SCIENTIFIC RESULTS OF THE VERNAY-LANG KALAHARI EXPEDITION, MARCH TO SEPTEMBER, 1930

FRESH-WATER FISHES

By HENRY W. FOWLER

Of the Academy of Natural Sciences of Philadelphia, U.S.A.

With Plates VI–IX and 18 Text-figures

INTRODUCTION

The fresh-water fishes reported in this paper were all secured in 1930. Mr Herbert Lang forwarded them to me in Philadelphia, where they arrived in the summer of 1932. He writes: "They were packed almost at once after our return from the field and were ready to be sent to you. We worked tremendously hard to secure all the various material and preserve it well. My friend, Mr V. FitzSimons, who collected and prepared all of the fishes, did this as a sideline. His chief interest went to reptiles and batrachians. In any case the fishes from Tsotsoroga Pan and from Nata River are the first ones ever collected in these localities, so far as I know. Those from Tsotsoroga Pan, of course, must have come originally from the Okovango inundations. Those from the Nata River are autochthonic, inasmuch as this river rises independently in Southern Rhodesia and runs directly into the Makarikari Lake, which is strongly brackish. Some of these fishes survive even in the larger brackish pools in the Nata River. There is no likelihood that these fishes have any direct connection with those of the Okovango watershed. The Botletle—really an eastern continuation of the Thamalakane River—flows at extremely rare intervals, probably once in 50 years or more, into the southern edge of the Makarikari Lake. The fishes from the Okovango basin, being all purely fresh-water types, would certainly not survive in the salty Makarikari Lake. Unfortunately we reached the Nata River at the wrong season to collect fishes. One ought to be there in May, when the river is probably drying up rapidly. At this period the pelicans, herons, kingfishers and other destroyers have not yet had an opportunity to fish out
the pools, in which naturally many fishes are almost stranded. These intermittent streams, with their irregular and powerful annual floods, change the bottoms of their beds every season. The Nata becomes, at the regular flood season, a powerful stream, and may attain a depth of over twenty feet, it inundates the country near its mouth for miles across, especially the land situated westward. The Matoppo Hills form the watershed between the headstreams of that portion of the Limpopo system and the Nata River. The southern streamlets swell the Limpopo, but toward the north-west flow the Maitengwe, Tegwani and Manzamnyana, forming the Nata River.

A series of specimens from this collection has been deposited in the Academy of Natural Sciences of Philadelphia. I have prepared figures of the new species, also some of others showing interesting or valuable features in variation. It is, therefore, hoped that these, together with the descriptions and annotations, will contribute to further ichthyological knowledge of the region. I have also included all the fishes known from the Lake Ngami basin, besides several interesting African fresh-water fishes recently received in the Academy.

The Lake Ngami fishes are known chiefly from Boulenger's excellent and finely illustrated paper of 1911. I have recently reported the DeSchauensee collection of 1930, which included eleven of the twenty-five species described by Boulenger and added three others. The Vernay-Lang Kalahari collection obtained thirteen of the species listed by Boulenger and adds four others presumably new. Altogether the Vernay-Lang Kalahari materials include upward of 900 specimens, represented by thirty species. Of these the following are new items:

Alestes thamalakanensis n.sp., Characidae.
A. langi n.sp., Characidae.
Petersius maunensis n.sp., Characidae.
Distichodina n.subgen., Distichodus Müller and Troschel.
Distichodus stigmatus n.sp., Characidae.
Barbus thamalakanensis n.sp., Cyprinidae.
B. tsotsorogensis n.sp., Cyprinidae.
B. bifrenatus n.sp., Cyprinidae.
B. fitzsimonsi n.sp., Cyprinidae.
Synodontis thamalakanensis n.sp., Mochokidae.
Aplocheilus chobensis n.sp., Poeciliidae.
Anabas vernayi n.sp., Anabantidae.

Mr Lang has kindly supplied some photographs showing interesting ecological and habitat conditions. Also, free use of the field notes, kindly supplied by Mr FitzSimons, has been made with the details of the materials.

**POLYPTERIDAE**

*Polypterus ornatipinnis* Boulenger

Depth 11; head 5\(\frac{2}{3}\), width 1\(\frac{4}{5}\). Snout 4\(\frac{1}{2}\) in head; eye 8\(\frac{1}{3}\), 2 in snout, 2\(\frac{1}{3}\) in interorbital; maxillary extends slightly behind hind eye edge, length 2\(\frac{1}{3}\) in head; teeth 54 above, 38 below, uniserial, conic, simple; each jaw with broad inner band of fine villiform teeth and large broad ovoid patch on vomer with backward extension; interorbital 2\(\frac{4}{5}\), broad, flattened. Two narrowly triangular gular plates, 1\(\frac{2}{3}\) in head. Head shields all paired; row of 4 between postorbital and spiracular shields; subopercle little less than orbit.

Scales 61 in longitudinal series; 42 around middle of body; 24 predorsal to operculum.

D. X, spines bifid terminally and not overlapping when depressed; A. 11, fin height 1\(\frac{2}{3}\) in head; caudal 1\(\frac{4}{5}\), rounded; pectoral 1\(\frac{2}{3}\); ventral 2.

Colour greyish above, with paler or whitish spots forming obsolete mottled appearance. Under surfaces uniform whitish. Lips and gill membranes mottled with blackish. Other fins all more or less barred with blackish, sharply defined.

One example, dry skin. Luembe River, Congo Basin, Angola. J. R. Evans. Length 385 mm.

I received this fish in April 1932 through Mr Prentiss N. Gray. It was obtained by Mr Evans who informed me that the natives considered it quite rare. As it appears to be only known from the type 370 mm. long obtained at Monsembe, and the Congo materials reported by Nichols and Griscom, the above details are offered.

**MORMYRIDAE**

Marcusenius castelnaui Boulenger


Only known from Lake Ngami.

Gnathonemus macrolepidotus (Peters)


Depth 3\(\frac{1}{3}\); head 3, width 2. Snout 6\(\frac{3}{4}\) in head from snout tip; eye covered with adipose tissue, 1\(\frac{1}{3}\) in snout, 2\(\frac{3}{4}\) in interorbital; mouth width 4\(\frac{2}{5}\) in head from snout tip, mandible forming rounded dermal pad, crease all around defining its limitations and with median transverse or vertical groove; apparently 4 minute teeth above and 4 below; interorbital 2\(\frac{3}{4}\), convexly elevated. Gill opening 2\(\frac{3}{4}\) in total head length.

Scales 49 in lateral line to caudal base and 2 more on latter; 8 above, 11 below, 36 predorsal with region entirely scaly, 12 around caudal peduncle; 18 marginal striae, connected by reticulations.

D. ii, 21, 1, third branched ray 2\(\frac{1}{10}\) in total head length; A. iii, 26, 1, third branched ray 2\(\frac{2}{3}\); caudal 1\(\frac{2}{3}\), well forked, lobes pointed; least depth of caudal peduncle 4; pectoral 1\(\frac{3}{4}\); ventral 2\(\frac{1}{3}\).
Largely uniform dark brown, body with darker spots and blotches, variable and numerous. Head and breast paler than upper surfaces. Fins all grey-brown, ventrals paler.

1429. Chobe River just below rapids, three miles from Kasane. July 26, 1930. Length 73 mm.

This interesting specimen agrees with the one in the Academy 224 mm. long obtained by the DeSchauensee Expedition. Especially noticeable is the delimited mental pad, which is larger, thicker and far more protruded, though without a median crease in the larger specimen. In the Quanza specimens of *Gnathonemus angolensis* Boulenger, five in all with the smallest 75 mm., the mental pad is not at all marked off from the rest of the chin or is it in any specimen with a median vertical groove.

*Mormyrus lacerda* Castelnau (fig. 1)


Fig. 1. *Mormyrus lacerda* Castelnau.


Scales 85–89 in lateral line to caudal base and 4–5 more on latter; 14–15 above, 13 below, 26–30 predorsal with narrow naked strip to occiput; 24–25 around caudal peduncle. Scales with 40–60 marginal striae, all connected by reticulations; circuli fine.

D. III, 59, I to III, 67, I, first branched ray 3 in total head length; A. III, 17, I, first branched ray 2½–2¾; caudal 1⅝, well forked, rounded lobes pointed; least depth of caudal peduncle 3⅔; pectoral 1½–1⅝; ventral 2⅕–2⅔.

Uniform dark brown. Head, especially below, lighter brown than upper surfaces. Dorsals dusky brown, paler terminally. Other fins all neutral to dusky blackish, especially paired ones.

941. Thamalakane River at Maun. May 22, 1930. Length 400 mm.

“Uniform dark brownish grey.”

982. Thamalakane River at Maun. May 26, 1930. Length 377 mm.

The above examples agree in every way and are of especial value in showing the variation of the species; Castelnau gives its length as 360 mm. and mentions it as “très-rare.”
CHARACIDAE

Hydrocyonoides odoe (Bloch) (fig. 2)


Depth 4-4½; head 2½–3½, width 2½–2⅓. Snout 2½–3 in head; eye 5½–8, 2½–2½ in snout; 1½–2⅓ in interorbital; maxillary reaches ½ eye diameter behind eye with age, length ½–1½ in head; interorbital 3½–3½, level.

Scales 48–51 in lateral line to caudal base and 4 more on latter; 11 above, 8 below, 31–33 predorsal.

D. ii, 7, i, first branched ray 1½–2½ in head; adipose fin 4½–6½; A. iii, 9, i, first branched ray 2–2½; caudal 1½–1½; least depth of caudal peduncle 3½–3½; pectoral 2–2½; ventral 2–2½.

Brown above, with neutral and grey shades, mottled with darker to blackish. Lower and under sides paler brown. Sides of head with 3 or 4 very variable dark bands, often incomplete or broken, radiate backward from eye on side of head. Iris dark or slate brown. Vertical fins closely spotted with black on greyish ground colour. Paired fins obscure grey or neutral to slate or black, sometimes a few dark spots on inner membranes of ventrals.

This species shows very interesting colour variation, especially the dark bands radiating backward from the eye. Therefore I have prepared the accompanying details.


972 and 973. Thamalakane River at drift, five miles above Maun. May 25, 1930. Length 255–280 mm.

981. Thamalakane River at Maun. May 26, 1930. Length 360 mm.

1063. Thamalakane River, five miles above Maun. June 1, 1930. Length 392 mm.

1175. Thamalakane River at Maun. April 28, 1930. Head only, length 78 mm.

Hydrocyon vittatus (Castelnau)


Fig. 2. *Hydrocyonoides odoe* (Bloch), variation.

**Alestes thamalakanensis** n.sp. (fig. 3)

Depth $3\frac{3}{4}$-4; head $3\frac{3}{8}-3\frac{7}{8}$, width $2\frac{1}{4}$-2$\frac{1}{4}$. Snout $3\frac{1}{8}-3\frac{1}{8}$ in head from snout tip; eye $\frac{3}{8}-\frac{3}{8}$, greater than snout, subequal with interorbital, only slight narrow adipose membrane anteriorly; maxillary nearly reaches front eye edge;

![Fig. 3. Alestes thamalakanensis n.sp. Type.](image)

mouth width $\frac{3}{8}-4\frac{1}{4}$ in head from snout tip; upper teeth biserial, 8 in each row, lower biserial with 8 in outer and 2 inner close set medially; interorbital $3-3\frac{1}{8}$, broadly convex; infraorbitals entirely cover cheek. Gill rakers $12+20$, finely lanceolate, $1\frac{1}{8}$ in gill filaments, which $1\frac{1}{8}$ in eye.

Scales 27-31 in lateral line to caudal base and 1 or 2 more on latter; 6 above, 2 below; 11-13 predorsal to occiput. Scales with 6-11 striae all radiating from centre of scale, in young from median reticulated area; circuli moderately fine.

D. III, 7, 1 or III, 8, 1, first branched ray $\frac{1}{10}-\frac{1}{10}$ in total head; adipose $3\frac{1}{8}-4$; A. III, 15, 1 or III, 16, 1, first branched ray $\frac{1}{2}-\frac{1}{2}$; caudal $1-1\frac{1}{2}$, deeply forked, lobes sharply pointed; least depth of caudal peduncle $2\frac{2}{8}-3\frac{3}{8}$; pectoral $\frac{1}{10}-\frac{1}{10}$; ventral $\frac{1}{8}-\frac{1}{10}$.

Back olivaceous brown, edge of each scale slightly darker. Upper surface of head dusky olivaceous, below eye whitish. Under surface of body below dark brown, underlaid streak from behind head to caudal base dusky, becoming blackish on caudal peduncle and extended as black bar out on caudal fin. Iris neutral grey. Fins all greyish, lower ones more or less grey-white.

**Diagnosis.** Apparently differs from *Alestes lateralis* Boulenger in its more slender body. Boulenger gives the depth as $3\frac{1}{8}-4\frac{1}{8}$ times in total length and his figure of his type shows $3\frac{1}{10}$, or about $3\frac{3}{4}$ to caudal base. My specimens
show depth 5\textsuperscript{\textcircled{.5}} times in total. In almost every other respect it agrees. It is therefore quite likely that *Alestes lateralis* Boulenger\textsuperscript{1} is really the present species.

In coloration little variation as the pattern is quite uniform. The pectoral fin is, however, quite variable and sometimes reaches within a scale of the ventral origin.


Also 25 paratypes same locality; 1115-1119, 1122, 1124, 1126-1128 on May 6; 903 on May 20; 945 and 946 on May 23; 1032, 1034-1041, 1043-1044 on May 30; 964 on June 24. These measure 96-140 mm.

**Alestes langi** n.sp. (fig. 4)

Depth 3\textsuperscript{\textcircled{.9}}-3\textsuperscript{\textcircled{.8}}; head 3\textsuperscript{\textcircled{.8}}-3\textsuperscript{\textcircled{.6}}, width 2\textsuperscript{\textcircled{.1}}-2\textsuperscript{\textcircled{.6}}. Snout 3\textsuperscript{\textcircled{.8}}-3\textsuperscript{\textcircled{.6}} in head from snout tip; eye greater than snout, subequal with interorbital to greater with age and with very narrow anterior adipose lid; maxillary vertical, nearly reaches front of eye; mouth width 4\textsuperscript{\textcircled{.2}}-4\textsuperscript{\textcircled{.6}} in head; teeth in jaws biserial, 8 in each upper row, 8 in lower outer and 2 in inner; interorbital 2\textsuperscript{\textcircled{.5}}-3, broadly convex; broad infraorbitals entirely cover cheek. Gill rakers 12+19, finely lanceolate, 1\textsuperscript{\textcircled{.3}} in gill filaments, 2\textsuperscript{\textcircled{.1}} in eye.

Scales 30-34 in lateral line to caudal base and 2 more on latter; 6 above, 2 below, 11 or 12 predorsal forward to occiput. Scales with 6-14 striae, radiating from scale centre, which usually forms reticulated area; cirri fine, coarser to obsolete apically.

D. 111, 8, 1, first branched ray 1\textsuperscript{\textcircled{.9}}-1\textsuperscript{\textcircled{.8}} in total head length; adipose fin 3\textsuperscript{\textcircled{.8}}-3\textsuperscript{\textcircled{.6}}; A. 14, 14, 1 or 14, 15, 1, fifth branched ray 1\textsuperscript{\textcircled{.6}}-1\textsuperscript{\textcircled{.1}}; caudal 1, well forked, lobes pointed; least depth of caudal peduncle 3-3\textsuperscript{\textcircled{.8}}; pectoral 1\textsuperscript{\textcircled{.6}}-1\textsuperscript{\textcircled{.1}}; ventral 1\textsuperscript{\textcircled{.8}}-1\textsuperscript{\textcircled{.1}}.

Back olivaceous brown, edge of each scale slightly darker. Dark brown underlaid ill-defined band laterally from head to caudal base where ending in black blotch, which also extended out over median caudal rays to tips. Lower

surface of head below eye and body below dark lateral band white. Iris neutral grey. Lips grey. Fins greyish, paired ones with more or less whitish.

**Diagnosis.** Known by its broad, deep, obtuse anal fin. Suggestive of *Alestes affinis* Günther, but that species widely different in coloration.


Also the following paratypes: 1114, 1120, 1121, 1125, 1129 on May 6; 1031 on May 30; 1056–1059 on May 31. These measure 88–114 mm.

Named for Mr Herbert Lang.

**Petersius maunensis** n.sp. (fig. 5)

Depth 5; head $\frac{3}{3}-\frac{3}{3}$, width $2\frac{1}{2}-2\frac{3}{2}$. Snout $4\frac{1}{4}$ in head from snout tip; eye $2\frac{3}{2}-2\frac{3}{2}$, greatly exceeds snout or interorbital, with slight anterior narrow adipose lid; maxillary reaches front eye edge, length $3$ in head from snout tip; apparently an irregular single row of $8$ upper teeth, more regular lower row of $8$; interorbital $3\frac{3}{4}-3\frac{3}{4}$, broadly convex; infraorbital nearly entirely covers cheek. Gill rakers $6+12$, lanceolate, subequal with gill filaments, which $2\frac{3}{2}$ in eye.

![Fig. 5. Petersius maunensis n.sp. Type.](image)

Scales $28-29$ in lateral to caudal base and $2$ or $3$ more on latter; $6$ above, $2$ below, $14$ predorsal forward to occiput. Scales with $9$ or $10$ striae, connected and radiating from scale centre; circuli fine.

D. III, 8, first branched ray $1\frac{1}{2}-1\frac{3}{2}$ in total head length; adipose fin $3\frac{1}{2}-3\frac{3}{4}$; A. III, 17, first branched ray $1\frac{1}{2}$; caudal $1$, deeply forked, lobes pointed; least depth of caudal peduncle $3\frac{3}{4}-3\frac{3}{4}$; pectoral $1\frac{1}{2}-1\frac{3}{4}$; ventral $1\frac{3}{4}-1\frac{3}{4}$.

Back pale brown, edge of each scale dusted darker. Dark brown median line before and behind dorsal fin. Blackish brown axial band from behind head to shoulder to caudal base, broadest on tail posteriorly and caudal band where more or less blackish, but not extended on caudal fin. Postocular above with some small blackish dots. Opercle dotted with black. Muzzle brownish. Iris neutral grey. Entire lower parts of head and body whitish. Blackish band on lower part of tail above anal fin base, narrowing posteriorly. Fins tinged dusky or brownish, lower ones with whitish.

**Diagnosis.** Unlike any known species in coloration. It still further differs in its slender body, none of Boulenger's species showing depth beyond $2\frac{3}{2}-4$ in total while my species shows $6$ or over.

Type No. 15276. Transvaal Museum. 949. Thamalakane River at Maun.
May 25, 1930. Above olive green, silvery below. A dark longitudinal band
from gill cover to root of caudal fin. Length 48 mm.
950. Same data. Paratype. Length 49 mm.
Named for Maun, the type locality.

Genus *Distichodus* Müller and Troschel


Type *Salmo niloticus* Hasselquist.

*Distichodina* n.subgen.

*Distichodus stigmaturus* n.sp.

**Diagnosis.** Fins scaleless. Body slender. Coloration variegated with
numerous dark vertical bars. Black spot at middle of caudal base.

**Etymology.** *Distichodina*, diminutive for *Distichodus*.

*Distichodus stigmaturus* n.sp. (figs. 6 and 7)

Depth 3½-4½; head 3½-3⅔, width 2½-2⅔. Snout 3½-3⅔ in head; eye 2⅔-3⅔,
greatly exceeds snout, greater than interorbital in young to subequal with age;
maxillary reaches ⅔ to eye; mouth small, terminal; interorbital 3⅓-3⅔ in head,

low, very slightly convex; infraorbital covers cheek. Gill rakers 6? + 10 short
points, greatly less than Gill filaments, which about ⅓ of eye.

Scales 39-42 in lateral line to caudal base and 1 or 2 more on latter; 5 or 6
above, 4 or 5 below, 15 or 16 predorsal. Scales with row of 22-25 slender
apical denticles; 16-18 rather coarse circuli.

D. III, 12, second branched ray 1⅛-1⅔ in head; adipose fin 3⅕-4; A. II, 9 or II, 10, second branched ray 1⅜-1⅝; caudal 1⅜-1⅝, deeply forked, broad
lobes pointed; least depth of caudal peduncle 2⅔-3⅔; pectoral 1⅜-2; ventral
1⅜-1⅝.

Very pale brown to nearly whitish below. Dark brown bar from snout tip
to eye. Iris neutral grey. About 13-20 dark vertical lateral bars, very variable,
sometimes only as blotches or spots, though usually posterior more distinct,
contrasted or larger. Caudal with median basal black round spots; little less
than pupil and contrasted in pale surrounding colour by dark brown vertical
bar at caudal base and dark crescent beyond on caudal fin. Otherwise fins all
pale brownish.
Fig. 7. *Distichodus stigmatus* n.sp., variation.
Diagnosis. Largely in that of the subgenus. Unique among all known species in its colour pattern.

Etymology. ουτυπά spot; ουπά tail.

**CYPRINIDAE**

**Barbus trimaculatus** Peters


Depth 3½–3½; head 3½–3½, width 1½–2. Snout 3½–3½ in head; eye 3½–3½, greater than snout, 1½–1½ in interorbital; maxillary reaches 1⁄₂ to eye or to front eye edge; front barbel 1½ in hind barbel which equals eye; interorbital 2½–2½, low, broadly convex; suborbitals form narrow strip below eye invading half of cheek to lower preopercle ridge. Gill rakers 3 + 6, short points, barely 1⁄₄ of gill filaments. Pharyngeal teeth 3, 2–2, 3, 5, hooked, larger with grinding surfaces.

Scales 29 or 30 in lateral line to caudal base and 2 more on latter; 6 above, 4 below, 10 or 11 predorsal. Scales on breast and caudal base little smaller than others. Ventral with pointed axillary scale. Scales with 8–12 radiating striae from common centre, 4–7 basal and as many apical; circuli fine, obsolete apically.
D. iii, 8, 1, third enlarged simple ray spine-like and its edges entire and long as head, first branched ray slightly longer than head; A. iii, 5, 1, first branched ray $\frac{3}{\pi}-\frac{4}{\pi}$ in head; least depth of caudal peduncle $\frac{1}{10}-\frac{2}{10}$; pectoral $\frac{1}{10}-\frac{1}{10}$; ventral $\frac{1}{10}-\frac{1}{10}$; caudal $\frac{1}{10}-\frac{1}{10}$ times head.

Back and upper surfaces umber, each scale slightly edged with darker. Lower surfaces whitish. On sides of body faint dark leaden axial line, more distinct towards caudal fin. Iris slate grey. Barbels brownish. Lips soiled with brownish. On caudal base and hind part of caudal peduncle medially large jet black ovoid blotch, from $\frac{1}{10}$ to nearly $\frac{2}{10}$ eye diameters in length and in great contrast with rest of coloration. In one example faint dark median lateral spot before dorsal and another behind dorsal. It also shows some scattered small black spots on caudal basally.

All Thamalakane River at Maun, 953, May 24, 1930; 1045 and 1046, June 3, 1930; 1123, June 6, 1930.

**Barbus paludinosus** Peters


Though reported from Lake Ngami, not obtained by the Vernay-Lang Kalahari Expedition.

**Barbus thamalakanensis** n.sp. (fig. 8)

Depth $\frac{4}{1}$; head $\frac{3}{3}$, width $\frac{3}{2}$. Snout $\frac{3}{4}$ in head; eye $\frac{3}{4}$, greatly exceeds snout, equals interorbital; a very short anterior barbel close before and $\frac{3}{4}$ of posterior, which $\frac{1}{4}$ in eye; mandible included, small; interorbital $\frac{2}{4}$ in head, low, slightly convex; suborbitals form narrow strip below eye. Gill rakers as 4 low, short, feeble rudiments; gill filaments $\frac{1}{3}$ in eye. Left pharyngeal teeth 5, 3, 2, hooked.

Scales 25 in lateral line to caudal base and 2 more on latter; 4 above, 3 below, 10 predorsal; scales with fins scaleless, except caudal base and ventral without axillary scale; 4 or 5 basal and 8 or 9 apical radiating striæ, of which 3 or 4 of each series may meet at common centre.
D. III, 8, 1, ends of first 3 branched ones broken; A. III, 5, 1, second branched ray \(1\frac{1}{2}\) in head; least depth of caudal peduncle \(2\frac{1}{2}\); pectoral \(1\frac{1}{2}\); ventral \(1\frac{1}{2}\); caudal \(1\frac{1}{2}\) times head, deeply forked, lobes sharp pointed.

Pale brown, each scale on back edged darker. A dark brown lateral band extends from side of mouth, but not across front of upper snout tip, to and through eye and median along side of body to caudal base where ending in spot not as large as pupil and not reflected out on caudal rays. Iris greyish. Fins all pale, dorsal and caudal slightly tinged with brown. Dark spot on body above front of base of anal.

**Diagnosis.** Though the structure of the third simple dorsal ray is unknown this species has much the appearance of *Barbus eutaenia* Boulenger. It differs, however, in many ways: its body more slender, eye larger, no dark spot at base of dorsal and pectorals falling within 2 scales of ventral fin origin.

Fig. 8. *Barbus thamalakanensis* n.sp. Type.


Olive green above, paler below. Caught in shallows with hand net. Length 40 mm.

Named for the Thamalakane River.

**Barbus kessleri** (Steindachner)


Barbus tsotsorogensis n.sp. (fig. 9)

Depth 3\frac{3}{4}-4; head 3\frac{1}{2}-3\frac{3}{4}, width 1\frac{1}{2}-2. Snout 3\frac{3}{4}-3\frac{3}{4} in head; eye 3\frac{3}{4}-3\frac{3}{4}, greater than snout, 1\frac{3}{4}-1\frac{3}{4} in interorbital; maxillary reaches 5 to or to eye, length 3\frac{3}{4}-4 in head; small front barbel about \frac{3}{4} hind barbel, which subequal with eye; barbels in young quite short; interorbital 1\frac{3}{4}-1\frac{3}{4} in head, broadly convex; suborbitals cover about half of cheek to lower ridge of preopercle. Gill rakers 4+10, lanceolate short points, 2\frac{3}{4} in gill filaments, which \frac{3}{4} in eye. Pharyngeal teeth 5, 3, 2-2, 3, 5, hooked, with grinding surfaces on larger.

Scales 34 in lateral line to caudal base and 2 more on latter; 7 above, 4 below, 14 or 15 predorsal. Scales little smaller on breast, belly and caudal base. Ventral axil with pointed scale. Scales with 8 or 9 striae radiating from a common centre, 4 or 5 apical and as many basal and each section with 1-5 incomplete auxiliaries marginally.

D. III, 7, 1, third enlarged bony spine with about dozen antrose serrae terminally on hind edge, first branched ray 1\frac{3}{4}-1\frac{3}{4} in head; A. III, 5, 1, first branched ray 1\frac{1}{4}-1\frac{1}{4}; least depth of caudal peduncle 2\frac{1}{4}-2\frac{1}{4}; pectoral 1\frac{1}{4}-1\frac{1}{4}; ventral 1\frac{3}{4}-1\frac{1}{4}; caudal 1\frac{3}{4}-1\frac{1}{4} times head.

Back brown, made up of fine close-set dark dots and edges of scales not darker. Sides of head and above dusted with dark dots and on body broad diffuse area of same form dark axial lateral band, diffuse and paler at caudal base, also without dark spot. Under surfaces of body uniformly pale to whitish. Iris slate. Barbels and lips pale to whitish. Fins all pale, dorsal and caudal little greyish.

Diagnosis. Like Barbus motebensis Steindachner, B. burchelli A. Smith, B. unitaeniatus Günther, though all these species with the third enlarged firmly erect simple dorsal ray smooth. It is somewhat suggestive of B. kerstenii Peters, but that species has but 26 scales in its lateral line.


1194. Tsotsoroga Pan, on north-eastern edge of the Mababe Flats. June 17, 1930. This the only pan in the neighbourhood containing fish, the water permanent or semipermanent and the area subject to periodical inundation during exceptionally high floods in the Okovango region. 152 specimens. Paratypes. Length 20- mm.
1541. Small fresh-water pan, within Makarikari depression. August 21, 1930. Pale olive green above, silvery on sides and below. From same localities as 1534 and 1535. 44 specimens. Length 15-43 mm. These are quite interesting on account of their very pale coloration and lack the dark lateral diffuse band of Barbus tsotsorogensis. They have however a grey axial line on the side of the tail, ribbed with oblique darker lines meeting and forming their angles on this axial line. This, however, is present in specimens of similar size of No. 1194.


**Barbus lujae** Boulenger


Three examples. Luce River, Angola. September 1930. Length 26-48 mm. In the larger examples the dark lateral spots are very obscure or obliterated. Dorsal spine entire. H. T. Green.

**Barbus bifrenatus** n.sp. (fig. 10)

Depth $3\frac{1}{2}-3\frac{3}{4}$; head $3\frac{1}{2}-3\frac{1}{2}$, width $1\frac{1}{2}-2$. Snout $3-3\frac{1}{2}$ in head; eye $2\frac{1}{2}-3$, greater than snout in young to subequal with age, $1\frac{1}{2}-1\frac{3}{4}$ in interorbital; maxillary reaches about $\frac{1}{2}$ in eye in young, to front eye edge with age, length $3-3\frac{1}{2}$ in head; front barbel $\frac{4}{10}$ of hind barbel, which $2\frac{1}{2}$ in head; interorbital $2\frac{1}{2}-2\frac{1}{2}$ low, broadly convex; suborbitals form narrow bony strip below and behind eye. Gill rakers as 3 very short feeble papillae-like points; gill filaments $1\frac{1}{4}$ in eye. Pharyngeal teeth 5, 3, 2-2, 3, 5, little hooked.

Scales 27-29 in lateral line to caudal base and 2 more on latter; 6 above, 3 below, 10 predorsal. Scales little smaller on breast and caudal base. Ventral with joined axillary scale. Scales with 6 basal and 12 apical radiating striae, most all meeting at common centre; circuli fine.

D. iii, 8, 1, first branched ray subequal with head; A. iii, 5, 1, first branched ray $1\frac{1}{2}$-1$\frac{3}{4}$; least depth of caudal peduncle 2-2$\frac{1}{2}$; pectoral $1\frac{1}{2}$; ventral $1\frac{1}{2}$; caudal $1\frac{1}{2}$-1$\frac{1}{2}$ times head.

Pale brown above, each scale on back with rather large well-marked deep brown dots or minute spots marginally. Sides and lower surfaces whitish, line of demarcation from back quite contrasted. A blackish brown line or very narrow band extends around front end of snout to eye, over postocular and axial along side of body to caudal base medially where ending in scarcely defined black spot. Course of lateral line accentuated below dark line by double brownish line or streak marking tubes, below front of dorsal one scale width distant, though joins in dark lateral streak on side of caudal peduncle.
Sometimes blackish spot near middle of dorsal base on back and always larger one on body close to and above anal base anteriorly. No very distinct dark vertebral median line on back. Iris greyish or grey-white. Dorsal and caudal greyish, other fins whitish.

Diagnosis. Greatly like *Barbus rogersi* Boulenger, from the Que River, Angola, and the Upper Zambesi. It differs chiefly in coloration as the dorsal is without a dark posterior upper edge, the tubes of the lateral line dark anteriorly and a black spot at the front of the anal.


**Barbus bifrenatus** n.sp. Type and young.

1194a. Tsotsoroga Pan. June 17, 1930. Found associated with 1194 but occurring in smaller numbers in proportion of 1 to 4. 76 paratypes. Length 16–35 mm.

1434c. Chobe River below rapids, three miles from Kasane. July 26, 1930. Dorsal and anal bright orange. Two specimens. Length 16 or 17 mm.

**Barbus fitzsimonsi** n.sp. (fig. 11)

Depth $3\frac{3}{8} - 3\frac{1}{2}$; head $3 - 3\frac{1}{2}$, width $1\frac{1}{4} - 2\frac{1}{4}$. Snout $3\frac{3}{8} - 3\frac{1}{2}$ in head; eye $3 - 3\frac{1}{2}$, exceeds snout, $1 - 1\frac{1}{2}$ in interorbital; maxillary reaches opposite front of eye, length $3\frac{3}{8} - 3\frac{1}{2}$ in head; one pair of barbels at maxillary end, $\frac{3}{4} - \frac{3}{8}$ of eye; interorbital $3 - 3\frac{1}{2}$ in head, convex; suborbitals form narrow bony strip along lower and hind eye edges. Gill rakers as 3 or 4 short feeble rudiments; gill filaments about $\frac{1}{2}$ of eye. Pharyngeal teeth 4, 3, 2-2, 3, 5, hooked, with rather broad grinding surfaces on largest of outer row.

Scales 21 or 22 in incomplete lateral line to caudal base and 2 more on latter; 4 above, 3 below, 9 predorsal. Scales but little smaller on breast and caudal base. Ventral axil with small pointed scale. Scales with 8 radiating striae from common centre, 4 basal and 4 apical; circuli rather coarse or 10 to 12.
D. III, 8, I, first branched ray $1\frac{3}{2}-1\frac{1}{2}$ in head; A. III, 5, I, first branched ray $1\frac{3}{4}-1\frac{1}{2}$; least depth of caudal peduncle $2\frac{1}{2}-2\frac{1}{4}$; pectoral $1\frac{3}{4}-1\frac{3}{4}$; ventral $1\frac{3}{4}-1\frac{3}{4}$; caudal $1\frac{1}{2}-1\frac{1}{2}$ times head.

Upper part of head and body brownish. Sides and lower surfaces whitish. Dark bar from mouth (but not extended across front edge of snout to its fellow) to eye and then across postocular and axial along side of body to caudal base where ending in distinct round black spot little smaller than pupil. Lateral dark band distinct though not sharply contrasted. Scales on sides of body, both above and below dark lateral band, dark edged. Iris grey to slate. Black spot on body close above anal base anteriorly, though none at dorsal base. Fins pale, dorsal and caudal greyish, others whitish.

**Diagnosis.** Closely related to *Barbus bifrenatus*, though differs chiefly in coloration. The dark band from the mouth to the eye not crossing the front of the snout, nor sharply defined along the sides of the body, though ending in a sharply contrasted round black spot at the caudal base. Moreover, the black spot on the body close above and the anterior part of the anal very distinct.

**Type No. 15251.** Transvaal Museum. 1434 B. Chobe River below rapids, three miles from Kasane. July 26, 1930. Dorsal and caudal fins pale orange yellow. 31 specimens. Length 15-22 mm.

1309 B. Chobe River at Kabulabula. July 12, 1930. 44 specimens. Length 16-20 mm.

Named for Mr V. FitzSimons.

**Barbus barilioides** Boulenger


Depth $3\frac{1}{4}-3\frac{3}{4}$; head $3\frac{1}{2}-3\frac{3}{4}$, width $2-2\frac{1}{2}$. Snout $3\frac{3}{4}-3\frac{3}{4}$ in head; eye $3-3\frac{1}{2}$, greater than snout, $1\frac{1}{2}$ in interorbital; maxillary reaches opposite eye, length $3\frac{3}{4}-3\frac{3}{4}$ in head; 2 short barbels each side, front one half posterior which less than $\frac{1}{2}$ of eye; interorbital $2\frac{3}{4}-2\frac{1}{2}$ in head, low, broadly convex; suborbital form narrow strip below and behind eye. Gill rakers 3 short, low, feeble rudiments; gill filaments $\frac{1}{2}$ of eye.

![Fig. 11. Barbus fitzsimonsi n.sp. Type.](image)
Scales 20–22 in median lateral series to caudal base and 1 or 2 more on latter; 8 transversely between dorsal and ventral origins, 10 or 11 predorsal. Smaller scales on breast and caudal base. Ventral without pointed axillary scale. Scales with 10 radiating striae from common centre, 6 basal and 4 apical; circuli coarse, about 8 basally and not extended apically.

D. II, 8, third simple ray entire, first branched ray $1 \frac{1}{2}$–$1 \frac{1}{4}$ in head; A. II, 5, 1, first branched ray $1 \frac{5}{6}$–$2$; least depth of caudal peduncle $2 \frac{2}{3}$–$3$; pectoral $1 \frac{1}{2}$–$1 \frac{3}{4}$; ventral $1 \frac{5}{6}$–$1 \frac{1}{4}$ times head.

Back and upper surface of head brown. Sides and lower surfaces pale to whitish. Iris slaty. Along axial line of body about 11–16 transverse dark bars, usually second or third prominent or quite black and last one forming transverse bar at caudal base. Small blackish spot at dorsal origin and larger and more pronounced one at anal origin. Fins all pale or transparent.

This species is distinguished chiefly by its coloration. The second or third dark lateral bar is always prominent and those on the tail frequently little distinct. Moreover the spots at the bases of the fins are always distinct.


**CLARIIDAE**

*Clarias gariepinus* (Burchell)

*Silurus* (Heterobranchus) *gariepinus* Burchell, *Travels Inter. Southern Africa*, 1, 1822, p. 425 (woodcut on p. 445) (only those rivers which run to the western coast (northward of the Cape of Good Hope)).


*Clarias capensis* (not Valenciennes) A. Smith, *Illustr. Zool. S. Africa*, 1845, pl. 27 (large lake near to Port Natal, immediately to the eastward of the Umgeni River).


Depth 6$\frac{1}{4}$–7; head 4–4$\frac{1}{4}$, width 1$\frac{5}{6}$–1$\frac{1}{2}$. Snout 3–3$\frac{1}{2}$ in head, in profile 3–3$\frac{1}{4}$; eye 14–21 in head in profile, 5–7$\frac{1}{2}$ in interorbital; mouth width 2$\frac{1}{2}$–2$\frac{3}{4}$ in head; teeth finely villiform, vomerine band little more crescent but only equal in width to premaxillary band; maxillary barbel reaching variably $\frac{3}{4}$ to pectoral to $\frac{1}{2}$ in depressed pectoral; nasal barbel variably reaching $\frac{3}{4}$–$\frac{5}{6}$ to end of supraoccipital point; outer mental barbel reaches $\frac{1}{4}$–$\frac{3}{4}$ to pectoral fin origin,
inner mental barbel $\frac{3}{4}$; interorbital 2-2$\frac{1}{2}$ in head, low, broadly convex; anterior fontanel $\frac{3}{4}$-$\frac{5}{6}$. Gill rakers 15-50, fine, slender, equal gill filaments or $\frac{1}{3}$ times eye. Head above rugose striate, covered with thin skin in young. Occipital point nearly an equilateral triangle.

Lateral line distinct; axial.

D. 60-66, fin height 4-4$\frac{1}{2}$ in head; space between last dorsal ray base and caudal base 5$\frac{3}{8}$-$\frac{7}{8}$; A. 40-56, fin height 4-4$\frac{1}{2}$; caudal 1$\frac{3}{8}$-1$\frac{3}{4}$, rounded; least depth of caudal peduncle 3$\frac{1}{2}$-4; pectoral 1$\frac{3}{8}$-2$\frac{1}{2}$, spine 1$\frac{1}{4}$-1$\frac{3}{8}$ in fin, and its outer edge variably smooth to rough; ventral 2$\frac{1}{2}$-3$\frac{1}{4}$ in head.

Grey to brown, often dark, above, sometimes clouded or mottled obscurely with darker. Sometimes upper surface of head olivaceous. Lips dark or brownish, also barbels. Often variable dark streak on lower side of head backward from mouth corner. Iris neutral grey to slate. Vertical fins all grey to dark or neutral blackish, sometimes brownish. Paired fins brownish, darker or neutral slate with age.

The series of specimens listed below is quite interesting as showing several colour varieties. Those from the Nata River Salt Pans are pale yellowish while others are pale greyish.

89. From a small affluent of the Metsimaklaba River, 12 miles west of Gaberones. March 18, 1930. Water fast drying up, muddy and evil smelling lying in shallow pools a foot or two deep along stream bed. Length 197-314 mm. These five specimens all rather pale and mottled with neutral grey above.

905. Thamalakane River at Maun. May 21, 1930. Length 860 mm. Weight 15 lb.


1094. Thamalakane River, five miles above Maun. June 4, 1930. Head 195 mm. long to hind edge of gill opening, total length 920 mm. This far in excess of 620 mm. as given by Boulenger. The nasal barbel not reaching beyond eye, maxillary 1$\frac{1}{2}$ to hind edge of gill opening, outer mental 1$\frac{3}{4}$ and inner mental 3.

1294. From probably perennial pan about three miles north of Tsotsoroga Pan. July 8, 1930. Pan containing fresh water, with water plants and reeds growing in profusion. About 50 yards in diameter and between 5 and 8 feet in deepest part. Length 740 mm.

1304. Chobe or Linyanti River at Kabulabula, July 11, 1930. Caught only at night. Length 455 mm.

1390 and 1392. Chobe River at Kabulabula. July 21, 1930. Two heads 140 and 200 mm. respectively as measured to hind end of gill opening.

1459. Chobe River below rapids, three miles from Kasane. July 28, 1930. Length 733 mm.

1534 and 1535. Small fresh-water pan, about half a mile from the Nata River and within the depression of the Makarikari Salt Pan. August 21, 1930. Colour generally very pale. About a light dirty khaki yellow, with indistinct mottling of greyish. Below white with tinge of pink. Anal, caudal and pectoral fins creamy, with tinges of pink. Length 436 and 343 mm. respectively.

1545-1548. Nata River, four miles from entrance into Makarikari Salt Pan. August 22, 1930. Fish caught after dark in large pools in river bed. Water distinctly brackish, probably caused originally by backwash from Makarikari Salt Pan on the subsidence of flood waters and then accentuated by evaporation. Length 365-415 mm.

Clarias liocephalus Boulenger


Depth 61½–7½; head 5½–5¾, width 1–1½. Snout 2½–2⅓ in head, measured in profile 3½–3⅓; eye 9½–11 in profile, 2⅔–3 in snout, 6⅓–7 in interorbital; mouth width 2–2⅓; lower jaw shorter than upper; teeth in villiform bands in jaws, vomerine band equally wide as premaxillary band; nasal barbel reaches back nearly as far as or quite to hind end of gill opening, maxillary ⅔–¾ in depressed pectoral, outer mental ¼ in depressed pectoral, inner mental ⅔–⅔ to pectoral origin; interorbital 1½–1½ in head to hind edge of gill opening, low, broadly convex. Top of head covered with thin skin, smooth; anterior fontanel 5 in head; humeral plate not exposed. Gill rakers 1+9, lanceolate, about equal eye or 1½ in gill filaments.

Lateral line distinct, axial.

D. 70–73, free space posterior to caudal base 6 in head in profile, fin height 2¼–3; A. 54 or 55, separated from caudal by notch, fin height 3–3¼; caudal 1½–2, rounded; pectoral 1½–2, spine 1½–1½ in fin and its outer edge with row of fine concealed serrae, also same on inner edge; ventral 2½–3.

Neutral grey to dark neutral brown above, under surfaces soiled whitish to drab. Iris grey. Barbels neutral grey. Edges of dorsal and anal slightly paler or greyish.

Boulenger suggested this may be found synonymous with Clarias submarginalius Peters from the Cameroons.


Clarias ngamensis Castelnau


Depth 5½–8½; head 4–4½, width 1½–1⅛. Snout 3–3⅓ in head; eye 10⅔–14½, 3½–4 in snout, 5½–7 in interorbital; mouth width 1½–2½ in head; broad band of villiform vomerine teeth twice as wide as premaxillary band; nasal barbel 1½–3 times to upper hind end of gill opening, maxillary 1½–1, outer mental 1½–1, inner mental 1½–2; interorbital 2–2½; low, broadly convex; anterior fontanel 2½–3½; top of head variably rugose striate to somewhat smooth; occipital point forming an equilateral triangle. Gill rakers 5+20, finely lanceolate, subequal with gill filaments or but slightly larger than eye.

Lateral line distinct, axial.

D. 53–59, fin height 3½–3⅔ in head; space between last dorsal ray base and caudal fin base 1½–2½; A. 46–52, fin height 3½–3¾; caudal 1½–1¾; least depth of caudal peduncle 2½–3; pectoral 1½–1⅛, spine 1½–1¼ in fin and its outer edge with as many as 24 antroverse serrae, more or less concealed in adipose membrane; ventral 2½–2⅓.
Back brownish to neutral olivaceous, sometimes with darker mottling. Under surface of head and belly grey-white to whitish. Iris neutral grey to slate. Barbels dusky or neutral slate, paler basally. Fins all dark or neutral grey, often very dark terminally.

A very interesting species originally obtained in Lake Ngami but now known from the Umsitu and Chobe Rivers as well. None of my examples reach so large a size as *Clarias gariepinus*. The species is readily distinguished, however, by its broad band of vomerine teeth.

Ten specimens from Thamalakane River at Maun; 906, 909, 910, 915 on May 21, 1930; 954-957 on May 23, 1930; 1001 on May 27, 1930; 1101 on May 28, 1930, pink to rosy red ventrally. Length 345-660 mm.


1391. Chobe River at Kabulabula. July 21, 1930. This specimen a head 140 mm. long, with the vomerine band twice as broad as the premaxillary band of teeth. This the largest specimen I have. Compared with the largest head of *Clarias gariepinus* the upper surface is much smoother and the anterior fontanel 4 in the head while in *C. gariepinus* this fontanel is much longer and reaches forward beyond the front of the eyes, or 3 in head.

**Clarias theodorae** Weber


Depth 6; head 5¾, width 1¼. Snout 2¼ in head; eye 12¼, 4½ in snout, 5¾ in interorbital; mouth width 2¼; teeth in villiform bands in jaws, vomerine band 1½ times as wide as premaxillary band; lips papillose; nasal barbel reaches ¾ to pectoral origin, maxillary barbel reaches ¼ in depressed pectoral, outer mental barbel reaches pectoral origin, inner mental barbel reaches ⅞ to pectoral origin; interorbital 2½ in head; top of head rugose striate, covered with thin skin. Anterior fontanel 3¾. Gill rakers 4+13, lanceolate, 1½ in gill filaments, equal eye.

Lateral line complete, axial, pores about 45 to posterior part of tail.

D. 80, fin height 1½ in head; A. 58, fin height 2½; last rays of dorsal and anal joined by membrane with front of caudal basally; pectoral 2, spine 1½ in fin, both edges with minute, concealed, antrorse serrae; ventral 2½ in head, close before vent.

Uniform blackish brown.


**SCHILBEIDAE**

*Silurus mystus* (Linnaeus)


Depth 4½-4¾; head 4⅓-4 ⅜, width 1½-1¾. Snout 3¾ in head from snout tip; eye 6-6½, 1½-2 in snout, 3-3½ in interorbital; mouth width 1½-2½ in head from snout tip; teeth in villiform bands in jaws, vomero-palatine band little narrower than premaxillary band; nasal barbel reaches ⅞ to pectoral origin, maxillary barbel reaches ⅞-⅞, outer mental reaches ⅞-⅞, inner mental reaches ⅞-⅞; interorbital ¾-⅞, ¾-1; lateral line distinct, axial. Gill rakers 3+9, lanceolate, ⅛ in gill filaments, which ⅜ of eye.

Lateral line distinct, axial.

D. 1, 5, 1, slender spine entire on front edge, hind edge with about dozen concealed small anterose serrae, first ray ⅝-1⅛ in total head; A. 111, 57, 111, 60, 1, fin height 2½-2½; least depth of caudal peduncle 3⅞-3⅞; pectoral ⅞-⅞, slender spine with outer edge entire, with rather fine concealed anterose serrae on inner edge; ventral ½-⅞.

Upper parts neutral grey-brown to dark slate, variably mottled darker. Under surface of head and belly pale to whitish. Flanks greyish. Fins all brownish to dark neutral grey or slate. Lower jaw pale brown. Iris slaty. Barbels brownish.

993. Thamalakane River at Maun. May 26, 1930. Length 263 mm.

1007. Thamalakane River at Maun. May 28, 1930. Dark brown to bluish black above, white below and infusions of yellow along sides. Usually caught only at night on rod and line. Length 260 mm.


One example, also from Maun. Length 260 mm.

MOCHOKIDAE

Synodontis melanostictus Boulenger


Depth 3⅞-3⅞; head 3⅞-3⅞, width 1⅛-1⅛. Snout 2-2½ in head; eye 5½-6½, 2½-3 in snout, 2½-3 in interorbital; teeth in premaxillary short, forms deep and rather broad band; mandibular teeth 24-28, about half eye diameter; lips moderate; mouth width 3-3½ in head; maxillary barbel reaches ⅞-⅞ in depressed pectoral, compressed with slight membranous flange basally, outer mental to or ⅛ in depressed pectoral, with few branches and papillae; inner mental reaches half-way to pectoral, with many branches and papillae; interorbital 2½-2½ in head, slightly convex, depressed pectoral, with few branches and papillae. Cranium and predorsal buckler finely rugose, completely ossified to dorsal; anterior fontanel 3½-5 in head; humeral plate an isosceles triangle, finely rugose, basal width 1½-1½ in its length. Gill opening lateral 2½-2½ in head.

Lateral line distinct, axial.
D. I, 6, 1, front edge of spine entire or few low antrorse serrae terminally and hind edge with concealed low antrorse serrae nearly its whole extent, spine subequal with head, first ray equals head or head with eye diameter; adipose fin length $1-\frac{1}{2}$ in head; A. III or IV, 7, 1, first branched ray $\frac{1}{2}-\frac{1}{2}$, caudal $1\frac{1}{2}-1\frac{1}{2}$ times head, deeply forked, upper lobe often little longer; least depth of caudal peduncle $3-3\frac{1}{2}$ in head; pectoral $1-1\frac{1}{2}$ times head, spine $1-1\frac{1}{2}$ in head and outer edge with $38-40$ antrorse serrae; ventral $1\frac{1}{2}-1\frac{1}{2}$.

Dark drab grey above, little paler below or on belly and under surface of tail. Body and fins everywhere marked with small neutral dusky crowded dark spots or dots. Fins all more or less dark neutral grey to slate. Barbels dark greyish. Iris slaty. Fin spines olive brown.


**Synodontis thamalakanensis** n.sp. (fig. 12)


Depth $3\frac{1}{4}-4$; head $3\frac{1}{2}-3\frac{1}{2}$, width $1\frac{1}{2}-1\frac{1}{2}$. Snout $2\frac{1}{2}-2\frac{1}{2}$ in head; eye $5\frac{1}{2}-6$, $2\frac{1}{2}-3$ in snout, $2-2\frac{1}{2}$ in interorbital; teeth in premaxillary short, forming deep short band, mandibular teeth 17 or 18, $\frac{1}{2}$ eye diameter; lips moderate; mouth width $3\frac{1}{4}-4$ in head; maxillary barbel reaches $\frac{1}{2}-\frac{1}{2}$ in depressed pectoral fin, compressed, with slight membranous flange basally; outer mental barbel reaches $1\frac{1}{4}-1\frac{1}{2}$ to pectoral origin, with 3 branches and some papillae; inner mental barbel $2\frac{1}{2}-2\frac{1}{2}$, greatly papillose; interorbital $2\frac{1}{2}-2\frac{1}{2}$, slightly convex. Cranium and predorsal buckler finely rugose striate, smooth to touch; anterior fontanel $2\frac{1}{2}-2\frac{1}{2}$ in head; humeral plate nearly equilateral triangle, finely rugose striate, surface nearly smooth. Gill opening lateral, 3 in head. Gill rakers 4+11, lanceolate, $\frac{1}{2}$ gill filaments, which $1\frac{1}{4}$ in eye.

![Fig. 12. Synodontis thamalakanensis n.sp. Paratype.](image-url)
Skin smooth coriaceous. Lateral line not evident.

D. I, 6, 1, front edge of spine entire except apically where 7 antroste low serrae, hind edge of spine with low antroste serrae its whole length, first ray nearly equals or little greater than head; adipose fin length \( 1 \frac{1}{2} \) in head; A. IV, 7, I, first branched ray \( 1\frac{1}{2} - 1\frac{3}{4} \); caudal deeply forked, length \( 1\frac{1}{2} \); least depth of caudal peduncle \( 3 - 3\frac{1}{10} \); pectoral \( 1\frac{1}{2} - 1\frac{1}{4} \), spine with front edge with row of very low obsolete serrae, concealed and nearly smooth to touch, inner edge with inner row of 15 large antroste concealed serrae; ventral \( 1\frac{3}{8} - 1\frac{4}{5} \) in head.

Largely neutral greyish. Body and fins marked everywhere, though less conspicuous on bony or rugose portion of cranium, occipital buckler and humeral plate, with small neutral black spots, very numerous, close set and larger than pale interspaces. Spots sometimes formed as more or less longitudinal series, streaks or lines on tail.

Diagnosis. I formerly confused this species with *Synodontis woosnami* Boulenger from Lake Ngami, though that species may be known by its larger spots and entire under regions of the head, trunk and tail immaculate. The present species seems most closely related to *Synodontis melanostictus* Boulenger, evidently representing it in Lake Ngami. It differs further on comparison with the Vernay-Lang series of specimens of that species, in its larger and more close-set spots, outer edge of the pectoral spine nearly smooth and more papilllose short barbels. Further its humeral plate is shorter.

Type No. 53245, A.N.S.P. Thamalakane River, Maun, Bechuanaland Protectorate. 1930. De Schauensee South African Expedition. Length 194 mm. Also No. 53246, A.N.S.P., same data, paratype. Length 184 mm. This specimen presented to the Transvaal Museum (T.M. 15305).

*Synodontis woosnami* Boulenger


*Synodontis macrostigma* Boulenger


**MYSTIDAE**

*Auchenoglanis ngamensis* Boulenger


Lake Ngami.
POECILIIDAE

Aplocheilus chobensis n.sp. (fig. 13)

Depth \(4\frac{1}{2}-4\frac{3}{4}\); head \(3\frac{3}{4}-3\frac{1}{2}\), width \(1\frac{1}{4}-1\frac{2}{3}\). Snout \(4-4\frac{3}{4}\) in head from snout tip; eye \(2\frac{1}{2}-3\) greatly exceeds snout, \(1\frac{2}{3}-1\frac{3}{4}\) in interorbital; maxillary not quite reaching eye, vertical length \(3-3\frac{3}{4}\) in head from snout tip; interorbital \(1\frac{1}{2}-2\), low, flattened. Gill rakers 1+8, slender, fine, \(\frac{1}{3}\) of gill filaments, which \(\frac{1}{3}\) of eye.

Scales 23 in median lateral series to caudal base and 2 or 3 more on latter; 7 transversely between dorsal and anal origins; 13 predorsal to head and 3 more forward to snout end; single row on cheek. Scales with 16 marginal parallel short striae; circuli about 21, mostly obsolete apically.

Fig. 13. Aplocheilus chobensis n.sp. Type and young.

D. 1, 7, third branched ray \(1\frac{1}{2}-2\) in total head length, fin origin over middle or slightly before middle of anal base; A. \(1\frac{1}{2}, 1\) or \(1\frac{3}{4}, 8, 1, \) third branched ray \(1\frac{1}{2}-1\frac{3}{4}\); least depth of caudal peduncle \(2-2\frac{1}{4}\); pectoral \(1\frac{1}{4}-1\frac{3}{4}\); ventral \(1\frac{1}{2}-2\); caudal equals to \(1\frac{1}{2}\) times head, rounded behind.

Brown above, paler to whitish below. Each scale edge on back and sides narrowly dark brown. A narrow dark median predorsal line and another axial dark line along side of trunk and tail. Iris slate. Fins greyish, lower ones with slightly paler margins. Some small specimens, evidently females, have dorsal and anal with dark spots and several obscurely on caudal base.

Diagnosis. Most closely related to Haplochilus myaposae Boulenger from Zululand. That species differs in its larger scales, 27 or 28 in longitudinal series, and the dorsal and anal with more rays or D. 10 and A. 14 or 15.

Type No. 15277. Transvaal Museum. 1433. Chobe River, below rapids, three miles from Kasane. July 26, 1930. Length 32 mm.

1309a. Chobe River at Kabulabula. July 12, 1930. This example with the same appearance as the adult, all its scales similarly dark edged. It differs from larger examples only in proportions. Length 12 mm.

Named for the Chobe River.


**Aplocheilus johnstoni** (Günther) (fig. 14)


---

![Fig. 14. Aplocheilus johnstoni (Günther). Larvae.](image-url)
eye, then medially whole length of body to caudal base and equally dark as upper edge of back. Narrow dark axial line on side of body. Back from each ventral, on lower side of belly and tail, line or streak of dark dots. Fins all light greyish, on caudal some medial and basal obscure dark grey spots and on anal 2 longitudinal dark grey lines little above middle.

These specimens better preserved than any I have examined. They differ from Boulenger's figure of the type in the presence of the diffuse dark lateral band and the markings on their fins. I have therefore prepared the accompanying figure.


1309a. Chobe River at Kabulabula. July 12. 17 specimens. Length 9–14 mm. These seem much more slender than the fry of Aplocheilus luluae, found associated. The tail is exceptionally long. Both upper and lower edges of body blackish their entire extent. Also a narrower dark axial line.


**Aplocheilus luluae** Fowler


The series of specimens at hand agree in every respect with the types. None show any scales on the base of the anal. Some do show, however, dark grey spots in one or two rows subbasally on the dorsal and anal fins. Other examples also show the outer margin of the anal dark or dusky. All the specimens have a distinct dark median line down the predorsal region. *Aplocheilus katangae* Boulenger is certainly very closely related, and seems to differ only in the absence of a dark band on the side of the head. The inferior lateral black band is described as "a blackish lateral streak along the lower half of the body, from the pectoral fin to the root of the caudal." Boulenger gives its length as 25 mm.


**ANABANTIDAE**

**Anabas multispinis** (Peters)


Reported from Lake Ngami.

Anabas vernayi n.sp. (fig. 15)

Depth 3; head 2 2/3, width 1 2/3. Snout 4 2/3 in head; eye 4, slightly greater than snout, 1 2/3 in interorbital; maxillary reaches 3/8 in eye, length 2 2/3 in head; teeth fine, in villiform bands in jaws; apparently no distinct teeth on palate; interorbital 4, broadly convex; opercle and subopercle denticulate. Gill rakers 7 lower tubercles, 1/2 of gill filaments, which 2 2/3 in eye.

Scales 18 in upper section of lateral line, 13 in lower section to caudal base; 3 above, 9 below, 16 predorsal; 6 rows on cheek to preopercle angle. Bases of soft vertical fins finely scaled. Scales with 13–14 basal radiating striae, several obsolete scattered small apical denticles; circuli fine, coarse or obscure apically.

D. XVIII, 9, 1, sixth spine 4 1/2 in head, fourth ray 2 2/3; A. IX, 9, 1, last spine 5 2/3, fourth ray 2 1/2; caudal 1 2/3, convex behind; least depth of caudal peduncle 2 1/2; pectoral 1 2/3; ventral 2 1/3.

Body dark brown above, paler to light brown below. Sides with 12 neutral black vertical to slightly inclined forward parallel bands, complete and well contrasted. On caudal peduncle 2 large neutral black blotches and small median dark spot at caudal base. Two irregular dark bars back from eye and third on lower side of head. Posteriorly head with scattered dark spots. Iris slate. Lips brownish. Fins uniform brownish, ventrals whitish. On soft dorsal base dark bars from body form 2 large blackish spots.

Diagnosis. This species approaches in coloration Anabas machadoi Fowler. That species differs, however, in the more numerous dark lines on the side of the head, cluster of small dark spots on the caudal peduncle and at the caudal base and the oblique dark bands broken into spots below. It is undoubtedly allied structurally with Anabas multispinis (Peters), which is said to have the "soft dorsal spotted with blackish."


Named for Mr Arthur A. Vernay.

GICHILDAE

*Tilapia kafuensis* Boulenger


*Tilapia macrochir* Boulenger


Depth 2½-2¼; head 2½-3, width 1½-2. Snout 2½-2¾ in head; eye 5½-6½, 2-2½ in snout, 2½-2¼ in interorbital; maxillary reaches ¾-¾ to eye, length 2½-2¾ in head; teeth of outer row not enlarged, all bifid; interorbital 2½-2¾, broadly convex. Gill rakers 6+2, short, lanceolate, ¼ of gill filaments, which 1½ in eye.

Scales 20-23 in upper section of lateral line, 12-14 in lower section to caudal base and 2 or 3 more on caudal base (most of which non-tubular); 5 or 6 above, 11 or 12 below, 10-12 predorsal, 2 or 3 rows on cheek. Scales with 13-16 basal radiating striae; cirri very fine, finely granular apically.

D. XVI, 11, 1, or 12, 1, last spine 2½-3 in head, sixth ray 1½-1¾; A. III, 9, 1 to 11, 1, third spine 3-3¾, fifth ray 1½-1¾; caudal 1½-1½, convex behind; least depth of caudal peduncle 2½-2¾; ventral 1½-1¾; pectoral 1½ times head.

Dark olive brown, more or less uniform, often with neutral to more brownish tints. Fins all dark neutral black, verticaIs with numerous small crowded pale spots on membranes. Paired fins brownish, ventrals often darker.


*Tilapia sheshekensis* Gilchrist and Thompson


*Tilapia alleni* Fowler


*Tilapia andersonii* (Castelnau)


III, 1915, p. 171, fig. 110 (copied) (Lake Ngami, Angola, Congo, Gaboon).


Tilapia melanopleura A. Duméril (fig. 16)


Chromis ogoweensis Günther, Ann. Mag. Nat. Hist. ser. 6, xvii, 1896, p. 271 (Ogowe River (Lambarene)).


Depth 2½–2¾; head 3½–3¾, width 1½–1¾. Snout 2¼–2½ in head; eye 4½–5½, 2–2¼ in snout, 1½–2½ in interorbital; maxillary reaches ½ or to eye, length 2½–3 in head; jaws nearly equal or lower slightly shorter; teeth compressed, bifid, outer prong shorter; interorbital 2½–3, broadly convex. Gill rakers 3 or 4–9 or 10, short points 3½ in gill filaments, which 1½ in eye.

Scales 19–21 in upper section of lateral line, 11–13 in lower section to caudal base and 2 more on latter; 3 or 4 above, 9 or 10 below, 12–13 predorsal.
Fig. 16. *Tilapia melanopleura* A. Duméril, variation.
forward opposite front eye edge; usually 4 rows on cheek, rarely 5. Scales small and crowded on chest and breast, also on caudal base. Scales with 13 or 14 basal radiating striae; circuli very fine.

D. XVI, 12, 1, last spine $\frac{1}{10}$–$\frac{1}{8}$ in head, sixth ray $\frac{1}{4}$–$\frac{1}{8}$; A. III, 9, 1 or III, 10, 1, third spine $\frac{2}{3}$–$\frac{3}{4}$, fifth ray $\frac{1}{4}$–$\frac{1}{8}$; caudal $\frac{1}{4}$–$\frac{1}{8}$, truncate; least depth of caudal peduncle 2–$\frac{3}{4}$; ventral $\frac{3}{10}$–$\frac{1}{4}$; pectoral usually little longer than head to $\frac{1}{4}$ times head.

Olive brown above, with basal pocket of each scale on body showing dusky to neutral black, giving appearance of short vertical bars. Head, breast, belly and under surface of tail whitish. Lips grey and often transverse greyish band across chin. Iris dark neutral grey. Head spotted with neutral black. Dorsal and caudal dark grey, spotted with paler to whitish, usually more contrasted on soft dorsal. Caudal greyish, usually spotted with paler on membranes of upper half. Anal usually uniformly greyish, sometimes spotted with whitish. Pectoral grey or brownish. Ventral grey to whitish.

This species may be known by its large gill rakers in combination with 4 or 5 rows of scales on its cheeks and colour pattern. Though the coloration is variable in preserved specimens, especially in formaline, the white spots on the fins often become darker and the darker areas still darker so that the fins may appear as spotted with darker. Almost all these specimens have a more elongated profile than Boulenger's figure of the type, though in none are the soft dorsal and anal so elongated. Boulenger gives "3 or 4 series of scales on the cheek." Most also show upper hind lobe of opercle neutral black. The small specimens from the Makarikari are very pale and bleached, with silvery sides and faint dark cross bands.

900. Thamalakane River at Maun. May 20, 1930. Length 208 mm.
919. Thamalakane River at Maun. May 21, 1930. Anal fin with red spots. Posterior edge and lower half of caudal tinged with red. Length 257 mm.
933–935. Thamalakane River at Maun. May 22, 1930. Lower half of body, including fins, tinged with dull wine red. Length 200–240 mm.
952 and 953. Thamalakane River at Maun. May 25, 1930. All lower parts, including fins, tinged with pink. Length 230–243 mm.
974 and 977. Thamalakane River at drift, five miles from Maun. May 25, 1930. Length 227–263 mm.
1306. Chobe River at Kabulubula. July 12, 1930. 15 specimens. Length 28–85 mm.
1428 and 1434e. Chobe River below rapids, three miles from Kasane. July 26, 1930. 12 specimens. Length 30–73 mm.
1541 a. From small fresh-water pan, within Makarikari depression. August 21, 1930. Pale green above, silvery on sides with 8 dark vertical bands. At present these greatly paler and with more simplified markings than the other materials. Nine specimens. Length 25–34 mm.

Four examples. Hanya River, near Lobito Bay, Angola. August 17, 1930. From crop of a bird. Length 46–82 mm. A.N.S.P.

Tilapia deschauenseei Fowler


Depth 1½–2; head 1½–2, width 1½–2. Snout 2½–3 in head from snout tip; eye 3½–4½, 1½–1⅞ in snout, 1⅞–1⅛ in interorbital; maxillary reaches ⅜–¾ to eye, length 3–3½ in head from snout tip; outer row of teeth compressed, narrow, bifid terminally; interorbital 2½–2⅛, broadly convex. Gill rakers 3+11, short, bidentate, 1½ in gill filaments, which 2 in eye.

Scales 16 or 17 in upper section of lateral line, 10 or 11 in lower section to caudal base and 2 more on latter; 4 above, 10 below, 10 or 11 predorsal forward opposite front eye edge; 2 rows only on cheek to preopercle keel, flange with few scattered scales, though not always present. Scales with 13 basal radiating striae; circuli fine basally, finely granular apically.

D. XIII to XV, 10, or 11, 1, last spine 1⅞–1⅜ in total head, fifth ray 1⅛–1⅜; A. III, 9, or III, 10, 1, third spine 2½–3, fifth ray 1½–1⅞; caudal 1–1½, slightly convex behind; least depth of caudal peduncle 1½–2; pectoral 1½–2; ventral 1½ in head to 1⅞ times head.

Dark brown or olivaceous generally, under surfaces slightly paler. 6 to 8 obscure darker transverse bands, more or less ill defined, wide as interspaces, on body. Slate black blotch on upper hind lobe of opercle, little less than eye. Iris slaty. Fins grey to slate black, sometimes dark brown or olive brown. Vertical fins obscurely spotted or blotched basally with darker to dusky or blackish, often formed as rather distinct black blotch at origin of soft dorsal. Some specimens show a dark axial streak along side of body and another along upper section of lateral line.

This series of specimens is quite uniform. The largest shows longer points to soft dorsal and soft anal. In the smallest the dark vertical bands are most distinct. The species may be known chiefly by its deeply ovoid body in combination with its squamation, fin formula and obscure coloration.


967 and 970. Thamalakane River at Maun. May 24, 1930. Length 105–167 mm.

1068 and 1069. Thamalakane River at Maun. June 1, 1930. Length 147–165 mm.

Tilapia woosnami Boulenger

Tilapia lucullae Boulenger


Tilapia sparrmani A. Smith


Depth 2; head 3, width 2. Snout 3 in head; eye 4 1/2 in snout, 1 1/2 in interorbital; maxillary reaches 8 1/2 to eye, length 3 3/4 in head; outer row of teeth compressed, bifid; interorbital 2 1/4, broadly convex. Gill rakers 3 + 9, short, pointer, 1 1/2 gill filaments, which 1 3/4 in eye.

Scales 18 in upper section of lateral line, 9 in lower section to caudal base and 2 more on latter; 4 above, 9 below, 9 predorsal forward opposite front eye edge; 2 rows on cheek. Scales with 13 basal radiating striae; circuli fine basally, forming rather coarse granules apically.

D. XIV, 14, 1, last spine 1 3/4 in head, sixth ray 1 1/2; A. III, 10, 1, third spine 2, fifth ray 1 1/2, caudal 1 1/2, convex behind; least depth of caudal peduncle 2; pectoral 1 1/2; ventral 1.

Brownish, scarcely paler below. Under surface of head and region about anal base with lavender shades. About 8 dark obscure transverse bands, ill defined and little evident, each little wider than interspaces. Neutral black spot size of pupil on upper hind lobe of opercle. Iris slate. Fins brownish, with obscure darker blotches on dorsal basally, form as faint dark streaks on soft dorsal and anal. Slightly darker blotch at front basal part of soft dorsal. Caudal without spots, pale terminally. Pectoral pale brown. Ventral neutral slate, pale basally.

Though largely in agreement with Boulenger’s figure, my example shows much less distinct spots on the soft dorsal and anal and none at all on the caudal. As preserved in formaline with depressed dorsal and anal, the soft dorsal shows a subbasal band rising medially anteriorly and the anal shows a basal longitudinal lavender grey band, less distinct in the erected fins.

978. Thamalakane River at drift, five miles from Maun. May 25, 1930. Length 146 mm.

1434e. Chobe River, below rapids, three miles from Kasane. July 26, 1930. 11 examples. Length 31–53 mm. All show the 9 dark vertical bars well...
contrasted, those on trunk little broader. Black spot at front of soft dorsal like an ocellus and but little less than eye, also greatly contrasted.


**Haplochromis moffatii** (Castelnau)


*Paratilapia angusticeps* Boulenger (fig. 17)


Depth 21/2–31/2; head 21/2–23/4, width 21/2–23/4. Snout 21/2–31/2 in head from snout tip; eye 4/3–6, 11/2–2 in snout, greater than interorbital in young to 11/2 in interorbital with age; maxillary reaches opposite front of eye, length 21/2–23/4 in head from snout tip; teeth simple, slender; interorbital 43/4–5, convex. Gill rakers 4–8 to 14, short, more or less bifid, 11/2 in gill filaments, which 11/2 in eye.

Scales 22–24 in upper section of lateral line, 14–16 in lower section to caudal base and 2 more on latter; 6 or 7 above, 10 or 11 below, 20–26 predorsal forward opposite middle of eye; 6–10 rows on cheek to preopercle ridge below, flange naked. Scales with 12–25 basal radiating striae; circuli very fine basally, apically granular.

D. XV, 12, 1 to XV, 16, 1, last spine 21/4–3 in total head length, fifth ray 2–21/2, tenth ray 11/4–11/2; A. III, 9, 1 to III, 12, 1, third spine 3–33/4, seventh ray 11/2–13/4, rounded behind; least depth of caudal peduncle 3–33/4; pectoral 11/2–2; ventral 13/4–13/4.
Fig. 17. *Paratilapia angusticeps* Boulenger, variation.
Brown above and on sides, under surface of head, breast, abdomen and tail whitish. Back with variable scattered dark brown to dusky spots or blotches. Usually dark spot to each scale base. Small or young examples often with several dark spots on cheek or only one may be below eye, also a postocular dark bar, ending in blackish blotch on upper hind lobe of opercle. Sides in small or young with 6 to 9 dark ill-defined transverse lateral bars, less evident with age, or variably broken as alternating dark blotches. With age head may be sprinkled with variable dark to blackish spots, blotches or dots. Vertical fins dark neutral grey, with pale grey to slaty spots, large, fewer and very variable with age on anal. Paired fins brownish to dark neutral grey.

This species is quite variable. Half-grown and young examples are quite different from those of adults shown by Boulenger. All have quite prominent, though variable, dark cross bars, also an interrupted dark median lateral band. This pattern of coloration very closely approaches that of *Tilapia rumsayi* Gilchrist and Thompson\(^\text{1}\), based on a specimen 61 mm. long.

\(^{1}\text{Ann. South African Mus. x i, pt. 6, June 8, 1917, p. 501, fig. 129 (Victoria Falls, Zambesi River).}\)
Paratilapia thurbergi (Castelnau) (fig. 18)


Depth $\frac{3}{4}$-$\frac{3}{4}$; head $\frac{2}{4}$-$\frac{2}{4}$, width $\frac{2}{4}$-$\frac{2}{4}$-$\frac{2}{4}$ in head from snout tip; eye $\frac{5}{8}$-$\frac{5}{8}$, $\frac{2}{4}$-$\frac{2}{4}$-$\frac{2}{4}$ in snout, $\frac{1}{4}$-$\frac{1}{4}$ in interorbital; maxillary reaches to or $\frac{1}{4}$ in eye, length $\frac{2}{4}$-$\frac{2}{4}$ in head from snout tip; lower jaw well protruded in front; teeth of outer row simple, slender, conic, little curved; interorbital $\frac{2}{4}$-$\frac{3}{4}$, broadly convex. Gill rakers 3 or 4+$+12$, short, compressed, with 1-4 variable short points, $\frac{1}{4}$-$\frac{1}{4}$ in gill filaments, which $\frac{1}{4}$ in eye.

Scales 26 or 27 in upper section of lateral line, lower section with 16 or 17 to caudal base and 3 more on latter; 5 or 6 above, 11 below; 15 to 18 predorsal forward opposite middle of eyes; 7 or 8 rows on cheek to lower preopercle ridge, flange naked. Scales with 16-18 basal radiating striae; circuli very fine basally, granular apically.

D. XVII or XVIII, 1, to 15, 1, last spine $\frac{2}{4}$-$\frac{3}{4}$ in total head length, eighth ray $\frac{1}{2}$-$\frac{1}{2}$; A. III, 9, to 11, 1, third spine $\frac{3}{4}$-$\frac{3}{4}$, fifth ray $\frac{1}{2}$-$\frac{1}{2}$; caudal $\frac{1}{4}$-$\frac{1}{4}$, truncate to slightly rounded behind; least depth of caudal peduncle $\frac{2}{4}$-$\frac{3}{4}$; pectoral $\frac{1}{4}$-$\frac{1}{4}$; ventral $\frac{1}{4}$-$\frac{1}{4}$.

Upper surfaces brown to neutral brown or dark grey, each scale edged with darker and dark or dusky basal bar. Under surface of head, breast, belly and tail paler than back. Head above with obscure dark specks or irregular spots, extending well down on sides. Iris dark neutral or brown. Broad diffuse dark lateral band from head to middle of caudal base, often narrowed somewhat forward. Small examples show traces of six or more diffuse or less distinct transverse streaks, sometimes merely emphasised slightly as darker blotch in diffuse dark longitudinal lateral band. Vertical fins dark or neutral grey, marked with close-set still darker rounded spots, which often very contrasted on soft dorsal and anal. Paired fins grey to dark greyish, ventrals darker or even neutral grey to blackish.

The young differ somewhat from the adults in the possession of dark vertical bars.
Fig. 18. *Paratilapia thumbergi* (Castelnau), variation.
I have no intermediate specimens between the smallest of the adult series, namely the one 222 mm. long, and the largest of the series of small examples which I have identified as young. The largest of the smaller series is only 59 mm. long. They involve some very interesting colour markings, having not only usually the median lateral dark horizontal band of the adult, but also the upper curved one along the upper section of the lateral line as well. In addition all young examples show dark transverse or vertical bars. These are evident in 938. Another character is the presence of a distinct dark basal caudal spot, often separated from the dark lateral band. Their fins have much the coloration of *Tilapia ovalis* (Steindachner) as figured by Boulenger, especially the spots of the caudal in being confined largely to the upper half of the fin, though both the dorsal and anal are said to be edged with black. *Tilapia ovalis* is described as “olive brown, with or without faint darker vertical bars.” *Tilapia woosnami* Boulenger seems to be known only from the type, 110 mm. long. It is shown without dark transverse bars and a uniform caudal, though no dark median horizontal streak extends back from behind shoulder.


917 and 918. Thamalakane River at Maun. May 21, 1930. Length 270–290 mm.

938. Thamalakane River at Maun. May 22, 1930. Length 240 mm.


1052. Thamalakane River at Maun. May 31, 1930. Length 222 mm.

1130. Thamalakane River at Maun. May 6, 1930. Length 285 mm.


1309c. Chobe River at Kabulabula. July 12, 1930. Three specimens. Length 18–21 mm. These show the caudal without white spots, though in almost every other way they agree, doubtless a character of early youth.


**Paratilapia gibbiceps** Boulenger


**Paratilapia frederici** (Castelnau)


Paratilapia smithii (Castelnau)


*Paratilapia mellandi* Boulenger


**Paratilapia smithii**

Depth $\frac{2}{3}-\frac{2}{3}$; head $\frac{2}{3}-\frac{2}{3}$, width $\frac{2}{3}-\frac{2}{3}$. Snout $3-\frac{3}{3}$ in head from snout tip; eye $3-\frac{3}{3}$ in snout, subequal with interorbital; maxillary reaches opposite eye, length $2\frac{2}{3}-3$ in head from snout tip; outer teeth in jaws as row of simple, conic, slightly curved and little larger teeth than others; interorbital $3\frac{1}{3}-4$, broadly convex. Gill rakers $5+11$ to $13$, low points, $\frac{1}{3}$ of gill filaments, which $\frac{2}{2}$ in eye.

Scales 20-22 in upper section of lateral line, 12 in lower section to caudal base and 1 more on latter; 4 or 5 above, 9 below, 11 or 12 predorsal forward to front eye edge; 4 rows on cheek. Scales with 16-18 radiating striae; circuli very fine basally, becoming coarse, irregular and sparse apically.

**D. XIV to XVI, 11, 1 or 12, 1, last spine $1\frac{1}{6}$–2 in total head, seventh ray $1\frac{1}{3}-1\frac{1}{3}$; A. III, 10, third spine $2-2\frac{1}{2}$, fifth ray $1\frac{2}{3}-1\frac{2}{3}$; caudal $1\frac{1}{3}-1\frac{1}{3}$, convex behind; least depth of caudal peduncle $2\frac{2}{3}-2\frac{2}{3}$; pectoral $1\frac{1}{3}-1\frac{1}{3}$; ventral $1\frac{1}{3}$–1.**

Upper surfaces brown to dark olive brown, little paler on under surfaces. About 8 obscure broad transverse dark bands on side of body. Each scale with dark blotch at base, each showing as short dark vertical bar. Iris slate. Dark blotch on upper hind lobe of opercle large as pupil. Fins all brownish, verticals with contrasted white and dark to blackish brown spots, obscure on spinous dorsal and front half of anal, though otherwise more or less conspicuous. Often white spots formed as whitish reticulations around dark spots. Ventral all dark neutral grey, sometimes with broad pale border. I have identified the 4 specimens listed below with this species, described "with rather indistinct dark cross-bars" though these not shown in Gilchrist and Thompson’s figure of the type. Variation is noticeable in the size of the eye.

**913 and 914. Thamalakane River at Maun. May 21, 1930.** Anal fin with brick red spots. Length 124 mm. both.

**969. Thamalakane River at Maun. May 24, 1930.** Length 130 mm.

**1070. Thamalakane River at Maun. June 1, 1930.** Length 137 mm.

*Paratilapia deschauenseae* Fowler


*Hemichromis fasciatus* Peters


