	0	1	0	0	0
Chilotilapia	Lake Nyassa	1	0	0	1	0	0	0
Schubotzia	Lake Albert	1	0	1	0	0	0	0
	Edward							
Xenochromis	Lake Tanganyika	1	0	0	1	0	0	0
Plecodus	"	1	0	0	1	0	0	0
Paretroplus		2	0	0	0	0	0	2
<i>Osphromenidae</i> { S. E. Asia & Africa								
Micracanthus		1	0	0	0	0	1	0
<i>Anabantidae</i> { S. E. Asia, Trop. & S. Africa								

Distribution of African Fishes.—(Concluded.)

World Range		Total no. of African species	N. W. Africa	Nile & N. E. Africa	East Africa	South Africa	West Tropical Africa	Madagascar & Mascarene Islands
Anabas		16	0	2	0	3	11	0
<i>Ophiocephalidæ</i>	{ E. & S. E. Asia Trop. Africa							
<i>Ophiocephalus</i>		3	0	1	0	0	3	0
<i>Gasterosteidæ</i>	Holarctic							
<i>Gasterosteus</i>		1	1	0	0	0	0	0
<i>Mastacembelidæ</i>	{ South Asia & Trop. Africa							
<i>Mastacembelus</i>		34	0	1	2	0	31	0

EXPLANATION OF PLATES LXIV-LXXXIII.

PLATES LXXX-LXXXIII IN COLOR.

PLATE LXIV.

- Fig. 1. *Mormyrops deliciosus* (Leach). Faradje. Total length 1060 mm.
Fig. 2. *Marcusenius psittacus* (Boul.). Faradje. Total length 185 mm.
Fig. 3. *Myomyrus macrops* Boul. Faradje. Total length 265 mm.
Fig. 4. *Mormyrus caballus* Boul. Faradje. Total length 480 mm.

PLATE LXV.

- Fig. 1. *Gnathonemus monteiri* (Günth.). Faradje. Total length 440 mm.
Fig. 2. *Gnathonemus petersii* (Günth.). Rungu. Total length 323 mm.
Fig. 3. *Gnathonemus tamandua* (Günth.). Faradje. Total length 263 mm.
Fig. 4. *Gnathonemus rhynchophorus* Boul. Faradje. Total length 375 mm.

PLATE LXVI.

- Fig. 1. *Hydrocyon lineatus* Bleek. Faradje. Total length 270 mm.
Fig. 2. *Distichodus affinis* Günth. Faradje. Total length 120 mm.
Fig. 3. *Mesoborus crocodilus* Pell. Rungu. Total length 234 mm. Same specimen as Plate LXXI. Fig. 2.
Fig. 4. *Phago boulengeri* Schilt. Faradje. Total length 93 mm.

PLATE LXVII.

- Fig. 1. *Alestes macrophthalmus* Günth. Faradje. Total length 375 mm.
Fig. 2. *Bryconæthiops microstoma* Günth. Faradje. Variety *yseuri*. Total length 140 mm.
Fig. 3. *Citharinus gibbosus* Boul. Faradje. Total length 460 mm. Lateral and dorsal views.

PLATE LXVIII.

- Fig. 1. *Sarcodaces odoë* (Bloch). Faradje. Total length 280 mm.
Fig. 2. The same with mouth open. Rungu.
Fig. 3. *Eugnathichthys macroterolepis* Boul. Faradje. Total length 125 mm.
Fig. 4. *Eugnathichthys eetveldii* Boul. Poko. Total length 283 mm.

PLATE LXIX.

- Distichodus langi* sp. nov. Faradje. Total length 560 mm.

PLATE LXX.

Fig. 1. *Hydrocyon lineatus* Bleek. Faradje. Total length 610 mm. To show mouth open.

Fig. 2. *Heterobranchus longifilis* C. & V. Faradje. To show accessory respiratory organs (R).

PLATE LXXI.

Fig. 1. *Ophiocephalus obscurus* Günth. Rungu. To show open mouth. Total length 350 mm. Same specimen as Plate LXXXIII. Fig. 2.

Fig. 2. *Mesoborus crocodilus* Pell. Rungu. To show open mouth. Same specimen as Plate LXVI. Fig. 3.

Fig. 3. *Labeo macrostoma* Boul. Rungu. To show open mouth. Same specimen as Plate LXXIV.

PLATE LXXII.

Fig. 1. *Barbus fasolt* Papp. Faradje. Total length 755 mm.

Fig. 2. Same specimen showing details of head with mouth open.

PLATE LXXIII.

Labeo longipinnis Boul. Rungu. Total length 695 mm.

PLATE LXXIV.

Labeo macrostoma Boul. Rungu. Total length 837 mm. Same specimen as Plate LXXI. Fig. 3.

PLATE LXXV.

Fig. 1. *Labeo greenii* Boul. Faradje. Two specimens. Total length of upper specimen 380 mm. Total length of lower specimen 390 mm.

Fig. 2. *Labeo chariensis* Pell. Faradje. Total length 300 mm.

Fig. 3. *Auchenoglanis occidentalis* (C. & V.). Faradje. Total length 230 mm.

PLATE LXXVI.

Fig. 1. *Heterobranchus longifilis* C. & V. Faradje. Total length 980 mm.

Fig. 2. *Synodontis pleurops* Boul. Faradje. Ventral and dorsal views. Total length of larger specimen 210 mm.

Fig. 3. *Euchilichthys dybowskii* (Vaill.). Faradje. Ventral view. Total length 115 mm.

PLATE LXXVII.

Fig. 1. *Malopterurus electricus* (Gmel.). Faradje. Total length 720 mm.

Fig. 2. *Chrysichthys waganaari* Boul. Poko. Total length 290 mm.

PLATE LXXXVIII.

Fig. 1. *Lates niloticus* (Linn.). Faradje. Total length 860 mm.

Figs. 2 & 3. *Pelmatochromis lateralis* Boul. Rungu. To show variation in depth in specimens of the same size. The figures are on the same scale. Total length of upper specimen 210 mm. Total length of lower specimen 248 mm.

PLATE LXXXIX.

Fig. 1. *Tetrodon mbu* Boul. Faradje. Total length 110 mm.

Fig. 2. *Euchilichthys guentheri* (Schilt.) Stanleyville. Total length 550 mm. Lower view of head to show disk and mouth.

PLATE LXXX.

Fig. 1. *Tilapia melanopleura* Duméril, Avakubi. $\frac{7}{10}$.

Fig. 2. *Bryconathrops microstoma* var. *boulengeri* Pellegr., Avakubi. $\frac{7}{10}$.

Fig. 3. *Distichodus lusosso* Schilthuis, Faradje. $\frac{3}{8}$.

PLATE LXXXI.

Fig. 1. *Barbus holotænia* Boul., Avakubi. $\frac{7}{10}$.

Fig. 2. *Labeo parvus* Boul., Avakubi. $\frac{7}{10}$.

Fig. 3. *Euchilichthys dybowskii* (Vaillant), Avakubi. $\frac{7}{10}$.

Fig. 4. *Synodontis decorus* Boul., Avakubi. $\frac{1}{2}$.

PLATE LXXXII.

Fig. 1. *Petrocephalus simus* Sauvage, Faradje. $\frac{1}{2}$. (Given as "*balleyi*" on plate.)

Fig. 2. *Micralestes altus* Boul., Avakubi. $\frac{4}{5}$.

Fig. 3. *Gnathonemus mirus* Boul., Faradje. $\frac{2}{5}$.

PLATE LXXXIII.

Fig. 1. *Mastacembelus congicus* Boul., Faradje. $\frac{3}{4}$.

Fig. 2. *Ophiocephalus obscurus* Boul., Faradje. $\frac{3}{4}$.

Fig. 3. *Polypterus ornatipinnis* Boul., Faradje. $\frac{1}{2}$.

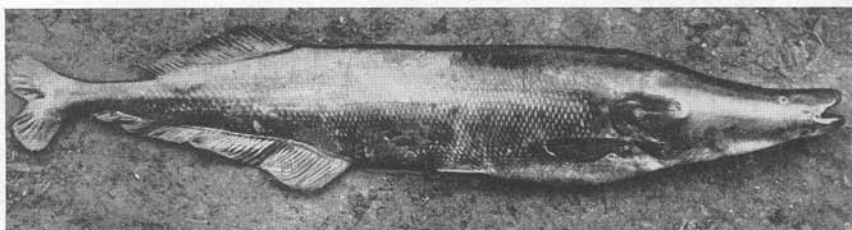
TEXT FIGURES.

Map 1. The Congo and Lake Region of Africa, showing all the localities where fishes were collected by the Congo Expedition, as well as some others mentioned in the present paper. The limits of the West African rain forest are indicated by a broken line p. 664

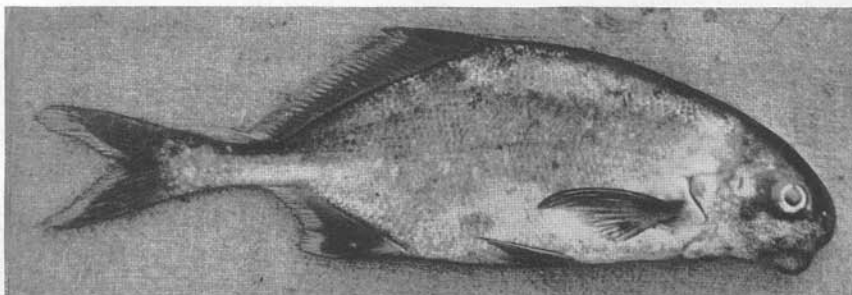
Map 2. Africa, indicating the divisions used in the discussion of the ichthyofauna p. 741

Map 3. Botanical Regions of Africa (after Engler) p. 744

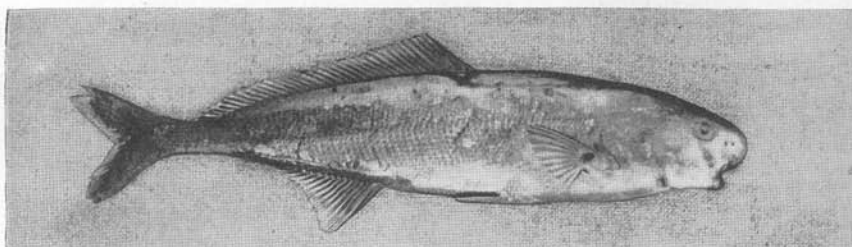
Fig. 1.	<i>Marcusenius osborni</i> , type	p. 668
Fig. 2.	<i>Marcusenius retrodorsalis</i> , type	p. 669
Fig. 3.	<i>Pellonula tenuis</i> , type	p. 675
Fig. 4.	<i>Pellonula congica</i> (Regan)	p. 676
Fig. 5.	<i>Alestes carmesinus</i> , type	p. 682
Fig. 6.	<i>Microstomatichthysoborus bashforddeani</i> , type	p. 685
Fig. 7.	<i>Nannæthiops tritaeniatu</i> s (Boulenger)	p. 686
Fig. 8.	<i>Labeo cyclopinnis</i> , type	p. 691
Fig. 9.	<i>Labeo soresz</i> , type	p. 692
Fig. 10.	<i>Labeo intermedius</i> , type	p. 694
Fig. 11.	<i>Discognathus ornatus</i> , type	p. 696
Fig. 12.	<i>Barbus atromaculatus</i> , type	p. 698
Fig. 13.	<i>Barbus rubripinnis</i> , type	p. 699
Fig. 14.	<i>Barbus dolichosoma</i> , type	p. 700
Fig. 15.	<i>Barbus candens</i> , type	p. 701
Fig. 16.	<i>Barilius salmolucius</i> , type	p. 703
Fig. 17.	<i>Engraulicypris congicus</i> , type	p. 704
Fig. 18.	<i>Clarias zygouron</i> , type	p. 705
Fig. 19.	<i>Clarias malaris</i> , type	p. 706
Fig. 20.	<i>Eutropius gastratus</i> , type	p. 709
Fig. 21.	<i>Gnathobagrus depressus</i> , type	p. 712
Fig. 22.	<i>Amarginops platus</i> , type. Lateral view	p. 714
Fig. 23.	<i>Amarginops platus</i> , type. Dorsal view	p. 714
Fig. 24.	<i>Amphilius notatus</i> , type	p. 715
Fig. 25.	<i>Synodontis tenuis</i> , type	p. 718
Fig. 26.	<i>Acanthocleithron chapini</i> , type	p. 721
Fig. 27.	<i>Doumea alula</i> , type	p. 722
Fig. 28.	<i>Haplochilus platysternus</i> , type	p. 724
Fig. 29.	<i>Paratilapia longipinnis</i> , type	p. 728
Fig. 30.	<i>Paratilapia xenodon</i> , type	p. 729
Fig. 31.	<i>Lamprologus obliquus</i> , type	p. 732



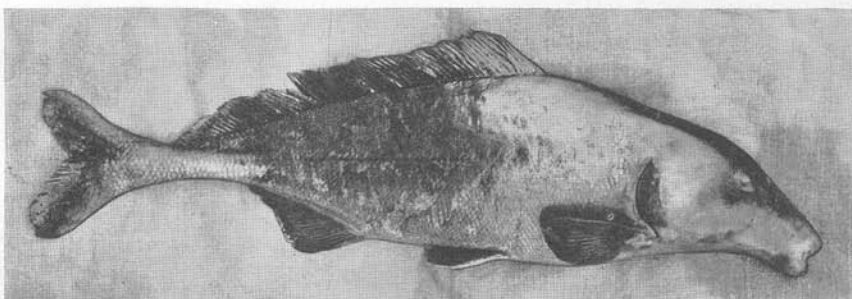
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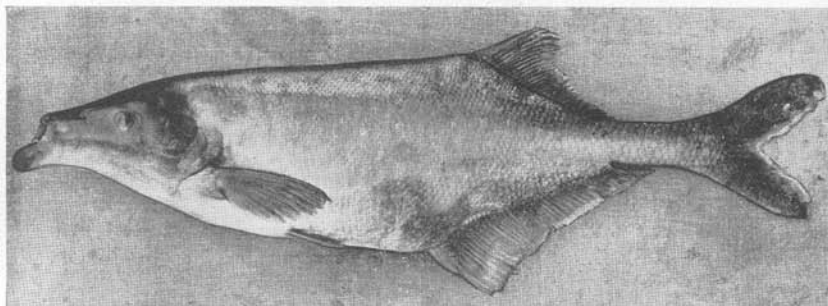


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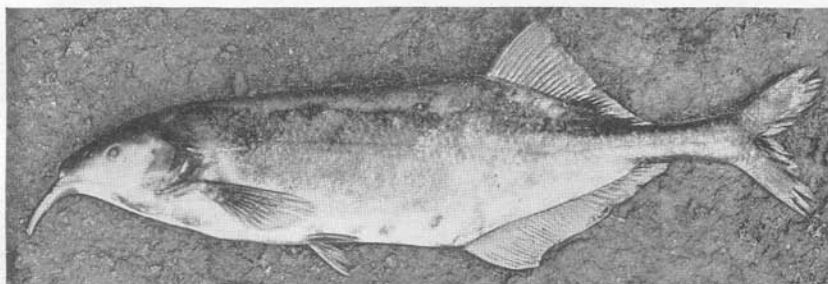


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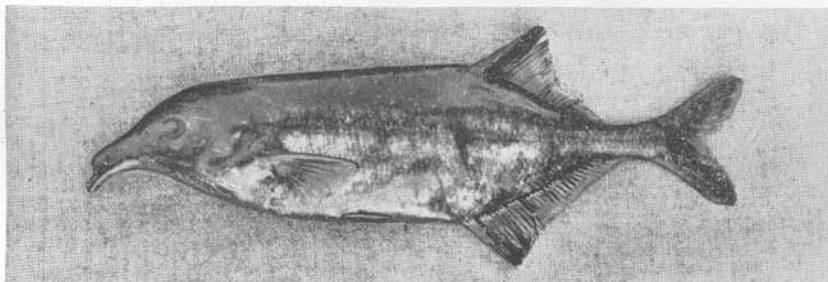
- Fig. 1. *MORMYRUS DELICIOSUS* (Leach). Faradje. Total length 1060 mm.
 Fig. 2. *MARCUSENIUS PSITTACUS* (Boul.). Faradje. Total length 185 mm.
 Fig. 3. *MYOMYRUS MACROPS* Boul. Faradje. Total length 265 mm.
 Fig. 4. *MORMYRUS CABALLUS* Boul. Faradje. Total length 480 mm.



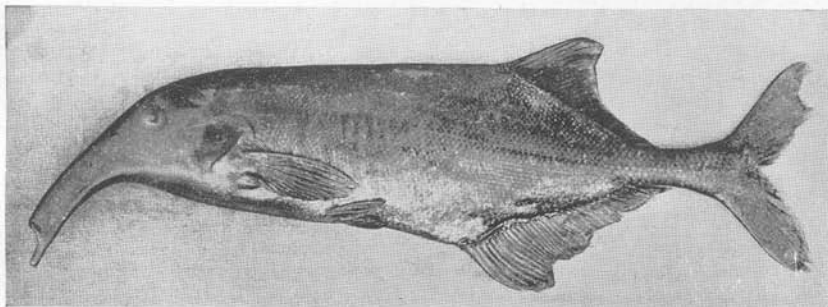
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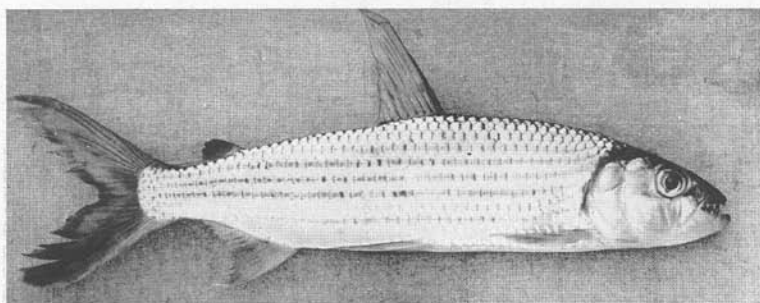


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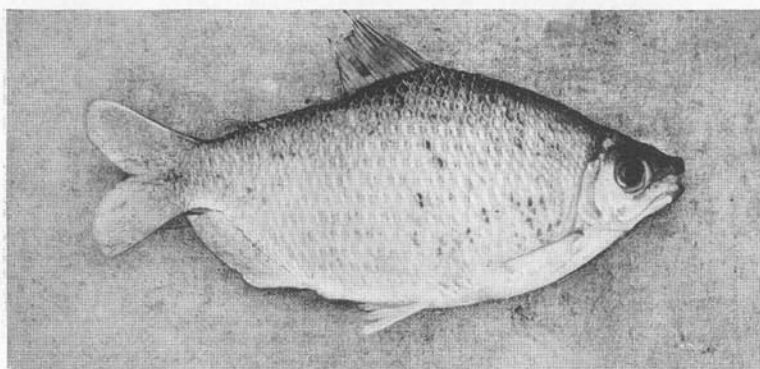


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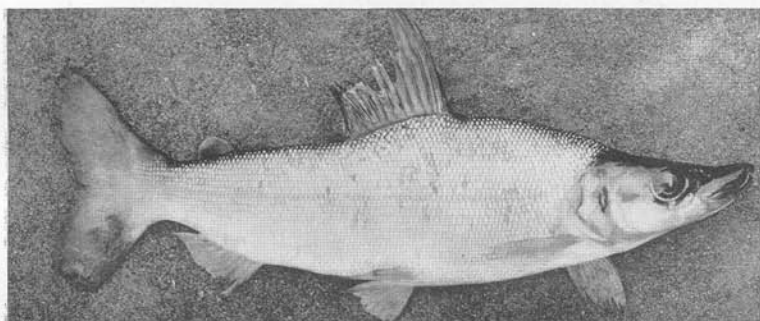
- Fig. 1. *GNATHONEMUS MONTEIRI* (Günth.). Faradje. Total length 440 mm.
Fig. 2. *GNATHONEMUS PETERSII* (Günth.). Rungu. Total length 323 mm.
Fig. 3. *GNATHONEMUS TAMANDUA* (Günth.). Faradje. Total length 263 mm.
Fig. 4. *GNATHONEMUS RHYNCHOPHORUS* Boul. Faradje. Total length 375 mm.



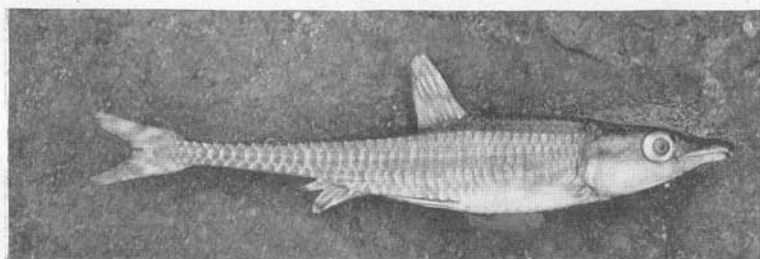
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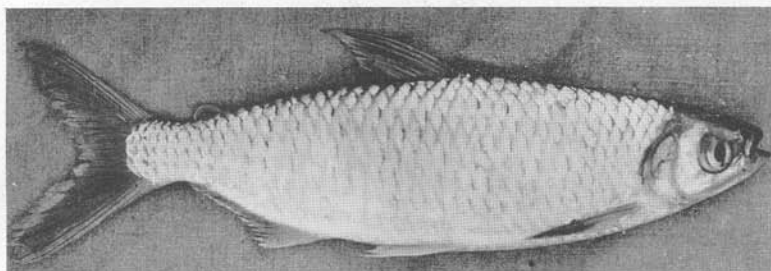
Fig. 1. *HYDROCYON LINEATUS* Bleek. Faradje. Total length 270 mm.

Fig. 2. *DISTICHODUS AFFINIS* Günth. Faradje. Total length 120 mm.

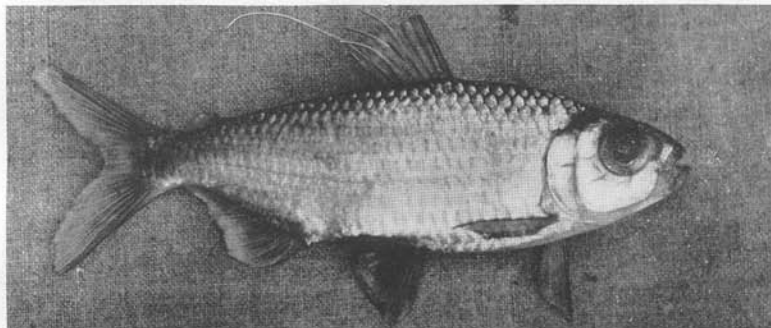
Fig. 3. *MESOBORUS CROCODILUS* Pell. Rungu. Total length 234 mm.

Same specimen as Plate LXXI, Fig. 2.

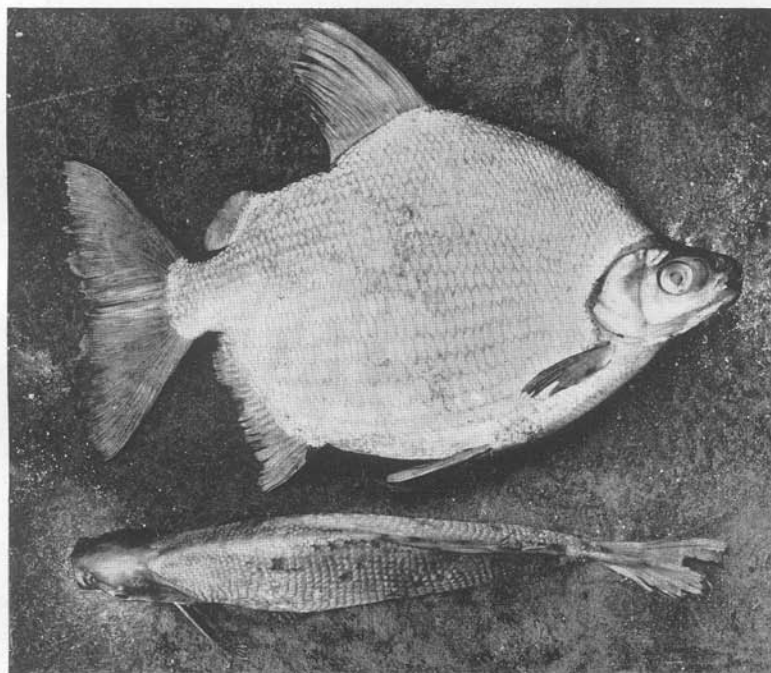
Fig. 4. *PHAGO BOULENGERI* Schilt. Faradje. Total length 93 mm.



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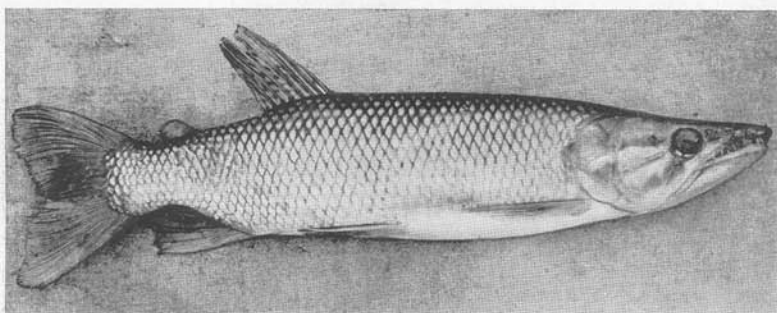


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Fig. 1. *ALESTES MACROPHthalmus* Günth. Faradje. Total length 375 mm.

Fig. 2. *BRYCONÆTHIOPS MICROSTOMA* Günth. Faradje. Variety *yseuxi*. Total length 140 mm.

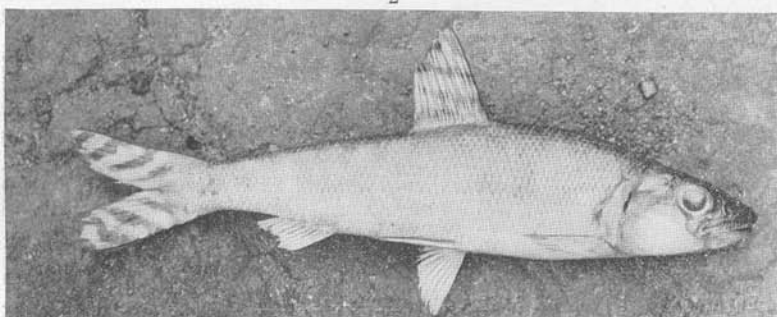
Fig. 3. *CITHARINUS GIBBOSUS* Boul. Faradje. Total length 460 mm. Lateral and dorsal views.



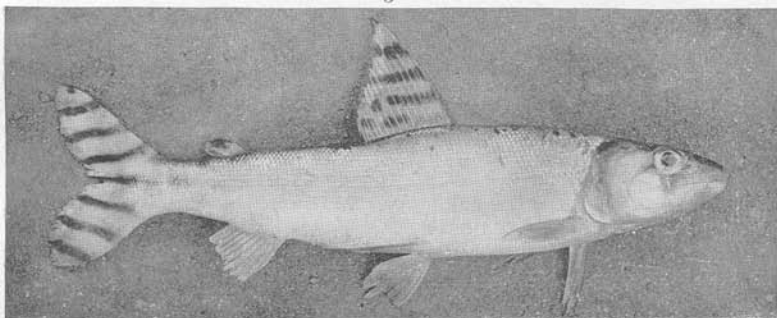
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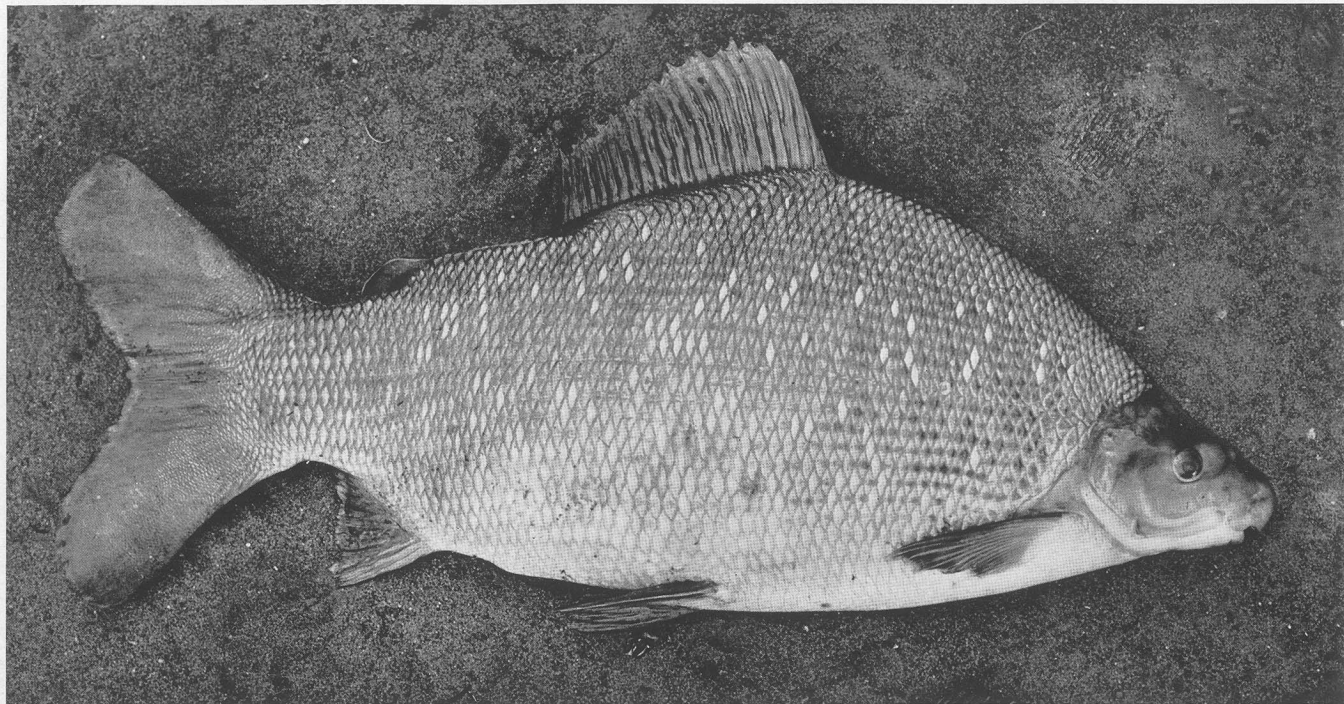
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Fig. 1. *SARCODACES ODOË* (Bloch). Faradje. Total length 280 mm.

Fig. 2. The same with mouth open. Rungu.

Fig. 3. *EUGNATHICHTHYS MACROTEROLEPIS* Boul. Faradje. Total length 125 mm.

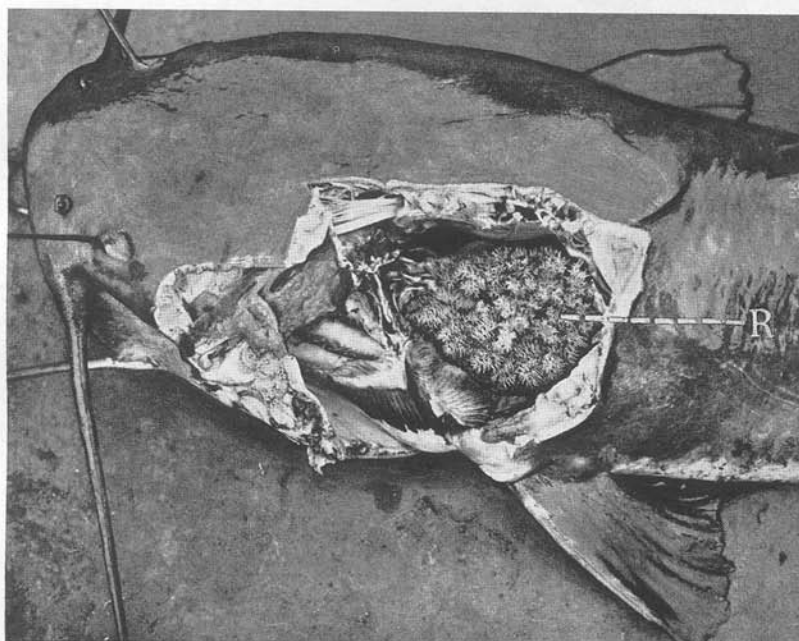
Fig. 4. *EUGNATHICHTHYS EETVELDII*. Poko. Total length 283 mm.



DISTICHODUS LANGI sp. nov. Faradje. Total length 560 mm.



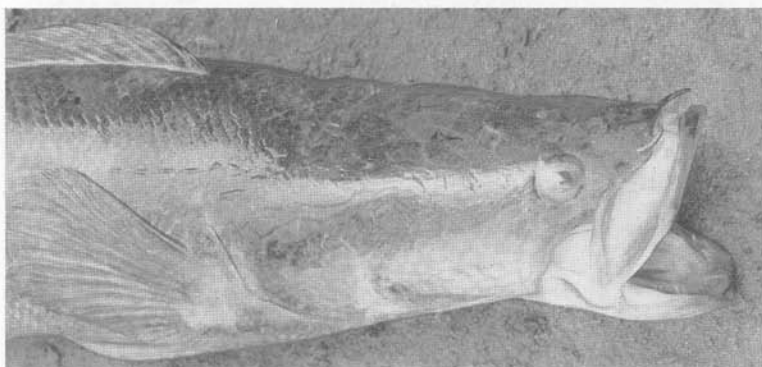
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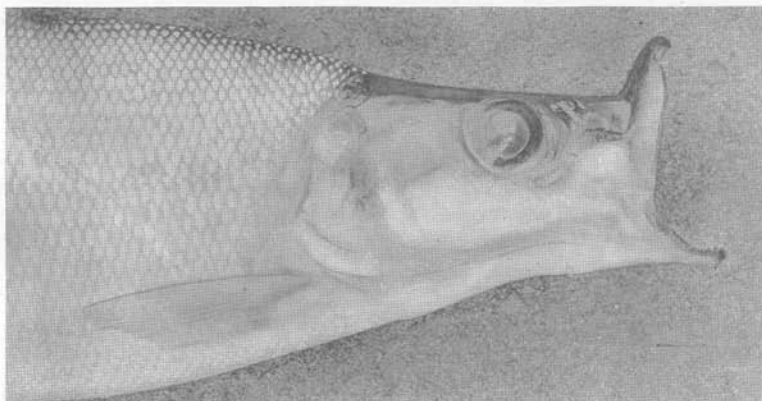
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Fig. 1. *HYDROCYON LINEATUS* Bleek. Faradje. Total length 610 mm. To show mouth open.

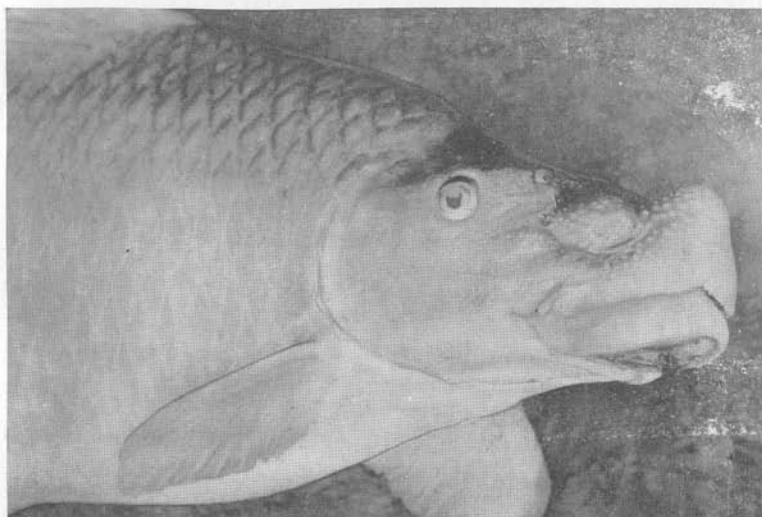
Fig. 2. *HETEROBRANCHUS LONGIFILIS* C. & V. Faradje. To show accessory respiratory organs (R).



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Fig. 1. *OPHIOCEPHALUS OBSCURUS* Günth. Rungu. To show open mouth. Total length 350 mm. Same specimen as Plate LXXXIII. Fig. 2.

Fig. 2. *MESOBORUS CROCODILUS* Pell. Rungu. To show open mouth. Same specimen as Plate LXVI, Fig. 3.

Fig. 3. *LABEO MACROSTOMA* Boul. Rungu. To show open mouth. Same specimen as Plate LXXIV.



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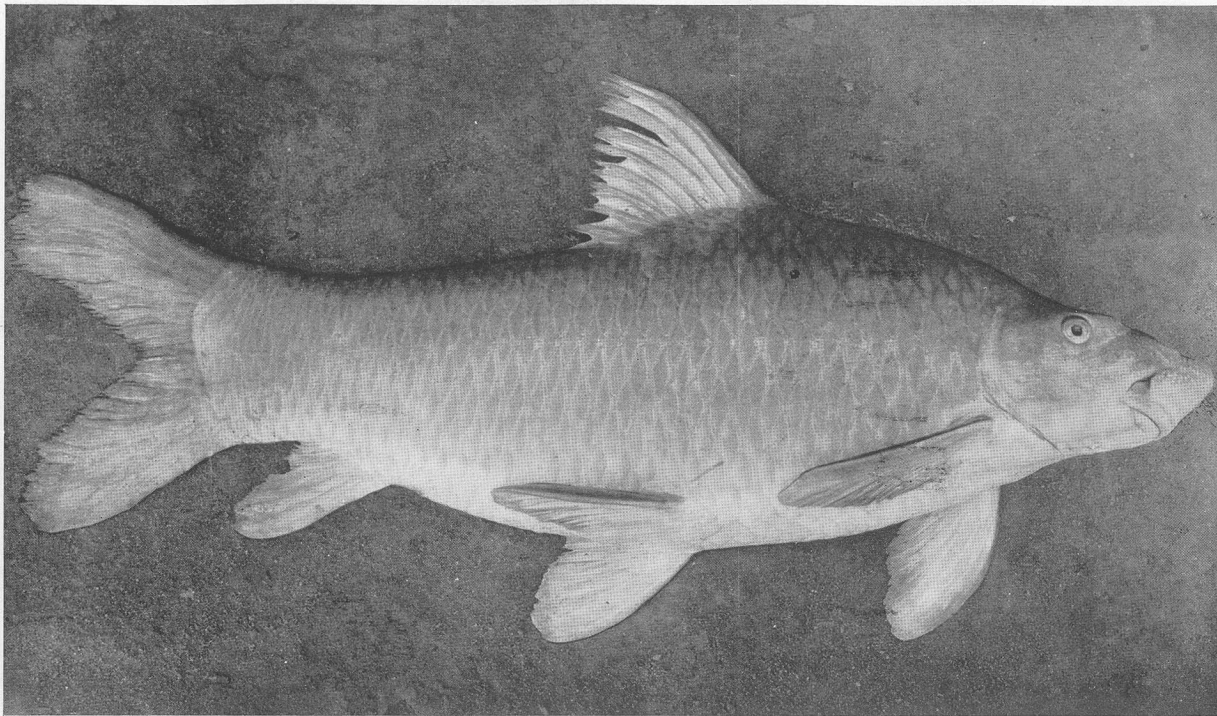
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Fig. 1. BARBUS FASOLT Papp. Faradje. Total length 755 mm.

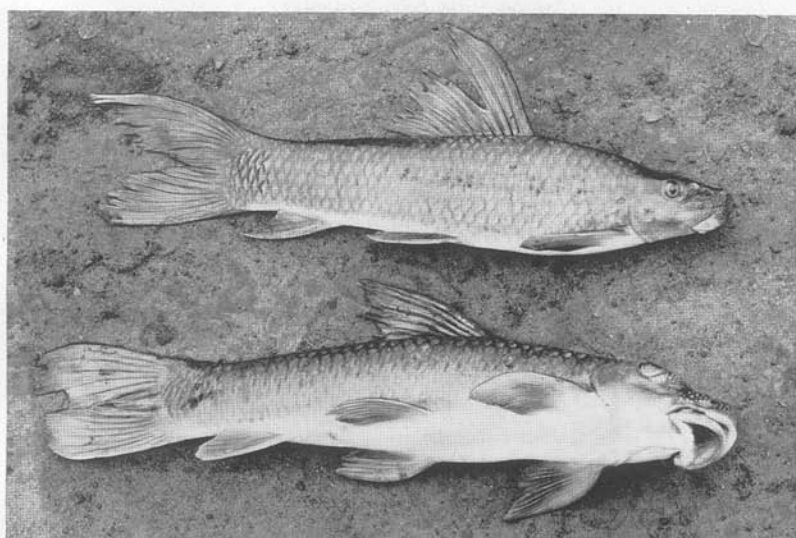
Fig. 2. Same specimen showing details of head with mouth open.



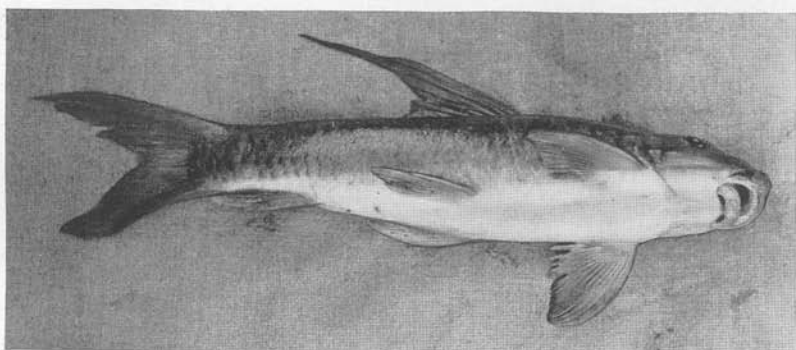
LABEO LONGIPINNIS Boul. Rungu. Total length, 695 mm.



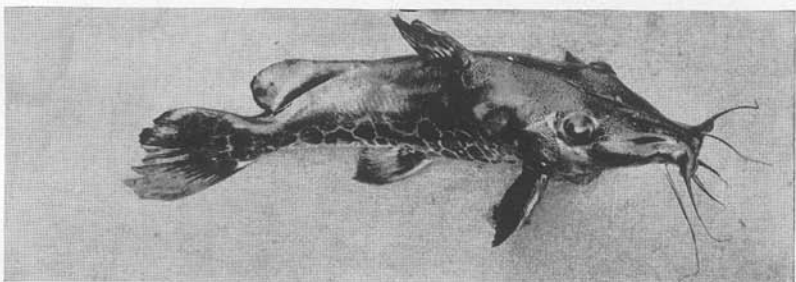
LABEO MACROSTOMA Boul. Rungu. Total length 837 mm. Same specimen as Plate LXXI, Fig. 3.



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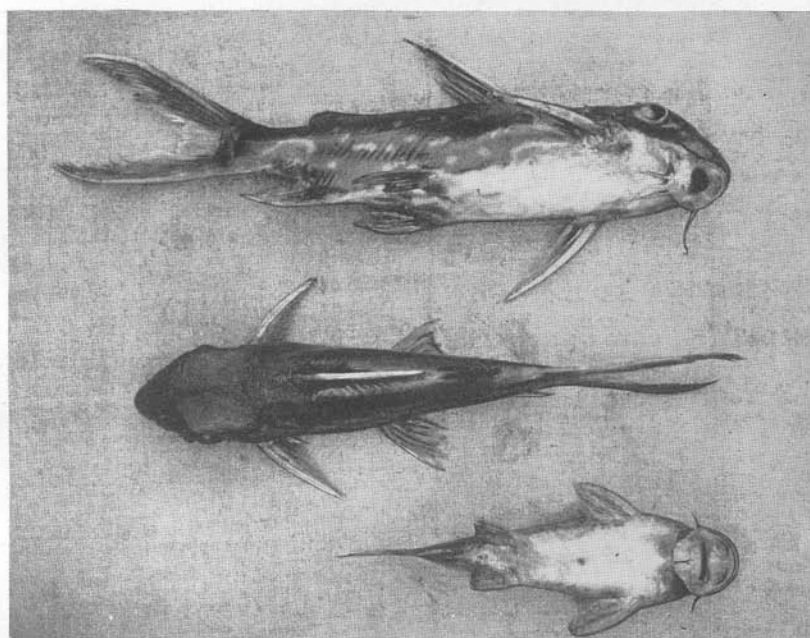
Fig. 1. LABEO GREENII Boul. Faradje. Two specimens. Upper 380 mm. Lower 390 mm.

Fig. 2. LABEO CHARIENSIS Pell. Faradje. Total length 300 mm.

Fig. 3. AUCHENOGLANIS OCCIDENTALIS (C. & V.). Faradje. Total length 230 mm.



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Fig. 1. *Heterobranchus longifilis* C. & V. Faradje. Total length 980 mm.
 Fig. 2. *Synodontis pleurops* Boul. Faradje. Ventral and dorsal views.
 Total length of larger specimen 210 mm.

Fig. 3. *Euchilichthys dybowskii* (Vaill.). Faradje. Ventral view. Total length 115 mm.

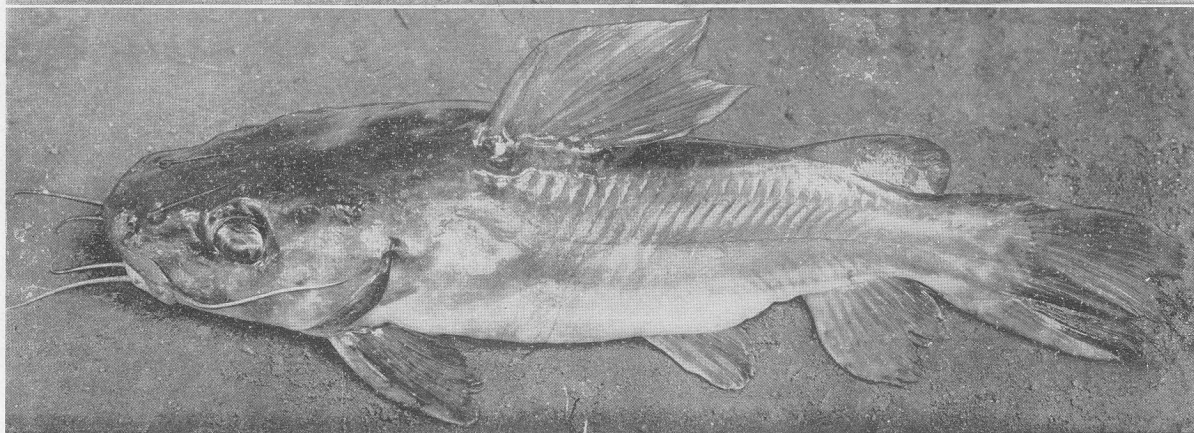
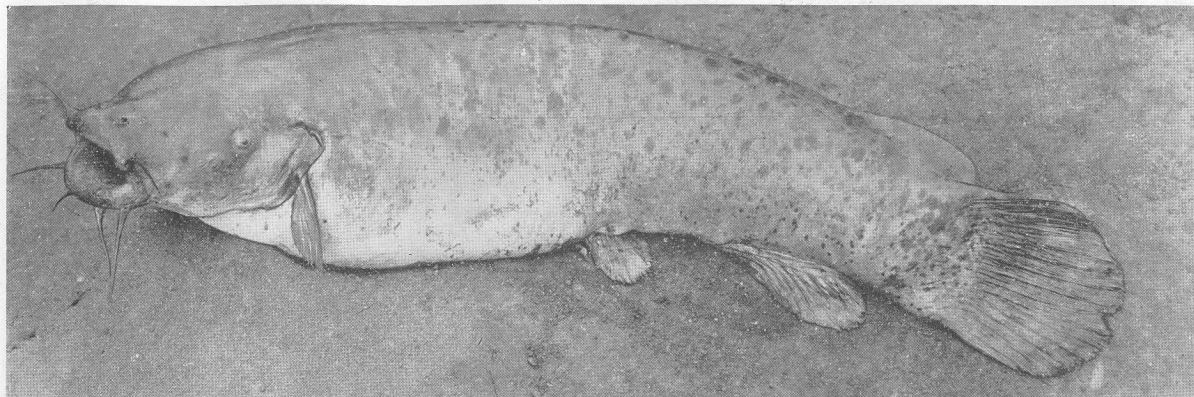
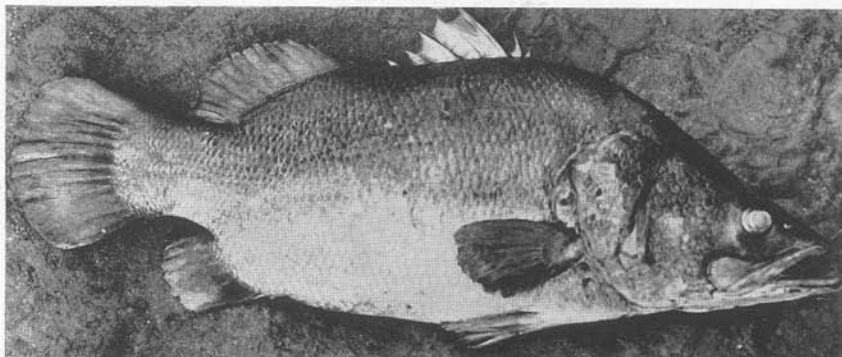


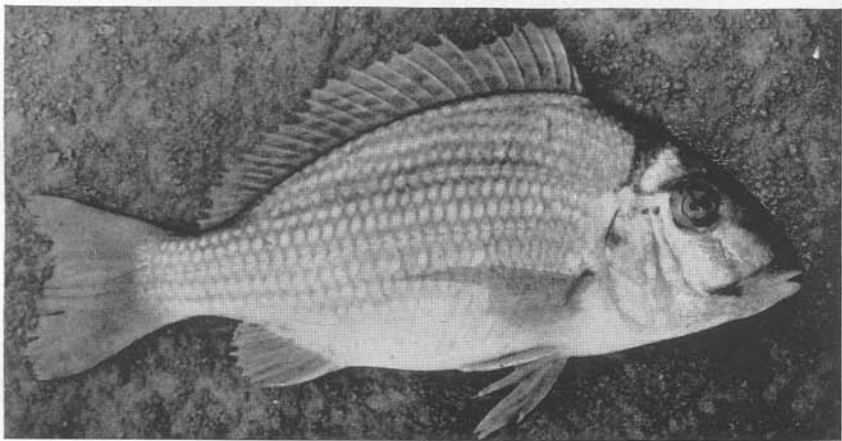
Fig. 1. MALOPTERURUS ELECTRICUS (Gmel.). Faradje. Total length 720 mm.
Fig. 2. CHRYSICHTHYS WAGENAARI Boul. Poko. Total length 290 mm.



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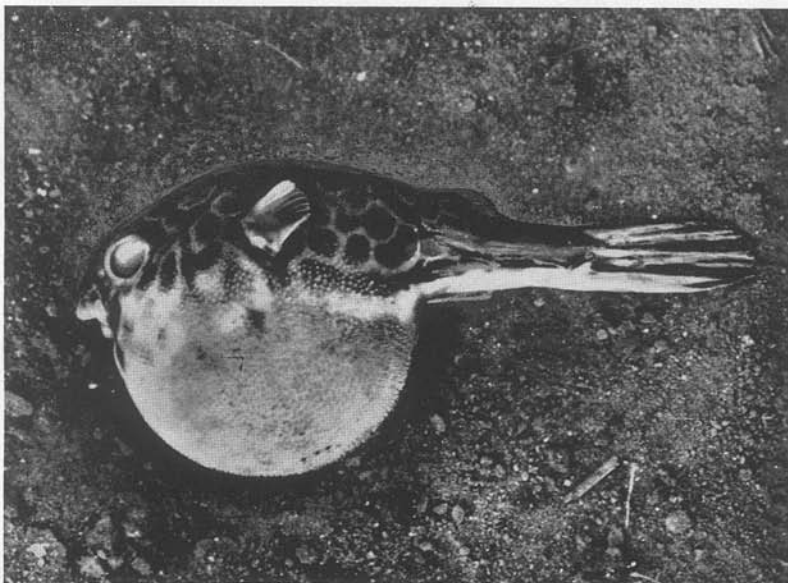
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Fig. 1. *LATES NILOTICUS* (Linn.). Faradje. Total length 860 mm.

Figs. 2 & 3. *PELMATOCHROMIS LATERALIS* Boul. Rungu. To show variation in depth in specimens of the same size. The figures are on the same scale. Total length of upper specimen 210 mm., lower specimen 248 mm.



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Fig. 1. *TETRODON MBU* Boul. Faradje. Total length 110 mm.

Fig. 2. *EUCHILICHTHYS GUENTHERI* (Schilt.). Stanleyville. Total length 550 mm. Lower view of head to show disk and mouth.

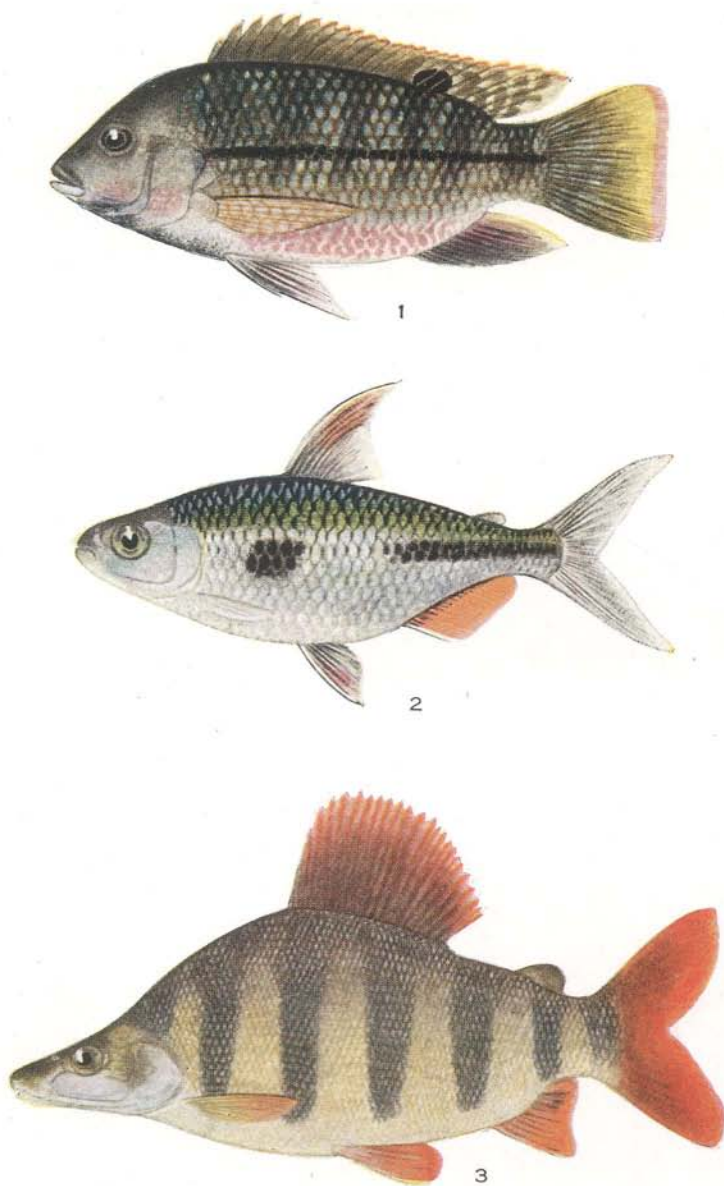


Fig. 1. *Tilapia melanopleura* Duméril.

Fig. 2. *Bryconæthiops microstoma* var. *boulengeri* Pellegr.

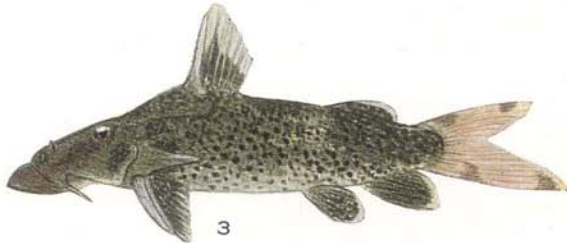
Fig. 3. *Distichodus lusosso* Schilthuis.



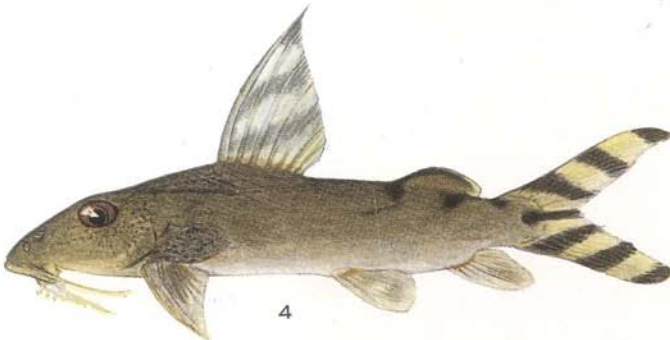
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Fig. 1. *Barbus holotænia* Blgr.
Fig. 2. *Labeo parvus* Blgr.
Fig. 3. *Euchilichthys dybowskii* (Vaillant)
Fig. 4. *Synodontis decorus* Blgr.

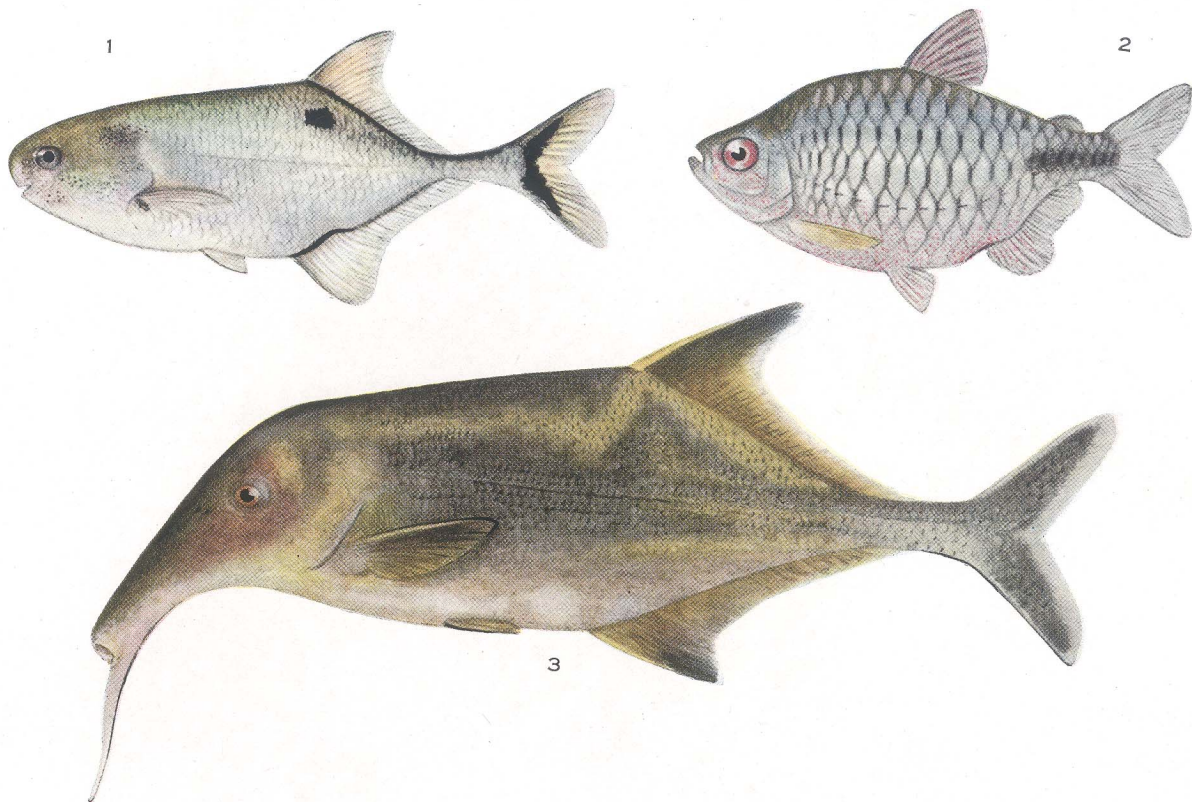


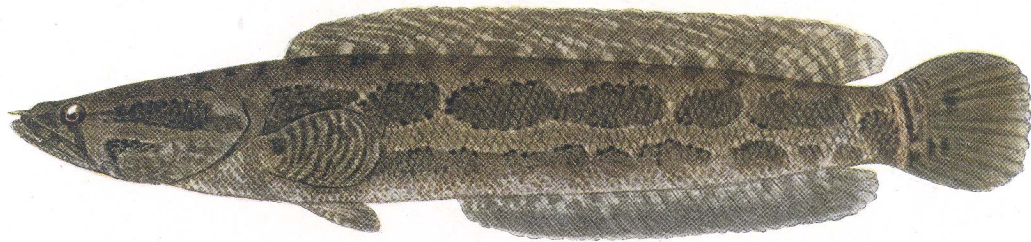
Fig. 1. *Petrocephalus ballayi* *Sauvage*.

Fig. 2. *Micralestes altus* *Blgr.*

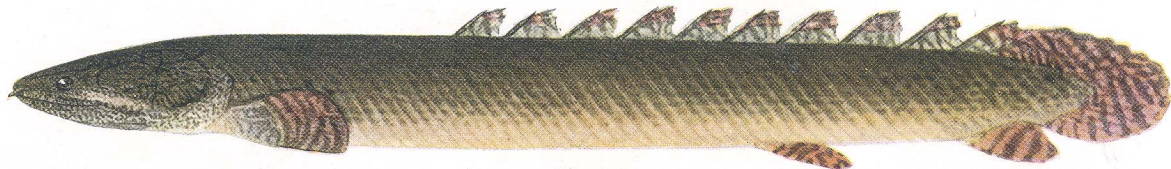
Fig. 3. *Gnathonemus mirus* *Blgr.*



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Fig. 1. *Mastacembelus congicus* Blgr.
Fig. 2. *Ophiocephalus obscurus* Günther.
Fig. 3. *Polypterus ornatipinnis* Blgr.