

*A Revision of the Cichlid Fishes of the Genus
 Lethrinops, Regan.* By ETHELWYNN TREWAVAS, B.Sc.

THE large collection of Fishes from Lake Nyassa made by Dr. C. Christy in 1925-26 has so greatly increased the British Museum material of *Lethrinops* as to make possible a revision of the genus. This revision has been completed by an examination of the types of *L. argenteus*, Ahl, *L. marginatus*, Ahl, and *L. fasciatus*, Ahl, in Berlin.

The genus was established by Regan in 1921 to include four species—*L. albus*, *L. macrorhynchus*, *L. lethrinus*, and *L. leptodon*. The better definition of generic characters resulting from the examination of more material has led to the inclusion in the genus of four species previously placed in *Haplochromis*, viz., *Haplochromis brevis*, Boulenger, *H. auritus*, Regan (in which is also included *H. macrochir*, Regan), *H. macrophthalmus*, Boulenger, and *H. præorbitalis*, Regan. Of Ahl's three species *L. argenteus* is close to, but is probably distinct from, *L. lethrinus*, *L. marginatus* is somewhat doubtfully referred to the synonymy of *L. alba*, and *L. fasciatus* is an undoubted *L. præorbitalis*. With this last species *L. macrorhynchus* is now also united. The Christy collection adds fifteen new species to the genus, thus bringing the number up to twenty-three.

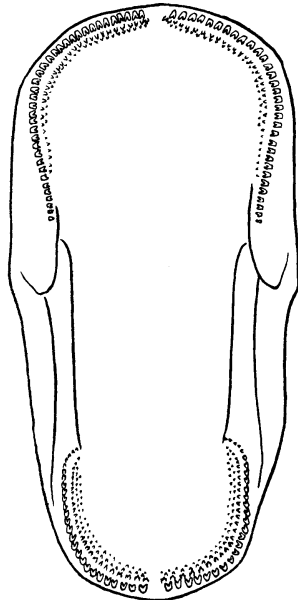
LETHRINOPS, Regan, 1921.
 (Type, *Chromis lethrinus*, Günther.)

Regan, Proc. Zool. Soc. 1921, p. 719.

Lower jaw narrow at symphysis, on either side of which it expands to form a flat, often nearly horizontal

surface for the teeth. Teeth small, in 2 to 5 series; outer bicuspid anteriorly, simple posteriorly (in *L. alta* all simple); inner simple or tricuspid, rarely a few bicuspid. Series of teeth forming bands that are more or less definitely interrupted at the symphyses. Band of teeth in lower jaw semicircular, incurved behind, ending somewhat abruptly at some distance from angle of mouth, not continued backwards as a single series. Scales usually finely denticulate, 28 to 35 in a longitudinal

Fig. 1.

Dentition of *Lethrinops lethrinus*, 130 mm. specimen. $\times 4$.

series. Dorsal XIV–XVII 10–13. Anal III 8–11. Caudal scaly, more or less distinctly emarginate, sometimes forked.

Pharyngeal apophysis formed by parasphenoid and basioccipital, with transverse oval articular facets. Vertebrae (counted in four skeletons) 30 to 32 (13–14 + 17–19); third vertebra with inferior apophyses united below.

Lake Nyassa.

This genus is distinguished from *Haplochromis* by the shape of the lower jaw and by the dentition.

L. christyi, *L. præorbitalis*, and *L. laticeps* are distinguished from the rest of the genus by their long snouts. Among the short-snouted forms *L. macracanthus* stands out by reason of its deep body, numerous gill-rakers, and flat grinding pharyngeal teeth. *L. variabilis*, *L. lituris*, and *L. brevis* form a distinct group characterized by few gill-rakers, and by a lower pharyngeal of peculiar shape, bearing cylindrical, backwardly curved teeth (fig. 4).

The other species fall into ill-defined groups round *L. aurita*, *L. lethrinus*, and *L. alba*, respectively, with *L. furcicauda* of the *L. lethrinus* group and *L. furcifer* of the *L. alba* group showing the even outline and forked tail of the active swimmer.

Coloration.

About ten dark vertical bars can be seen more or less plainly in most of the species. Additional markings belong mainly to two well-marked types, both of which are common in other Nyassa genera.

Type A.—A dark oblique band near and parallel to dorsal outline from nape to base of caudal; found in *L. brevis*, *L. cyrtonotus*, *L. furcicauda*, *L. laticeps*, and a few *L. præorbitalis*. The same band, broken up into spots on the cross-bars, is found in some *L. præorbitalis* and about half of the specimens of *L. variabilis* (fig. 2, A).

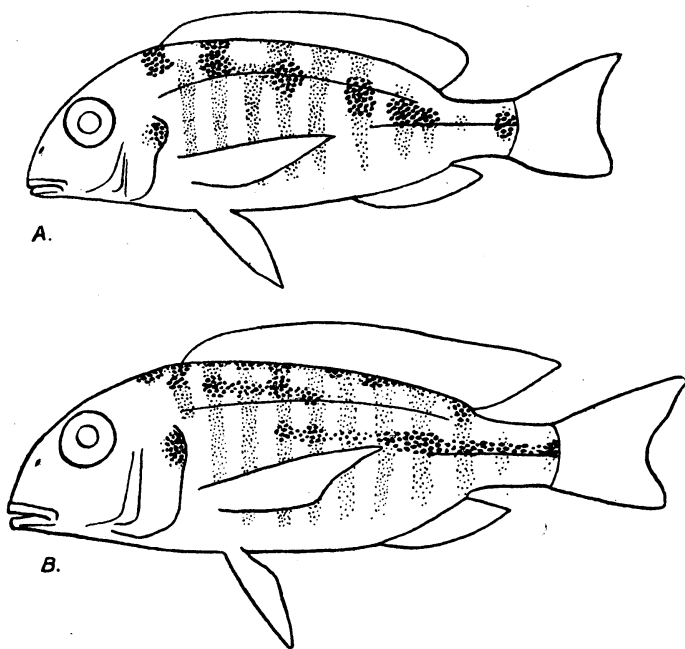
Type B.—A dark streak or series of spots at base of dorsal, a parallel streak above or crossing upper lateral line below spinous dorsal, and a third along lower lateral line running forwards to head or ending below some part of spinous dorsal; found in the remaining specimens of *L. variabilis* (fig. 2, B), in *L. trilineata*, and the majority of specimens of *L. lethrinus*, and perhaps in *L. oculata*. In a modification of this type the lowest streak curves upwards anteriorly to meet and fuse with the middle streak on the upper lateral line. This is found in certain specimens of *L. lethrinus*, whose darker general coloration and large size suggest that they may be mature males, and in *L. leptodon*. In some specimens of *L. leptodon* and in *L. lunaris* all that remains of the pattern is the indefinite dark patch formed by fusion of the lower and middle lines.

An indefinite dark patch on the upper lateral line is found also in *L. furcifer* and *L. lituris*, and in some specimens of *L. aurita* and *L. alba*. The remaining species have a silvery or yellowish colour, usually darker above.

Secondary Sexual Characters.

Unfortunately the viscera were removed before preservation, so that secondary sexual characters can be checked only by analogy with species of other genera and by examining occasional fragments of gonads that remain. In nearly all the species, specimens are found with dorsal, anal, and pelvic fins produced; dorsal dark within a broader or narrower pale margin, and with series of spots, sometimes forming stripes; caudal with spots or irregular

Fig. 2.



Lethrinops variabilis. Two specimens showing the two types of colour-pattern, A and B. $\times \frac{3}{4}$.

stripes; anal dusky distally, with several large ocelli; pelvics often dusky; darker colour on snout, nape, and body, and vertical bars often very distinct. These are no doubt mature males. The colour in life of such a male of *L. præorbitalis* was described by the collector thus:

"Lavender each side of face, less so along back ; lavender and dull yellow stripes on caudal fin. Twenty minutes after taking out of water lavender changed to deep electric blue."

The general body-colour of females is paler, but the specific colour-pattern, if any, is more distinct. The fins are smaller and paler, the spots on dorsal and caudal are few or absent, and the anal ocelli, if present, are small and faint.

In males of *L. furcifer* and *L. furcicauda* the margin of the dorsal fin is even, not produced into lappets, as in *Cyrtocara* ; a few highly coloured males of *L. præorbitalis* show the same feature.

Synopsis of the Species.

- I. Diameter of eye $2\frac{1}{2}$ (young) to a little more than 4 in length of head ; snout $\frac{3}{8}$ * to $1\frac{1}{2}$ diameter of eye.
 - A. Anterior pharyngeal teeth cylindrical, with ends curved strongly backwards ; 5 to 8 gill-rakers on lower part of anterior arch.
 1. 5 to 8 gill-rakers, 2 to 4 of which are short and thick, on lower part of anterior arch ; diameter of eye 3 to $3\frac{1}{2}$ in length of head 1. *variabilis*.
 2. 7 or 8 gill-rakers, the lower small but not thick, on lower part of anterior arch.
 - Diameter of eye 3 to $3\frac{1}{2}$ in length of head ; an indefinite dark patch on upper lateral line 2. *lituris*.
 - Diameter of eye $2\frac{1}{2}$ to 3 in length of head ; a dark oblique band from nape to caudal.. 3. *brevis*.
 - B. Anterior pharyngeal teeth somewhat compressed, with minute anterior cusp, and with ends curved backwards ; 9 gill-rakers on lower part of anterior arch 4. *trilineata*.
 - C. Anterior pharyngeal teeth compressed, with anterior cusp and with ends usually straight or turned forwards.
 1. Depth of præorbital $4\frac{1}{2}$ to 7 in length of head.
 - a. Lower pharyngeal deeply notched behind, with numerous small teeth. 9 to 12 gill-rakers on lower part of anterior arch 5. *microstoma*.
 - b. Lower pharyngeal sub-triangular, usually with a group of enlarged teeth at posterior end of 2 to 4 middle series.
 - a. 9 to 11 gill-rakers on lower part of anterior arch. 6. *parvidens*.
 - β. 12 to 16 gill-rakers on lower part of anterior arch.
 - (i) Dorsal XIV-XVII 10-11 ; no dark band parallel to dorsal outline.
 - * Diameter of eye $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head (in specimens of 70 to 80 mm.). 12 or 13 gill-rakers on lower part of anterior arch 7. *macrophthalmus*.

- ** Diameter of eye $2\frac{1}{2}$ to $3\frac{1}{2}$ in length of head (in specimens of 65 to 140 mm.).
- 12 to 15 gill-rakers on lower part of anterior arch; pectoral fin not extending beyond middle of anal; 9 vertical bars, if any, below dorsal fin 8. *aurita*.
- 16 gill-rakers on lower part of anterior arch; pectoral fin reaching end of anal; 7 vertical bars below dorsal fin 9. *longimanus*.
- (ii) Dorsal XV 13; a dark band from nape to caudal, near and parallel to dorsal outline.
10. *cyrtotonotus*.
2. Depth of præorbital 3 to $4\frac{1}{2}$ (rarely 5 in young) in length of head.
- a. 19 or 20 gill-rakers on lower part of anterior arch; depth of body 2 in the length 11. *macracanthus*.
- b. 9 to 14 gill-rakers on lower part of anterior arch; caudal moderately or crescentically emarginate.
- a. Depth of body $2\frac{1}{2}$ in the length; 9 to 11 gill-rakers on lower part of anterior arch.
- Teeth in jaws in two series, the outer simple;
lower jaw shorter than upper 12. *alta*.
- Teeth in jaws in 3 to 5 series; lower jaw slightly projecting 13. *argentea*.
- β. Depth of body $2\frac{1}{2}$ to 3 in the length.
- (i) Snout 1 (young) to $1\frac{1}{2}$ diameter of eye; usually a few posterior median teeth of lower pharyngeal enlarged.
* 9 to 11 gill-rakers on lower part of anterior arch.
14. *lethrinus*.
- ** 11 to 14 gill-rakers on lower part of anterior arch.
- Depth of præorbital 3 to $3\frac{1}{2}$ in length of head;
teeth in 3 or 4 series 15. *leptodon*.
- Depth of præorbital $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head;
teeth in 2 series 16. *lunaris*.
- (ii) Snout $\frac{3}{4}$ to $1\frac{1}{2}$ diameter of eye; pharyngeal teeth all small.
- Diameter of eye $\frac{1}{2}$ length of head (in a specimen of 130 mm.) 17. *oculata*.
- Diameter of eye less than $\frac{1}{2}$ length of head (in specimens of 120 mm. or more) 18. *alba*.
- c. 9 to 12 gill-rakers on lower part of anterior arch; caudal forked.
- Depth of præorbital $3\frac{1}{2}$ to $4\frac{1}{2}$ in length of head;
no dark band parallel to dorsal outline... 19. *furcifer*.
- Depth of præorbital $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head;
a dark band on body near and parallel to dorsal outline 20. *furcicauda*.
- II. Diameter of eye $3\frac{1}{2}$ (young) to 6 in length of head; snout, in adult, $1\frac{1}{2}$ to $2\frac{1}{2}$ diameter of eye.
- A. Depth of præorbital $3\frac{1}{2}$ to 4 in length of head (in specimens of 110 to 183 mm.) 21. *christyi*.
- B. Depth of præorbital $2\frac{1}{2}$ to $3\frac{1}{2}$ in length of head (in specimens of 140 to 300 mm.).
- Head $2\frac{1}{2}$ to $2\frac{3}{4}$ as long as broad 22. *laticeps*.
- Head $2\frac{1}{2}$ to $2\frac{3}{4}$ as long as broad 23. *præorbitalis*.

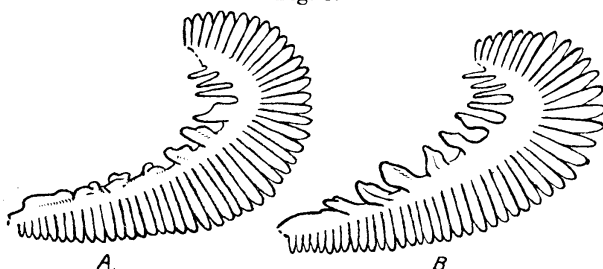
1. *Lethrinops variabilis*, sp. n.

Depth of body $2\frac{1}{2}$ to 3 times in the length.

Snout decurved, equal to or shorter than diameter of eye. Maxillary reaching vertical from anterior edge of eye or nearly. Depth of præorbital 4 to 5 (5 to 7 in specimens of less than 100 mm.) in length of head. Gill-rakers on those parts of arches forming floor of pharynx, short, thick, fleshy lobes (fig. 3). Lower pharyngeal with dentigerous area broadly blunt in front, and with anterior blade short and deep. Dorsal XIV–XVI 10–12. Anal III 8–9. Colour either of type A, with the band represented by dark spots on 7 or 8 of the vertical bars, or of type B (fig. 2).

Twenty-nine specimens, 63 to 173 mm. in total length (coll. Christy).

Fig. 3.



Anterior gill-arch of : A, *Lethrinops variabilis*; B, *L. brevis*.

I have been unable to correlate the difference of colour-pattern with any other differences. Specimens of both sexes are found in each of the colour-pattern groups. All the type B specimens were taken at the southern end of the lake, and all of type A, except one female with young, from the north (Vua and Mwaya).

2. *Lethrinops lituris*, sp. n.

Depth of body $2\frac{1}{2}$ to nearly 3 in the length.

Snout decurved, as long as or shorter than diameter of eye. Maxillary reaching vertical from anterior edge of eye or nearly. Depth of præorbital $3\frac{1}{5}$ to $4\frac{2}{3}$ in length of head. Lower gill-rakers short, but not thick and fleshy. Lower pharyngeal with dentigerous area less blunt than in *L. variabilis* or *L. brevis*; anterior blade rather short.

Dorsal XV–XVI 10–12. Anal III 8–10. Colour silvery, with an indefinite patch on upper lateral line below spinous dorsal, and, in some specimens, another between lateral lines.

Forty-seven specimens, 88 to 168 mm. in total length (coll. Christy).

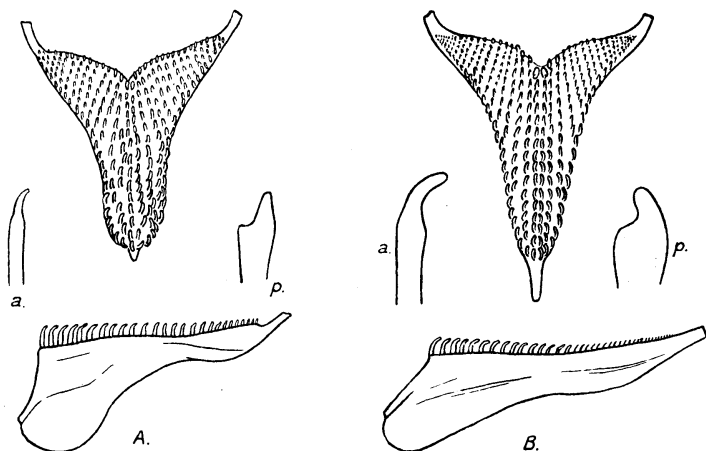
3. *Lethrinops brevis*, Boulenger, 1908.

Tilapia brevis, Boulenger, Cat. Afr. Fish. iii. p. 262, fig. 177 (1915).
Haplochromis brevis, Regan, Proc. Zool. Soc. 1921, p. 709.

Depth of body $2\frac{1}{2}$ to $2\frac{3}{4}$ times in the length.

Snout decurved, shorter than diameter of eye. Maxillary extending to below anterior edge of eye. Depth of

Fig. 4.



Lower pharyngeal of: A, *Lethrinops variabilis* (145 mm. specimen);
 B, *L. brevis* (162 mm. specimen), seen from above and from the left. $\times 3\frac{1}{4}$.

(a) anterior, and (p) posterior, tooth of a middle row, seen from the left.

præorbital 4 to $5\frac{1}{2}$ in length of head. Lower gill-rakers not thick and fleshy (fig. 3). Lower pharyngeal with denticerous area blunt in front and anterior blade short and deep (fig. 4, B). Dorsal XV–XVI 11–12. Anal III 9–10. A broad continuous oblique band from nape to caudal.

Described from the types, 70 and 75 mm., and four specimens (coll. Christy), 132 to 163 mm. in total length.

4. *Lethrinops trilineata*, sp. n.

Depth of body $2\frac{3}{5}$ times in the length.

Snout with slightly convex profile, as long as diameter of eye. Maxillary not reaching vertical from anterior edge of eye. Depth of præorbital $4\frac{1}{2}$ in length of head, interorbital width 4, length of lower jaw $2\frac{1}{2}$. 9 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area rather blunt in front, and with anterior blade moderately long; anterior pharyngeal teeth somewhat compressed, curved backwards, with a minute anterior cusp. Dorsal XVI 11. Anal III 10. Colour of type B, with the lowest stripe extending forwards to head.

A single specimen, 132 mm. in total length (coll. Christy).

This fish is distinguished from *L. microstoma* by the longer lower jaw and by the coloration. It approaches *L. lituris* in the number of gill-rakers and the structure of the pharyngeal teeth, and *L. variabilis* in coloration.

5. *Lethrinops microstoma*, sp. n.

Depth of body $2\frac{1}{2}$ to $2\frac{4}{5}$ times in the length.

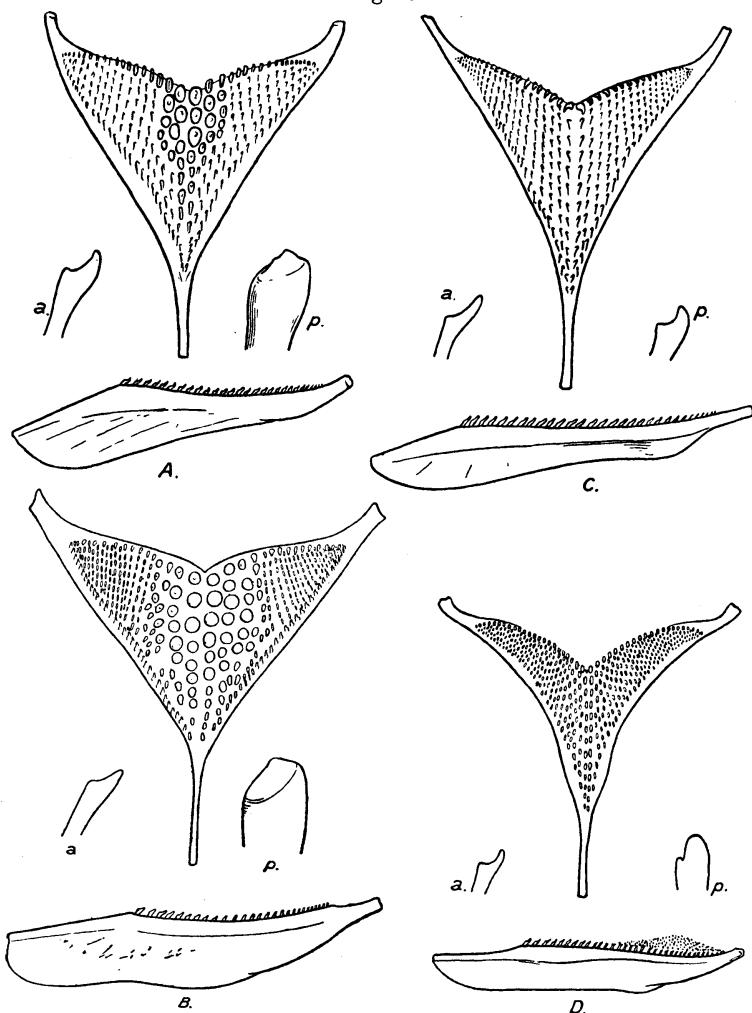
Snout with straight or slightly convex profile, as long as, or shorter than, diameter of eye. Maxillary usually not reaching vertical from anterior edge of eye. Depth of præorbital $4\frac{1}{4}$ to $4\frac{3}{4}$ in length of head, interorbital width $3\frac{2}{3}$ to $4\frac{1}{4}$, length of lower jaw $2\frac{2}{3}$ to 3. 9 to 12 gill-rakers on lower part of anterior arch. Lower pharyngeal (fig. 5, D) with dentigerous area acute in front, deeply notched behind, and with anterior blade long; pharyngeal teeth small, numerous, compressed, with an anterior cusp and ends turned forwards; rarely a few anterior teeth with ends directed backwards. Dorsal XIV–XVII 10–12. Anal III 9–10. Pectoral about as long as head, reaching origin of anal, or nearly. Usually traces of about 10 vertical dark bars on body, and sometimes an indefinite dark patch on upper lateral line.

Twenty specimens, 95 to 145 mm. in total length (coll. Christy).

6. *Lethrinops parvidens*, sp. n.

Depth of body $2\frac{2}{3}$ to $2\frac{3}{4}$ in the length. Snout with straight or slightly convex profile, $\frac{3}{4}$ to a little longer

Fig. 5.



Lower pharyngeals, seen from above and from the left side, of :

A. *Lethrinops alta* ($\times 3\frac{1}{2}$), from a specimen 158 mm. long.

B. *L. macracanthus* ($\times 2\frac{1}{2}$), from a specimen 200 mm. long.

C. *L. alba* ($\times 3\frac{1}{2}$), from a specimen 165 mm. long.

D. *L. microstoma* ($\times 3\frac{1}{2}$), from a specimen 136 mm. long.

A and B represent the sub-triangular type, with large teeth, C is moderately notched behind, with small teeth, D is deeply notched behind, with numerous very small teeth.

(a) anterior, (p) posterior, tooth of a middle row, seen from the left.

than diameter of eye. Maxillary not extending to below eye. Depth of præorbital $4\frac{2}{5}$ to $5\frac{1}{5}$ in length of head, interorbital width 4 to $4\frac{1}{2}$, length of lower jaw $2\frac{3}{5}$ to $2\frac{4}{5}$. 9 to 11 gill-rakers on lower part of anterior arch. Lower pharyngeal subtriangular, or rather deeply notched behind, acute anteriorly with long anterior blade; posterior teeth of 2 to 4 middle series enlarged and blunt, other teeth compressed, with an anterior cusp and with ends turned forwards, or a few anterior teeth with ends directed backwards. Dorsal XIV–XVI 10–12. Anal III 8–10. Pectoral about as long as head, reaching origin of anal or beyond. Silvery; sometimes an indefinite dark patch on upper lateral line below spinous dorsal, occasionally another below soft dorsal; occasionally traces of about 10 dark vertical bars.

Eight specimens, 90 to 128 mm. in total length (coll. Christy).

This species differs from *L. microstoma* in the structure of the pharyngeal teeth, and from *L. aurita* in the fewer gill-rakers and somewhat smaller mouth.

7. *Lethrinops macrophthalmus*, Boulenger, 1908.

Tilapia macrophthalmus (part.), Boulenger, Cat. Afr. Fish. iii. p. 261, fig. 176.

Haplochromis macrophthalmus, Regan, Proc. Zool. Soc. 1921, p. 714.

Depth of body $2\frac{2}{3}$ to 3 in the length. Snout decurved, shorter than diameter of eye, which is $2\frac{1}{2}$ to $2\frac{3}{5}$ in length of head, depth of præorbital 6 to 7, interorbital width $4\frac{3}{4}$ to $5\frac{1}{4}$, length of lower jaw $2\frac{3}{4}$ to $2\frac{4}{5}$. Maxillary extending to vertical from anterior edge of eye or nearly, never beyond. 12 to 13 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area acute in front, sub-triangular or moderately notched behind, with posterior teeth of two middle series sometimes slightly enlarged; other teeth small, compressed, with anterior cusp and with ends turned forwards. Dorsal XVI 10. Anal III 8. Pectoral a little longer than head, extending to above anal. Colour silvery.

Four young fish, types of *T. macrophthalmus*, 70 to 80 mm. in total length (coll. Rhoades).

These are distinguished from young specimens of *L. aurita* by the larger eye, shorter maxillary, narrower interorbital region, and lesser depth of præorbital.

8. *Lethrinops aurita*, Regan, 1921.

Haplochromis auritus, Regan, Proc. Zool. Soc. 1921, p. 699, fig 14.
Haplochromis macrochir, Regan, *tom. cit.* p. 712, fig. 24.

Depth of body $2\frac{1}{3}$ to $2\frac{4}{5}$ (young) in the length. Snout with straight or slightly convex profile, $\frac{2}{3}$ to a little longer than diameter of eye, which is $2\frac{3}{4}$ to $3\frac{2}{3}$ in length of head, interorbital width $3\frac{3}{4}$ to $4\frac{1}{2}$, depth of præorbital $4\frac{1}{4}$ to 6, length of lower jaw $2\frac{2}{5}$ to $2\frac{3}{4}$. Maxillary extending to below eye or nearly (in specimens up to 105 mm. always to vertical from anterior edge of eye or beyond). 12 to 15 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area sub-triangular, not deeply notched behind; a group of 4 to 20 enlarged blunt teeth posteriorly; other teeth compressed, with anterior cusp, and with ends turned forwards or straight. Dorsal XV–XVII 10–11. Anal III 8–10. Pectoral longer than head, extending to above anal, usually to above soft anal. Body either silvery, with or without an indefinite dark patch on upper lateral line below spinous dorsal, or darker, with 10 or 11 vertical bars, of which 9 are below dorsal fin, and which may be accentuated on upper lateral line below spinous dorsal.

Described from the type of *H. auritus*, 80 mm. (coll. Wood), the types of *H. macrochir*, 115 and 130 mm. (coll. Wood), and twenty-one specimens, 93 to 140 mm. in total length (coll. Christy).

The specimens of the Christy collection form a series connecting the young type of *H. auritus* with the adult types of *H. macrochir*, and exhibiting a considerable range of variation, notably in the number of enlarged pharyngeal teeth and in the size of the eye. The diameter of the eye in two specimens of 140 mm. is respectively $3\frac{1}{3}$ and $3\frac{2}{3}$ in the length of the head, in three specimens of 120 mm. is $3\frac{1}{4}$, and in three others of the same length $3\frac{1}{2}$. As, however, other correlated differences cannot be found, this is ascribed to individual variation.

Six young fish, 65 to 73 mm. long, are referred to this species and have the following characters: Diameter of eye $2\frac{1}{2}$ to 3 in length of head, interorbital width $4\frac{1}{3}$ to $4\frac{3}{4}$, depth of præorbital $5\frac{1}{2}$ to a little more than 6. Maxillary reaching vertical from anterior edge of eye. 12 to 13 gill-rakers on lower part of anterior arch. 2 to 6 posterior teeth of lower pharyngeal slightly enlarged.

9. *Lethrinops longimanus*, sp. n.

Depth of body $2\frac{1}{3}$ in the length. Snout with very slightly convex profile, $1\frac{1}{4}$ diameter of eye, which is $3\frac{1}{2}$ in length of head ; interorbital width and depth of præorbital $4\frac{1}{3}$, length of lower jaw $2\frac{2}{3}$. Maxillary not reaching vertical from anterior edge of eye. 16 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area sub-triangular, not deeply notched behind ; a group of 14 enlarged blunt teeth posteriorly. Dorsal XVI 10. Anal III 10. Pectoral nearly $1\frac{1}{4}$ length of head, reaching end of anal. Body with 9 or 10 dark vertical bars, of which 7 are below dorsal fin.

A single specimen, 133 mm. in total length (coll. Christy).

This species is distinguished from *L. aurita* by the longer snout, longer pectoral fin, and more widely spaced vertical bars.

10. *Lethrinops cyrtonotus*, sp. n.

Depth of body $2\frac{1}{2}$ in the length. Snout with straight profile, as long as diameter of eye, which is $3\frac{2}{3}$ in length of head ; interorbital width 4, depth of præorbital $4\frac{2}{3}$, length of lower jaw $2\frac{2}{3}$. Maxillary reaching vertical from anterior edge of eye. 13 or 14 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area subtriangular, not deeply notched behind ; a group of about 10 enlarged blunt teeth posteriorly. Dorsal XV 13. Anal III 10. Pectoral as long as head, extending nearly to middle of anal. A broad dark band from nape to caudal, near and parallel to dorsal outline, which is highly arched.

A single specimen, 112 mm. in total length (coll. Christy).

This species is distinguished from the three preceding by the highly arched dorsal outline, the large number of soft rays in the dorsal fin, and the coloration.

11. *Lethrinops macracanthus*, sp. n.

Depth of body 2 in the length. Snout steeply declivous, a little longer than diameter of eye, which is 4 in length of head, equal to depth of præorbital. Lower jaw $2\frac{1}{3}$ in length of head ; maxillary reaching vertical from anterior edge of eye. 19 or 20 gill-rakers on lower part of anterior arch. Lower pharyngeal large and strong, with all teeth

of six middle series, except a few anteriorly, enlarged and blunt (fig. 5, B). Dorsal XVII 10; spines strong. Anal III 10. Traces of about 9 dark vertical bars on body.

A single specimen, 200 mm. in total length (coll. Christy).

12. *Lethrinops alta*, sp. n.

Depth of body $2\frac{1}{3}$ in the length. Snout declivous, $1\frac{1}{3}$ diameter of eye. Maxillary ending halfway between nostril and eye. Depth of præorbital $3\frac{2}{3}$ in length of head. Jaws somewhat pointed at symphysis, lower shorter than upper; teeth in 2 series, inner very small, outer small, simple. 10 or 11 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area sub-triangular; posterior teeth of five middle series enlarged (fig. 5, A). Dorsal XV 11. Anal III 9. 10 dark vertical bars on body.

A single specimen, 158 mm. in total length (coll. Christy).

13. *Lethrinops argentea*, Ahl, 1927.

Lethrinops argenteus, Ahl, Sitzungsber. Ges. naturf. Fr. Berl. 1927, p. 60.

Depth of body $2\frac{1}{3}$ in the length. Snout with straight steep profile, a little shorter than post-orbital region. Maxillary not reaching vertical from anterior edge of eye. Depth of præorbital $3\frac{1}{3}$ in length of head. Lower jaw slightly projecting, teeth in 3 to 5 series. 9 or 10 gill-rakers on lower part of anterior arch. Lower pharyngeal with posterior teeth of the two middle rows enlarged (in one specimen examined). Dorsal XVI 10-11. Anal III 9. Male yellowish silver with traces of vertical bars; females paler.

Known from the types, four specimens (1 male, 3 females), 155 to 175 mm. in total length.

14. *Lethrinops lethrinus*, (Günther, 1893.)

Chromis lethrinus, Günther, Proc. Zool. Soc. 1893, p. 622, pl. iv. A.
Tilapia lethrinus (part.), Boulenger, Cat. Afr. Fish. iii. p. 254, fig. 171.
Lethrinops lethrinus, Regan, Proc. Zool. Soc. 1921, p. 720.

Depth of body $2\frac{1}{2}$ to 3 in the length. Snout declivous, about as long as post-orbital part of head, 1 to $1\frac{2}{3}$ diameter of eye. Depth of præorbital 3 to 4 in length of head. Jaws equal anteriorly or lower slightly projecting; maxillary extending to between nostril and eye; teeth in 2 or

3 series in upper jaw, 3 or 4 in lower ; anterior outer teeth bicuspid. 9 to 11 gill-rakers on lower part of anterior arch. Lower pharyngeal with posterior teeth of two or four middle series often enlarged, but sometimes teeth all small. Dorsal XV-XVI 10-11. Anal III 8-10. Colour of type B in females and young ; in some larger specimens, probably mature males, the lowest horizontal stripe runs forwards and upwards, fusing with the middle stripe on the upper lateral line below the spinous dorsal.

Described from the type (coll. Johnston), 140 mm., two specimens (coll. Moore), 180 and 200 mm., and 52 specimens (coll. Christy), 78 to 185 mm. in total length.

15. *Lethrinops leptodon*, Regan, 1921.

Depth of body $2\frac{2}{3}$ to nearly 3 in the length. Snout declivous, as long as post-orbital part of head, or nearly, 1 to $1\frac{1}{2}$ diameter of eye. Depth of præorbital 3 to $3\frac{2}{3}$ in length of head. Jaws equal anteriorly, or lower jaw slightly projecting ; maxillary usually not reaching vertical from anterior edge of eye ; teeth in 3 or 4 series, the anterior outer teeth bicuspid. 11 to 14 gill-rakers on lower part of anterior arch. Lower pharyngeal with posterior teeth of two or four middle series enlarged more or less, or teeth all small. Dorsal XV-XVI 10-11. Anal III 9-10. Colour-pattern a modified form of type B, with all specimens, small or large, pale or dark, having the lowest stripe fused with the one above it below spinous dorsal to form a dark patch which, in some, is the only remaining part of the pattern.

Described from seven of the types (coll. Wood), 130 to 195 mm., and two specimens (coll. Christy), 130 and 160 mm. in total length.

Close to *L. lethrinus*, from which it is only partially distinguished by the coloration, and by the number of gill-rakers. Of fifty specimens of *L. lethrinus*, seven have 9 gill-rakers on the lower part of the anterior arch, three 9 or 10, thirty-five 10, two 10 or 11, and three 11. Of the nine specimens of *L. leptodon*, two have 11, four 12, one 12 or 13, one 13, and one 13 on one side and 14 on the other.

It is distinguished from *L. argentea* by more numerous gill-rakers and lesser depth of body, and by the colour-pattern.

16. *Lethrinops lunaris*, sp. n.

Lethrinops leptodon (part.), Regan, Proc. Zool. Soc. 1921, p. 721.

Depth of body $2\frac{1}{2}$ to $2\frac{2}{3}$ in the length. Snout shorter than post-orbital part of head, 1 to $1\frac{1}{3}$ diameter of eye. Depth of præorbital $3\frac{1}{2}$ to $3\frac{1}{3}$ in length of head. Jaws equal anteriorly or lower jaw slightly projecting; maxillary nearly or quite reaching vertical from anterior edge of eye; teeth small, in 2 series; outer teeth mostly bicuspid. 12 or 13 gill-rakers on lower part of anterior arch. Lower pharyngeal with posterior teeth of two or four middle series slightly enlarged and blunt. Dorsal XV 11-13. Anal III 9-10. Caudal deeply emarginate. Body darker at base of dorsal; an indefinite dark patch on upper lateral line below spinous dorsal, and very faint traces of about 8 vertical bars.

Described from one of the types of *L. leptodon*, 177 mm. (coll. Wood), and five specimens (coll. Christy), 138 to 186 mm. in total length.

Distinguished from *L. leptodon* by the more deeply emarginate caudal and slightly narrower præorbital.

17. *Lethrinops oculata*, sp. n.

Depth of body nearly 3 in the length. Snout declivous, equal to diameter of eye, which is $\frac{1}{3}$ length of head. Depth of præorbital 4 in length of head. Jaws equal anteriorly; maxillary nearly reaching vertical from anterior edge of eye; teeth in 2 series. 9 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area deeply notched behind; teeth small, compressed, with anterior cusp. Dorsal XV 11. Anal III 9. Caudal emarginate. Body darker on nape and at base of dorsal; two or three faint spots above upper lateral line and traces of one or two on lower.

A single specimen, 135 mm. in total length (coll. Christy).

Distinguished from specimens of *L. alba* of the same size by the larger eye.

18. *Lethrinops alba*, Regan, 1921.

Tilapia macrophthalmia (part.), Boulenger, Cat. Afr. Fish. iii. p. 261.

Lethrinops albus, Regan, Proc. Zool. Soc. 1921, p. 719.

? *Lethrinops marginatus*, Ahl, Sitzungsber. Ges. naturf. Fr. Berl. 1927, p. 61.

Depth of body $2\frac{2}{3}$ to 3 in the length. Snout with straight or slightly convex profile, $\frac{3}{4}$ to $1\frac{1}{3}$ diameter of eye,

which is 3 to 4 in length of head. Depth of præorbital $3\frac{2}{3}$ to $4\frac{1}{2}$ in length of head, length of lower jaw $2\frac{1}{4}$ to $2\frac{3}{4}$. Jaws equal anteriorly or lower jaw slightly projecting; maxillary ending not far short of vertical from anterior edge of eye; teeth in 2, or, rarely, 3 series in upper jaw, 3 in lower. 9 to 13 gill-rakers on lower part of anterior arch. Lower pharyngeal with dentigerous area moderately notched behind; teeth small, compressed, with anterior cusp and ends straight or curved forwards (fig. 5, C). Dorsal XIV-XVI 10-12. Anal III 8-10. Caudal moderately emarginate. Usually traces of about 10 vertical bars, occasionally darker on upper lateral line.

Described from the type, 100 mm. in total length (coll. Johnston), and 23 specimens (coll. Christy), 105 to 165 mm. in total length. Two young fish, 84 and 88 mm., are included in this species, their larger eye, narrower præorbital and slenderer form being regarded as juvenile characters.

19. *Lethrinops furcifer*, sp. n.

Depth of body $2\frac{2}{3}$ to 3 in the length. Snout with convex profile, a little longer than diameter of eye. Depth of præorbital $3\frac{2}{3}$ to $4\frac{1}{4}$ in length of head. Jaws equal anteriorly; maxillary not or only just reaching vertical from anterior edge of eye; teeth small, in 2 series in upper jaw, 3 in lower. 9 to 11 gill-rakers on lower part of anterior arch. Lower pharyngeal teeth small, compressed, with anterior cusp. Dorsal XV-XVI 11-13. Anal III 9-11. Caudal forked. Dorsal and anal fin-membranes with straight edges between the spines in male, with small lappets in female. Body silvery, with an indefinite dark patch above upper lateral line; sometimes traces, darker in males, of about 10 vertical bars.

Twelve specimens, 120 to 195 mm. in total length (coll. Christy).

A young fish, 84 mm. long, probably belongs to this species, from which it differs in juvenile features (eye 3 in length of head, præorbital depth 5) and in having the faint vertical bars accentuated under the spinous dorsal as five spots and on the tail as four.

20. *Lethrinops furcicauda*, sp. n.

Depth of body $2\frac{1}{2}$ to 3 in the length. Snout declivous or with slightly convex profile, $1\frac{1}{4}$ to $1\frac{1}{2}$ diameter of eye.

Depth of præorbital $3\frac{1}{4}$ to $3\frac{3}{5}$ in length of head. Jaws equal anteriorly or lower jaw slightly projecting; maxillary extending to between nostril and eye; teeth in 2 or 3 series in upper jaw, 3 or 4 in lower. 10 to 12 gill-rakers on lower part of anterior arch. Lower pharyngeal teeth small, compressed, with ends curved slightly forwards; rarely three posterior teeth of two or four middle series enlarged and less compressed. Dorsal XV-XVI * 11-13. Anal III 9-10. Caudal deeply emarginate. Dorsal and anal fin-membranes with straight edges between the spines in males, with lappets in females. An oblique dark band from nape to caudal.

Nineteen specimens, 175 to 210 mm. in total length (coll. Christy).

21. *Lethrinops christyi*, sp. n.

Depth of body $2\frac{1}{2}$ to $2\frac{3}{5}$ in the length, length of head 3 to $3\frac{1}{3}$. Snout with straight or concave profile, longer than post-orbital region, $1\frac{2}{5}$ (young) to $1\frac{1}{3}$ diameter of eye, which is $3\frac{1}{2}$ (young) to $4\frac{1}{2}$ in length of head, interorbital width $3\frac{3}{4}$ to $4\frac{1}{3}$, depth of præorbital $3\frac{1}{2}$ to 4. Jaws equal anteriorly or lower slightly projecting; maxillary ending just behind nostril; teeth very small, in 2 series. 8 or 9 gill-rakers on lower part of anterior arch. Lower pharyngeal teeth small, compressed, with anterior cusp. Dorsal XV-XVI 11. Anal III 9-10. Body with 10 or 11 vertical bars, of which 8 are below dorsal fin.

Three specimens, 110, 114, and 183 mm. in total length (coll. Christy).

22. *Lethrinops laticeps*, sp. n.

Depth of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the length, length of head $2\frac{3}{5}$ to 3. Head $2\frac{1}{5}$ to $2\frac{1}{3}$ as long as broad. Snout with straight profile, a little longer than post-orbital region, $1\frac{3}{4}$ to $2\frac{1}{3}$ diameter of eye, which is $4\frac{2}{3}$ to $5\frac{1}{3}$ in length of head, interorbital width $3\frac{1}{2}$ to 4, depth of præorbital 3 to $3\frac{1}{3}$. Jaws equal anteriorly, or lower slightly projecting; maxillary ending nearer nostril than eye; teeth in 3 or 4 series in upper jaw, 4 or 5 in lower. 10 to 12 gill-rakers on lower part of anterior arch. Lower pharyngeal teeth small, compressed, with anterior cusp. Dorsal

* One specimen has a weak spine after the 8th, giving XVII.

XV–XVI 11–13. Anal III 9–10. A dark oblique band, more distinct in females than in males, from nape to base of caudal; traces of 8 to 10 vertical bars.

Thirteen specimens, 210 to 300 mm. in total length (coll. Christy).

23. *Lethrinops præorbitalis*, Regan, 1921.

Tilapia lethrinus (part.), Boulenger, Cat. Afr. Fish. iii. 1915, p. 254.

Haplochromis præorbitalis, Regan, Proc. Zool. Soc. 1921, p. 717, pl. iii.

Lethrinops macrorhynchus, Regan, *tom. cit.* p. 720.

Lethrinops fasciatus, Ahl, Sitzungsber. Ges. naturf. Fr. Berl. 1927, p. 61.

Depth of body $2\frac{1}{2}$ to 3 in the length. Head $2\frac{1}{3}$ to $2\frac{2}{3}$ as long as broad. Snout with straight or slightly concave profile, $\frac{2}{5}$ to nearly $\frac{1}{2}$ length of head, $1\frac{2}{3}$ to $2\frac{1}{2}$ diameter of eye, which is 4 to 6 in length of head, interorbital width $3\frac{1}{5}$ to 5, depth of præorbital $2\frac{3}{4}$ to $3\frac{1}{5}$. Lower jaw usually projecting; maxillary ending a little behind nostril; teeth in 2 to 4 series in upper jaw, 3 to 5 in lower. 9 to 11 gill-rakers on lower part of anterior arch. Lower pharyngeal teeth small, compressed, with anterior cusp. Dorsal XIV–XVI 11–13. Anal III 9–11. Females pale, males darker, both darker along back; a few specimens with a broad dark band near and parallel to dorsal outline, some with this band represented by a series of dark spots on the vertical bars, which may be very faint or absent in other specimens.

Described from the types of *Haplochromis præorbitalis* (coll. Wood), 210 and 240 mm., the type of *L. macrorhynchus* (coll. Johnston), 180 mm., and 56 specimens (coll. Christy), 140 to 285 mm. in total length.

Three young fish, 90 to 105 mm. long, are referred to this species, but show certain differences in proportion attributable to age: snout $1\frac{1}{4}$ to $1\frac{1}{2}$ diameter of eye, which is $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, interorbital width 5 to $5\frac{1}{4}$, depth of præorbital $3\frac{3}{4}$ to 4.

L. laticeps and *L. præorbitalis* are closely related species, but, as well as the difference in width of head and of interorbital region, there appear to be higher average numbers of gill-rakers and dorsal spines in *L. laticeps* than in *L. præorbitalis*. Of the thirteen specimens of *L. laticeps*, three have 10 gill-rakers on the lower part of the anterior arch, nine have 11 and one 12; of fifty-five specimens of *L. præorbitalis*, twenty-one have 9, thirty-three 10, and

one 11. Of the thirteen specimens of *L. laticeps*, three have XV dorsal spines and ten XVI; of forty-nine specimens of *L. præorbitalis* two have XIV, thirty-six XV, and eleven XVI.