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ANNALS

OF THE

SOUTH AFRICAN MUSEUM.

(VOL. XI.)

- 1.—*The Arenicolidae of South Africa, including an Account of Arenicola loveni Kinberg.*—By J. H. ASHWORTH, D.Sc.,
Lecturer in Invertebrate Zoology in the University of Edinburgh
(with Plate I. and Five Text-Figures).

INTRODUCTION.

DURING the course of investigations on the genus *Arenicola* it became necessary to determine the characters and systematic position of *A. loveni* Kinberg, and to ascertain if this is a valid species or if, as suggested by several writers, it should be merged with *A. marina*. As a decision regarding the validity and position of the species could be reached only after examination of the type, I applied to Professor Théel for the loan of this specimen, preserved in the Riksmuseum, Stockholm. I beg to express to him my sincere thanks for so readily entrusting to me this interesting and valuable specimen and also for permitting me to make an inspection of its internal organs, without which a definite conclusion regarding the position of the species could not have been attained. My examination of the type specimen showed that the species *A. loveni* Kinberg is a valid one. On ascertaining this I wrote to Professor J. D. F. Gilchrist, inquiring if, during his marine investigations, he had found specimens of *Arenicola* on the shores of South Africa. In reply he sent to me, in July, 1909, four specimens taken in Saldanha Bay, which prove to belong to Kinberg's species. He has since (October, 1910) sent to me examples of *Arenicola* dug from the sand in Table Bay and in Lüderitzbucht (Angra Pequena), and two specimens found cast up dead, after a storm, on the shore of False Bay. I beg to thank Professor Gilchrist for so generously placing these specimens at my disposal.

From the type specimen and the four examples from Saldanha Bay I have prepared a description, and a new and full diagnosis, of *A. loveni*. The examples from False Bay belong to this species.

The well-preserved material from Lüderitzbucht enables me to revise and correct a previous record from the same locality, and forms the basis of remarks on the distribution of *A. assimilis*.

ARENICOLA LOVENI KINBERG.

HISTORICAL ACCOUNT.

The species *Arenicola loveni* Kinberg was founded on a specimen collected at Port Natal, near Durban; it was defined by J. G. H. Kinberg in his "Annulata Nova" * in the following terms: "Segmentum buccale triannulum, segmenta setigera 20 quorum sex anteriora singulumque postremum ebranchiata; longitudino 395-400 mm.; latitudo 20 mm." Following this diagnosis is the reference "Eug. Resa, Ann. T. xxviii. l." This Plate XXVIII. forms one of a series,† containing figures of the Annulata collected on the voyage round the world of the frigate *Eugenie*, prepared for issue in 1857, that is, ten years prior to the publication of the diagnosis of the species. Although copies of the plate were printed, they were never actually published. The figures on this plate relating to *Arenicola loveni* were, until recently, known to me only through a short description of them published by Professor Fauvel.‡ My thanks are due to Professor Théel for his kindness in sending to me a copy of this interesting plate.

The species *A. loveni* is not mentioned in the literature, so far as I am aware, from 1867 until 1888, when, in discussing the ecaudate species of *Arenicola*, Professor von Marenzeller § stated that these species may have a chaetigerous segment behind the last branchiferous one, and that similar cases have been previously met with—for instance, *A. loveni* Kbg. Judging from the short diagnosis, the only description then available,|| von Marenzeller remarked that *A. loveni* seems to resemble *A. marina*, and that the validity of the former species is doubtful. In 1899 Fauvel (*loc. cit.*) gave a description of the figures of *A. loveni* on the unpublished plate above mentioned. He pointed out that, as far as one is able to judge by

* Öfersigt Kongl. Vetenskaps-Akad. Förhandl., 1866, p. 355, Stockholm, 1867.

† Kongl. Svenska Fregatten Eugénies Resa omkring Jorden. Zoologi. Annulata. Stockholm, 1857.

‡ Fauvel, P., "Observations sur les Arénicoliens," in: Mem. Soc. Nation. Sc. Natur. Math., Cherbourg, t. xxxi., p. 179, 1899.

§ Marenzeller, E. von, "Polychäten der Angra Pequena-Bucht," in: Zool. Jahrb., Abth. Syst., bd. iii., pp. 14. 15. Jena, 1888.

|| Von Marenzeller had not access to a copy of the unpublished plate.

the figure of the worm, this species differs from a large example of *A. marina* only in the presence of a chaetigerous ring between the last branchial segment and the caudal region. This chaetigerous ring is shown bearing, on each side, a tuft of setae but no notopodial elevation. Fauvel remarked that such a character in an *Arenicola* is so extraordinary that one might ask if there had not been an error of observation. In view of the insufficient information regarding this species he concluded that it was impossible to decide whether *A. loveni* is a distinct species or should be merged with *A. marina*.* Gamble and Ashworth † placed this among the species of *Arenicola*, which, being so shortly and insufficiently described, must for all practical purposes be ignored.

The above account, which embodies the whole of the information hitherto available regarding *A. loveni*, ‡ shows that the validity of this species and its position with reference to other species of the genus have been regarded as very uncertain.

OCCURRENCE.

Up to the present Kinberg's specimen, obtained at Port Natal, near Durban, is the only recorded example of *A. loveni*, and no details are given of the conditions under which it was found. The only information available on the habitat of this species is contained in a letter (dated July 7, 1909), which Professor Gilchrist sent to me with the specimens, and from which I quote the following: "I had been looking for several years for *Arenicola* here" (*i.e.*, on the shores of Cape Colony), "but found no trace of it until on a visit to Saldanha Bay, on the west coast, I found the castings of the worm in a little sandy cove just inside the bay. Most of the sand here is very shifty, but in this sheltered place it seemed to be more permanent

* J. E. Ives (Proc. Acad. Nat. Sc., Philadelphia, for 1890, p. 74, Philadelphia, 1891) apparently considers *A. loveni* Kbg. to be a synonym of *A. marina*, for in stating the range of distribution of *A. marina* he includes South Africa. The only records of *Arenicola* from South Africa are those of Kinberg (*A. loveni*) and von Marenzeller (*A. marina*, from Angra Pequena), so that Ives' statement implies that he considers Kinberg's specimen to be an example of *A. marina*. It may be mentioned here that the specimens collected by Professor Gilchrist at Angra Pequena (for an account of which see pp. 18-21) have enabled me to show that the species found there is not *A. marina* but *A. assimilis* var. *ajjnis*.

† Gamble, F. W., and Ashworth, J. H., "The Anatomy and Classification of the *Arenicolidae* . . ." in Quart. Journ. Micr. Sc., vol. 43, p. 429, 1900.

‡ Since this was written the author has published an account of the type specimen and of the examples from Saldanha Bay, similar to that on pp. 2-15 of this communication, in Arkiv för Zoologi (K. Svenska Vetensk-Akad. Stockholm), Bd. 7, No. 5, 19 pp., 1 Pl., 1910.

and was of rather darker colour. The worms were procured by digging rather quickly with a spade; they seemed to be about a foot or so beneath the surface."

SIZE.

The length of the type specimen was given by Kinberg as 395 to 400 mm. On measuring the specimen, I found it to be about 405 mm. in length, of which the tail represents about 155 mm. The symbol " $\frac{1}{1}$ " by the side of the figure of this worm on the unpublished plate indicates that the figure is natural size, but, on measurement, it is found to be 475 mm. long, of which the tail is about 200 mm. The figure is therefore larger than natural size, and does not accurately represent the relative proportions of the body and tail of the specimen.

The measurements of the specimens from Saldanha Bay are as follows:—

| | | | | |
|--------|--------------|----------|----------------------|--------|
| No. 1. | Total length | 335 mm., | of which the tail is | 90 mm. |
| No. 2. | " | 335 | " | 195 |
| No. 3. | " | 175 | " | 55 |
| No. 4. | " | 385 | " | 155 |

The largest of these most closely approaches the type specimen in size and in the proportion of its body and tail. It is, however, rather shorter and somewhat stouter in the body region than the type; its tail is the same length as, but thicker than, that of the type specimen. The diameter of the type is given by Kinberg as 20 mm.: the specimen was probably measured near the third or fourth chætigerous annulus, where it is widest; its girth at the fourth chætigerous annulus is now about 60 mm. Specimen No. 4, from Saldanha Bay, measured at the level of the fourth chætigerous segment, where it is thickest, has a diameter of 23 mm. and a girth of 68 mm.; the diameter and girth of the middle of the tail are 16 mm. and 50 mm. respectively.

Although of such massive proportions, *A. loveni* is not the largest species of the genus; it is surpassed in size by *A. cristata* Stimpson, and is equalled, at any rate in length, by *A. marina* (L.). The largest specimen of *Arenicola* known to me is an example, in my possession, of *A. cristata* from Woods Hole, Massachusetts, U.S.A., which is 515 mm. in length (the tail being 190 mm. long) and 75 mm. in girth at its widest point. Examples of *A. marina* 350 to 400 mm. long are occasionally found, the anterior region of which

may attain a girth of about 70 mm., but their tail region is usually less massive than that of *A. loveni*. The other species of *Arenicola* are much smaller than these; the largest known examples of *A. claparedii* Levinsen, *A. assimilis* Ehlers, and its variety *affinis* Ashworth, are about 220 mm., and of *A. ecaudata* Johnston and *A. grubii* Claparède about 250 mm. long.

COLOUR.

All the specimens are brown in colour; the shade varies a little in different regions, being usually slightly darker in the anterior portion.

PROSTOMIUM. (Plate I., Fig. 1.)

The prostomium of the type specimen is beautifully preserved. It consists of a large median lobe and two small lateral lobes of almost uniform width (that is, not dilated anteriorly), and united posteriorly in a narrow median portion the central part of which is depressed slightly below the level of the lateral portions. The transverse diameter of this prostomium, at its widest part, is about 2·2 mm.

In three of the Saldanha examples the prostomium is well preserved. In each case it agrees in the form and proportion of its parts with that of the type specimen. In the Saldanha specimen, in which it is best seen, the prostomium has a transverse diameter of 3 mm. of which the median lobe forms 1·8 mm.

The nuchal organ is present and has the usual relation to the prostomium.

SEGMENTATION AND PARAPODIA.

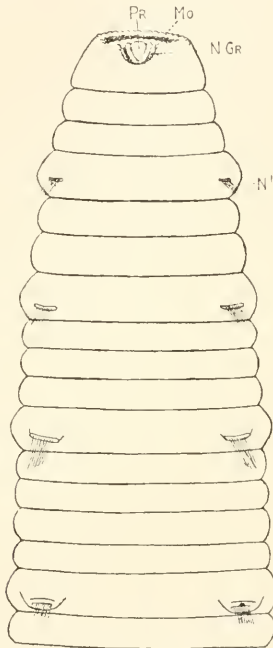
This species has nineteen chætigerous segments, on each of which notopodia and neuropodia are clearly seen. Each of the segments from the fourth to the nineteenth inclusive is subdivided into five annuli, the fourth of which—the chætigerous annulus—is the largest. Behind the third chætigerous annulus there are, therefore, four smaller rings between any two successive chætigerous ones. Between the third and second chætigerous annuli there are three rings, between the second and first there are two, and in front of the first chætigerous annulus there are three rings, as stated in Kinberg's diagnosis ("segmentum buccale triannulum") and the prostomium. The annulation of the anterior end is as represented in Kinberg's figure and in the accompanying diagram (Text-Fig. I.).

The difference in the sculpturing of the skin of the pre-branchial

and branchial regions is not so marked and abrupt as it is shown in Kinberg's figure.

The tail is strong and muscular, its numerous segments (usually about 100 to 150)* are very narrow from before backwards, especially in the anterior half of the tail. The epidermis is raised into small rounded papillæ; there are no elongate papillæ or other outgrowths of the body wall in this region.

The notopodia have the usual bluntly conical form; a tuft of capillary setæ projects from the oval aperture of the setal sac,



TEXT-FIGURE I.

Arenicola lorenii. Anterior end, dorsal aspect. $\times 1.5$.

Mo. Mouth. N¹. First notopodium. N.Gr. Nuchal groove. Pr. Prostomium.

which is situated on or near the rounded apex of the notopodium.

The type specimen possesses a twentieth segment bearing notopodial setæ (Fig. 2). Following the nineteenth chætigerous annulus are four rings and then a larger one. On the right dorso-lateral region of this larger annulus there is a slight elevation, from an aperture in which a tuft of twelve to fifteen capillary setæ projects;

* There are 175 septa in the tail of one of the Saldanha specimens.

on the left side there is a corresponding setal sac, but setæ are no longer present in it. The setæ remaining in this specimen are now very loosely held in position, several bundles of notopodial setæ are seen to be on the point of falling out of their setal sacs and others have already dropped out, including the small tuft which was in the twentieth left notopodium.

There is no trace of neuropodia or neuropodial setæ or of gills on either side of this twentieth segment.

The type specimen is, therefore, abnormal in that it possesses an additional chætigerous segment, but this extra segment is not provided with fully developed parapodia; its notopodia are smaller than those of the preceding segments, and it possesses no neuropodia. Kinberg's figure is correct in its representation of this extra segment. There is such a remarkable constancy in the number of chætigerous segments in the caudate species of *Arenicola* that the presence of an extra pair of notopodial setal tufts in Kinberg's figure called forth Professor Fauvel's remark that this might be due to an error of observation. Cases in which extra notopodia, neuropodia, and gills are present in caudate Arenicolidae are rare. Among some thousands of specimens of *A. marina* which have passed through my hands during the last few years, I have seen only three* with a complete chætigerous and branchiferous twentieth segment. Out of over one hundred specimens of *A. claparedii* examined, I have seen only one which exhibits an abnormality of this nature; this specimen has an extra (twentieth) notopodium and neuropodium, but on one side only.

Neuropodia are clearly visible on all the chætigerous segments of *A. loveni*. On specimen No. 4 the groove of the first neuropodium is about 1 mm. in length, that of the second 2 mm., of the third 4 mm., of the fourth 7 mm., and of the fifth, sixth, and seventh 12 mm. The groove thus exhibits a rapid elongation in successive segments until in the fifth, sixth, and seventh segments it attains its maximum length of about 12 mm., and almost reaches the mid-ventral line. The right and left neuropodial grooves in this region of the body are separated ventrally by a distance of only a little over 1 mm. In the following segments the neuropodial grooves are slightly shorter, they gradually diminish from 11.5 mm. in length in the eighth segment to 9.5 mm. in the nineteenth segment. The neuropodia of the first few segments are scarcely raised above the general surface of the chætigerous annulus, but those of the tenth and succeeding segments are clearly seen as elongate ridges, extending

* Not seven, as erroneously stated in Arkiv för Zoologi, Bd. 7, No. 5, p. 7.

from just below the notopodium practically to the mid-ventral line (Fig. 2), where the neuropodia of the right and left sides are separated from each other only by the narrow and shallow mid-ventral groove.* The neuropodia are of the elongate type, like those of *A. marina*, and differ from the short neuropodia present in *A. clapedii* and *A. assimilis*.

Nephridiopores are present in all the specimens on segments 5 to 9 inclusive; the pore is immediately dorsal to the upper end of the neuropodium.

Another external feature associated with the parapodia is worthy of note, namely, the presence of a small, round, or oval depression, about .25 to .5 mm. in diameter, immediately ventral to certain of the notopodia. These depressions are best seen in the type specimens in which they are present, on both right and left sides, in segments 13 to 20 inclusive (Fig. 2). It is interesting to note that the segment bearing the additional notopodium exhibits a depression similar to, but slightly smaller than, that of the preceding normal segments. These pits are also present in two of the Saldanha specimens, but on the last two or three chaetigerous segments only. Depressions identical in form and position are occasionally seen in *A. cristata*, but their significance is as yet unknown. Sections were made of a piece of the body wall between the eighteenth notopodium and neuropodium of one of the Saldanha specimens, but the preservation of the tissue is not sufficiently good to permit critical observations on the histology of the cells. The epidermis of the depressed area is composed, almost entirely, of deeply staining, narrow, columnar cells. Although the position of the pit reminds one of that of the lateral sense organs ("Seitenorgane") of Capitellidæ and Scalibregmidæ, it is, at present, impossible to say if the structure in question is a sense organ.

SETÆ.

The setæ in some of the notopodia seem to be in two more or less distinct series, an anterior and a posterior; the setæ of the anterior row are rather shorter than those of the posterior row, but they have the same form and structural detail. The setæ of the ninth notopodium of one of the Saldanha examples were examined in detail. The longer ones are about 6.6 to 6.8 mm. in length, the shorter ones 5.3 to 5.6 mm. For a distance of 1.0 to 1.3 mm. behind the tip each setæ bears, along one edge, a well-marked lamina which attains a breadth of 15 μ , and, as seen under medium magnification, is marked

* The ventral and metastomial grooves are feebly marked in all the specimens.

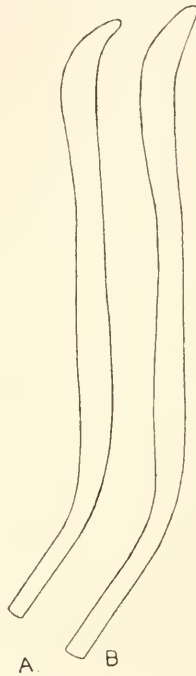
by closely set oblique lines and has a finely dentate margin (Fig. 3). The other margin of the seta, for a distance of 1.5 to 1.7 mm. from the tip, bears numerous regularly arranged structures which, seen under low or medium magnification, look like long fine teeth; similar structures are also present along the laminate side of the seta for a short distance proximal to the lamina. In most species of *Arenicola* the "teeth," corresponding to those just described, are more closely pressed to the shaft of the seta, whereas in *A. loveni* they project at an angle of 30° to 40° from the shaft, and are consequently much more obvious, especially as in *A. loveni* they are also of larger size. The exact nature of these outgrowths on the shaft of the seta is difficult to determine, but, under an immersion objective, it is seen that they are regularly arranged crests passing round the shaft (Fig. 4). The apparently undivided base of the crest is fixed to the shaft and its distal margin, that is its free edge, is subdivided into a large number of fine teeth. Each crest appears to be a comb-like structure, bent so as to envelop the greater portion of the shaft of the seta, the curved portion being seen in profile where it projects beyond the edge of the shaft. The regularly arranged structures, seen under low power, as fine teeth along one margin of the seta are, then, the profile view of these crests, which remind one of the similar crests or "Sägeblätter" present on the setæ of some Aphroditidæ and certain other Polychæta. The laminate portion of the seta bears on its surface numerous fine processes the pointed tips of which are directed at slightly different angles; those seen in profile at the margin of the lamina form a regular series of very fine teeth. In each interval between the "Sägeblätter" there is a denser transverse band, the presence of which, at regular intervals of about 10 to 12 μ , gives to the distal portion of the shaft of the seta a transversely striated appearance, which is well seen even under low magnification (about 50) and forms a very striking feature of the notopodial setæ of *A. loveni* (Fig. 3). Kinberg has clearly indicated the transverse striation in his figure (1G, s.) of a seta.

The well-marked striation and the high degree of development of the crests are two characteristic features by which the notopodial setæ of this species may be readily distinguished from those of any other species of *Arenicola*.

Crotchets from the nineteenth neuropodium of the type specimen are about .75 mm. long (Text-Fig. II., A). The distal end of the crotchet does not bear teeth behind the rostrum, and there is a wide angle—about 130°—between the rostrum and the shaft. Both these

features are characteristic of the late growth phases of the crotchets of *Arenicola*. The crotchets (Text-Fig. II., B) of one of the Saldanha specimens were also examined and compared directly with those of the type specimen with which they closely agree, the only difference being that, in the former, the angle between the rostrum and shaft is a little wider.

It is so constantly the case in all species of *Arenicola*, that the crotchets present in the same neuropodium are practically uniform



5. $\times 110$

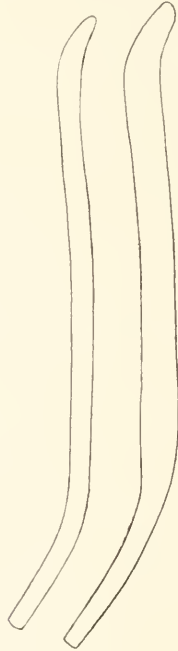
TEXT-FIGURE II.

Arenicola loveni. Two neuropodial crotchets, A from the type specimen, B from a Saldanha specimen. $\times 110$.

in build, that the occurrence of an instance to the contrary is worthy of note. In the fifteenth neuropodium of one of the Saldanha specimens there are 115 crotchets, among which is one differing from the rest in its more slender form; it is of the same length and curvature as its fellows, but is only about 28μ in diameter in the middle of its shaft, whereas the corresponding portion of the neigh-

bouring crotchets is $43\ \mu$ in diameter. This slender crotchet and the next one to it are drawn in Text-Fig. III. They are from near the middle of the neuropodium, and the rostrum of the stouter one is rather worn away at its tip.

The crotchets of *A. loveni* are intermediate in their characters between those of large examples of *A. marina* and *A. cristata*, but more nearly approach the latter.



6. $\times 110$

TEXT-FIGURE III.

Arenicola loveni. Two adjacent crotchets from a Saldanha specimen. The left one is abnormally slender. $\times 110$.

GILLS.

There are in each specimen thirteen pairs of gills, the first pair being situated on the seventh segment. In all the specimens the first gill is small, in one of the Saldanha examples the first left gill is represented by a minute tri-lobed tubercle. The successive gills increase gradually in size up to about the tenth, which is usually the largest; the last gill is distinctly smaller than the preceding one.

In those specimens in which the gills are well expanded they are seen to be of the pinnate type, as is clearly indicated in Kinberg's figures 1A, 1F. The larger gills of the type specimen consist of sixteen to twenty axes on each of which lateral branches are borne. The longest axes of the middle gills are 7 mm. in length and bear about sixteen branches on each side. The gills of the Saldanha specimens are of exactly the same type. The ninth right gill of one of them was examined in detail; it consists of nineteen axes connected by a short common basal piece less than 2 mm. in length; there is not a well-marked web-like membrane between the bases of the gill axes of this species, such as is often present in large Laminarian specimens of *A. marina*. The longest axis of this gill is about 7 mm. in length, and bears on each side fifteen branches; the shortest axis is rather less than 3 mm. in length, and has six pairs of lateral branches.* The lateral branches, though often opposite or paired, are not always so arranged; on some axes or on some portion of certain axes they are alternate. The subsequent branching of the lateral twigs is either dichotomous, or, especially in the larger ones, approximately pinnate.

INTERNAL ORGANS. (Fig. 5.)

The internal organs of the type specimen and of two of the Saldanha examples have been examined.

Septa and Muscles.

The three septa, present in all known species of *Arenicola*, are found in *A. loveni* in the usual positions, namely, at the anterior end of the first, third, and fourth chaetigerous segments.

The strong first septum (S') bears two enormous, backwardly directed pouches (S.P.), much larger than those of any other species. In the three specimens examined these pouches are 25 to 26 mm. long; they are about 3.5 mm. in diameter in front, but taper gradually towards their blunt posterior ends. The wall of the pouch consists of four layers; externally and internally there is a very thin film of coelomic epithelium, between which are two series of muscles. The outer layer of muscles is about .5 mm. thick and its fibres are chiefly circular in direction; the inner one consists of series of stout longitudinal bands, similar to those seen in sections of the body wall, which project into the lumen of the pouch, and,

* A gill axis, intermediate between these in length and number of branches, is seen in Fig. 2.

indeed, almost obliterate it. The arrangement of the muscles of the wall suggests that the pouch is capable of considerable dilatation. In the intervals between the longitudinal muscle bands there are three large blood-vessels which give off branches, the cœlomic epithelial covering of which is composed of cubical or oblong cells containing granules, some of which appear to be yellow and suggestive of chlorogogen granules. The lumen of the pouch opens into the most anterior division of the cœlom in front of the first septum; the aperture is not a simple pore, but is crossed by a number of muscle fibres. The pouches pass backwards through the second septum and extend as far as the third one, immediately in front of which their blind ends lie and are generally directed laterally. The enormous size of these septal pouches is the most striking feature of the internal anatomy of this species, and may be given as the principal internal diagnostic character. Comparison with the conditions seen in the other species of *Arenicola* will render this obvious. Septal pouches are not present in *A. claparedii* and *assimilis*, those of *A. marina* and *glacialis* are small, conical or thumb-shaped structures only 2 to 3 mm. long; in *A. caudata* and *grubii* the pouches are finger-like and about 5 to 8 mm. in length, those of the *A. cristata* are usually of similar shape and length, but in large American examples they attain a length of 13 mm. The septal pouches of *A. loveni* are thus twice as large as the largest hitherto found in any other species of *Arenicola*, and, as already stated, they pass through the second septum and extend backwards to the third, whereas, in all other species, even in large examples of *A. cristata*, the pouches never perforate the second septum, but lie entirely in front of it. The function of the septal pouches is unknown, but it has been suggested that they aid in the eversion of the "proboscis."

The powerful retractor muscles of the pharynx (PH.R.) pierce the first septum; they arise from the body wall a short distance anterior to the level of the second chætigerous annulus.

The second septum (S^2) is thin, and, in each of the specimens examined, is pierced by two apertures of considerable size, one to the right and the other to the left of the œsophagus. These two apertures permit the passage backwards of the two septal pouches.

The third septum (S^3) is well developed. In one of the Saldanha specimens, in which it has been examined in detail, this septum is marked on its anterior face with small brown or black spots, each due to the presence of excretory granules in certain groups of cells.

On its posterior face the septum bears numerous slender branching vessels, 30 to 40 μ in diameter, covered wholly or partly with chlorogenous tissue. The ultimate branches of the blood-vessels end blindly. The septum is apparently perforated, like that of *A. marina*, but the apertures are difficult to see as they are masked by the felt-work of blood-vessels above described.

The setal musculature is of the usual type, except that the three anterior notopodia have either no retractor or only a very short one, 2 mm. or so in length, which arises from the body wall just ventral to the notopodium. Some of the other notopodia also have a similar short retractor instead of the usual long retractor strand inserted at the side of the nerve cord.

The strap-like oblique muscles (M.OB.), which arise at the sides of the nerve cord and are inserted about the level of the upper end of the neuropodia, commence in the Saldanha specimens immediately behind the third septum; in the type specimens the most anterior oblique muscles are in the fourth chaetigerous annulus.

Alimentary Canal.

The alimentary canal presents the usual regions—pharynx (PH.), oesophagus, stomach (ST.) and intestine. On the posterior portion of the oesophagus there are two oesophageal glands (O.G.L.) more or less conical in shape; in the type specimen they are almost heart-shaped, but in the Saldanha examples they are more elongate cones. In the three specimens examined these glandular caeca are 10 to 11.5 mm. long; they open into the posterior portion of the oesophagus by a tubular stalk about 2 mm. in diameter.

Vascular System.

The pair of hearts (H.) and the vascular system need not be described in detail, they are on the same plan as the hearts and vessels of *A. marina*. The first vessel from the gills opening into the dorsal vessel is found in the twelfth segment, that is, the first five gills return blood to the sub-intestinal vessel, the other eight to the dorsal vessel; in *A. marina* the efferent vessels of the first six gills open into the sub-intestinal vessel and of the last seven gills into the dorsal vessel.

Nephridia.

Five pairs of nephridia are present, opening on the fifth to the ninth segments. The nephridium is built on the same plan as that of *A. marina*. The dorsal lip of the funnel is fringed with thirty

to forty triangular processes ; each of these is attached by its narrower end and its broader distal margin is subdivided into six to eight rounded lobes. The ventral lip may be slightly folded but is not frilled or ridged, and is not indented. All the nephridia are about the same size, that is, the first and last do not show any signs of being in process of reduction.

Gonads.

The gonad is microscopic, as in *A. marina*, and the stages of growth of the reproductive cells found in the coelomic fluid are similar to those seen in the coelom of *A. marina*.

Central Nervous System and Statocysts.

The brain and nerve cord are apparently similar to those of *A. marina*, but, as material suitably preserved for histological work is not available, they have not been studied in detail. Giant nerve fibres are present in the nerve cord, as in all other species of *Arenicola*, except *A. claparedii*.

A statocyst was found on each side of the type specimen, connected to the body wall by a strand of tissue, but it could not be definitely ascertained whether this was a solid cord of nerve and connective tissue or whether it contained a narrow tubular structure. The former seemed more probable, as careful search failed to reveal any external aperture at or near the point where the tissue strand meets the body wall. When the Saldanha specimens came into my hands serial sections were made of a statocyst and the adjacent body wall of one of them, which definitely prove that the vesicle has no opening to the exterior (Fig. 6). The three diameters of the lumen of this statocyst are .22, .2, and .15 mm. respectively. The walls of the organ are thick, they average about .07 mm. in thickness. Each statocyst contains a single round or oval statolith, two * diameters of the one in the serial sections are .088 and .075 mm. respectively.

REMARKS ON SPECIMENS OF *ARENICOLA LOVENI*
FROM FALSE BAY.

The two specimens found cast up dead on the shore of False Bay, after a storm, are in bad condition ; the body wall has a leathery

* The third diameter cannot be accurately ascertained.

consistency, and is thickly encrusted with sand-grains. The specimens are 360 mm. (of which the tail is 135 mm.) and 250 mm. (of which the tail forms 90 mm.) long respectively, and about 12 mm. in diameter at their widest part; that is, they are more slender than the specimens already described. The tail segments are very numerous, namely, about 205 and 186 respectively. The outlines of the prostomium are not well shown, but the other external features—the annulation, the parapodia, the number and position of the nephridiopores, the number and nature of the gills, the characters of the notopodial setæ—are sufficiently well preserved to permit their agreement with those of the specimens described in the preceding pages to be certainly ascertained. The capillary setæ in particular present the well-marked striation and “Sägeblätter” characteristic of *A. loveni*. The larger specimen was examined internally, and found to possess the two enormous septal pouches diagnostic of *A. loveni*. This being sufficient, with the external features already noticed, to fully determine the species, an examination of the remaining organs, which are in defective condition, was not attempted.

DIAGNOSIS OF *ARENICOLA LOVENI* KINBERG.

The characters of this species may be given thus: Caudate *Arenicola* with nineteen chætigerous segments; thirteen pairs of gills, the first gill on the seventh segment, gills large and pinnate; the median lobe of the prostomium is large, the smaller lateral lobes are of almost uniform width, *i.e.*, they are not dilated or lobate at their anterior ends; neuropodia are clearly visible on each segment, those of the branchial and of the two pre-branchial segments are long dorso-ventrally and almost reach the mid-ventral line; each notopodial seta bears numerous finely toothed crests or “Sägeblätter” at regular intervals along the distal third of the shaft, this part of the seta has a transversely striated appearance, as seen under low magnification; five pairs of nephridia which open on the fifth to the ninth segments; one pair of œsophageal glands, conical in shape; two enormous muscular pouches project backwards from the first septum, pass through apertures in the second septum, and terminate immediately in front of the third septum; a pair of closed, oval statocysts, each containing a single large, oval, secreted statolith. *Type Specimen* in the Riksmuseum, Stockholm.—The type specimen was collected at Port Natal, Durban. The species is now

recorded from Saldanha Bay and False Bay, collected by Professor J. D. F. Gilchrist. These are the only records of the capture of this species.

AFFINITIES OF *ARENICOLA LOVENI* KINBERG.

The affinities of this species with other caudate species of the genus may now be determined. There are so few features in which *A. loveni* agrees with *A. claparedii* Levinsen, *A. assimilis* Ehlers (and its variety *affinis* Ashworth), and *A. glacialis* Murdoch, that we may conclude that Kinberg's species is not nearly related to any of these. *A. loveni* has certain features in common with *A. marina* (Linnæus) and *A. cristata* Stimpson, for instance, elongate neuropodia and a single pair of œsophageal glands; in these three species a pinnate type of gill occurs, though in most examples of *A. marina*—that is, in the littoral variety—the gill is bushy, the pinnate type of gill being found only in examples from the lower tidal zone—that is, in the Laminarian variety. *A. loveni* and *A. marina* also agree in regard to the number of their segments and gills, but they differ in the number of their nephridia and the nature of their septal pouches, statocysts and statoliths. Important points of agreement (besides those named above) between *A. loveni* and *A. cristata* are presented by their closed statocyst and single statolith, and by their prostomium; moreover, the septal pouches of *A. cristata*, while not nearly so large as those of *A. loveni*, more nearly approach the latter in size than do those of any other species. In the characters of its setæ, both notopodial and neuropodial, *A. loveni* presents a closer approach to *A. cristata* than to any other species. The chief differences between *A. loveni* and *A. cristata* are in regard to the number of segments (nineteen and seventeen respectively), gills (thirteen and eleven pairs respectively), and nephridia (five and six pairs respectively).

The systematic position of *A. loveni* may be stated thus: There is no affinity, beyond a generic one, between *A. loveni* and *A. claparedii*, *assimilis* and *glacialis*. In its general external appearance *A. loveni* most nearly resembles the large Laminarian examples of *A. marina*, but in its prostomium and setæ and in some of its internal organs, especially its septal pouches and statocysts, it departs markedly from *A. marina* and much more nearly approaches *A. cristata*, from which it differs chiefly in the number of its segments and gills. These facts indicate that the affinities of *A. loveni* lie between *A. marina* and *A. cristata*, but more closely to the latter than to the former.

ARENICOLA ASSIMILIS EHLERS* VAR. *AFFINIS*
ASHWORTH.†

The specimens collected at Lüderitzbucht (Angra Pequeña) and Table Bay belong to this species and variety, which has not hitherto been recorded from South Africa.

OCCURRENCE.

Professor Gilchrist found these worms abundant, but only at one place, at Lüderitzbucht, between the town and Shark's Island. They are not common in Table Bay and seem to occur chiefly in the area uncovered only at very low tide. (Extract from Professor Gilchrist's letter, dated October 11, 1910, sent with the specimens.)

SIZE.

About a score of specimens from Lüderitzbucht and three from Table Bay have been examined. Most of them range in length from 60 to 85 mm., of which the tail forms 20 to 35 mm.; three are smaller and three are longer, the longest is 160 mm. (tail 85 mm.). The larger worms are about 11 mm. in diameter at their widest point, that is, about the fourth segment.

COLOUR.

All the specimens are now brown, for the most part light brown, in colour. Professor Gilchrist tells me that those obtained in Table Bay were of a striking yellow colour when alive.

EXTERNAL FEATURES.

The prostomium has the form typical of *A. assimilis*, that is, the lateral lobes are in the form of a **V**, the limbs of which are of uniform width, *i.e.*, not dilated or lobate anteriorly, though they may be curved (as in Text-Fig. V.). The extent of the protrusion of the prostomium varies in different specimens; in most cases the prostomium is seen as represented in Text-Fig. IV., in a few it is more fully extended or protruded, approaching the condition shown in Text-Fig. V. The transverse diameter of the prostomium is

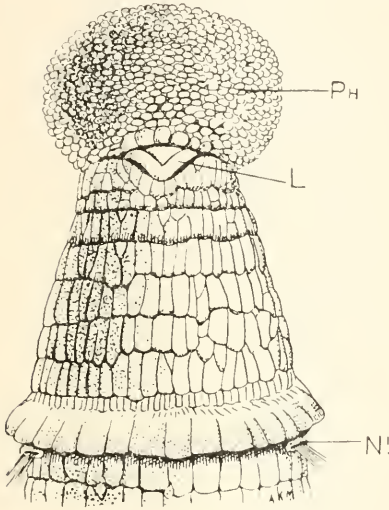
* "Polychaeten" p. 104, in Hamburger Magalhaensische Sammelreise, Hamburg, 1897; see also Festschr. K. Ges. Wiss. Göttingen, p. 178, 1901.

† Quart. Journ. Micr. Sci., vol. 46, pp. 737-785, 1903. The only differences between *A. assimilis* and its var. *affinis* are that the former has twenty chaetigerous segments and the first gill on the eighth segment, while in the variety there are only nineteen chaetigerous segments, and the first gill is on the seventh.

about 2 mm. Posteriorly and laterally the prostomium is bounded by the nuchal organ.

Each of the specimens has nineteen chaetigerous segments. The neuropodia of the branchial region form oval or nearly semicircular pads on the lateral region of the segment, but neither the muscular ridge nor the groove, or sac, which contains the crotchets, approaches the mid-ventral line. Short neuropodia of this type are found only in the species *A. assimilis* and *A. claparedii* Levinson.

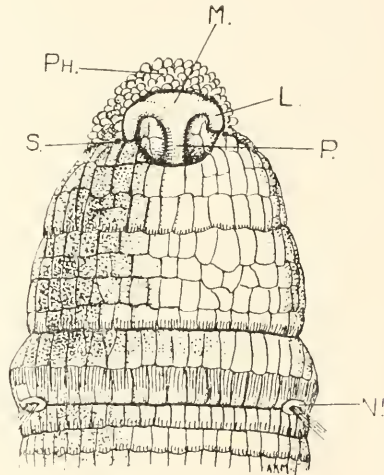
The setæ of this species do not present any striking features such



TEXT-FIGURE IV.

Arenicola assimilis. Anterior end, dorsal aspect, of a specimen from Uschuaia, Beagle Channel. The prostomium is shown in a state of normal extension. $\times 6$.

L. Lateral lobe of prostomium. M. Median lobe. N¹. First notopodium. P. Median posterior portion of prostomium. Ph. Pharynx. S. Aperture of statocyst (which is shown too large in the figure).



TEXT-FIGURE V.

Arenicola assimilis var. *affinis*. Anterior end, dorsal aspect, of a specimen from the Falkland Islands. The prostomium is shown protruded to its fullest extent. $\times 6$.

as those met with in *A. loveni*. The notopodial and neuropodial setæ are similar to those of *A. marina*.

All the specimens from Lüderitzbucht have the full complement of gills, namely, thirteen pairs. The first gill is borne on the seventh segment and is invariably of moderate or large size. In the examples from Table Bay, the first gill exhibits very marked re-

duction; in fact, in two of the specimens the first pair of gills is wanting, and in the third the first right gill is absent and the first left one minute. The longer axes of the middle gills are about 2.5 mm. in length. The gills are of the pinnate type.

A striking feature of all the specimens is the presence of only five pairs of nephridiopores, which are situated on the fifth to the ninth segments inclusive. I have previously examined more than twenty specimens of this species from the Falkland Islands, South America, Tasmania, and New Zealand, in all of which, except two, six pairs of complete nephridia are present; though in several cases the first pair is smaller than any of the others. In one of the two specimens just mentioned, the first nephridium of one side is complete, but that of the other side has no funnel, and in the other example the first left nephridium is wanting and the first right one is represented only by its terminal vesicle. The specimens from Lüderitzbucht and Table Bay illustrate a further step in the reduction, for none of them possesses a nephridiopore on the fourth segment. The apertures of the other nephridia, on the fifth to the ninth segments, are readily seen in these specimens, which have been killed in an expanded condition, so that the absence of pores on the fourth segment is ascertainable with certainty. Dissection of two specimens from Lüderitzbucht and one from Table Bay confirms the absence of nephridia from the fourth segment.

There are comparatively few segments—about ten to sixteen—in the tail, and they are only feebly marked off from each other externally. The tail is less muscular than that of *A. loveni*.

INTERNAL ORGANS.

These need not be described in detail here,* but reference may be made to a few outstanding features. The three septa are present as in other species of *Arenicola*, at the anterior end of the first, third, and fourth chætigerous segments. Septal pouches are not present in this species.

Oblique muscles are present from the first or second chætigerous annulus to the end of the tail.

There are several glands on each side of the posterior portion of the œsophagus, namely, a long anterior one, and usually seven or eight smaller behind this, but one specimen has a long and fifteen short cæca on each side.

* An account of the anatomy of *A. assimilis*, by the present writer, will be found in *Quart. Journ. Micr. Sci.*, vol. 46, pp. 740-759, 1903.

The vascular system is practically identical with that of *A. marina*.

The margin of the ventral lip of each nephridial funnel is frilled and its internal face marked with ridges which converge towards the bottom of the funnel. This condition of the ventral lip is so constantly met with in this species that it may be looked upon as specific. The dorsal lip bears the usual fringe of triangular, vascular, ciliated processes.

The gonads are small, as in *A. marina*.

The brain and nerve cord are similar to those of *A. marina*. Statocysts are present and may be found in dissections of the anterior end. They are situated nearer to the brain than in *A. marina*. Each statocyst opens to the exterior but the pore is very difficult to find,* it is situated just under the extreme antero-lateral margin of the prostomium. In nearly all preserved specimens the peristomial region is contracted, and the pore, which lies at the bottom of a groove, is not visible. In well-extended specimens the small aperture will be found in the position indicated in Text-Fig. V., S.

The statocysts are large; in a specimen about 70 mm. long their three diameters are about .2 mm., .18 mm., and .15 mm. respectively. From each vesicle a moderately wide tube passes out laterally and turns forwards to open externally near the lateral margin of the prostomium, as described above. Each statocyst contains about a score of statoliths, which consist, for the most part, of sand-grains together with a few fragments of sponge spicules. The statoliths in this specimen are practically naked. The peristomial wall of another specimen was stained, cleared, and examined as a whole mount; each of the sand-grains and spicule-fragments in this statocyst has received a thick chitinoid envelope, secreted by the gland cells in the wall of the statocyst, so that the resultant statoliths have rounded outlines. In the former specimen the canal of the statocyst is widely open throughout its length, so that the cavity of the statocyst is in free communication with the exterior; in the latter specimen the passage is occluded at one or more points, and closure of the statocyst has thus been brought about—a condition invariably found to be correlated with the presence of coated statoliths such as those above described.

* A binocular dissecting microscope is almost indispensable for making examinations for the openings of the statocysts and nephridia and other minute features.

REMARKS ON THE DISTRIBUTION OF *ARENICOLA*
ASSIMILIS.

Arenicola assimilis, in the wide sense, that is, including the variety *affinis*, is evidently the characteristic species of the southern regions. Typical examples have been recorded from Punta Arenas (Strait of Magellan), Ushuaia (Beagle Channel), and South Georgia. Examples referable to the variety *affinis* are known from Ushuaia (a gill-less post-larval specimen), Lapataia Nueva (Beagle Channel), Susanna Cove (Strait of Magellan), the Falkland Islands, Kerguelen, Macquarie Island, Campbell Island, Stewart Island, and Otago Harbour (New Zealand). The most northerly station from which this species has hitherto been recorded is the last named, which is in about 46° S. latitude. I have recently received, from Professor H. B. Kirk, two specimens from Plimmerton, near Wellington, about 41° S., which shows that *A. assimilis* var. *affinis* extends into the North Island of New Zealand. Professor W. A. Haswell has sent me a few specimens from Burnie, on the north coast of Tasmania (also about 41° S.) which belong to the same species and variety. This is the first record of *Arenicola assimilis* from the Australian sub-region. The examples from Lüderitzbucht and Table Bay not only extend the records to the coast of Africa but to a latitude considerably further north than any previous record, Table Bay being in latitude 34° S., and Lüderitzbucht in 26° 40' S. (approximately).

In a recent publication* I directed attention to the distribution of *A. assimilis* as supporting the view that there was formerly a more extensive Antarctic continent. The distribution of this species of *Arenicola* presents, in fact, a remarkable parallel to that of certain Oligochætes. Mr. Beddard † pointed out that the characteristic earthworms of New Zealand are Acanthodrilidæ, that the same family is equally characteristic of Patagonia, and that the only earthworms known from the intervening localities—the Falklands, South Georgia, Marion and Kerguelen Islands—also belong to this family. Mr. Beddard regarded these facts as evidence in favour of a former greater extension northwards of the circum-polar Antarctic

* "The Annelids of the Family Arenicolidæ of North and South America . . ." in Proc. U.S. Nat. Mus., vol. 39, pp. 1-32. Washington, 1910.

† Beddard, F. E., "A Monograph of the Order of Oligochæta," Oxford, 1895, p. 154. See also, by the same author, "A Text-Book of Zoogeography," Cambridge, pp. 60 and 170.

continent,* and he was inclined to believe that this land mass did not include the Cape of Good Hope.

When the above comments were written a year ago, the species *Arenicola assimilis* was not known from South Africa. This seemed to indicate that the conclusion to which Mr. Beddard had arrived from a study of the earthworms, namely, that the Antarctic continent did not include the Cape of Good Hope, was supported by the distribution of the species of *Arenicola*. This support must, of course, now be withdrawn in view of the finding of *A. assimilis* in Table Bay and Lüderitzbucht, but the main portion of the thesis stands, namely, that the distribution of this species is consonant with the view that there was formerly a large southern continental mass, with which were connected, possibly at different periods, Patagonia, South Africa, Tasmania, New Zealand, and the intermediate islands, which are probably remains of former larger land areas.

PREVIOUS RECORDS OF *ARENICOLA* FROM ANGRA PEQUEÑA.

Arenicola was recorded from Angra Pequeña by Professor von Marenzeller,† who referred his specimens to the species *A. marina*. Through his kindness I was enabled, two years ago, to examine one of his specimens, which, unfortunately, was not in good condition at the anterior end. The outlines of the prostomial lobes were so badly preserved that this character was not available in diagnosis. An examination for statocysts was made, as well as could be without unduly damaging the specimen, but these organs could not be found although the œsophageal connectives were carefully inspected by means of a binocular dissecting microscope. It was concluded wrongly, as it now appears, that statocysts were absent. Other characters exhibited by the specimen, namely, the number of segments and gills, the short neuropodia, the multiple œsophageal glands and the absence of septal pouches, showed that the worm was an example of either *A. claparedii* or *A. assimilis* var. *affinis*.

* Professor Benham has more recently urged that the distribution of the earthworm *Notiodrilus* affords convincing evidence in favour of the former existence of Antarctica. See Report 9th Meeting Australian Assoc. Adv. Sci., pp. 319-343, 1903; and "The Sub-antarctic Islands of New Zealand," p. 254, 1909.

† "Polychäten der Angra Pequeña-Bucht," in: Zool. Jahrb., Abt. Syst., Bd. III., p. 12, 1888. This record was repeated by Professor Ehlers in: Denkschr. Medic. naturwiss. Ges. Jena, Bd. xiii., pp. 47-50, 1908.

The absence of statocysts seemed to indicate the former species and the presence of nephridiopores on the fifth to the ninth segments supported this view. The specimen was therefore referred to the species *A. claparedii*,* but in my note-book it was registered as *probably* belonging to this species † together with the comment that further material, in a better state of preservation, was required in order to permit a satisfactory determination.

When Professor Gilchrist's specimens from Lüderitzbucht came into my hands it was at once noticed that their prostomium was identical with that of *A. assimilis*, and an internal examination proved, among other things, the presence of statocysts close to the brain. It immediately occurred to me that my diagnosis of Professor von Marenzeller's specimen might be erroneous. This diagnosis rested almost entirely on two points, namely, that statocysts could not be found and that nephridial openings were present only on the fifth to the ninth segments. The search for statocysts in preserved material is seldom easy, but it was attended with unusual difficulty in that specimen, which had been more than twenty years in alcohol and was not in good condition, so that the possibility of having overlooked these organs was fully realised. The specimens recently examined from Lüderitzbucht, undoubtedly examples of *A. assimilis* var. *affinis*, are peculiar in that all have their nephridial apertures in the fifth to the ninth segments, that is, on the same segments as in *A. claparedii*, and not on the fourth to the ninth segments, as is usual in examples of *A. assimilis* from other parts of the world. Such a local variation was not foreseen or allowed for. The finding of this variation, which renders the number of nephridiopores unreliable as a distinguishing character between *A. claparedii* and *A. assimilis*, indicated that my provisional diagnosis, made two years ago, rested on a very insecure basis: it depended entirely on whether the absence of statocysts could be regarded as proved satisfactorily. In order to remove the uncertainty I applied to Herr Regierungsrat Ganglbauer, Director of

* Ashworth, J. H., "Die Arenicoliden-Sammlung im Königl. Zoologischen Museum in Berlin," in: Mitt. Zool. Mus. Berlin, Bd. IV., p. 351, 1910.

† When the examination was made the difference in the form of the neuropodial crotchets of *A. claparedii* and *A. assimilis* had not been fully recognised and shown to be constant. During the past few months I have examined many series of setae from both these species and have found that, especially in the case of small or medium-sized specimens, the crotchets usually afford considerable help in differentiating these two species. The crotchets of *A. claparedii* are dilated near the distal end so as to resemble the head of a swan, whereas the crotchets of *A. assimilis* do not exhibit such a dilatation.

the Zoological Department of the Naturhistorisches Hofmuseum in Vienna, for the loan of the specimen from Angra Pequeña, and beg to thank him for sending it to me. I have thoroughly re-examined this example in the light of recent extensive experience of the two species above named and do not hesitate to state that it is not an example of *A. claparedii* but of *A. assimilis* var. *affinis*. The dorsal region of the œsophageal connectives was very carefully examined with the binocular microscope with the result that no trace of a statocyst could be seen on one side, and on the other its presence was doubtful. A stained and cleared preparation of the peristomial wall, examined with a higher magnification, shows, however, that a statocyst is present, although it is imperfect and recognisable only with great difficulty. Partial maceration of the anterior end has resulted in the disappearance of a portion of the wall of the vesicle, permitting the statoliths to fall out; the remaining portions of the wall, the cells of which are in a loosely attached condition, stain unsatisfactorily, and are easily overlooked. The presence of nineteen chætigerous segments, thirteen pairs of gills, short neuropodia, multiple œsophageal glands, and the absence of septal pouches are characters shared only by *A. claparedii* and *A. assimilis* var. *affinis*. The presence of statocysts shows that the worm must be referred to the latter, for *A. claparedii* does not possess these organs. An examination of the crotchets* confirms this diagnosis.

The records from Angra Pequeña of *A. marina* by Professor von Marenzeller and of *A. claparedii* by the writer must therefore be transferred to *A. assimilis* var. *affinis*.

THE UNIVERSITY OF EDINBURGH.

December 22, 1910.

* See footnote p. 24.

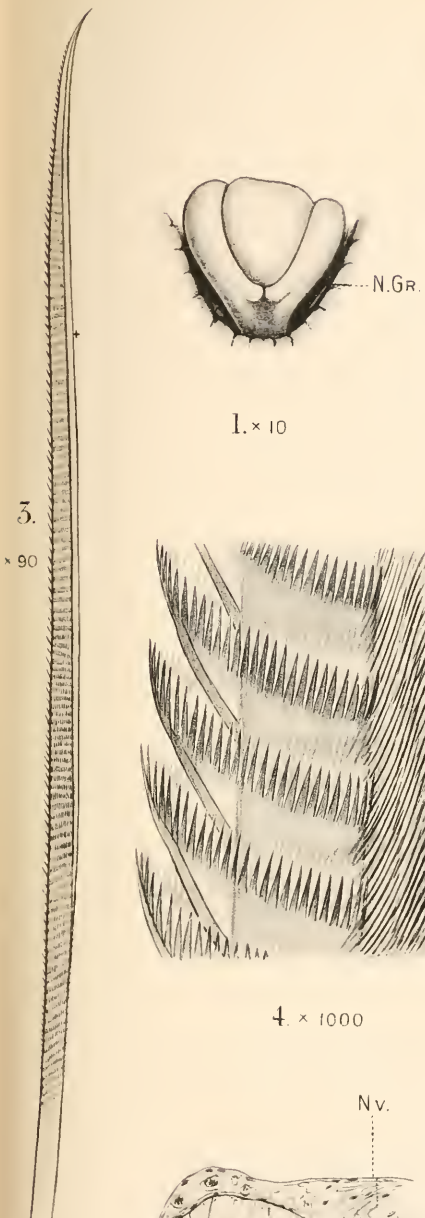
DESCRIPTION OF THE FIGURES OF *ARENICOLA*
LOVENI KINBERG.

PLATE I.*

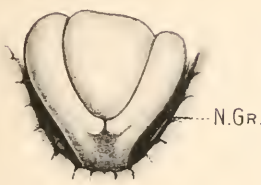
FIG.

1. The prostomium of the type specimen. Dorsal aspect. N.G.R. Nuchal groove. $\times 10$. For description, see p. 5.
2. The posterior end of the body and the first three tail segments of the type specimen, seen from the right side, showing: A portion of the nineteenth segment, namely, the nineteenth chætigerous annulus, with its neuropodium (N.R.¹⁹), notopodium (N.¹⁹), and gill (BR.¹³), and the following ring; the extra, twentieth, segment and notopodium (N.²⁰) which this specimen possesses; the pit (P.), possibly sensory. The ventral axis of the gill (BR.¹³) is represented, but only the origins of the other axes are shown. $\times 5$. For further description, see pp. 6, 7.
3. Distal third of one of the shorter notopodial setæ from a Saldanha specimen, showing the "teeth," the transverse striation, and the lamina. $\times 90$. A portion, from the part marked +, is seen highly magnified in Fig. 4.
4. A portion of a notopodal seta, showing the toothed crests or "Sägeblätter." $\times 1000$. For descriptions of Figs. 3 and 4, see pp. 8, 9.
5. The anterior portion of the type specimen, as far back as the sixth chætigerous segment, opened by an incision along the mid-dorsal line. The figure, which is natural size, shows: The pharynx (PH.) protruded, the prostomium (Pr.) and its retractor muscles, the three septa (S¹, S², S³). The first septum is pulled backwards, it is pierced by some of the retractors (PH.R.) of the pharynx, and bears the two enormous, muscular, septal pouches (S.P.). The second septum is perforated by two apertures—one right and one left of the œsophagus—to permit the passage of the septal pouches. Close behind the third septum are the œsophageal glands (E.G.L.) and the two hearts (H.), which are dilated, the right one fully. The first (NPH¹) and second pairs of nephridia are shown. D.V. Dorsal blood vessel. M.OB. Oblique muscle band. N¹. Setæ of first notopodium. N³. Setal sac of third notopodium, with its protactor muscles. ST. Stomach. For further description, see pp. 12-14.
6. Section of a statocyst of a Saldanha specimen (see p. 15). The epithelium, which forms the wall of the vesicle, is not well preserved, but several sense cells (S.C.) may be recognised in it. Note also the single large statolith and the strand (Nv.) of nerve and connective tissue continuous with the sheath of similar nature which envelops the vesicle. $\times 110$.

* The cost of the original drawings for this Plate, and a portion of the other expenses connected with the preparation of the report, have been defrayed by a grant from the Earl of Moray Endowment of the University of Edinburgh.



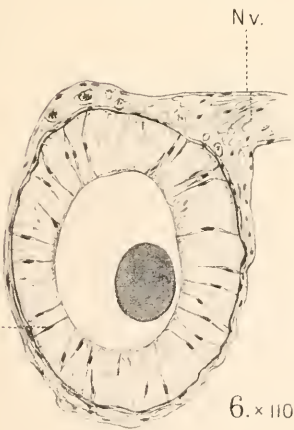
3.
x 90



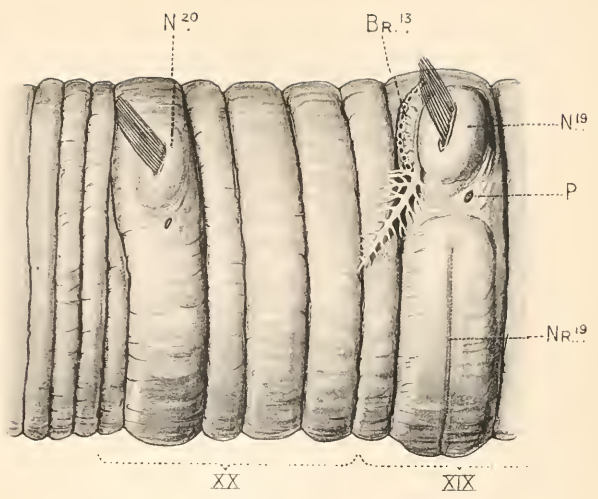
1. x 10



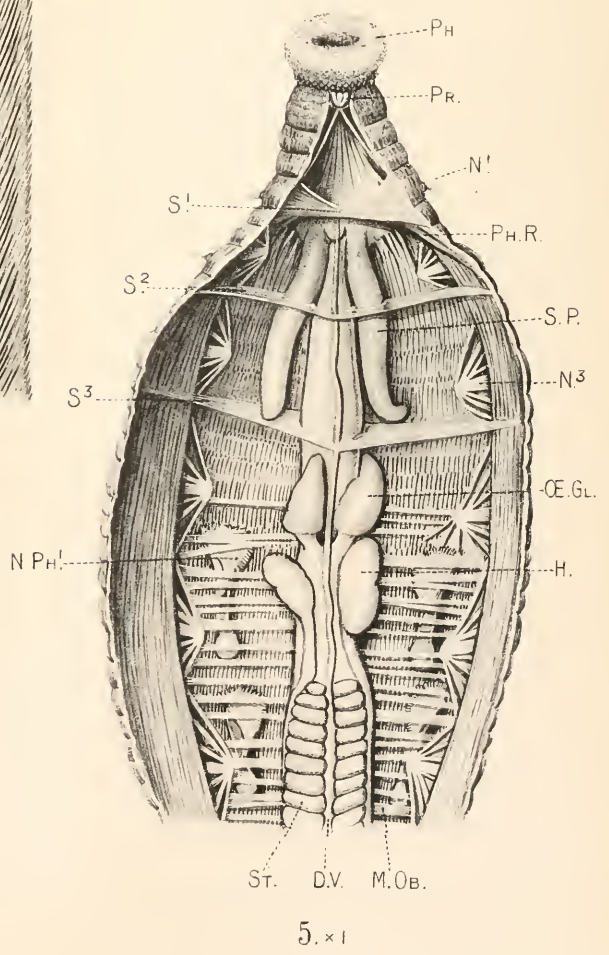
4. x 1000



6. x 110.



2. x 5.



5. x 1



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2.—*Descriptions of Fishes from the Coast of Natal* (Part III).* By
 J. D. F. GILCHRIST, M.A., D.Sc., Ph.D., and W. WARDLAW
 THOMPSON, F.Z.S.

THE following is a further contribution to the description of a collection of fishes from Natal. It will be seen that, as in the previous papers, the older classification and some of the older names are retained for local convenience and easy comparison with such readily accessible works of reference as Day's "Fishes of India."

FAMILY PERCIDÆ.

GEN. LUTIANUS, Bloch.

LUTIANUS ERYTHROPTERUS, Bl.

Teeth; a canine on each side of premaxillary, an outer row of curved canine-like teeth on either jaw, a triangular patch of villiform teeth on vomer, a narrow band on palatines, none on tongue. Depth of body $2\frac{1}{7}$ times in total length excluding caudal, length of head 3 times. Snout twice diameter of eye, which is $1\frac{1}{5}$ times in inter-orbital width and $4\frac{3}{4}$ times in length of head; maxillary reaches to vertical of posterior nostril; preoperculum with a shallow emargination on lower part of vertical limb, which is finely serrated, the serræ being slightly coarser at angle and extending a short distance along its horizontal border; scales on cheeks and opercles.

Dorsal xi 14, moderately strong; the 1st spine very short, 4th spine longest and nearly $\frac{1}{2}$ length of head, from the 4th to the last the spines are slightly lower; soft portion of fin higher than spinous,

* Parts I. and II. have appeared in Vol. VI.

5th to 10th rays longest and $1\frac{1}{8}$ times height of longest spine, their height nearly equalling base of soft portion of fin. Pectorals a little more than $\frac{4}{5}$ length of head, reaching the vent. Ventrals a little more than $\frac{7}{10}$ length of head, the spine as long as 3rd spine of dorsal fin. Anal iii 9, 2nd spine strongest and not quite as high as 3rd, which is $\frac{3}{4}$ the height of 4th spine of dorsal. Caudal truncate and about same length as ventral fin. Scales ciliated, in somewhat bent rows going diagonally upwards and forwards; extending over base of dorsal fin, reaching higher on soft rays than on spines and equally developed over bases of anal and caudal fins. Lat. l. 55, lat. tr. $\frac{1}{2}\frac{1}{2}$.

Colour when fresh, pinkish with wavy darker stripes; blackish on top of head. In preservative the colour is silvery, with about 8 irregular dark longitudinal lines; blackish on top of head and with a black patch above and on sides of tail; ventrals blackish, dorsal and anal with a dark shade.

One specimen, 185 mm. in length, from Mr. Romer Robinson, Natal, who describes it as having been caught in Durban Bay, and kindly furnishes a note of the colour when alive.

LUTIANUS LINEATUS, Q. and G.

Teeth villiform, strong slightly curved anterior canines on upper jaw, smaller ones laterally on lower; a curved band on vomer, a band on palatines, an oval patch of minute teeth on tongue. Depth of body equals length of head and is $2\frac{9}{10}$ times in total length excluding caudal. Snout $1\frac{1}{3}$ times diameter of eye, which is $2\frac{1}{8}$ times in interorbital width and $5\frac{1}{4}$ times in length of head; distance between eye and upper edge of maxilla $1\frac{1}{5}$ times diameter of eye, maxillary reaches vertical of anterior 3rd of orbit; preoperculum serrated, emarginate above angle and with a notch into which a small interopercular knob is received; operculum with 2 blunt points; 8 series of scales between preorbital and angle of preoperculum.

Dorsal x 13, spines strong, 4th and 5th longest and $\frac{1}{4}$ length of head, the last spine of the fin a little more than $\frac{1}{2}$ height of longest; soft portion of fin lower than spinous, the anterior rays a little longer than adjacent spine, posterior about $\frac{3}{4}$ height of longest spine. Pectorals $\frac{4}{5}$ length of head, falcate. Ventrals $\frac{1}{2}$ length of head. Anal iii 8, spines strong; 3rd spine longest, $\frac{2}{3}$ height of soft rays and $\frac{9}{10}$ height of longest spine of dorsal. Caudal deeply forked. Scales moderately large on body, covering cheeks and opercles; an

irregular oblique patch on each side of nape; base of soft dorsal and anal covered with smaller scales for about $\frac{1}{2}$ their height, base of caudal covered with small scales. Lat. l. 54, lat. tr. $\frac{7}{15}$.

Colour (when fresh), body below lateral line and side of head salmon-coloured, more gamboge yellow on head and pinkish on body; above lateral line and on top of head darker and purplish; dorsal fin dark red, other fins of same colour as body but rather darker.

Colour (of preserved specimen), body above lateral line and fins dark, below lateral line whitish. The oblique rows of scales above lateral line are marked by white streaks, the rows of scales below lateral line by a series of horizontal dark streaks.

One specimen, 500 mm. in length, from the Fish Market, Durban, Natal.

GEN. DIAGRAMMA, Cuv.

DIAGRAMMA GRISEUM, C. and V.

Teeth in jaws villiform, the outer row containing slightly larger ones. Depth of body nearly $2\frac{2}{3}$ times in total length excluding caudal, length of head a little more than $3\frac{2}{3}$ times. Snout $1\frac{1}{5}$ times diameter of eye, which is 4 times in length of head and $1\frac{3}{10}$ times in interorbital width. Upper profile of head descends parabolically from origin of dorsal fin to mouth, with a concave depression above nostrils; snout obtuse, lips thick and fleshy, cleft of mouth horizontal; maxillary reaches to vertical of posterior nostril; preoperculum slightly emarginate, distinctly serrated, with a rounded angle; 4 or 5 small pores below symphysis of lower jaw. Scales extend over the head to between the nostrils and laterally over the posterior portion of the preorbital; cheeks and preoperculum covered with small scales; suprascapula serrated.

Dorsal xiii 22, commences above suprascapula and ends above the middle of the distance between caudal and anal fins; the length of the spinous portion is more than that of the soft and the distance of the last soft ray from the caudal equals that between the 1st and 5th spines; spines strong, the 3rd is the longest and is nearly $\frac{2}{3}$ length of head, the remaining spines successively decreasing; anterior soft rays slightly longer than adjacent spine, remainder gradually rising to height of 3rd spine, the posterior rays decreasing so as to form a rounded edge to the fin. The spinous portion of the fin moves in a scaly sheath, which is deeper and more conspicuous below the last 3rd of the fin; the soft rays are covered with scales for about $\frac{1}{3}$ their

height. Pectorals $\frac{7}{10}$ length of head. Ventrals $\frac{2}{3}$ length of head, not reaching anus. Anal iii 7, 2nd spine stronger and longer than 3rd and $\frac{1}{3}$ length of head; soft rays longest anteriorly and about $\frac{1}{2}$ length of head; the lower half of the fin is covered with small scales as in the soft dorsal. Caudal emarginate, nearly $\frac{1}{5}$ length of head, lower half of the fin with a scaly sheath and the ray membranes with small scales for $\frac{3}{4}$ their length. Lat. l. 58, lat. tr. $\frac{1}{2}\frac{2}{3}$.

Colour (of preserved specimen), brownish grey; faint narrow longitudinal lines on head from snout and from behind eye to posterior border of opercle.

One specimen, 370 mm. in length, from Mr. Romer Robinson, Natal.

GEN. DENTEX, Cuv.

DENTEX FILOSUS, Val.

Teeth, 4 canines on each jaw. Depth of body nearly $2\frac{2}{5}$ times in total length excluding caudal, length of head $3\frac{1}{4}$ times. Snout slightly more than $1\frac{1}{3}$ times diameter of eye, which equals the inter-orbital width and is $3\frac{2}{3}$ times in length of head; nape convex, elevated, the profile from origin of dorsal fin to point of snout making a long curve; jaws equal; maxillary reaches to vertical of anterior margin of eye; height of preorbital about $\frac{2}{3}$ its length and about $\frac{9}{10}$ diameter of eye; 8 series of scales between preorbital and angle of preoperculum; opercle with a flat spine. Scales on top of head extend forward in a curve to nearly the vertical of front margin of eyes; opercles and cheeks scaled.

Dorsal xii 10; 3rd to 5th spines elongate and produced into a filament, especially the 3rd, which is $\frac{9}{10}$ length of head; soft portion of fin lower than spinous, the anterior rays $\frac{2}{3}$ length of head. Pectorals nearly as long as head, reaching to anal. Ventrals $\frac{3}{4}$ length of head, the rays slightly elongate. Anal iii 8; 2nd spine stronger than 3rd and about the same height, $\frac{1}{3}$ length of head; soft rays similar to those of soft dorsal and about the same height. Caudal slightly more than $\frac{9}{10}$ length of head, forked; upper lobe longer than lower. Lat. l. 62, lat. tr. $\frac{8}{15}$.

Colour (of preserved specimen), pale reddish tint above, whitish below; dorsal fin and margin of caudal lobes tinged with black; faint irregular dark patches on back of head and behind soft dorsal.

One specimen, 163 mm. in length, from Mr. Romer Robinson, Natal.

GEN. LOBOTES, Cuv.

LOBOTES SURINAMENSIS, C. and V.

Teeth villiform, with an outer row of slightly enlarged conical ones. Depth of body $2\frac{1}{7}$ times in total length excluding caudal, length of head nearly 3 times. Snout $2\frac{1}{10}$ times diameter of eye, which is $2\frac{2}{3}$ times in interorbital width and nearly 9 times in length of head; preoperculum strongly serrated on vertical limb with 1 or 2 spinate teeth at the angle which is rounded and slightly produced and serrated on lower edge; horizontal limb of preopercle entire over its anterior portion; lower jaw projects beyond upper, maxillary reaches vertical of middle of orbit. Dorsal profile concave on occiput; shoulder-bone and bone above axilla serrated.

Dorsal xii 15; spines strong, 6th longest and nearly $\frac{2}{3}$ length of head; soft portion of fin higher than spinous and about $\frac{1}{3}$ length of head, with the posterior margin acutely rounded. Pectorals a little more than $\frac{1}{2}$ length of head. Ventrals $\frac{3}{5}$ length of head, not reaching anus. Anal iii 11; 3rd spine lanceolate in shape, strongest and longest, nearly $\frac{3}{10}$ length of head; soft portion of fin similar to soft dorsal. Caudal rounded, nearly $\frac{2}{3}$ length of head. Lat. l. 45, lat. tr. $\frac{9}{18}$. Scales on body large, head and cheeks as far as anterior margin of orbits covered with small scales, snout naked; a sheath of small scales on dorsal anal and base of caudal fins, low beneath the spinous dorsal and broader below the soft dorsal.

Colour (of preserved specimen), light brown, the belly a faint yellowish tint; pectorals and ventrals whitish; a whitish transverse patch near extremity of caudal.

One specimen, 515 mm. in length, from Tugela River mouth, from Mr. Romer Robinson, Natal, who states that the fish when fresh caught is silvery like the "Kabeljauw."

GEN. GERRES, Cuv.

GERRES FILAMENTOSUS, C. and V.

Teeth fine on both jaws. Depth of body $2\frac{1}{3}$ times in total length excluding caudal, length of head $3\frac{3}{10}$ times. Snout slightly exceeds diameter of eye, which equals interorbital width and is $3\frac{1}{4}$ times in length of head; maxillary extends to vertical of anterior margin of eye; preopercle entire, its angle rounded; opercle with a blunt point.

Dorsal ix 10; 1st spine very short, 2nd produced and nearly $1\frac{2}{3}$ times length of head, extending to about posterior extremity of soft dorsal; the last 4 spines are shorter than the soft rays, which anteriorly are nearly $\frac{2}{3}$ length of head and decrease in height posteriorly. Pectorals $1\frac{1}{3}$ times length of head, reaching to anal. Ventrals $\frac{3}{4}$ length of head. Anal iii 7; 2nd spine stronger and about same length as 3rd, which is $\frac{1}{3}$ length of head. Lat. l. 45, lat. tr. $\frac{6}{12}$. A well-developed scaly sheath at base of dorsal and anal; about 5 rows of scales between lateral line and base of dorsal sheath.

Colour (of preserved specimen), silvery below, darker above; extremity of dorsal black edged, tip of caudal lobes dark, minute dark specks on anal and soft dorsal.

One specimen, 171 mm. in length, from Mr. Romer Robinson, Natal.

FAMILY SQUAMIPINNES.

GEN. CHÆTODON, Lin.

CHÆTODON VAGABUNDUS, L.

Teeth fine and brushlike. Depth of body nearly $1\frac{2}{5}$ times in total length excluding caudal, length of head $3\frac{1}{3}$ times. Snout $1\frac{1}{3}$ times diameter of eye, which is slightly less than interorbital width and $3\frac{3}{4}$ times in length of head. Dorsal profile much elevated and concave from above eyes to snout; lips equal, upper very thick in the centre; maxillary scarcely reaches vertical of anterior nostril; snout a little produced and pointed; preopercle scarcely denticulated.

Dorsal xiii 25, commences above base of pectorals, spines strong; interspinous membranes deeply notched; soft portion of fin higher than spinous and obtusely angular, the middle rays longest. Pectorals a little more than $\frac{2}{3}$ length of head. Ventrals $\frac{2}{3}$ length of head, scarcely reaching anus, the spine strong. Anal iii 21; 2nd spine about same length as 3rd but stronger and slightly curved; soft portion of fin similar to soft dorsal. Caudal fan-shaped with slightly curved outer edge. Scales ciliated, entirely covering head.

Colour (of preserved specimen), silvery, a black band about the diameter of the eye in width passing upwards from angle of interopercle through eye to nape at origin of dorsal fin and descending thence to angle of interopercle on the other side; a black curved band from outer edge of last dorsal spine passing along lower half of soft dorsal across peduncle and on to anal as far as the 12th ray;

dorsal and anal fins margined with black, the outer edge of anal being slightly tipped with white; two black bands on caudal, the anterior of which is broader and crescent-shaped; about 6 dark lines passing upwards and backwards from opercle to base of spinous dorsal, with numerous others passing downwards and backwards from the lowest of these lines to the belly and anal fin.

One specimen, 107 mm. in length, from Mr. Romer Robinson, Natal, who mentions that when fresh the tail and posterior half of the body are of an orange colour, and that there are orange stripes across the snout and above the eye.

FAMILY SPARIDÆ.

GEN. PAGRUS, Cuv.

PAGRUS SPINIFER, Forsk.

Teeth, 4 conical incisors on each jaw, with rounded teeth behind them; 2 series of rounded molars along the sides of the jaws. Depth of body $2\frac{1}{3}$ times in total length excluding caudal, length of head $3\frac{2}{5}$ times. Snout equals 3 times diameter of eye, which is $1\frac{3}{5}$ times in interorbital width and 5 times in length of head. Dorsal profile elevated, with a protuberance in front of the eyes; maxillary reaches to vertical of posterior nostril; preorbital deep, nearly twice diameter of eye in height; 6 or 7 rows of scales between preorbital and angle of preoperculum; preopercle crenellated at angle and along lower limb; operculum with 2 blunt inconspicuous points.

Dorsal xii 10; compressed and flexible, first 2 spines very short, 3rd to 5th spines elongate; 3rd spine longest and equals length of head, the interspinous membrane cleft to base of 4th and the membranes between the rest of the spines deeply emarginate. Pectorals $1\frac{2}{3}$ times length of head, reaching to posterior 3rd of anal. Ventrals over $\frac{1}{2}$ length of head, reaching to anus; the spine nearly $\frac{3}{4}$ length of longest ray. Anal iii 8; 2nd spine a little stronger and slightly longer than 3rd and $\frac{2}{3}$ length of head. Caudal emarginate and a little longer than head. Scales cycloid. Lat. l. 54, lat. tr. $\frac{7}{13}$.

Colour (of preserved specimen), whitish, a black spot on axil.

One specimen, 375 mm. in length, from Mr. Romer Robinson, Natal.

The diameter of the eye is greater in description of *P. spinifer* than in this specimen, which is, however, probably larger.

FAMILY COTTIDÆ.

GEN. PLATYCEPHALUS, Bl. Schn.

PLATYCEPHALUS PUNCTATUS, C. and V.

Teeth in villiform bands on jaws, in two parallel bands on vomer and a long narrow band on palatines. Depth of body $5\frac{3}{4}$ to $6\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{1}{3}$ to $3\frac{1}{2}$ times. Snout $1\frac{3}{4}$ times diameter of eye, which is $7\frac{1}{2}$ to 8 times in length of head; interorbital width slightly concave and about $\frac{3}{4}$ diameter of eye; width of head between preopercular spines equals $\frac{3}{4}$ its length; maxillary reaches to vertical of anterior 4th of eye. Supraorbital margin with 5 teeth, the ridge from it to the occiput commences with a strong spine and a group of radiating ridges, with another spine near the nape; a bony ridge armed with spines passes from middle of posterior margin of eye to origin of lateral line, the last spine being long and blade-like; a strong spine, directed backwards, a little in advance of upper anterior angle of eye; a short bony ridge internal to either front nostril; a strong ridge, commencing in a stellate group of 5 ridges on snout, passes across preorbital armed with 2 spines and joins a strong spine at angle of preoperculum beneath the base of which is a smaller flat triangular spine pointing downwards; operculum with 2 spines, the lower continued in a bony ridge to preopercular border; nostrils tubular, the anterior terminating in a flap; a spine above axilla.

Dorsal i, viii 11; spines weak, 3rd spine longest and nearly $\frac{1}{2}$ length of head; soft dorsal lower than spinous. Pectorals a little more than $\frac{1}{2}$ length of head. Ventrals nearly $\frac{4}{5}$ length of head, reaching to 2nd anal ray. Anal 12, commencing below 2nd ray of soft dorsal and not so high. Caudal truncate, $\frac{3}{5}$ length of head. Lat. l. about 80, lat. tr. $\frac{8}{5}$; 6 rows of scales between lateral line and base of spinous dorsal.

Colour (of preserved specimens), light brown above, faint yellow beneath; 3 faint brown cross-bands below spinous dorsal; upper part of body and head sprinkled with small blackish spots which form irregular transverse lines on all the fins except the ventrals; spinous dorsal with a dark upper edge.

Two specimens, 235 mm. and 240 mm. in length respectively, from Mr. Romer Robinson, Natal.

FAMILY TEUTHIDÆ.

GEN. TEUTHIS, Lin.

TEUTHIS NEBULOSA (Q. and G.).

Teeth about 12 on either side of each jaw. Depth of body $2\frac{1}{3}$ to $2\frac{1}{2}$ times in total length excluding caudal, length of head about 4 times. Snout $1\frac{1}{3}$ to nearly $1\frac{1}{2}$ times diameter of eye, which is 1 to $1\frac{1}{5}$ times in interorbital width and $3\frac{1}{2}$ to $3\frac{2}{3}$ times in length of head; interorbital space flat; anterior upper edge of orbit prominent and finely serrated; snout blunt, with broad upper lip; maxillary reaches vertical of posterior nostril; preopercular angle slightly produced; soft portion of cheek about 1 diameter of eye in height and $1\frac{1}{4}$ to $1\frac{1}{2}$ times as long as high.

Dorsal xiii 10; spines weak, increasing in length to 4th or 5th, which is $\frac{1}{2}$ length of head, remainder decreasing to $\frac{1}{4}$ to $\frac{1}{3}$ length of head; soft rays nearly $\frac{1}{2}$ length of head. Pectorals about $\frac{3}{4}$ length of head. Ventrals slightly more than $\frac{2}{3}$ length of head. Anal vii 9; spines increase in length to 3rd which is nearly as high as longest spine of soft dorsal, decreasing in length to the last, which is slightly longer than the diameter of the eye; soft rays similar to soft dorsal. Caudal deeply emarginate, with pointed lobes, the upper slightly longer than the lower and about the length of the head; middle rays of caudal $\frac{3}{5}$ to $\frac{2}{3}$ length of outer rays of upper lobe. Scales minute.

Colour (of preserved specimens), brown, slightly marbled; spinous dorsal and anal with darker blotches, which in soft dorsal and anal form irregular lines; shoulder dark, narrow oblique lines passing upwards from behind ventrals across sides, of a faint white in one specimen and of an orange tint in the other; an indistinct light band on base of caudal.

Two specimens, 163 mm. and 161 mm. in length respectively, from Mr. Romer Robinson, Natal.

FAMILY NANDIDÆ.

GEN. PLESIOPS, Cuv.

PLESIOPS NIGRICANS, Rüpp.

Teeth, villiform on jaws, vomer and palatines, the outer row on both jaws slightly enlarged. Depth of body 3 times in total length

excluding caudal, length of head $2\frac{9}{10}$ times. Snout equals interorbital and nearly $1\frac{1}{4}$ times diameter of eye, which is $5\frac{1}{5}$ times in length of head. Snout somewhat obtuse, jaws about equal; maxillary extends to behind posterior margin of orbits; interorbital space convex.

Dorsal xii 7; commences above base of pectorals, spines much shorter than soft rays; anterior spine lowest, the posterior $2\frac{3}{5}$ in length of head; interspinous membrane extends beyond tips of spines and is very deeply emarginate, the spines somewhat tuberculous. Soft portion of fin lower anteriorly, rising to 5th ray, which is twice the length of the longest spine. Pectorals nearly $\frac{2}{3}$ length of head. Ventrals i 4, spine hidden, first 2 rays prolonged, reaching to origin of anal and about same length as head. Anal iii 8; 3rd spine longest and about same height as longest spine of dorsal; soft portion of fin similar to and about same height as soft dorsal. Caudal a little more than $\frac{3}{4}$ length of head, rounded. Scales finely ciliated in last half of body. There are 27 or 28 pierced scales in the upper lateral line and 13 or 14 in the lower.

Colour (of preserved specimen), dark greenish brown; a light patch on preoperculum, operculum and base of pectorals.

One specimen, 190 mm. in length, from Mr. Romer Robinson, Natal.

FAMILY SCIÆNIDÆ.

GEN. UMBRINA, Cuv.

UMBRINA ANGUSTILINEATA, n. sp.

Teeth villiform in both jaws, a few on anterior portion of premaxillaries slightly larger than the rest. Depth of body $3\frac{1}{10}$ times in total length excluding caudal, length of head $3\frac{3}{5}$ times; depth of head equals its length, width of head nearly $\frac{1}{2}$ its length. Eyes $4\frac{1}{7}$ times in length of head, a little more than $1\frac{1}{4}$ diameters from end of snout and $1\frac{1}{6}$ diameters apart; distance between eye and maxilla equals $\frac{4}{5}$ diameter of orbit; snout obtuse, slightly swollen, overhanging the jaws; maxillary reaches to vertical of middle of eye; cleft of mouth lateral, upper jaw overhanging lower; preoperculum with vertical margin serrated, more coarsely so at angle; two blunt opercular points. Shoulder-flap serrated; 3 pores in line across base of snout; a central barbel below symphysis of lower jaw, nearly $\frac{1}{4}$ diameter of eye in length and with 2 open pores on each side.

Dorsal x, i 25 ; spines flexible, 1st minute, 3rd longest and nearly $\frac{3}{4}$ length of head, remainder decreasing rapidly in length, the last being minute ; soft rays about uniform in height, divided, a little more than $\frac{1}{2}$ length of longest spine and equal to postocular portion of head. Pectorals as long as head behind anterior 3rd of eyes. Ventrals $\frac{2}{3}$ length of head, reaching a little more than $\frac{2}{3}$ distance to base of caudal. Anal ii 7 ; 2nd spine strong, nearly $\frac{2}{3}$ length of head and $\frac{2}{3}$ height of anterior soft rays ; length of base of fin nearly $\frac{1}{4}$ that of soft dorsal. Caudal with straight outer edge, a little more than $\frac{3}{4}$ length of head. Lat. l. 52, lat. tr. $\frac{7}{15}$. Lateral line becomes straight above posterior margin of anal, tubes branched. Scales ctenoid ; a band at base of soft dorsal and anal fins.

Colour (of preserved specimen), brown, covered with minute dark specks ; about 11 sinuous narrow white lines on body passing downwards and forwards from behind, 2 or 3 extend on to the head ; a dark spot on opercle ; anal with 3 or 4 light blotches on lower half forming an irregular line.

One specimen, 208 mm. in length, from Mr. Romer Robinson, Natal.

FAMILY CARANGIDÆ.

GEN. CARANX, Lacép.

CARANX NATALENSIS, n. sp.

Teeth, in a single series on each jaw with a few irregularly placed as a second row laterally and a short inner row at symphysis. Depth of body $2\frac{7}{10}$ to 3 times in total length excluding caudal, length of head 3 to slightly more than $3\frac{3}{4}$ times. Snout $1\frac{5}{7}$ times to twice diameter of eye, which is $1\frac{2}{3}$ to $1\frac{3}{5}$ times interorbital width and $4\frac{1}{2}$ to slightly more than 5 times in length of head ; eyes without adipose lids but with the skin slightly projecting over them ; greatest width of head nearly $\frac{1}{2}$ its length, depth of head nearly $\frac{1}{3}$ its length ; maxillary does not reach vertical of anterior margin of eye ; depth of preorbital $\frac{5}{7}$ to about 1 diameter of eye ; jaws equal, snout obtuse, occipital crest well developed. Body oval and compressed, dorsal and anal profiles equally convex, a slight depression above nostrils.

Dorsal viii, i 25 ; spines flexible, 2nd, 3rd, and 4th about equal and $\frac{2}{3}$ length of head ; 2nd dorsal highest anteriorly, lower than longest spines and about $\frac{1}{3}$ length of head. Anal ii, i 21 ; similar

to soft dorsal. The last ray of soft dorsal and anal slightly elongated. Pectorals a little longer than head, falciform. Ventrals nearly $\frac{1}{2}$ length of head. Caudal nearly $\frac{9}{10}$ length of head, deeply forked. Lateral line forms a low curve to below 12th or 13th ray of dorsal, the length of curve $1\frac{1}{3}$ to $1\frac{2}{3}$ times that of the straight portion; scutes on straight portion commence below 16th ray of dorsal and are about 25 in number, becoming most developed on the free portion of the tail. Lat. l. sc. 105 (circa); a narrow band of fine scales along base of soft dorsal and anal; scales on chest. Scales on body ciliated.

Colour (of preserved specimens), uniform yellowish, with a dark shade along back and a dark blotch on opercles; body and fins covered with minute dark specks. The smaller specimen is silvery on the belly.

Two specimens, 194 mm. and 265 mm. in length respectively, the larger one taken off Umhloti in 6 fms.; from Mr. Romer Robinson, Natal.

GEN. CHORINEMUS, Cuv. and Val.

CHORINEMUS LYSAN, Forsk.

Teeth, anteriorly in 2 rows, posteriorly in one, on premaxillaries; in 2 rows on lower jaw, the outer row directed outwards and upwards; in a pear-shaped patch, slightly prolonged posteriorly, on vomer; in a pyriform band, widest anteriorly, on palatines; teeth on tongue. Depth of body 3 times in total length excluding caudal, length of head $4\frac{1}{2}$ times; greatest width of head $2\frac{3}{10}$ times in its length; height of head $\frac{2}{3}$ its length. Snout obtuse; $\frac{2}{3}$ diameter of eye, which equals interorbital width and is $3\frac{1}{5}$ times in length of head; cleft of mouth deep; maxillary extends to about $\frac{1}{2}$ diameter of eye beyond orbits and is narrow, uncovered by preorbital from beneath the first 3rd of the eye and slightly widened and rounded posteriorly; length of premaxillary $\frac{5}{8}$ that of head. Profile of head in front of nape slightly concave and swollen in front of orbits.

Dorsal vii, i 19; anal ii, i 18; anterior rays of both dorsal and anal elevated, $\frac{3}{4}$ length of head; last 10 rays on each fin semi-detached, the last ray being a little elongated. Pectorals over $\frac{2}{3}$ length of head. Ventrals nearly $\frac{2}{3}$ length of head. Caudal $1\frac{1}{10}$ times length of head, the lobes deeply forked. Scales distinct and lanceolate. Lateral line has a slight angular elevation soon after its commencement and is slightly wavy.

Colour (of preserved specimen), dark on back, white below; with 6 irregular dark blotches on the sides, one below lateral line at its commencement, the others above it.

One specimen, 290 mm. in length, from Durban; from Mr. Romer Robinson, Natal.

FAMILY SCOMBRIDÆ

GEN. CYBIUM.

CYBIUM LINEOLATUM, C. and V.

Teeth, 16 to 18 on each jaw, triangular and strongly compressed, the central ones on the mandibles being the stronger; a triangular pointed patch on vomer, a band on palatines. Depth of body equals length of head and is $4\frac{1}{5}$ times in total length excluding caudal. Snout $1\frac{1}{5}$ times diameter of eye, which is $1\frac{2}{3}$ times in interorbital width and $4\frac{1}{5}$ times in length of head; jaws about equal; maxillary reaches to vertical of posterior 3rd of eye and partly concealed by preorbital; preoperculum emarginate on its vertical border, with its lower edge about as long as the vertical.

Dorsal xvi, 16, ix; spines of 1st dorsal weak, higher anteriorly where they are about $\frac{1}{3}$ length of head; soft dorsal higher anteriorly, a little over $\frac{1}{2}$ length of head and with 9 detached finlets. Pectorals as long as the head behind middle of eye. Ventrals a little more than $\frac{1}{2}$ length of pectorals. Anal ii 14, x; similar to soft dorsal and about the same height, with 10 detached finlets. Caudal deeply forked, nearly $1\frac{2}{3}$ times length of head. Lateral line at first in upper 4th of body, descends gradually with undulations towards the end of the soft dorsal fin until it arrives below the 5th finlet, after which it is nearly straight; central keel well developed on free portion of tail.

Colour (of preserved specimen), dark neutral tint on back and upper part of body, light-coloured on sides and belly; rows of elongated dark blotches on body, 3 below lateral line like interrupted lines; spinous dorsal and posterior margin of upper lobe of caudal black; pectorals, soft dorsal and anal covered with minute dark specks.

One specimen, 374 mm. in length, from Mr. Romer Robinson, Natal; said to be common at Durban, where it is netted off the beach.

FAMILY MUGILIDÆ.

GEN. MUGIL, Arted.

MUGIL DIADEMA, n. sp.

(Diamond Mullet.)

Depth of body equals length of head and is $4\frac{1}{5}$ times in total length excluding caudal. Snout $1\frac{1}{7}$ times diameter of eye, which is $2\frac{3}{5}$ times in interorbital width and $5\frac{1}{3}$ times in length of head; width of head nearly equals $\frac{2}{3}$ its length. Eye without adipose lid; upper profile of head almost straight; interorbital space slightly convex, its width contained nearly $2\frac{1}{4}$ times in length of head; cleft of mouth twice as wide as deep, upper lip broad in the centre, lower jaw with a hollow knob at symphysis which is received into a corresponding depression on upper jaw; extremity of maxillary bone visible, preorbital broad, about $\frac{1}{2}$ diameter of eye in width, serrated at its posterior lower border; uncovered space below chin long and lanceolate; nostrils close together and about midway between eye and snout; about 20 scales between snout and origin of spinous dorsal.

Dorsal iv, i 8; commences nearer to base of caudal than to point of snout; spines of 1st dorsal moderately strong, 1st spine longest and $\frac{3}{5}$ length of head; soft dorsal higher than spinous, anterior rays somewhat produced and nearly $\frac{4}{5}$ length of head, posterior border of fin emarginate, length of base $2\frac{3}{5}$ times in longest ray. Pectorals nearly as long as head. Ventrals $\frac{4}{5}$ length of head, inserted midway between base of pectorals and origin of spinous dorsal. Anal iii 9, similar to soft dorsal but a little higher. Caudal deeply emarginate. Scales large, extending over upper surface of head to snout; fins more or less covered with small oblong scales; a very small axillary scale. Lat. l. 30 to root of caudal, lat. tr. 12.

Colour (of preserved specimen), grey, dark above light on abdomen; thin, dark, hair-like streaks on each scale.

One specimen, 313 mm. in length, from Durban Bay, from Mr. Romer Robinson, Natal.

It differs from *M. ceylonensis*, Günth., in length of pectorals and soft dorsal, fewer scales in l.l. and maxillary not entirely hidden; differs from *M. Smithii* in elongate soft dorsal and anal which are characteristic of this species among South African Mulllets.

MUGIL NATALENSIS, Cast.

(Flathead Mullet.)

Depth of body $3\frac{7}{10}$ times in total length excluding caudal, length of head $4\frac{1}{4}$ times. Snout equals diameter of eye, which is a little more than $2\frac{1}{5}$ times in interorbital width and $4\frac{3}{5}$ times in length of head. Eye with a very narrow posterior adipose lid; interorbital space slightly convex and nearly $\frac{1}{2}$ length of head; cleft of mouth twice as broad as deep, maxillary almost entirely concealed; preorbital strongly serrated; upper lip thickened in the centre; nostrils close together; uncovered space on chin long and lanceolate; width of head equals its length behind the middle of the eye, its height about the same.

Dorsal iv, i 8; commencing midway between base of caudal and middle of eye, spines moderately strong, 1st spine longest, about $\frac{3}{5}$ length of head; soft dorsal emarginate, covered with scales, length of base about $\frac{3}{5}$ height of anterior rays, which are not quite as high as longest spine of 1st dorsal. Pectorals $\frac{2}{3}$ length of head and situated about the middle of the depth of the body. Ventrals about $\frac{7}{10}$ length of head, and arise on the vertical of midway between base of pectorals and 1st spine of dorsal. Anal iii 9; slightly higher anteriorly than 2nd dorsal, its base equals about $\frac{2}{3}$ its height; 3rd spine about $\frac{3}{10}$ length of head and nearly $1\frac{1}{4}$ times the length of the 2nd. Caudal deeply emarginate, slightly more than length of head. Scales 25 rows between snout and spinous dorsal; 14th and 27th scales of lateral line correspond to origin of spinous and soft dorsals; preorbital scaled; scales on all fins except 1st dorsal; no elongated axillary scale. Lat. l. 42, lat. tr. $14\frac{1}{2}$.

One specimen, 270 mm. in length, from Mr. Romer Robinson, Natal; taken in tidal waters, common.

MUGIL CEYLONENSIS, Gthr.

(Blue-tail Mullet.)

No teeth. Depth of body slightly more than $3\frac{2}{5}$ times in total length excluding caudal, length of head $4\frac{1}{5}$ times. Snout nearly $\frac{3}{4}$ diameter of eye, which is $4\frac{1}{4}$ times in length of head; interorbital width $\frac{1}{2}$ length of head; greatest width of head nearly $\frac{3}{4}$ its length, greatest height $\frac{2}{3}$ its length. Snout short, broad, obtuse; upper jaw overhangs lower; lower lip thin with a tubercle at symphysis which fits into a corresponding notch on upper lip which is moderately thick; maxillary hidden by preorbital, which has its lower margin finely serrated and bent and its angle serrated; cleft

of mouth small, its depth $\frac{2}{3}$ the breadth; free space on chin very narrow and short; eyes without adipose membrane.

Dorsal iv, i 8; commences midway between point of snout and base of caudal; spines of 1st dorsal flexible and moderately strong 1st spine longest and $1\frac{3}{5}$ times in length of head; 5 rows of scales between 1st and 2nd dorsals. Anterior rays of 2nd dorsal nearly $1\frac{2}{3}$ times height of longest spine of 1st dorsal; upper margin of fin concave, the posterior rays being slightly produced; base of fin nearly $\frac{1}{2}$ its height. Pectorals $1\frac{1}{10}$ times length of head, inserted above the middle of the depth of the body and extending to vertical of 3rd spine of 1st dorsal; a moderately enlarged axillary scale at the base. Ventrals nearly $\frac{3}{4}$ length of head, inserted about midway between base of pectorals and origin of 1st dorsal. Anal iii 8; situated opposite to soft dorsal, which it closely resembles in length, height, and shape. Caudal deeply forked, more than $1\frac{1}{2}$ times in length of head; least depth of free portion of tail equals $\frac{1}{2}$ length of head. Scales striated, extending over head to point of snout and on cheeks; 20 rows between point of snout and origin of 1st dorsal fin; soft dorsal, anal and base of caudal entirely covered with scales. Lat. l. 33, lat tr. 12.

Colour (of preserved specimen), silvery, darker above than below; a dark spot superiorly at base of pectorals.

One specimen, 268 mm. in length, from Mr. Romer Robinson, Natal.

MUGIL CAPITO, Cuv.

(Grey Mullet.)

Depth of body $4\frac{1}{4}$ to $4\frac{1}{4}$ times in total length excluding caudal, length of head $3\frac{3}{4}$ to 4 times. Snout slightly greater than diameter of eye, which is $\frac{1}{2}$ interorbital width and nearly 5 to $5\frac{2}{3}$ times in length of head; width of head equals $\frac{2}{3}$ its length; eyes without adipose lids; snout broad and depressed; interorbital space slightly convex, its width contained $2\frac{2}{3}$ times in length of head; preorbital with extremity truncated and well serrated; maxillary reaches to vertical of anterior nostril; nostrils less distant from each other than the posterior is from the eye; angle made by mandibular bones obtuse; space at chin elongate, pointed, cuneiform. About 30 scales between snout and spinous dorsal.

Dorsal iv, i 8; 1st dorsal commences midway between middle of eye and base of caudal; spines moderately strong and flexible, 1st spine longest and about $\frac{2}{3}$ length of head; anterior rays of soft dorsal about as high as 2nd spine of 1st dorsal, upper surface of the

fin concave and its base $\frac{2}{3}$ length of longest ray. Pectorals $\frac{2}{3}$ to $\frac{7}{10}$ length of head, situated slightly above centre of body. Ventrals $\frac{2}{3}$ length of head, inserted midway between origin of pectorals and of spinous dorsal. Anal iii 9; commences slightly in advance of soft dorsal, 3rd spine moderately strong and $\frac{2}{3}$ height of soft rays, which are slightly longer than the rays of the soft dorsal; base of fin $\frac{4}{5}$ length of longest ray, upper margin of fin strongly emarginate, the posterior rays being produced. Caudal forked. Lat. l. 42-45, lat. tr. 14; the 12th, 16th, and 30th scales correspond respectively to extremity of pectorals and origin of dorsal fins; no elongated axillary scale; small scales on all fins except spinous dorsal; a dark stripe along the middle of each series of scales on the body.

Colour (of preserved specimens), uniform greyish.

Two specimens, 236 mm. and 320 mm. in length respectively; the smaller from Mr. Romer Robinson, Natal, the larger from Durban market.

FAMILY LABRIDÆ.

GEN. JULIS, Cuv. and Val.

JULIS HEBRAICA, Lacép.

Depth of body $3\frac{1}{3}$ to $3\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{1}{5}$ to $3\frac{1}{3}$ times. Snout about twice diameter of eye, which is $1\frac{2}{7}$ to 2 times in interorbital width and $5\frac{6}{7}$ to $6\frac{1}{4}$ times in length of head; jaws about equal, the anterior teeth of upper jaw projecting outwards and overlapping lower; maxillary reaches to vertical of anterior nostril, cleft of mouth lateral; infraorbital ring striated. Upper profile of snout very obtuse in the larger specimen.

Dorsal viii 13; spines weak and lower than soft rays, which are of uniform height and about $\frac{1}{3}$ length of head. Pectorals $\frac{1}{3}$ length of head. Ventrals $\frac{1}{2}$ length of head. Anal ii 11; similar to soft dorsal but slightly higher anteriorly. Caudal lunate, the lobes produced and equal to or $1\frac{1}{3}$ times length of head. Scales comparatively large, cycloid. Lat. l. 27, lat. tr. $\frac{2}{3}$.

Colour (when fresh), blue, with irregular violet bands on head and body in front of pectorals, a light vertical band from back to belly behind pectorals; head and anterior half of body darker than posterior half; caudal dark base and lobes, light in centre.

Colour (of preserved specimen), purplish brown, with dark lines from eye to opercular margin and to base of pectorals, a dark

interrupted line on isthmus; a light cross-band passing from anterior spines obliquely behind pectorals almost to belly behind ventrals.

Two specimens, 137 mm. and 178 mm. in length respectively, taken off breakwater, Durban; from Mr. Romer Robinson, Natal, who has supplied the note of the colouring when fresh.

GEN. COSSYPHUS, Cuv. and Val.

COSSYPHUS MACRURUS, Lacép.

A strong posterior canine tooth, strong canines on upper jaw projecting forwards. Depth of body slightly greater than length of head and about 3 times in total length excluding caudal. Snout twice diameter of eye, which is $1\frac{3}{5}$ times in interorbital width and a little more than $5\frac{1}{2}$ times in length of head; cleft of mouth oblique; jaws about equal, the upper slightly overlapping lower; upper lip broad in centre, with folds; maxillary reaches to vertical of anterior 3rd of eye and is entirely hidden by the preorbital; preoperculum indistinctly serrated, emarginate above the angle, which is rounded. Head longer than high, its greatest height equals its length behind posterior nostril, flat on top.

Dorsal xii 10; spines weak and produced in a short filament, the 1st spine slightly lower than the remainder, which are subequal and nearly $\frac{1}{4}$ length of head; soft portion of fin higher posteriorly. Pectorals $\frac{2}{3}$ length of head. Ventrals with outer rays produced but not reaching anus, about same length as pectorals. Anal iii 12; similar to soft dorsal. Caudal $\frac{2}{3}$ length of head, truncate, outer rays produced. Lat. l. 33, lat. tr. $\frac{6}{13}$.

Colour (when fresh), "reddish on sides shading to dark on back. Dark patch on side near base of tail. Belly yellowish shading to smoky colour below pectorals. Under side of lower jaw light yellow. Dorsals dark. Tail reddish with dark edges. Anal dark. Pectorals transparent with red at base. Eye red with black pupil."

Colour (of preserved specimen), grey, a large black blotch along the whole of the spinous dorsal fin extending on to the spines; a dark blotch between lateral line and base of soft dorsal; whitish longitudinal lines on cheeks and behind eyes, soft dorsal and anal with brown dots in rows, ventrals blackish, pectorals diaphanous.

One specimen, 256 mm. in length, from Mr. Romer Robinson, Natal; who has kindly furnished a note of the colouring when fresh.

COSSYPHUS NIGROMACULATUS, Gilchr. and Thomp.

Charopsodes pictus, Gilchr. and Thomp.

Teeth, 4 strong canines in front on either jaw, the inner pair on lower jaw being small; lateral teeth in a continuous cutting edge; the larger specimen has 2 canines at the angle of upper jaw on left side, the smaller specimen has only 1. Depth of body $2\frac{2}{3}$ to $2\frac{3}{4}$ times in total length excluding caudal, length of head 3 times. Snout 3 times diameter of eye, which is $\frac{1}{2}$ to $\frac{2}{3}$ interorbital width and $5\frac{1}{16}$ to 7 times in length of head; interorbital space convex; preorbital emarginate, its least depth about twice diameter of eye; preoperculum minutely serrated; upper lip thick, cleft of mouth oblique, maxillary reaches vertical of anterior margin of eye and nearly hidden by preorbital.

Dorsal xi-xii 10-12; commences above base of pectorals; spines short, strong and embedded in thick skin, which is produced as a short lobe covering end of each spine; interspinous membranes deeply cleft; 1st spine shortest, the remainder about subequal and $\frac{1}{5}$ to $\frac{3}{10}$ length of head; soft portion of fin anteriorly about as high as adjacent spines rising posteriorly to about $\frac{1}{3}$ length of head. Pectorals $\frac{7}{10}$ to $\frac{3}{4}$ length of head, superior rays longest. Ventrals with first 2 rays produced, about $\frac{1}{5}$ length of head and reaching to origin of anal. Anal iii 12; resembles soft dorsal but not so high. Caudal emarginate, outer rays produced and nearly as long as head. Scales on body large, smaller ones covering throat, opercles, cheeks, and top of head as far as eyes. Lat. l. 33, lat. tr. $\frac{6\frac{1}{2}-7}{14-15}$.

Colour (of larger specimen when fresh), very brilliant, pinkish red with a tinge of lemon-yellow markings as follows: Dots and short irregular lines on head and anterior dorsal part of body, on interspinous membranes of all fins except spinous dorsal where they are black and on margin of caudal fin; a black blotch at distal end of pectorals and one on the body between the spinous and soft portions of the dorsal fin.

Colour (of preserved specimens), yellow or grey with a reddish tinge in places; a large black patch above lateral line extending on to base of dorsal fin, a black patch on distal extremity of pectorals; spinous dorsal black.

Two specimens, one 425 mm. in length, from Durban market; the other, 240 mm. in length, procured from line fishermen at Durban, caught outside the harbour.

On reconsideration of specimens we have found that these two fish, which we have formerly described as different, apparently may

be varieties of the same species, and that it seems preferable to extend the definition of the genus *Cossyphus* to include *Charopsodes*.

FAMILY SCLERODERMI.

GEN. BALISTES, Arted.

BALISTES NIGER, Mungo Park.

Teeth compressed, notched. Depth of body about twice in total length excluding caudal, length of head $2\frac{7}{10}$ times. Snout $4\frac{1}{3}$ times diameter of eye, which is about $1\frac{1}{3}$ times in interorbital width and $5\frac{1}{3}$ times in length of head. A groove in front of the eyes. Cheeks entirely scaled. Some enlarged scutes behind gill-openings.

Dorsal iii 27; commences above first 3rd of pectorals, 1st spine strong and more than $\frac{2}{5}$ length of head; soft rays of 2nd dorsal higher anteriorly, 3rd ray longest and about same height as 1st spine of anterior dorsal, remaining rays shortening to the last which is $\frac{1}{3}$ height of the longest; margin of fin curving from 3rd to last ray. Pectoral $\frac{1}{3}$ length of head. Ventral spine movable, a series of sharp spines from its base to the vent. Anal 24, similar to soft dorsal, but margin of fin a little rounder. Caudal $\frac{3}{5}$ length of head, truncate. Lat. l. sc. 45 (circa); about 25 series of scales in a transverse line from origin of soft dorsal to vent; 6 rows of small recurved spines on tail.

Colour (when fresh) "yellow brown; violet blue from mouth to ventrals; 2 white bands under mouth. Tail brown with longitudinal yellow stripes and broad white outer edging, and narrow white edging above and below. Dorsal and anal chocolate base shading to lighter brown, pectorals ditto."

Colour (of preserved specimen), bluish brown, a light ring round lower jaw; soft dorsal, anal and pectorals light-coloured; caudal with a light upper and lower edge and a white posterior extremity.

One specimen, 130 mm. in length, taken off the breakwater at Durban; from Mr. Romer Robinson, who kindly supplied a note of the colouring when fresh.

GEN. MONACANTHUS, Cuv.

MONACANTHUS NATALENSIS, n. sp.

Depth of body $1\frac{1}{3}$ times in total length excluding caudal, length of head nearly $3\frac{1}{3}$ times. Snout $4\frac{2}{3}$ times diameter of eye, which

is $1\frac{3}{5}$ times in interorbital width and about 5 times in length of head; eyes placed high up at posterior angle of head, over the gill-openings and just behind dorsal spine; profile of head from dorsal spine to point of snout slightly concave.

Dorsal i 34; spine $\frac{1}{5}$ length of head, strong and slightly curved, situated nearer to point of snout than to origin of soft dorsal and just in front of the vertical of anterior margin of eye, armed posteriorly for about $\frac{3}{4}$ its length with a series of barbs on each side pointing outward and upward. Soft dorsal highest anteriorly, the rays lengthening to the 5th which is $\frac{3}{5}$ height of spinous dorsal, the succeeding rays decreasing in height to the last, which is about $\frac{1}{4}$ the height of the 5th ray. Pectorals a little more than $\frac{2}{3}$ length of head and situated in the vertical of posterior margin of orbits. Ventral small, immovable. Anal 31, rays of uniform height and about $\frac{2}{3}$ length of longest rays of soft dorsal, except posteriorly, where they are shortened and give the fin a rounded edge. Caudal $\frac{3}{4}$ length of head, subtruncate and with the corners rounded; caudal peduncle swollen at the sides. Scales small, skin velvet-looking with a rough surface, scales setiform and turned forward on side of tail; minute black hair-like processes occurring in clumps in the form of a few black spots.

Colour (of preserved specimen), dark brown; soft dorsal, anal and pectoral fins whitish; a few dark black spots occurring irregularly on the body.

One specimen, 170 mm. in length, from Mr. Romer Robinson, Natal.

FAMILY GYMNOBONTES.

GEN. TETRODON, Cuv.

TETRODON IMMACULATUS, var. VIRGATA, Bl. Schn.

Teeth of about equal size in both jaws. Length of head scarcely equals its distance from base of dorsal fin and is nearly $2\frac{5}{6}$ times in total length excluding caudal. Eyes prominent, situated slightly nearer to gill-opening than to point of snout, longitudinal diameter $2\frac{1}{3}$ times in distance from point of snout and twice in interorbital width, which is broad and flat, the osseous part only extending $\frac{3}{4}$ the distance between the eyes; snout short, obtusely pointed, nearly $\frac{1}{2}$ length of head and scarcely longer than interorbital width; 2 well-developed nasal tentacles on each side on a single base. Profile of head from orbits to snout slightly concave.

Dorsal 9; situated in last 3rd of distance from middle of eye to base of caudal, its height twice the length of its base and $\frac{2}{3}$ length of the head. Pectorals $\frac{2}{3}$ length of head. Anal 9; commencing behind posterior margin of dorsal and of similar shape, but slightly higher. Caudal nearly $\frac{2}{3}$ length of head, truncate. Minute spines on body as far as snout, becoming larger on abdomen. No fold on lower part of tail or body.

Colour (when fresh), dark brown above; belly yellowish, striped longitudinally with brown lines; fins yellowish; back dark with lighter patches.

Colour (of preserved specimen), dark brownish black on upper part of body including cheeks and snout; light drab colour below, with many dark curving lines running from throat and round base of pectorals along the sides and abdomen to base of tail.

One specimen, 83 mm. in length, taken off breakwater, Durban; from Mr. Romer Robinson, Natal, who kindly supplies a note of the colouring when fresh.

TETRODON HISPIDUS, Lacép.

Teeth equal on both jaws. Length of head equals the distance from base of dorsal fin and is $2\frac{3}{4}$ times in total length excluding caudal. Eyes of moderate size situated slightly nearer to gill-opening than to point of snout and $2\frac{3}{4}$ times in length of snout, which is slightly more than $\frac{1}{2}$ length of head; interorbital width slightly less than length of snout, flat, the osseous part twice the diameter of the eye in width; orbits prominent; profile of snout slightly concave; two prominent nasal papillæ on a single base on each side.

Dorsal 10; situated in last 3rd of distance from anterior margin of eye to base of caudal fin, height $2\frac{1}{2}$ times the length of the base and nearly $\frac{1}{2}$ length of head. Pectorals $\frac{2}{3}$ length of head. Anal 10; commencing behind posterior margin of base of dorsal, which it resembles, but is not so high. Caudal nearly $\frac{3}{4}$ length of head, truncate, with a slightly rounded posterior margin and equal to its distance from anterior margin of dorsal. Spines on body extend superiorly from interorbital space to near base of caudal, more or less widely separated and in patches and hidden in the skin; inferiorly they extend from throat and cheeks below line of pectorals to vent, being prominent and denser on abdomen, and with a patch on the side below the dorsal fin.

Colour (when fresh), yellowish on back, shading to dirty white on belly. Many small white spots on back, thicker near tail; pec-

torals yellow, white circular line round base of pectorals with smaller yellow circle inside, yellow vertical line at base of pectorals and another below it; other fins yellowish. Several black vertical bands below line of pectoral extending to belly on each side of body.

Colour (of preserved specimen), blackish brown above, white on abdomen, with a few scattered small white spots on back, which become more numerous and well defined on the sides from below dorsal fin and especially on free portion of tail; 4 or 5 subvertical black blotches on each side of abdomen; pectorals dark near the base, white on outer $\frac{2}{3}$, a whitish ring round base including gill-openings. Caudal dark brown.

One specimen, 135 mm. in length, taken off breakwater, Durban; from Mr. Romer Robinson, Natal, who has kindly supplied the note of the colouring when fresh.

TETRODON HYPSELOGENION, Blkr.

Teeth about the same size on each jaw. Length of head equals its distance from dorsal fin and is nearly 3 times in total length excluding caudal. Osseous interorbital space narrow and about $\frac{3}{4}$ diameter of eye, which is prominent, situated on upper margin of head, a little nearer to point of snout than to gill-opening, and is $3\frac{3}{8}$ times in length of head; snout $1\frac{3}{8}$ times diameter of eye; chin prominent and vertical, its depth nearly equals length of snout and is $\frac{1}{3}$ length of head; lower jaw projects beyond upper, mouth small; posterior nostrils have a prominent papilla on each with two openings; gill-openings fringed with coarse papillæ.

Dorsal commences in last 3rd of distance from snout to base of caudal; anterior rays highest; length of base equals $\frac{2}{3}$ the height of the fin, which is $\frac{3}{5}$ length of head. Anal commences below middle of dorsal, similar to but not as high as dorsal. Caudal truncate.

Body covered with small spines from interorbital space nearly to dorsal fin, abdomen covered with numerous similar spines; a cross band of small spines across the side to abdomen, behind pectorals; remainder of sides naked.

Colour (of preserved specimen), upper half of body dark brown with irregular larger and smaller whitish spots; lower half of body white; sides with a silvery longitudinal band; irregular sub-vertical bars on cheeks; caudal fin dark brown, with a whitish inferior edge.

FAMILY MURÆNIDÆ.

GEN. MURÆNESOX, McCall.

MURÆNESOX CINEREUS, Forsk.

(Silver Eel.)

Vomerine teeth compressed, with a basal lobe in front and behind, teeth of middle row fang-like and powerful; teeth of inner series of mandible similar in form to but much smaller than those of the vomer and but rarely with basal lobes, those of the outer series rudimentary and not bent outwards; fang-like canines at symphysis. Length of head contained nearly $2\frac{1}{2}$ times in distance between point of snout and vent; snout slender, produced into a point beyond lower jaw; cleft of mouth wide, $2\frac{3}{10}$ times in length of head; eyes situated nearly in middle of length of head, $1\frac{1}{4}$ times interorbital width and $2\frac{3}{4}$ times in length of snout.

Dorsal commences in advance of gill-openings. Pectorals well developed, $\frac{1}{3}$ length of head. Tail about $1\frac{1}{2}$ times length of trunk.

Colour (of preserved specimen), uniform dark brown on back, lighter below.

One specimen, 735 mm. in length, from Mr. Romer Robinson, Natal.

GEN. MURÆNA, Arted.

MURÆNA NEBULOSA, Ahl.

Teeth obtuse, molar-like. Length of head $5\frac{3}{4}$ times in distance from point of snout to vent; tail slightly longer than the trunk. Eyes about 2 diameters from point of snout and situated midway between it and cleft of mouth, which is $2\frac{7}{8}$ times in length of head; gill-opening about equals diameter of eye.

Dorsal fin fairly well developed and commencing a little in front of gill-opening.

Colour (of preserved specimen), whitish ground, covered with numerous dark specks; a row of about 30 large irregular black spots on back, some of them with white spots in them, running through dorsal fin and a similar row of black blotches below them extending through abdomen.

One specimen, 260 mm. in length, caught at the Bluff, Durban; from Mr. Romer Robinson, Natal.

MURÆNA MELEAGRIS, Shaw.

(Spotted Eel.)

Canines fairly well developed; teeth on mandibles uniserial, on maxillary and premaxillary biserial, in a single row longitudinally on vomer. Length of head about 4 times in distance between point of snout and vent; length of tail $1\frac{3}{5}$ to $1\frac{7}{10}$ times in length of trunk. Eyes small, $2\frac{1}{5}$ to $2\frac{1}{3}$ diameters from end of snout and situated nearer to it than to angle of mouth; cleft of mouth about $\frac{1}{2}$ length of head; mouth cannot be entirely closed; anterior nasal tube $\frac{1}{2}$ to $\frac{3}{5}$ vertical diameter of eye; gill-opening $1\frac{2}{5}$ diameters of eye. A row of widely separated open pores on mandibles and maxillary and 3 or 4 pores about the nostrils.

Dorsal low and anteriorly enveloped in skin, commencing a little in advance of gill-opening.

Colour (of preserved specimens), dark brown above, light on belly; covered with small white spots smaller than the eye.

Two specimens, 437 mm. and 435 mm. in length respectively, from Mr. Romer Robinson, Natal.

MURÆNA NUDIVOMER, Günth.

Teeth uniserial on both jaws, anterior ones serrated; a large curved tooth behind the row at symphysis of upper jaw; no vomerine teeth. Length of head nearly 4 times in distance from point of snout to vent; tail nearly $1\frac{3}{5}$ times length of trunk. Eyes small, $2\frac{2}{7}$ diameters from point of snout and situated nearer to it than to angle of mouth; snout of moderate length, about $5\frac{3}{4}$ times in length of head; cleft of mouth $2\frac{3}{5}$ times in length of head; gill-openings equal twice diameter of eye; nasal tube small, $\frac{3}{7}$ diameter of eye.

Dorsal and anal fins well developed, covered with thick skin; dorsal commences in the vertical of nearly midway between cleft of mouth and gill-opening. Body slender and tapering to tail.

Colour (of preserved specimen), head white with small brown spots on lower half and vermiculated brown lines on upper, gradually merging a short distance behind the head into brown with numerous white oval spots, sometimes confluent, over the rest of the body and extending through the fins.

One specimen, 908 mm. in length, from Mr. Romer Robinson, Natal.

MURENA TESSELLATA, Rich.

Teeth in a single row, triangular and slanting backwards, large ones interspersed with smaller; 2 strong pointed teeth pointing backwards at symphysis of upper jaw. Length of head $4\frac{1}{3}$ times in distance from snout to vent; tail $1\frac{1}{2}$ times length of trunk. Snout compressed and rounded; eyes situated midway between angle of mouth and end of snout, diameter equals $\frac{1}{2}$ length of snout; cleft of mouth $2\frac{1}{3}$ times in length of head. Profile of head boldly convex to eyes; gill-opening equals diameter of eye; anterior nasal tubes equal $\frac{1}{2}$ diameter of eye; mouth can be shut completely.

Colour (of preserved specimen), body, fins, and head covered with irregular black blotches, with many round spots in a more or less irregular row on body; interspaces light.

One specimen, about 380 mm. in length, from Mr. Romer Robinson, Natal.

MURENA POLYZONA, Rich.

(Banded Eel.)

Teeth, biserial on lower jaw, molar-like and slightly pointed at anterior end of mandible, a row of rather pointed teeth on maxillary with a few smaller teeth on the outside; a band of 4 longitudinal rows of molar-like rounded teeth on vomer. Length of head $3\frac{1}{2}$ to $3\frac{7}{10}$ times in distance from point of snout to vent; tail $1\frac{1}{2}$ times length of trunk; eyes situated in upper half of head, $1\frac{3}{5}$ to 2 diameters from end of snout and situated nearer to point of snout than to angle of mouth; cleft of mouth $2\frac{1}{2}$ to $2\frac{4}{5}$ times in length of head. Profile of head boldly convex to the eyes, slightly convex thence to point of snout, which is slightly longer than the lower jaw; gill-opening equals diameter of eye; anterior nasal tube $\frac{2}{3}$ diameter of eye.

Dorsal well developed, commences in advance of gill-opening.

Colour (of preserved specimens), yellowish brown, darker above than below, crossed by about 28 irregular narrow white or yellow transverse bands, which extend through dorsal and anal fins and across caudal.

Two specimens, 374 mm. and 518 mm. in length respectively, from Mr. Romer Robinson, Natal.

FAMILY SCYLLIIDÆ.

GEN. SCYLLIORHINUS, Gill.

SCYLLIORHINUS NATALENSIS, Regan.

(Striped Dog-fish.)

Teeth long, with a central setose cusp and 2 cusps at the base on each side. Head broad, depressed; snout obtusely pointed; length of snout $\frac{7}{10}$ width of mouth and $2\frac{3}{5}$ times the space between the nasal valves; diameter of eye $1\frac{1}{5}$ times in length of snout; no labial folds; gill-openings $1\frac{1}{5}$ times diameter of eye. Scales of body trispinate.

The 1st dorsal originates slightly in front of posterior base of ventrals, the 2nd dorsal over posterior end of base of anal. Dorsal fins equal; the length of their respective bases is $2\frac{3}{5}$ times in the distance between them, which is nearly $1\frac{1}{2}$ times the distance between the posterior margin of base of 2nd dorsal and base of caudal; posterior margin of pectorals situated less than $\frac{1}{2}$ the distance between posterior end of its base and anterior end of ventrals; posterior end of ventrals pointed.

Colour (of preserved specimen), grey, white underneath; with transverse irregular bars across back which are dark-edged and enclose a bar of the same shade as the ground colour; 1 bar crosses the head from eye to eye; the 3 bars across the back anterior to the origin of the ventrals extend to abdomen, the remainder only reach to median line, 1 being at the base of each dorsal fin, 1 midway between these fins, 1 midway between 2nd dorsal and base of caudal; there are fainter bars between each dark bar. Pectorals with transverse blotches. Ventrals with a large blotch at base. Caudal with 2 partial bars only visible on edge of fin, tip of fin dark; tip of dorsals with a dark blotch.

One specimen, 438 mm. in length, from Durban Museum.

FAMILY RHINOBATIDÆ.

GEN. RHINOBATUS, Müll. and Henl.

RHINOBATUS BLOCHII, M. and H.

Teeth on both jaws about equal in size. Snout elongate, its length $7\frac{1}{10}$ times in total length; interorbital width $3\frac{1}{3}$ times in length of snout; distance between outer angles of nostrils equals

$\frac{1}{2}$ distance of mouth from end of snout; anterior nasal valve continued towards median line by a fold that nearly meets that of the other side; cleft of mouth straight, longer than nostril; rostral ridges more distant from each other behind than in front and separated by a shallow groove.

Dorsal fins about the same height and pointed; their distance apart equals $1\frac{1}{2}$ times interspace between 2nd dorsal and root of caudal.

Back finely granular, with a row of compressed spines along the middle of the back, 1 on each shoulder, and a row round upper margin of eyes.

Colour (of preserved specimen), pale, slightly mottled brown above, nearly white on lower side; scattered small round whitish spots on back.

One specimen, 640 mm. in length, from Mr. Romer Robinson, Natal.

FAMILY TRYGONIDÆ.

GEN. PTEROPLATEA, Müll. and Henl.

PTEROPLATEA NATALENSIS, n. sp.

Disk nearly twice as broad as long. Tail a little more than $\frac{1}{2}$ as long as disk, with a minute rudimentary fin at extremity and a slight upper and lower ridge semi-annulated with black. A short tentacle behind spiracle. Lower dental laminae concave in the centre, the points of the curve being received into corresponding depressions in the convex curve of the upper laminae.

Teeth small, unicuspid. Spine not serrated. Interorbital space convex with a V-shaped depression and 2 or 3 small knobs or blunt spines. Two large tuberculous lumps behind spiracles.

Colour (of preserved specimen), light brown mottled with darker; upper surface of tail with brown patches.

One specimen, 157 mm. in length excluding caudal, from Mr. Romer Robinson, Natal.

GEN. ÆTOBATIS, Müll. and Henl.

ÆTOBATIS NARINARI, Euphrasen.

Teeth, lower dental laminae projecting. Disk about twice as broad as long, distance from mouth to anus nearly $\frac{2}{5}$ width of disk. Head

distinct from pectoral fins, elevated. Snout projecting and acutely pointed; eyes small; interorbital width broad and convex, about $8\frac{1}{2}$ times diameter of eye; nasal valves forming a quadrangular flap, the lower edge fringed and divided in the centre.

Dorsal fin very small, arises opposite centre of ventrals, which are $\frac{5}{8}$ as broad as long; tail whiplike and produced, $3\frac{1}{5}$ times length of body, with a spine situated just behind termination of dorsal fin (broken off in specimen).

Back smooth; colour brown, spotted with small oval spots (which in the preserved specimen are whitish), margins of pectorals of a lighter shade of yellowish brown and the edges crenellated.

One specimen, 290 mm. in length excluding caudal, from Mr. Romer Robinson, Natal.

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ERRATUM.

On page 181 of Vol. VI., Part II., read *Umbrina striata* Blgr.

3.—*A Revised Reference List of South African Non-marine Mollusca ; with Descriptions of New Species in the South African Museum.*—By M. CONNOLLY.

INTRODUCTION.

LITTLE more than thirteen years have elapsed since the publication of Messrs. Melvill and Ponsonby's "Contribution towards a Check-List of the Non-marine Molluscan Fauna of South Africa" (Proc. Mal. Soc., 1898, iii., p. 166-184), which included all species then known south of the Tropic of Capricorn; and of Dr. Sturany's "Catalog der . . . südafrikanischen Land-und Süßwasser-Mollusken" (Wien, 1898), in which he described several new forms, and listed, with few exceptions, all older ones which had been up to that date reported from south of the line roughly formed by the Zambesi and Kunene Rivers.

In this short time, however, the number of non-marine shells known in South Africa has increased by nearly one-half, the 408 species listed by Sturany having grown to 586, despite the fact that many forms then considered distinct have since been altogether expunged or placed in synonymy.

No apology, therefore, is needed for the appearance of a revised reference list, and it only remains to add a few words of explanation as to special features introduced in the new work.

At Dr. Péringuey's desire, I have adopted Sturany's more extended geographical boundaries. Although Messrs. Melvill and Ponsonby's invaluable series of articles in the Ann. and Mag. Nat. History has left comparatively little to be cleared up regarding the non-marine mollusca to the south of the Tropic of Capricorn, very little is known, conchologically, of much of the region just north of that limit, and the present list must necessarily leave much room for amplification in this direction.

Very few South African non-marine fossils are yet known, and most of them were described in papers dealing also with recent shells. I have therefore included both recent and fossil species in

the body of my work, but, to facilitate distinction, the reference number is printed in ordinary type before recent species, and in *italics* before those which have only been found, so far, in a fossil condition in South Africa.

A list of authors and works consulted, with the abbreviations used, is given on p. 288. Owing to the great increase of recent literature on the subject, the list of references under each species has been lightened by the omission of all those of a purely "check-list" character, or of no actual value to the student.

Many comparatively unimportant references to classification or locality only are also omitted, the authority quoted after each locality being, in the latter case, considered sufficient.

I have also omitted many of the older references to European and American species, as the descriptions contained in them are of little value.

The letters *A.* (anatomy),
D. (description, external),
F. (figure, external),
L. (locality),
N. (note),
R. (radula),

are appended respectively to each reference to denote the class of information it contains.

With regard to Férussac's *Tabl. Syst. des Moll.*, part iii., of which there were two editions in the same year, with different pagination, the alternative pages are given.

The species described and figured by Sturany in *Südafr. L.- und S.-W.-Moll.*, November, 1898, were first published by him in a "Preliminary Note" in the *Anz. kais. Akad. Wiss. Wien*, in June of the same year. I have not, in this instance, quoted the earlier reference, except in the case of *Chondrocyclus isipingöensis*, where priority of nomenclature is involved.

The present work is intended, primarily, to be of as much use as possible to students in South Africa. This accounts for my having appended full references to Genera and the higher divisions, many of which I have found it quite impossible to trace in any library in that country; and also for the addition of as many localities for each species as I have been able to gather; but it has been, naturally, quite impossible to verify the correctness of all of the latter. Many of the older specific names have been misapplied, at various times, to other species, while many recently described shells

have wrongly figured, prior to their description, under one of the older names. In giving all these localities, however, it is my hope that future collectors, on finding a certain shell in a certain neighbourhood, will at least have some guide as to the known species with which their specimens may be compared.

No single map is yet published which includes all the localities mentioned, but to simplify matters as far as possible I have given the province in which each is situated, and subdivided the larger or more intricate districts. Thus, German South-West Africa is divided into Ovampoland (north), Damaraland (or Hereroland) (central), and Great Namaland (south). Little Namaland is in the Cape of Good Hope Province, just south of the mouth of the Orange, and Griqualand West is that portion of the colony north of the same river. Cape Peninsula, where specially mentioned, refers to the small, but conchologically rich, district between Cape Town and Cape Point.

British Bechuanaland, on the north, is divided from Bechuanaland by a line nearly following the direction of the Molopo River. Lorenzo Marques represents the whole Portuguese territory in East Africa south of the Zambesi, as distinct from Mozambique to its north; while the Northern Transvaal comprises the district north of Pretoria.

An effort has been made to state where the type of each species is preserved, and through the kindness of the custodians of the collections mentioned, I have been able to locate about nine-tenths of the total number. In cases where the type cannot be traced or was never specified, the whereabouts of original specimens has, when possible, been given.

For the information of local students, the letters S.A.M. are affixed to the names of species contained in the collection of the South African Museum. I may add that the magnificent Burnup Collection is exhibited in the Natal Government Museum, Pietermaritzburg, while there are good collections of non-marine mollusca at Grahamstown and Port Elizabeth, and a smaller one at Kimberley.

It only remains for me to express my most grateful thanks to the many kind friends who have been ever ready to assist me in the many difficulties which have cropped up in the course of even the present unassuming work. It is almost impossible to mention all by name, and I must therefore confine myself on this page to acknowledging my extreme indebtedness to Messrs. J. H. Ponsonby and H. C. Burnup for an enormous amount of invaluable help and advice, to which are due, in great measure, any merits which may eventually be found in the ensuing pages.

FAMILY TESTACELLIDÆ, Gray, 1853.

(A.M.N.H. xii. p. 330.)

GENUS TESTACELLA, Cuvier, 1800.

(Leç. d'Anat. comp. Paris, i. Table 5.)

Type of Genus *T. haliotideca*, Drap.

5. TESTACELLA AURIGASTER, Layard. [S.A.M.]

1893 *Testacella aurigaster*, Lay., CKll., Conchologist, ii. p. 205. N.1902 " " (as Syn. of *T. maugeri*, Fér.) Tayl.,

Mon. Brit. Moll. pp. 25, 27. L.

Hab. CAPE PENINSULA. Cape Town (Layard; Lightfoot).

I believe I am correct in stating that Layard actually published the description of this species, but in what periodical cannot be traced. It is nearly related to *T. maugeri*, Fér., with which it may probably prove to be synonymous.

FAMILY STREPTAXIDÆ, Gray, 1860.

(A.M.N.H. vi. p. 268.)

SUB-FAMILY STREPTAXINÆ, Godwin-Austen, 1908.

(Fauna Brit. India, Moll. p. 1.)

GENUS STREPTAXIS, Gray, 1837.

(A.M.N.H. i. p. 484.)

Type of Genus, *S. nobilis*, Gray.

6. STREPTAXIS GWANDAENSIS, Preston.

1912 *Streptaxis gwandaensis*, Prest., A.M.N.H. ix. p. 69, f. 1. D.F.

Type in coll. Preston.

Hab. RHODESIA. Near Geelong Mine, Gwanda District (S. B. Cox).

SUB-FAMILY ENNEINÆ, Kobelt, 1904.

(Conch. Cab. p. 92.)

GENUS ENNEA, H. and A. Adams, 1855.

(Gen. Rec. Moll. ii. p. 171.)

Type of Genus, *E. elegantula* (Pfr.).

The South African portion of this Genus is undoubtedly in need of severe critical revision. Many species have been differentiated on

It appears inadvisable to regard *impervia* as other than a well-marked variety of *adamsiana*, being a stouter form with magnified dentition. *Impervia* is found generally along the coast-belt of Natal, with a very small sprinkling of the narrower form. At Pine Town it is difficult to differentiate the two; at Botha's Hill they are enigmatical; while on reaching Pietermaritzburg and the surrounding district only the narrower form is found.

8. ENNEA ALBERSI (Pfeiffer).

[S.A.M.]

1854 *Pupa albersi*, Pfr., P.Z.S. p. 295. *D.*1855 *Ennea albersi*, Pfr., Mal. Blätt. ii. p. 61. *D.*" " " Novit. Conch. i. p. 38. pl. 10, f. 15-17. *D.F.*1859 " " " Mon. Hel. iv. p. 338. *D.*1885 " " " Tryon, Man. of Conch. i. p. 97. pl. 19, f. 83, 84. *D.F.*1903 " " " M. & P., A.M.N.H. vii. p. 596. *N.F.*1904 " " " Kob., Conch. Cab. p. 182. pl. 23, f. 7-9. *D.F.*

Type in British Museum.

Hab. NATAL. Port Natal (Strangier, fide Pfeiffer 1859). Port Shepstone, both sides of the River Umzimkulu (Burnup).

9. ENNEA ALICIE, Melv. & Pons.

1907 *Ennea alicie*, M. & P., A.M.N.H. xix. p. 95. pl. 6, f. 1. *D.F.*

Type in British Museum.

Hab. ZULULAND. Makowe (Burnup). Dukuduku Forest (Toppin).

This may possibly be conspecific with *E. dædalea*, M. and P. Size is the chief distinguishing characteristic, and intermediate grades exist.

10. ENNEA APEROSTOMA, Melv. & Pons.

1892 *Ennea aperostoma*, M. & P., A.M.N.H. ix. p. 93. pl. 6, f. 10. *D.F.*1904 " " " Kob., Conch. Cab. p. 219. pl. 27, f. 10. *D.F.*

Type in British Museum.

Hab. NATAL (Layard).

var. LISSOPHANES, Melv. & Pons.

1892 *Ennea aperostoma* var. *lissophanes*, M. & P., A.M.N.H. ix. p. 93. *N.*

Type in British Museum.

Hab. NATAL (Layard).

11. ENNEA ARNOLDI, Sturany. [S.A.M.]

- 1898 *Ennea arnoldi*, Stur., S. A. Moll. p. 28. pl. 2, f. 26-30. *D.F.*
1904 " " Kob., Conch. Cab. p. 203. pl. 25, f. 10-13. *D.F.*
Type in Naturh. Hofmus. Vienna.
Hab. NATAL. Isipingo; Durban (Penther). Tongaat; Lower Umkomaas (Burnup).

var. ELONGATA, Sturany.

- 1898 *Ennea arnoldi* var. *elongata*, Stur., S. A. Moll. p. 29. pl. 2, f. 31. *D.F.*
Type in Naturh. Hofmus. Vienna.
Hab. NATAL. Isipingo (Penther).

12. ENNEA AURIS-LEPORIS, Melv. & Pons.

- 1898 *Ennea auris-leporis*, M. & P., A.M.N.H. i. p. 25. pl. 8, f. 3. *D.F.*
1904 " " Kob., Conch. Cab. p. 182. pl. 23, f. 10. *D.F.*
Type in British Museum.
Hab. NATAL (fide M. and P.).

13. ENNEA BERTHÆ, Melv. & Pons.

- 1901 *Ennea berthæ*, M. & P., A.M.N.H. i. p. 315. pl. 2, f. 1. *D.F.*
1904 " " Kob., Conch. Cab. p. 235. pl. 32, f. 20. *D.F.*
Type in British Museum.
Hab. NATAL. Karkloof Bush (McBean). Ntimbankulu (Burnup).

14. ENNEA BOWKERÆ, Melv. & Pons.

- 1892 *Ennea bowkeræ*, M. & P., A.M.N.H. ix. p. 92. pl. 6, f. 9. *D.F.*
1904 " " Kob., Conch. Cab. p. 219. pl. 27, f. 9. *D.F.*
Type in British Museum.
Hab. CAPE OF GOOD HOPE. East London (Miss Bowker).

15. ENNEA BURNUPI, Melv. & Pons. [S.A.M.]

1897. *Ennea burnupi*, M. & P., A.M.N.H. xix. p. 634. pl. 17, f. 2. *D.F.*
1904 " " Kob., Conch. Cab. p. 217. pl. 27, f. 5. *D.F.*
Type in British Museum.
Hab. NATAL. Town Bush, Pietermaritzburg; Gordon Falls (Burnup).

16. ENNEA CAIRNSI, Melv. & Pons.

1897 *Ennea cairnsi*, M. & P., A.M.N.H. xix. p. 634. pl. 17, f. 1. *D.F.*1904 " " Kob., Conch. Cab. p. 216. pl. 27, f. 4. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Mouth of Buffalo River (in coll. Cairns; Burnup).

17. ENNEA CALLISTA, Melv. & Pons.

1909 *Ennea callista*, M. & P., A.M.N.H. iv. p. 485. pl. 8, f. 1. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Dassie Krantz, Grahamstown (Farquhar).

18. ENNEA CALOPASA, Melv. & Pons.

1903 *Ennea calopasa*, M. & P., A.M.N.H. xii. p. 596. *D.F.*

Type in British Museum.

Hab. NATAL. Port Shepstone, both sides of the River Umzimkulu (Burnup).

19. ENNEA CANDIDULA, Morelet.

1889 *Ennea candidula*, Morel., J. de C. xxxvii. p. 12. pl. 2, f. 2. *D.F.*1890 " *layardi*, Ancey, Bull. Soc. Mal. Fr. vii. p. 159. *D.*1904 " " " Kob., Conch. Cab. p. 242. *D.*" " *candidula*, Morel., Kob., Conch. Cab. p. 240. pl. 29, f. 6-8. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth, South End, and Kragga Kama, 17 miles south of Port Elizabeth (Crawford). Port Elizabeth and Grahamstown (*layardi*, fide Layard).

NATAL. Upper Tugela (Quekett).

20. ENNEA CARYATIS, Melv. & Pons. [S.A.M.]

1898 *Ennea caryatis*, M. & P., A.M.N.H. i. p. 24. pl. 8, f. 2. *D.F.*1904 " " " Kob., Conch. Cab. p. 134. pl. 19, f. 13. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Cradock (Farquhar). Prieska (Gibbons; Gould).

21. ENNEA CIMOLIA, Melv. & Pons. [S.A.M.]

1895 *Ennea cimolia*, M. & P., A.M.N.H. xvi. p. 478. pl. 18, f. 2. *D.F.*1904 " " " Kob., Conch. Cab. p. 185. pl. 23, f. 15. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown (Farquhar). Pirie Forest (var., Godfrey).

NATAL. Dargle; Nottingham Road; Karkloof; Edendale; Backworth and Ntimbankulu, Mid-Illovo (Burnup).

E. pantheri, Sturany, though much smaller, seems otherwise identical.

22. ENNEA CIONIS, Melv. and Pons.

1898 *Ennea cionis*, M. & P., A.M.N.H. i. p. 25. pl. 8, f. 4. *D.F.*

1904 " " Kob., Conch. Cab. p. 135. pl. 19, f. 15. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Van Staadens River, Port Elizabeth (Crawford).

ZULULAND. Melmoth (Miss Hickey).

23. ENNEA CLAUSTRARIA, Melv. & Pons. [S.A.M.]

1903 *Ennea claustraria*, M. & P., A.M.N.H. xii. p. 597. pl. 31, f. 16. *D.F.*

1907 " *stauroma*, " " xix. p. 96. pl. 6, f. 4. *D.F.*

Both types in British Museum.

Hab. ZULULAND. Lower Umfolosi Drift (Burnup). Melmoth (*stauroma*, Miss Hickey).

Almost identical with *infrendens*, von Mts., except that the latter has a small plait on the columellar lip, just above the basal tooth, where *claustraria* has only a slight swelling.

24. ENNEA COLUMNELLA, Melv. & Pons. [S.A.M.]

1901 *Ennea columnella*, M. & P., A.M.N.H. viii. p. 316. pl. 2, f. 2. *D.F.*

1904 " " Kob., Conch. Cab. p. 235. pl. 32, f. 22. *D.F.*

Type in British Museum.

Hab. NATAL. Karkloof Bush (McBean). Dargle; Edendale; Ntimbankulu (Burnup).

25. ENNEA CONNOLLYI, Melv. & Pons. [S.A.M.]

1909 *Ennea connollyi*, M. & P., A.M.N.H. iv. p. 486. pl. 8, f. 2. *D.F.*

Type in British Museum.

Hab. NATAL. Majuba (Connolly).

TRANSVAAL. Hennop's River; Buis Kop (Connolly).

Generally a much narrower shell than the figure would suggest.

40. ENNEA DUNKERI, Pfeiffer.

- 1855 *Ennea dunkeri*, Pfr., Mal. Blätt. ii. p. 173. *D.*
 1856 „ „ Novit. Conch. i. p. 73. pl. 20, f. 11-13. *D.F.*
 1859 „ „ Mon. Hel. iv. p. 339. *D.*
 1885 „ „ Tryon, Man. of Conch. i. p. 98. pl. 19,
 f. 89. *D.F.*

- 1898 *Ennea differens*, Stur., S.A. Moll. p. 20. pl. 1, f. 5, 6. *D.F.*
 1904 „ „ Kob., Conch. Cab. p. 202. pl. 25,
 f. 6, 7. *D.F.*

„ *Ennea dunkeri*, Pfr., Kob., Conch. Cab. p. 193. pl. 24, f. 9, 10. *D.F.*
 Type of *dunkeri* in Stettin Museum; *differens* in Naturh. Hofmus.
 Vienna.

Hab. NATAL. Port Natal (Plant). Durban (*differens*, Penther).
 Tyeloti, near Botha's Hill; Pinetown; Table Mountain; Lower
 Umkomaas (Burnup).

41. ENNEA ELLIPTICA, Melv. & Pons. [S.A.M.]

- 1898 *Ennea elliptica*, M. & P., A.M.N.H. ii. p. 126. pl. 7, f. 2. *D.F.*
 1904 „ „ Kob., Conch. Cab. p. 180. pl. 23, f. 4. *D.F.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg; Nottingham Road; Dargle;
 Karkloof; Hilton Road; Tyeloti, near Botha's Hill; Zwaartkop;
 Richmond; Edendale (Burnup).

42. ENNEA ESHOWENSIS, Melv. & Pons.

- 1909 *Ennea eshowensis*, M. & P., A.M.N.H. iv. p. 487. pl. 8, f. 4. *D.F.*
 Type in British Museum.

Hab. ZULULAND. Eshowe (Lady Saunders).

43. ENNEA EUTHYMIA, Melv. & Pons. [S.A.M.]

- 1893 *Ennea euthymia*, M. & P., A.M.N.H. xii. p. 107. pl. 3, f. 10. *D.F.*
 1898 „ „ Stur., S.A. Moll. p. 21. *N.*
 1904 „ „ Kob., Conch. Cab. p. 197. pl. 24, f. 19. *D.F.*

Type in British Museum.

Hab. NATAL. Thornybush, near Pietermaritzburg (Burnup).

A larger variety is found at Lower Umkomaas (Burnup).

44. ENNEA EXIMIA, Melv. & Pons.

- 1898 *Ennea eximia*, M. & P., A.M.N.H. i. p. 28. pl. 8, f. 8. *D.F.*
 1904 „ „ „ Kob., Conch. Cab. p. 184. pl. 23, f. 13. *D.F.*
 1909 „ „ „ A.M.N.H. iv. p. 487. pl. 8, f. 6. *N.F.*

Type in British Museum.

Hab. TRANSVAAL. Between Barberton and Delagoa Bay (fide M. and P.).

45. ENNEA FARQUHARI, Melv. & Pons.

- 1895 *Ennea farquhari*, M. & P., A.M.N.H. xvi. p. 478. pl. 18,
 f. 3-5. *D.F.*
 1904 „ „ „ Kob., Conch. Cab. p. 186. pl. 23,
 f. 17. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown (Farquhar).

E. microthauma, M. & P., is very nearly allied to this species.

46. ENNEA FORICLUSA, Melv. & Pons.

- 1901 *Ennea foriclusa*, M. & P., A.M.N.H. viii. p. 316. pl. 2, f. 3. *D.F.*
 1904 „ „ „ Kob., Conch. Cab. p. 236. pl. 32, f. 23. *D.F.*

Type in British Museum.

Hab. NATAL. Table Mountain, about 12 miles from Pietermaritzburg (Burnup).

47. ENNEA FORMOSA, Melv. & Pons. [S.A.M.]

- 1898 *Ennea formosa*, M. & P., A.M.N.H. ii. p. 126. pl. 7, f. 3. *D.F.*
 1904 „ „ „ Kob., Conch. Cab. p. 183. pl. 23,
 f. 12. *D.F.*

Type in British Museum.

Hab. NATAL. Durban (Quekett). Pietermaritzburg (Burnup; Connolly). Karkloof (Taynton).

Some doubt exists as to whether the locality originally given—Durban—is correct.

48. ENNEA GENIALIS, Melv. & Pons. [S.A.M.]

- 1903 *Ennea genialis*, M. & P., A.M.N.H. xii. p. 598. pl. 31, f. 14. *D.F.*
 1907 „ *vallis*, „ „ „ „ xix. p. 96. pl. 6, f. 5. *D.F.*

Types in British Museum.

Hab. ZULULAND. Patana; Lower Umfolosi Drift (Burnup). Melmoth (*vallis*, Miss Hickey).

Though the type of *vallarisi* is a little smaller and more coarsely ribbed than that of *genialis*, the two species appear to be inseparable.

49. ENNEA 'GOULDI, Pfeiffer. [S.A.M.]

- 1855 *Ennea gouldi*, Pfr., Mal. Blätt. ii. p. 174. D.
 1856 „ „ Novit. Conch. i. p. 72. pl. 20, f. 7-10. D.F.
 1859 „ „ Mon. Hel. iv. p. 339. D.
 1885 „ „ Tryon, Man. of Conch. i. p. 98. pl. 19,
 f. 13. D.F.
 1904 „ „ Kob., Conch. Cab. p. 193. pl. 24, f. 11, 12. D.F.

Type in Stettin Museum.

Hab. NATAL. Durban (Plant), Isipingo (Penther). Lower Umkomaas; Equeefa; Alexandra Junction; Umbogintwini; Tongaat; Pinetown; Ntimbankulu (Burnup).

var. EXCEDENS, Sturany.

- 1898 *Ennea gouldi*, Pfr., var. *excedens*, Stur., S.A. Moll. p. 18. pl. 1,
 f. 3. D.F.

Type in Naturh. Hofmus. Vienna.

Hab. NATAL. Durban (Penther). Lower Umkomaas (Burnup).

50. ENNEA HICKEYANA, Melv. & Pons.

- 1901 *Ennea hickeyana*, M. & P., A.M.N.H. viii. p. 317. pl. 2, f. 4. D.F.
 1904 „ „ Kob., Conch. Cab. p. 243. pl. 33, f. 5. D.F.

Type in British Museum.

Hab. NATAL. Biggarsberg (Miss Hickey).

51. ENNEA HIMEROTHALES, Melv. & Pons.

- 1903 *Ennea himerothales*, M. & P., A.M.N.H. xii. p. 599. pl. 31,
 f. 13. D.F.

Type in British Museum.

Hab. NATAL. Port Shepstone (Burnup). Durban (in coll. Ponsonby).

52. ENNEA HYPSONA, Melv. & Pons.

- 1909 *Ennea hypsona*, M. & P., A.M.N.H. iv. p. 488. pl. 8, f. 7. D.F.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Traps Valley, Bathurst (Farquhar).

61. ENNEA KRAUSSI, Pfeiffer. [S.A.M.]

- 1855 *Ennea kraussi*, Pfr., Mal. Blätt. ii. p. 174. *D.*
 1856 „ „ Novit. Conch. i. p. 73. pl. 20, f. 14-16. *D.F.*
 1859 „ „ Mon. Hel. iv. p. 341. *D.*
 1885 „ „ Tryon, Man. of Conch. i. p. 100. pl. 19,
 f. 91. *D.F.*
 1898 *Ennea sejuncta*, Stur., S.A. Moll. p. 24. pl. 1. f. 10-12. *D.F.*
 1904 „ „ Kob., Conch. Cab. p. 204. pl. 25, f. 15-17. *D.F.*
 „ *Ennea kraussi*, Pfr., Kob., Conch. Cab. p. 134. pl. 19, f. 19, 20.
D.F.

Type of *kraussi* in Stettin Museum; *sejuncta* in Naturh. Hofmus. Vienna.

Hab. NATAL. Port Natal (Plant). Durban (*sejuncta*, Penther). Lower Umkomaas; Tongaat Beach; Umbogintwini; Pinetown (Burnup).

62. ENNEA LABYRINTHEA, Melv. & Pons.

- 1895 *Ennea labyrinthea*, M. & P., A.M.N.H. xvi. p. 479. pl. 18,
 f. 7, 8. *D.F.*
 1898 „ *labyrinthica*, M. & P., Stur., S.A. Moll. p. 29 (*Err. typ.*).
 1904 „ *labyrinthea*, M. & P., Kob., Conch. Cab. p. 224. pl. 28,
 f. 2, 3. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown (Farquhar).

63. ENNEA LEPPANI, Sturany.

- 1898 *Ennea leppani*, Stur., S.A. Moll. p. 28. pl. 2, f. 23-25. *D.F.*
 1904 „ „ Kob., Conch. Cab. p. 137. pl. 19, f. 21, 22. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. CAPE OF GOOD HOPE. Albany District (Penther).

64. ENNEA MAGNOLIA, sp. nov., pl. 2, f. 1. [S.A.M.]

Shell small, elongate, cylindrical, subrimate, smooth, glossy, vitreous, transparent. Spire narrow, produced, sides parallel, apex rounded. Whorls 6, flattish, with practically no sculpture; the apical small, remainder almost equal in circumference and increasing very slowly in distance between sutures. Suture shallow, margined below. Aperture subquadrate; peristome white, slightly thickened and reflexed, with 2 weak teeth; the parietal, short and pointed; the other, little more than a protuberance caused by a slight

straightening, half-way down, of the outer lip, which forms an obtuse forward angle at this point.

Shell 4.75×1.4 ; aperture $.95 \times .85$; last whorl 1.8 mm.

Type in British Museum.

Hab. RHODESIA. Victoria Falls (Connolly; Warren).

The contour of the spire, regular in the type, is frequently irregular, being sometimes crooked, and sometimes swollen towards the apex. The present species resembles *E. cimolia*, M. & P., in form and substance, but is more than twice as large, with much weaker dentition.

65. *ENNEA MARGARETTÆ*, Melv. & Pons.

1895 *Ennea margarettæ*, M. & P., A.M.N.H. xvi. p. 479. pl. 18, f. 1. *D.F.*

1904 " " Kob., Conch. Cab. p. 185. pl. 23, f. 16. *D.F.*

Hab. CAPE OF GOOD HOPE. Grahamstown (Farquhar).

Founded on a single specimen, not fully mature, whose present whereabouts has not been ascertained.

66. *ENNEA MARIE*, Melv. & Pons.

1892 *Ennea mariæ*, M. & P., A.M.N.H. ix. p. 92. pl. 6, f. 12. *D.F.*

1904 " " Kob., Conch. Cab. p. 220. pl. 27, f. 11. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Craigie Burn, Somerset East (Miss Bowker).

67. *ENNEA MARITZBURGENSIS*, Melv. & Pons. [S.A.M.]

1893 *Ennea maritzburgensis*, M. & P., A.M.N.H. xii. p. 107. pl. 3, f. 11. *D.F.*

1904 " " Kob., Conch. Cab. p. 198. pl. 24, f. 21. *D.F.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg (Quekett; Burnup; Ponsonby).

68. *ENNEA MENKEANA* (Pfeiffer).

1853 *Pupa menkeana*, Pfr., Mon. Hel. iii. p. 551. *D.*

1859 *Ennea menkeana* " Novit. Conch. i. p. 113. pl. 32, f. 3-5. *D.F.*

1878 *Pupa menkeana* " Sow., Conch. Icon. pl. 19, f. 176. *D.F.*
(*Err. Loc.*).

- 1885 *Ennea menkeana*, Pfr., Tryon, Man. of Conch. i. p. 97. pl. 18,
f. 79. *D.F.*
1904 " " Kob., Conch. Cab. p. 191. pl. 24, f. 6. *D.F.*
Hab. NATAL. Port Natal (in coll. Menke).

69. ENNEA MICROTHAUMA, Melv. & Pons.

- 1899 *Ennea microthauma*, M. & P., A.M.N.H. iv. p. 194. pl. 3, f. 1. *D.F.*
1904 " " Kob., Conch. Cab. p. 234. pl. 32,
f. 13. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown (Langley).

Extremely closely allied to the variable *E. farquhari*, M. & P.

70. ENNEA MINUTA, Morelet.

- 1889 *Ennea pusilla*, Morel., J. de C. xxxvii. p. 13. pl. 2, f. 3. *D.F.*
" " *minuta* (= *pusilla*, Morel., 1889, nec 1881), Morel.,
J. de C. xxxvii. p. 200.
1898 " *ambigua*, Stur., S.A. Moll. p. 29. *N.*
1904 " *minuta*, Morel., Kob., Conch. Cab. p. 212. pl. 26, f. 22-
24. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford). Tharfield (Miss Bowker).

71. ENNEA MONTANA, Melv. & Pons.

- 1903 *Ennea montana*, M. & P., A.M.N.H. xii. p. 599. pl. 31, f. 15. *D.F.*
Type in British Museum.
Hab. CAPE OF GOOD HOPE. Mountain Drive, Grahamstown (Farquhar).

72. ENNEA MULTIDENTATA, Sturany. [S.A.M.]

- 1898 *Ennea multidentata*, Stur., S.A. Moll. p. 25. pl. 1, f. 16. *D.F.*
1904 " " Kob., Conch. Cab. p. 195. pl. 24,
f. 15. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. NATAL. Isipingo (Penther). Equeefa; Durban; Alexandra Junction (Burnup).

73. ENNEA MUNITA, Melv. & Pons.

- 1892 *Ennea munita*, M. & P., A.M.N.H. ix. p. 86. pl. 6, f. 5. *D.F.*
1904 " " Kob., Conch. Cab. p. 217. pl. 27, f. 6. *D.F.*

83. ENNEA PERSPICUA, Melv. & Pons.

- 1893 *Ennea perspicua*, M. & P., A.M.N.H. xi. p. 23. pl. 3, f. 12. *D.F.*
 1904 " " Kob., Conch. Cab. p. 188. pl. 23,
 f. 22. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Middelburg (Crawford).

84. ENNEA PERSPICUÆFORMIS, Sturany.

- 1898 *Ennea perspicuæformis*, Stur., S.A. Moll. p. 17. pl. 1, f. 2. *D.F.*
 1904 " " Kob., Conch. Cab. p. 189. pl. 23,
 f. 23. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. LORENZO MARQUES. Delagoa Bay (Penther)

Described from a single specimen, only differing from *E. perspicua*, M. & P., in its smaller size and fewer whorls.

85. ENNEA PFEIFFERI (Krauss).

- 1841 *Pupa pfeifferi*, Krs., Küst., Conch. Cab. p. 87. pl. 12, f. 17-19. *D.F.*
 1848 " " Südafr. Moll. p. 79. *D.*
 " " " Pfr., Mon. Hel. ii. p. 352. *D.*
 1885 *Ennea pfeifferi*, Krs., Tryon, Man. of Conch. i. p. 101. pl. 19,
 f. 98. *D.F.*
 1904 " " Kob., Conch. Cab. p. 133. pl. 19, f. 12. *D.F.*

Type in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE. Potteberg; Swellendam (Krauss).

var. MINIATA, Krauss.

- 1848 *Pupa pfeifferi*, var. *miniata*, Krs., Südafr. Moll. p. 79. *D.*
 " " " " Pfr., Mon. Hel. ii. p. 353. *D.*
Hab. ? TRANSVAAL. Mount Mohapaani (Wahlberg).

86. ENNEA PHRAGMA, Melv. & Pons.

- 1907 *Ennea phragma*, M. & P., A.M.N.H. xix. p. 95. pl. 6, f. 3. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Waku, Cathcart District, near the Klipplatz River (Miss Hickey).

87. ENNEA PLANTI, Pfeiffer. [S.A.M.]

- 1855 *Ennea planti*, Pfr., Mal. Blätt. ii. p. 173. *D.*
 1856 " " Novit. Conch. i. p. 72. pl. 20, f. 5, 6. *D.F.*

- 1859 *Ennea planti*, Pfr., Mon. Hel. iv. p. 337. *D.*
 1878 *Pupa planti* ,, Sow., Conch. Icon. pl. 18, f. 169. *D.F.*
 1885 *Ennea planti* ,, Tryon, Man. of Conch. i. p. 90. pl. 17, f. 25. *D.F.*
 1898 ,, ,, Stur., S.A. Moll. p. 16. *N.*
 1904 ,, ,, Kob., Conch. Cab. p. 178. pl. 22, f. 23, 24. *D.F.*
 Type in Stettin Museum.
Hab. NATAL (Plant). Durban (Penther). Tongaat Beach
 (Burnup).

88. ENNEA POLITA, Melv. & Pons.

- 1893 *Ennea polita*, M. & P., A.M.N.H. xii. p. 108. pl. 3, f. 12. *D.F.*
 1904 ,, ,, Kob., Conch. Cab. p. 195. pl. 24, f. 14. *D.F.*
 Type in British Museum.
Hab. CAPE OF GOOD HOPE. Tharfield (Miss Bowker).

89. ENNEA PREMNODES, Sturany.

- 1901 *Ennea premnodes*, Stur., Ann. Hofmus. Wien, xvi. p. 69, f. 5. *D.F.*
 1905 ,, ,, Kob., Conch. Cab. p. 344. pl. 32
 (1904), f. 19. *D.F.*
 Type in Naturh. Hofmus. Vienna.
Hab. CAPE OF GOOD HOPE. Albany District (Penther).

90. ENNEA PULCHELLA, Melv. & Pons.

- 1893 *Ennea pulchella*, M. & P., A.M.N.H. xii. p. 108. pl. 3, f. 13. *D.F.*
 1904 ,, ,, Kob., Conch. Cab. p. 197. pl. 24,
 f. 18. *D.F.*
 Type in British Museum.
Hab. NATAL. Pietermaritzburg (Burnup).

91. ENNEA QUEKETTI, Melv. & Pons. [S.A.M.]

- 1896 *Ennea queketti*, M. & P., A.M.N.H. xviii. p. 315. pl. 16, f. 2. *D.F.*
 1898 ,, ,, Stur., S.A. Moll. p. 16. *N.*
 1904 *Ennea queketti* ,, Kob., Conch. Cab. p. 241. pl. 29,
 f. 20. *D.F.*
 Type in British Museum.
Hab. NATAL. Umzinto (Canon Pennington). Isipingo (Penther).
 Equeefa; Lower Umkomaas; Durban (Burnup).

96. ENNEA SEPARATA, Sturany. [S.A.M.]

1898 *Ennea separata*, Stur., S.A. Moll. p. 20. pl. 1, f. 7, 8. *D.F.*1904 " " Kob., Conch. Cab. p. 202. pl. 25, f. 8, 9. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. NATAL. Isipingo; Durban Bluff (Penther). Equeefa; Pietermaritzburg; Table Mountain; Lower Umkomaas; Umbogintwini; Port Shepstone; Ntimbankulu (Burnup).

97. ENNEA SOCRATICA, Melv. & Pons.

1893 *Ennea socratica*, M. & P., A.M.N.H. xii. p. 109. pl. 3, f. 14. *D.F.*1904 " " Kob., Conch. Cab. p. 198. pl. 24, f. 20. *D.F.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg (fide M. & P.).

Founded on a single specimen.

98. ENNEA SYLVIA, Melv. & Pons.

1903 *Ennea sylvia*, M. & P., A.M.N.H. xii. p. 599. pl. 31, f. 4. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Maeström Forest, Bedford (Farquhar).

NATAL. Examples from Natal, which have been attributed to this species, are now proved to be distinct.

99. ENNEA THARFIELDENSIS, Melv. & Pons.

1893 *Ennea tharfieldensis*, M. & P., A.M.N.H. xii. p. 109. pl. 3, f. 15. *D.F.*1904 " " Kob., Conch. Cab. p. 200. pl. 24,
f. 24. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Tharfield (in coll. Layard). Kowie (Farquhar).

100. ENNEA THELODONTA, Melv. & Pons.

1892 *Ennea thelodonta*, M. & P., A.M.N.H. ix. p. 85. pl. 6, f. 4. *D.F.*1904 " " Kob., Conch. Cab. p. 216. pl. 27,
f. 3. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Langley; Crawford).

101. ENNEA TRANSIENS, Sturany. [S.A.M.]

- 1898 *Ennea transiens*, Stur., S.A. Moll. p. 19. pl. 1, f. 4. *D.F.*
1904 " " Kob., Conch. Cab. p. 228. pl. 28, f. 10. *D.F.*
Type in Naturh. Hofmus. Vienna.
Hab. NATAL. Durban and neighbourhood (Penther).
Very nearly allied to, if not identical with, *wahlbergi*, Krs.

102. ENNEA TRIGLOCHIS, Melv. & Pons.

- 1903 *Ennea triglochis*, M. & P., A.M.N.H. xii. p. 600. pl. 31, f. 11. *D.F.*
" " *virgo* " " " " f. 10. *D.F.*
Types in British Museum.
Hab. NATAL. Botha's Hill (Burnup).
ZULULAND. Lower Umfolosi Drift (Burnup). Melmoth (Miss Hickey). Dukuduku Forest and Kosi Bay (Toppin).
Although the types differ slightly, intermediate forms are found of these two shells, which are now admitted to be conspecific.

103. ENNEA VANDENBROECKI, Melv. & Pons.

- 1893 *Ennea vandenbroeckii*, M. & P., A.M.N.H. xii. p. 110. pl. 3, f. 16. *D.F.*
1904 " " Kob., Conch. Cab. p. 199. pl. 24, f. 22. *D.F.*
Type in British Museum.
Hab. NATAL (ex. coll. Vandenbroeck).
Founded on two specimens.

104. ENNEA VANSTAADENSIS, Melv. & Pons.

- 1893 *Ennea vanstaadensis*, M. & P., A.M.N.H. xii. p. 110. pl. 3, f. 17. *D.F.*
1904 " " Kob., Conch. Cab. p. 199. pl. 24, f. 23. *D.F.*
Type in British Museum.
Hab. CAPE OF GOOD HOPE. Van Staadens River, Port Elizabeth (Crawford).

105. ENNEA VITREOLA, Melv. & Pons.

- 1908 *Ennea vitreola*, M. & P., A.M.N.H. i. p. 130. pl. 7, f. 3. *D.F.*
Type in Natal Museum, Pietermaritzburg.
Hab. NATAL. Hilton Road (Burnup).

106. ENNEA WAHLBERGI (Krauss).

- 1848 *Pupa wahlbergi*, Krs., Südafr. Moll. p. 80. pl. 5, f. 5. *D.F.*
 „ „ *wahlbergii* „ Pfr., Mon. Hel. ii. p. 352. *D.*
 1855 „ *wahlbergi* „ Küst., Conch. Cab. p. 158. pl. 19, f. 6-9. *D.F.*
 1878 „ *wahlbergi*, Pfr., Sow., Conch. Icon. pl. 20, f. 187. *D.F.*
 1885 *Ennea wahlbergi*, Krs., Tryon, Man. of Conch. i. p. 96. pl. 19,
 f. 99. *D.F.*
 1904 „ „ Kob., Conch. Cab. p. 190. pl. 24, f. 3, 4. *D.F.*
 Type in Stuttgart Museum.
Hab. NATAL (Wahlberg). Durban and neighbourhood; Isipingo
 (Penther, fide Sturany).
 Founded on two specimens, which differed from each other both
 in sculpture and dentition.

107. ENNEA WARRENI, Melv. & Pons. [S.A.M.]

- 1903 *Ennea warrenii*, M. & P., A.M.N.H. xii. p. 601. pl. 31, f. 7. *D.F.*
 Type in British Museum.
Hab. ZULULAND. Lower Umfolosi Drift (Warren). Makowe
 (Crosly). Melmoih (Miss Hickey).
 CAPE OF GOOD HOPE. Port St. John's (Shortridge).

108. ENNEA WOTTONI, Melv. & Pons.

- 1895 *Ennea wottoni*, M. & P., A.M.N.H. xvi. p. 479. pl. 18, f. 6. *D.F.*
 1898 „ „ Stur., S.A. Moll. p. 17. *N.*
 1904 „ „ Kob., Conch. Cab. p. 186. pl. 23, f. 18. *D.F.*
 Type in British Museum.
Hab. CAPE OF GOOD HOPE. Grahamstown (Farquhar). Albany
 District (Penther).
 Very closely allied to, if not inseparable from, *infans*, Crvn.

109. ENNEA XYSILA, Melv. & Pons. [S.A.M.]

- 1907 *Ennea xysila*, M. & P., A.M.N.H. xix. p. 97. pl. 6, f. 6. *D.F.*
 „ „ „ var. *hyalina*, M. & P., *ibid.* pl. 6, f. 6a. *N.F.*
 Types in British Museum.
Hab. TRANSVAAL. Johannesburg (Johnson; McBean). Pretoria
 and surrounding district (McBean; Connolly). Heidelberg (Miss
 Livingston).

Although the extremes of form vary greatly, almost every intermediate grade can be traced, so that the varietal name is hardly retainable.

110. ENNEA ZELOTA, Melv. & Pons. [S.A.M.]

1907. *Ennea zelota*, M. & P., A.M.N.H. xix. p. 97. pl. 6, f. 7. *D.F.*

Type in British Museum.

Hab. NATAL. Port Shepstone; Equeefa (Burnup).

GENUS STREPTOSTELE, Dohrn, 1866.

(Mal. Blätt. xiii. p. 128.)

Type of Genus, *S. lotophaga* (Morel).

111. STREPTOSTELE HERMA, sp. nov., pl. 2, f. 3. [S.A.M.]

Shell very small, elongate, narrowly rimate, slightly glossy, translucent, milky olivaceous. Spire produced, tapering, very narrow, apex rounded. Whorls 7, gradually increasing, little convex, but impressed at the suture; the first 2 smooth, remainder beautifully sculptured with rather coarse, irregular, almost straight striæ. Suture deep. Aperture short, piriform, virtually edentulate, the only processes being an almost imperceptible parietal callosity, and an incurvation of the outer lip about one-third of its length below the suture. Peristome not thickened, thinly reflexed.

Shell 4.5×1.3 ; aperture $.9 \times .8$; last whorl 1.5 mm.

Type in British Museum.

Hab. RHODESIA. Victoria Falls (Connolly).

This beautiful little species belongs to a group of Central African shells which have been placed of late years in *Streptostele*. As their columella is not achatinoid, as it should be in Dohrn's genus, it is probable that a new section will have to be founded for them.

FAMILY RHYTIDIDÆ, Pilsbry, 1893.

(Man. of Conch. viii. p. 135.)

GENUS NATALINA, Pilsbry, 1893.

(Man. of Conch. viii. p. 135.)

(= *Aerope*, Albers, 1860, non Leach, 1813.)

Type of Genus, *N. caffra* (Fér.).

The species which follow have been variously attributed to *Natalina*, or to *Rhytida*, Albers (Die Helic., 1860, p. 89. Type *greenwoodi*, Gray), and its subgenera, *Macrocycloides*, von Martens

1895 *Natalina caffra*, Fér., M. Woodw., Proc. Mal. Soc. i. p. 270.
pl. 17, f. 1-9. A.

1903 " " " Mlldff., Conch. Cab. p. 20, pl. 3, f. 4-7. D.F.
Type—*ubi?*

Hab. CAPE OF GOOD HOPE. Caffraria (Delalande). Uitenhage (fide Férussac). Algoa Bay (Krauss). Port Elizabeth (Crawford). Grahamstown; Bedford; Bathurst; Kowie (Farquhar). Somerset East (Miss Bowker). Pirie Mountain (Godfrey).

TRANSVAAL. Between Delagoa Bay and Lydenburg (Wilms).

NATAL. Woods near Natal Bay (Krauss). Along the coast from Port Shepstone to Tongaat; Pinetown; Pietermaritzburg; Karkloof; Curry's Post (Burnup).

ZULULAND (in coll. Layard, who wrote: "This species was sent to me from Natal by the late Mr. H. J. McKen, who told me he procured it on a battlefield in Zululand, feeding on the putrefying corpses of the natives slain in one of their tribal fights.")

var. WESSELIANA, Maltzan.

1876 *Helix caffra*, Fér., var. *wesseliana*, Maltz., Kobelt, Jahrb. d. deutsch. Mal. Ges. iii. p. 149. pl. 5, f. 1. D.F.

1877 *Helix caffra*, Fér., var. *wesseliana*, Maltz., Pfr., Mon. Hel. viii. p. 558. D.

1885 *Aerope caffra*, Fér., var. *wesselliana*, Maltz., Tryon, Man. of Conch. i. p. 131. pl. 25, f. 14. D.F.

1903 *Natalina caffra*, Fér., var. *wesseliana*, Maltz., Mlldff., Conch. Cab. p. 21. pl. 3, f. 8. D.F.

Hab. SOUTH AFRICA (fide Kobelt).

ZULULAND (Toppin).

LORENZO MARQUES. Rikatla (Junod).

115. NATALINA CAFFRULA, Melv. & Pons. [S.A.M.]

1898 *Natalina caffrula*, M. & P., A.M.N.H. i. p. 24. pl. 8, f. 1. D.F.

" " " Stur., S.A. Moll. p. 32. N.

1903 " " " Mlldff., Conch. Cab. p. 23. pl. 4, f. 4, 5. D.F.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Knysna (Purcell). North bank of Zwartkops River, Port Elizabeth (Crawford).

LORENZO MARQUES. Matolla (Penther, fide Sturany).

NATAL. Durban (Penther, fide Sturany).

- 1853 *Helix cosmia*, Pfr., Rve., Conch. Icon. pl. 173, f. 1174. *D.F.*
 1854 ,, ,, ,, Conch. Cab. p. 389. pl. 143 (1852), f. 6-8. *D.F.*
 1864 ,, *omphalion*, Bs., A.M.N.H. xiii. p. 494. *D.*
 1868 ,, ,, ,, Pfr., Mon. Hel. v. p. 153. *D.*
 1887 ,, (*Pella*) *cosmia*, Pfr., Tryon, Man. of Conch. iii. p. 106.
 pl. 20, f. 80. *D.F.*
 1898 *Natalina cosmia*, Pfr. (= *omphalion*, Bs.), M. & P., Proc. Mal.
 Soc. iii. p. 170.

1903 *Rhytida (Macrocycloides) cosmia*, Pfr., Mlldff., Conch. Cab.
 p. 60. pl. 10, f. 23-25. *D.F.*

Type of *cosmia*—*ubi*? Specimens of *omphalion*, ex auct., in
 University Museum of Zoology, Cambridge.

Hab. CAPE PENINSULA. Lion's Head, near Camp's Bay (*munda*,
 Benson). Top of Table Mountain, overlooking Cape Town (*cerrea*,
 Layard). Kalk Bay (Lightfoot). Simonstown (*omphalion*, "fide
 Hawkins," Benson).

120. NATALINA DUMETICOLA (Benson). [S.A.M.]

- 1851 *Helix dumeticola*, Bs., A.M.N.H. vii. p. 106. *D.*
 1854 ,, ,, Pfr., Conch. Cab. p. 390. pl. 143 (1852),
 f. 16-18. *D.F.*
 1853 ,, ,, ,, Mon. Hel. iii. p. 93. *D.*
 ,, ,, ,, Rve., Conch. Icon. pl. 173, f. 1172. *D.F.*
 1856 ,, ,, A.M.N.H. xviii. p. 437. *N.*
 1887 *Helix (Pella) dumeticola*, Bs., Tryon, Man. of Conch. iii. p. 106.
 pl. 20, f. 79. *D.F.*
 1903 *Rhytida (Macrocycloides) dumeticola*, Bs., Mlldff., Conch. Cab.
 p. 59. pl. 10, f. 20-22. *D.F.*

Type in British Museum.

Hab. CAPE PENINSULA. Green Point; Simonstown; Simon's
 Bay (Benson). Camp's Bay (Layard). Hout Bay; Milnerton;
 Kommetje (Connolly); Robben Island (Fisk).

121. NATALINA EUMACTA (Melv. & Pons).

- 1892 *Helix (Aerope) eumacta*, M. & P., A.M.N.H. x. p. 237. pl. 13,
 f. 4. *D.F.*
 1903 *Natalina eumacta*, M. & P., Mlldff., Conch. Cab. p. 22. pl. 3,
 f. 9. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE (*not* Natal). Bashee River, Idutywa
 (Crawford).

122. NATALINA INHLUZANA (Melv. & Pons.).

1894 *Helix* (*Dorcasia*) *inhluzana*, M. & P., A.M.N.H. xiv. p. 91. pl. 1, f. 4. *D.F.*

1895 *Dorcasia inhluzana*, M. & P., A.M.N.H. xv. p. 165. pl. 12, f. 6. *F.*

1903 *Rhytida* (*Afrorhytida*) *inhluziana*, M. & P., Mlldff., Conch. Cab. p. 64. pl. 11, f. 7. *D.F.*

1907 „ *inhluzana*, M. & P., A.M.N.H. xix. p. 99. *N.*

Type in British Museum.

Hab. NATAL. Inhluzani Mountain (Mrs. Shaw).

“Nearly allied to, if not a variety of, *R. kraussi*, Pfr.” (M. & P., 1907).

123. NATALINA INSIGNIS, Melv. & Pons.

1907 *Natalina insignis*, M. & P., A.M.N.H. xix. p. 98. pl. 6, f. 9. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Teafontein, Grahamstown (Farquhar).

124. NATALINA KNYSNAENSIS (Pfeiffer). [S.A.M.]

1845 *Helix knysnaensis*, Pfr., P.Z.S. p. 131. *D.*

1846 „ „ A.M.N.H. xvii. p. 439. *D.*

1847 „ „ Phil., Abb. u. Besch. ii. p. 85. pl. 7, f. 5. *D.F.*

1848 „ „ Mon. Hel. i. p. 84. *D.*

1852 „ „ Rve., Conch. Icon. pl. 177, f. 403. *D.F.*

1853 „ „ Conch. Cab. p. 343. pl. 133 (1852), f. 5, 6. *D.F.*

1887 *Helix* (*Pella*) *knysnaensis*, Pfr., Tryon, Man. of Conch. iii. p. 106. pl. 20, f. 75. *D.F.*

1889 *Aerope knysnaensis*, Pfr., Pilsb., Proc. Acad. Nat. Sci. Phila. p. 277. pl. 9, f. A-G. *F.A.R.*

1890 „ „ Pilsb., Proc. Acad. Nat. Sci. Phila. p. 41. *N.*

1903 *Rhytida* (*Afrorhytida*) *knysnaensis*, Pfr., Mlldff., Conch. Cab. p. 61. pl. 11, f. 1, 2. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Knysna (coll. Cuming). Port Elizabeth (Crawford; Farquhar). Somerset East (Miss Bowker).

125. NATALINA KRAUSSI (Pfeiffer).

1846 *Helix kraussi*, Pfr., Symb. iii. p. 70. *D.*

1848 „ „ „ Mon. Hel. i. p. 197. *D.*

- 1848 *Helix kraussi*, Pfr., Krs., Südafr. Moll. p. 77. pl. 4, f. 24. *D.F.*
 1851 „ *sturmiana*, Pfr., P.Z.S. p. 253. *D.*
 1853 „ „ „ Mon. Hel. iii. p. 150. *D.*
 „ „ „ „ Rve., Conch. Icon. pl. 168, f. 1132. *D.F.*
 1854 „ *kraussi*, Pfr., Rve., Conch. Icon. pl. 198, f. 1391. *D.F.*
 „ „ *sturmiana*, Pfr., A.M.N.H. xiii. p. 142. *D.*
 „ „ „ „ Conch. Cab. p. 397. pl. 144 (1852), f. 3, 4.
D.F.
 1888 „ (*Acusta*) *kraussi*, Pfr., Tryon, Man. of Conch. iv. p. 50.
 pl. 10, f. 30. *D.F.*
 1890 „ *sturmiana*, Pfr., Pilsb., Man. of Conch. vi. pl. 36, f. 28,
 29. *F.*
 1895 *Rhytida kraussii*, Pfr., Cooke, Camb. Nat. Hist., Moll. & Brach.
 p. 232, f. 139. *R.*
 1898 „ *kraussi* „ (= *sturmiana*), M. & P., Proc. Mal. Soc.
 iii. p. 170.
 1903 „ (*Afrorhytida*) *kraussi*, Pfr., Mlldff., Conch. Cab. p. 63.
 pl. 11, f. 5, 6. *D.F.*

Type of *sturmiana* in British Museum; *kraussi*—*ubi*?

Hab. CAPE OF GOOD HOPE. Outeniqua, George District (Krauss).
 Knysna (fide Pfeiffer). Tharfield (Miss Bowker) and Grahamstown
 (Miss Glanville, fide Layard).

ORANGE FREE STATE. Van Reenen, Drakensberg (Burnup).

Sturmiana was described from a shell in the Cuming collection,
 “*Hab. ?*” but in the Nomenclator Pfeiffer gives the locality Delagoa
 Bay.

N. inhluzana (M. & P.) is possibly a variety of *kraussi*.

126. NATALINA LIGHTFOOTIANA, Melv. & Pons. [S.A.M.]

- 1909 *Natalina lightfootiana*, M. & P., A.M.N.H. iv. p. 490. pl. 8,
 f. 13. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Swellendam (Lightfoot). Montagu
 (Connolly).

As the shell of this species is not glossy, but dull, and the animal,
 to the best of my belief, not carnivorous, it probably belongs to a
 different family.

127. NATALINA LILIACEA, Preston.

- 1912 *Natalina liliacea*, Prest., Proc. Mal. Soc. x. p. 17. *D.F.*

Type in coll. Dautzenberg.

Hab. CAPE OF GOOD HOPE. Knysna Forest (Cox).

128. NATALINA LIPAROXANTHA (Melv. and Pons.). [S.A.M.]

1892 *Helix (Macrocyclus) liparoxantha*, M. & P., A.M.N.H. x. p. 238.
pl. 13, f. 3. *D.F.*

1903 *Rhytida (Macrocycloides) liparoxantha*, M. & P., Mlldff., Conch.
Cab. p. 58. pl. 10, f. 18. *D.F.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg; Pinetown; Table Mountain;
Port Shepstone (Burnup).

ZULULAND. Hlabisa (Burnup).

CAPE OF GOOD HOPE. Transkei (Weisbecker).

Very closely allied to *N. coenotera* (M. & P.) and *vernica* (Krs.).

129. NATALINA OCONNORI, Preston.

1912 *Natalina oconnori*, Prest., A.M.N.H. ix. p. 445. *D.F.*

Type in coll. Preston.

Hab. CAPE OF GOOD HOPE. Ceres District (O'Connor).

130. NATALINA QUEKETTIANA (Melv. & Pons.).

1893 *Helix (Macrocyclus) quekettiana*, M. & P., A.M.N.H. xii. p. 103.
pl. 3, f. 1. *D.F.*

1903 *Rhytida (Afrorhytida) quekettiana*, M. & P., Mlldff., Conch.
Cab. p. 63. pl. 11, f. 4. *D.F.*

Type in British Museum.

Hab. NATAL. Town Bush, Pietermaritzburg (Quekett).

131. NATALINA SCHAERFIÆ (Pfeiffer).

1861 *Helix schærfiæ*, Pfr., Mal. Blätt. viii. p. 73. pl. 2, f. 1-3. *D.F.*

1864 „ „ Bs., A.M.N.H. xiii. p. 494. *N.*

1868 „ „ Mon. Hel. v. p. 242. *D.*

1886 „ „ Kob., Conch. Cab. p. 615. pl. 178, f. 1-6.
D.F.

1890 *Helix (Ampelita) schærfiæ*, Pfr., Pilsb., Man. of Conch. vi.
p. 43. pl. 7, f. 95, 96, 97, 1, 2. *D.F.*

Type in Stettin Museum.

Hab. CAPE OF GOOD HOPE. Bredas Bosch, Gnadenthal District
(Mrs. Schärf). Oudebosch; Bredasdorp (Layard).

132. NATALINA TARACHODES, sp. nov., pl. 2, f. 4. [S.A.M.]

Shell small, depressed, rounded, broadly and deeply umbilicate,
very glossy, transparent, golden corneous. Spire not elevated.
Whorls $4\frac{1}{2}$, flattened above, but not carinated, rapidly increasing

covered with very faint, regular, curved striæ, which are still fainter on the under side. Suture simple, shallow. Aperture nearly circular, descending a little in front. Peristome thin, simple, receding sharply in profile from above. Columella very weak, concave, without marginal reflexion.

Diam. maj. 8, min. 7; alt. 3·3; apert. alt. 3·2, lat. 3·7 mm.

Radular formula 12+0+12×35.

Type in British Museum.

Hab. CAPE PENINSULA (generally distributed).

This little species has been known for fifty years, but has been generally misidentified as *vernica*, Krauss, or *bullacea*, Pfr., under one of which names it appears in many museum and private collections. It is a far smaller form than *vernica*, with the type of which I have compared it, while *bullacea* is an Australian species, non-existent in South Africa. *N. vernica*, var. *minor*, Pfr., from Natal, which I have not seen, may be near akin to *tarachodes*, but, if so, is worthy of specific rank.

133. NATALINA TRIMENI (Melv. & Pons.). [S.A.M.]

1892 *Helix (Aerope) trimeni*, M. & P., A.M.N.H. x. p. 237. pl. 13, f. 1. *D.F.*

1893 *Natalina tremeni*, M. & P., Pilsb., Man. of Conch. viii. p. 135. (*Err. typ.*)

1895 „ *trimeni*, M. & P., Pace., Proc. Mal. Soc. i. p. 232. *A.R.*

1903 *Rhytida (Afrorhytida) trimeni*, M. & P., Mlldff., Conch. Cab. p. 62. pl. 11, f. 3. *D.F.*

Type in British Museum.

Hab. “S. AFRICA” (Trimen).

CAPE OF GOOD HOPE. Somerset East (Miss Bowker). Grahams-town; Cradock (Farquhar). Kowie, Port Alfred (Crawford). Witmoss (Reeve),

134. NATALINA VERNICOSA (Krauss).

1848 *Helix vernica*, Krs., Südafr. Moll. p. 76. pl. 4, f. 23. *D.F.*

„ „ „ Pfr., Zeitschr. f. Malak. v. p. 93. *D.*

1850 „ „ „ Bs., A.M.N.H. vi. p. 254. *N.*

1851 „ „ „ Rve., Conch. Icon. pl. 43, f. 198. *D.F.*

1853 „ „ „ Pfr., Mon. Hel. iii. p. 95. *D.*

1879 *Rhytida vernica*, Krs., Binn., Ann. N.Y. Acad. Sci. i. p. 355. pl. 14, f. I. *R.*

- 1884 *Rhytida vernicosa*, Krs., Binn., Ann. N.Y. Acad. Sci. iii. p. 82.
pl. 17, f. L. *R.*
- 1885 *Elæa vernicosa*, Krs., Tryon, Man. of Conch. i. p. 130. pl. 28,
f. 52-54. *D.F.*
- 1903 *Rhytida (Macrocyclus) vernicosa*, Krs., Mildff., Conch. Cab.
p. 57. pl. 10, f. 12-14. *D.F.*

Type in Stuttgart Museum.

Hab. NATAL (Wahlberg).

CAPE OF GOOD HOPE. Port Elizabeth (fide Morelet). Grahams-
town (Miss Glanville, fide Layard).

A good deal of confusion has existed with regard to this species,
and it is by no means certain that some of the specimens described
or figured by the foregoing authors, especially Binney and Möllen-
dorff, are correctly identified.

The type appears to be an immature example, nearly akin to
N. liparoxantha (M. & P.).

var. MINOR, Pfeiffer.

- 1853 *Helix vernicosa*, Krs., var. *minor*, Pfr., Mon. Hel. iii. p. 95. *D.*
- 1885 *Elæa* " " " Tryon, Man. of Conch. i.
p. 131. *N.*

" var. β . *Minor*, costulis superficiei obsoletioribus" (Pfr., *l.c.*).

Hab. NATAL (fide Pfeiffer).

135. NATALINA VIRIDESCENS (Melv. & Pons.). [S.A.M.]

- 1891 *Helix (Patula) viridescens*, M. & P., A.M.N.H. viii. p. 238. *D.*
- 1892 " " " " ix. pl. 4, f. 1. *F.*
- " " " " Pilsb., Man. of Conch. viii.
p. 78. pl. 30, f. 32. *D.F.*
- 1903 *Rhytida (Macrocyclus) viridescens*, M. & P., Mildff., Conch.
Cab. p. 61. pl. 10, f. 26. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Pretoria (Farquhar; McBean).

NATAL. Dargle; Inhluzani (Burnup).

TRIBE HOLOGNATHA, W. G. Binney, 1878.
(Moll. United States, v. p. 81.)

FAMILY ZONITIDÆ, Mörch, 1863.
(Vid. Med. naturhist. Foren. Copenhagen, p. 267.)

SUB-FAMILY HELICARIONINÆ, Godwin-Austen, 1883.

(Moll. of India, pt. 4, p. 146.)

GENUS ZINGIS, von Martens, 1878.

(Monats-Ber. K. Akad. Wiss. Berlin, p. 290.)

(= *Sheldonia*, Ancey, 1888.)

Type of Genus, *Z. radiolata*, von Mts.

136. ZINGIS CRAWFORDI (Melv. & Pons.). [S.A.M.]

1890 *Helix (Pella) crawfordi*, M. & P., A.M.N.H. vi. p. 469. *D.*

1892 " " " ix. p.94. pl.4, f.4. *F.*

1893 *Phasis (Trachycystis) crawfordi*, M. & P., Pilsb., Man. of Conch. viii. p. 146. pl. 35, f. 10. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Middleton; Kleinpoort, Graff Reinett line (Crawford). Cradock (Farquhar). Witmoss (Reeve). Somerset East (in S.A. Museum).

137. ZINGIS DELICATA, Melv. & Pons. [S.A.M.]

1895 *Zingis delicata*, M. & P., A.M.N.H. xv. p. 163. pl. 12, f. 1. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Knysna District (Cox; O'Connor; Purcell).

138. ZINGIS HAYGARTHI, Melv. & Pons.

1899 *Zingis haygarthi*, M. & P., A.M.N.H. iv. p. 195. pl. 3, f. 3. *D.F.*

Type in British Museum.

Hab. ZULULAND. 'Nkhandla Forest (Haygarth).

139. ZINGIS MINYTHODES (Melv. & Pons.). [S.A.M.]

1892 *Helix (Pella) minythodes*, M. & P., A.M.N.H. x. p. 240. pl. 13, f. 8. *D.F.*

1893 *Phasis (Trachycystis) minythodes*, M. & P., Pilsb., Man. of Conch. viii. p. 144. pl. 35, f. 15. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Craigie Burn, Somerset East (Crawford).

140. ZINGIS PERLEVIS, Preston.

1912 *Zingis perlevis*, Prest., Proc. Mal. Soc. x. p. 17. *D.F.*

Type in coll. Dautzenberg.

Hab. CAPE OF GOOD HOPE. Knysna Forest (Cox).

Possibly better placed in *Peltatinæ*.

141. ZINGIS ROSENBERGI, Preston.

1909 *Zingis rosenbergi*, Prest., A.M.N.H. iv. p. 498. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Pietersburg (fide Preston).

142. ZINGIS THERMARUM, Melv. & Pons. [S.A.M.]

1909 *Zingis thermarum*, M. & P., A.M.N.H. iv. p. 491. pl. 8, f. 14. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Warmbaths; Pietpotgietersrust (Connolly).

RHODESIA. Umtali (in S.A. Museum).

GENUS HELICARION, Férussac, 1821.

(Tabl. Syst. Moll. pt. 3, p. 23 (or 19), as *Helixarion*, *emend.* p. 71 (or 67).Type of Genus, *H. cuvieri*, Fér.

Most of the following species should doubtless be placed in *Peltatinæ*, but, without knowledge of the animal, it is impossible to determine their exact generic position.

143. HELICARION CHRYSOPRASINUS (Melv. & Pons.). *

1892 *Vitrina chrysoprasina*, M. & P., A.M.N.H.x.p.241. pl.13, f.11. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Cathcart (ex coll. Wotton).

ORANGE FREE STATE. Thaba N'chu (Connolly).

The locality—Pretoria—given for the type is almost undoubtedly erroneous.

144. HELICARION COXI, Preston.

1912 *Helicarion coxi*, Prest., Proc. Mal. Soc. x. p. 16. *D.F.*

Type in coll. Dautzenberg.

Hab. CAPE OF GOOD HOPE. Knysna (Cox).

145. HELICARION KNYSNAENSIS, Preston.

1912 *Helicarion knysnaensis*, Prest., Proc. Mal. Soc. x. p. 16. *D.F.*

Type in coll. Dautzenberg.

Hab. CAPE OF GOOD HOPE. Knysna (Cox).

146. HELICARION PLANTI (Pfeiffer).

1856 *Vitrina planti*, Pfr., P.Z.S., p. 324. *D.*1859 ,, ,, Mon. Hel. iv. p. 794. *D.*1862 ,, ,, Rve., Conch. Icon. pl. 8, f. 57. *D.F.*1885 *Vitrina (Gallandia) planti*, Pfr., Tryon, Man. of Conch. i. p. 157. *D.*

* Since the above was printed, this Species has been proved to belong to *Microkerkus*.

Type in British Museum.

Hab. NATAL (Plant).

A very distinct species, perhaps more nearly akin to true *Helicarion* than others of the present group.

147. *HELICARION PUMILIO*, Melv. & Pons. *

1909 *Helicarion pumilio*, M. & P., A.M.N.H. iv. p. 490. pl. 8, f. 11. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Zoutpansberg (Cregoe).

148. *HELICARION RUSSOFULGENS*, Melv. & Pons.

1909 *Helicarion russofulgens*, M. & P., A.M.N.H. iv. p. 490. pl. 8, f. 12. *D.F.*

Type in British Museum.

Hab. ZULULAND. Eshowe (Lady Saunders).

NATAL. Tongaat (Burnup). ? Hilton Road (fide M. & P.)

149. *HELICARION TRANSVAALENSIS* (Craven).

1880 *Vitrina transvaalensis*, Crvn., P.Z.S. p. 615. pl. 57, f. 3. *D.F.*

1885 „ (*Gallandia transvaalensis*, Crvn., Tryon, Man. of Conch. i. p. 156. pl. 34, f. 88, 89. *D.F.*

1912 “New Genus?” *transvaalensis*, Crvn., G.-Aust., A.M.N.H. ix. p. 128.

Type in British Museum.

Hab. TRANSVAAL. Lydenburg (Craven).

NATAL. Majuba (Connolly).

BASUTOLAND. Mont-aux-Sources (Warren).

150. *HELICARION VANDENBROECKII* (Craven).

1880 *Vitrina vandenbroeckii*, Crvn., P.Z.S. p. 615. pl. 57, f. 4. *D.F.*

1885 „ (*Gallandia vandenbroeckii*, Crvn., Tryon, Man. of Conch. i. p. 156. pl. 34, f. 90, 91. *D.F.*

Type in British Museum.

Hab. NATAL. Lydenburg (Craven).

SUB-FAMILY TROCHONANININÆ (nov.).

GENUS *MARTENSIA*, Semper, 1870.

(Reis. im Archip. Philippin., ii, 3. p. 42.)

(= *Ledoulxia*, Bgt., 1885, *pars.*)

Type of Genus, *M. mozambicensis* (Pfr.).

* This Species has just been constituted Type of the new Genus *Andrarion*, Godwin-Austen.

151. *MARTENSIA MOZAMBICENSIS* (Pfeiffer). [S.A.M.]

- 1855 *Helix mozambicensis*, Pfr., P.Z.S. p. 91. pl. 31, f. 9. *D.F.*
 1859 „ „ Mon. Hel. iv. p. 32. *D.*
 1869 „ „ Novit. Conch. iii. p. 499. pl. 108,
 f. 1-3. *D.F.*
 1870 *Martensia mossambicensis*, Pfr., Semp., Reis. Archip. Philippin.
 ii, 3. p. 42. pl. 3, f. 5. pl. 6, f. 15. *A.R.*
 1874 „ *mossambicensis*, Pfr., Jick., Fauna N.-O.-Afr. p. 49. *D.*
 1881 *Helix mozambicensis*, Pfr., Dohrn, Conch. Cab. p. 609. pl. 177,
 f. 7-11. *D.F.*
 1883 *Trochomorpha mozambica*, Bgt., Ann. Sci. Nat. Paris, xv. p. 107. *L.*
 1885 *Trochonanina mozambicensis*, Pfr., Bgt., Hélixarionidées, p. 7. *N.*
 1886 *Nanina (Martensia) mozambicensis*, Pfr., Tryon, Man. of Conch.
 ii. p. 50. pl. 24, f. 80. *D.F.*
 1889 *Trochonanina mozambicensis*, Pfr., Bgt., Moll. de l'Afr. équat.
 p. 17. *N.*
 1894 „ „ Smith., Proc. Mal. Soc. i.
 p. 164. *N.*
 1895 *Martensia mozambicensis*, Pfr., G.-Aust., Proc. Mal. Soc. i.
 p. 281. pl. 19, f. 1. *A.*
 1897 *Trochonanina (Martensia) mossambicensis*, Pfr., von Mts.,
 D.-O.-Afr. p. 46. pl. 1, f. 8. *D.F.* p. 296. *N.*
 1907 *Martensia mossambicensis*, Pfr., Melv. & Standen, Manchester
 Memoirs, li, 4. p. 9. *N.*

Type in British Museum.

Hab. LORENZO MARQUES. Tette (Peters). Movene (Penther).

TRANSVAAL. Barberton (Fry). Zoutpansberg (Cregoe).

RHODESIA. Salisbury (Miss Weineck).

Widely distributed in East Africa.

von Martens (1897) considers *Trochonanina livingstoniana*, Ancey, from Nyassa, to be merely a small, high form of this species.

var. *ALBOPICTA*, von Martens.

- 1869 *Nanina mossambicensis*, Pfr., var. *albopicta*, von Mts., von der
 Decken's Reisen in Ostafrika, iii. p. 56. pl. 1, f. 2. *D.F.*
 1878 *Trochonanina mossambicensis*, Pfr., var. *albopicta*, von Mts.,
 Monats-Ber. Akad. Wiss. Berlin, p. 289. *N.*
 1885 „ *anceyi*, Bgt., Helixarionidées, p. 9. *D.*
 „ *Ledoulxia albopicta*, von Mts., Bgt., Helixarionidées, p. 12. *N.*
 1886 *Martensia mozambicensis*, Pfr., var. *albopicta*, von Mts., Tryon,
 Man. of Conch. ii. p. 50. *N.*

- 1889 *Trochonanina anceyi*, Bgt., Moll. de l'Afr. équat. p. 20. D.
1897 „ *mossambicensis*, Pfr., var. *albopicta*, von Mts.,
D.-O.-Afr. p. 47. D.

Hab. MOZAMBIQUE. Tette (Peters).

Occurring, often in company with the normal form, in many parts of East Africa.

var. *ELATIOR*, von Martens.

- 1866 *Trochomorpha?* *mossambicensis*, Pfr., var. *elator*, von Mts.,
Mal. Blätt. xiii. p. 92. D.
1869 *Helix mossambicensis*, var. *elator*, von Mts., Pfr., Novit. Conch.
iii. p. 500. pl. 108, f. 4-6. D.F.
1874 *Martensia mossambicensis*, Pfr., var. *elator*, von Mts., Jick.,
Fauna N.-O.-Afr. p. 50. N.
1897 *Trochonanina mossambicensis*, Pfr., var. *elator*, von Mts.,
D.-O.-Afr. p. 47, pl. 3, f. 9. D.F.

Hab. LORENZO MARQUES. Ikehongove (? Itschongove), (Schenck).

Not so plentiful, but rather more widely distributed than the normal form, occurring as far north as Abyssinia (von Martens).

GENUS TROCHOMORPHA, Albers, 1850.

(Die Helic., p. 116.)

Type of Genus, *T. trochiformis* (Fér.).

152. TROCHOMORPHA PLACENTA, Melv. & Pons.

- 1899 *Trochomorpha placenta*, M.&P., A.M.N.H. iv. p. 197. pl. 3, f. 9. D.F.
Type in British Museum.

Hab. ZULULAND. 'Nkandhla Forest (Haygarth).

GENUS TROCHOZONITES, Pfeffer, 1883.

(Abhandl. Naturwiss. Verein. Hamburg, vii, 2. p. 23.)

Type of Genus, *T. percarinatus* (von Mts.).

153. TROCHOZONITES DIORYX, Melv. & Pons.

- 1892 *Helix (Trochozonites) dioryx*, M. & P., A.M.N.H. ix. p. 89. pl. 5,
f. 2. D.F.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Robbe Bay, Port Nolloth (Layard).

GENUS THAPSIELLA, Gude, 1911.

(Proc. Mal. Soc. ix. p. 272.)

Type of Genus, *T. masakuensis* (Smith).

154. THAPSIELLA CONNOLLYI, Preston.

1912 *Thapsiella connollyi*, Prest., A.M.N.H. ix. p. 70, f. 3. *D.F.*

Type in coll. Preston.

Hab. RHODESIA. Victoria Falls (Connolly).

SUB-FAMILY PELTATINÆ, Godwin-Austen, 1912.

(A.M.N.H. ix. pp. 124, 126.)

GENUS PELTATUS, Godwin-Austen, 1908.

(A.M.N.H. i. p. 131.)

Type of Genus, *P. aloicola* (M. & P.).

155. PELTATUS ALOICOLA (Melv. & Pons.).

1890 *Vitrina huttonia*, Bs., var. *aloicola*, M. & P., A.M.N.H. vi. p. 467. *D.*1908 *Peltatus hudsonia*, Bs., G.-Aust., A.M.N.H. i. p. 131. pl. 8, f. 1.*D.F.A.*1912 ,, *aloicola*, M. & P., G.-Aust., A.M.N.H. ix. p. 130. pl. 4,
f. 1. *D.A.R.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth, North End and Rufane Vale, living on aloes (Crawford).

156. PELTATUS ARNOTTI (Benson).

1864 *Helix arnotti*, Bs., A.M.N.H. xiii. p. 491. *D.*1868 ,, ,, Pfr., Mon. Hel. v. p. 67. *D.*1909 *Zingis arnotti* ,, M. & P., A.M.N.H. iv. p. 491. pl. 8, f. 16. *N.F.*1912 *Peltatus* ,, ,, G.-Aust., A.M.N.H. ix. p. 137. *N.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Colesberg (Arnott).

157. PELTATUS ASTHENES (Melv. & Pons.).

1907 *Helicarion asthenes*, M. & P., A.M.N.H. xix. p. 99. pl. 6, f. 10. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Cradock (Farquhar).

158. PELTATUS CALEDONENSIS, Godwin-Austen.

- 1912 *Peltatus caledonensis*, G.-Aust., A.M.N.H. ix. p. 132. pl. 2, f. 1.
pl. 4, f. 3. pl. 5, f. 1. D.A.R.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Houw Hoek (Connolly).

159. PELTATUS CAPSULA (Benson). [S.A.M.]

- 1864 *Helix capsula*, Bs., A.M.N.H. xiii. p. 492. D.

- 1868 " " Pfr., Mon. Hel. v. p. 52. D.

- 1892 *Nanina hypochlora*, M. & P., A.M.N.H. ix. p. 87. pl. 4, f. 8. D.F.

- 1912 *Peltatus capsula*, Bs., G.-Aust., A.M.N.H. ix. p. 133. pl. 7, f. 2. D.A.

Type of *capsula* in University Museum of Zoology, Cambridge;
hypochlora in British Museum.

Hab. CAPE PENINSULA. Simonstown (Layard; Connolly).

Hypochlora was described from "Cape of Good Hope (Layard)";
Colonel Godwin-Austen has assisted me to compare the type with
capsula, and agrees that the two species are inseparable.

160. PELTATUS COTYLEDONIS (Benson). [S.A.M.]

- 1850 *Helix cotyledonis*, Bs., A.M.N.H. v. p. 216. D.

- 1852 " " Rve., Conch. Icon. pl. 124, f. 740. D.F.

- 1853 " " Pfr., Mon. Hel. iii. p. 31. D.

- 1854 " " " Conch. Cab. p. 376. pl. 141 (1852),
f. 3, 4. D.F.

- 1887 *Helix (Pella) cotyledonis*, Bs., Tryon, Man. of Conch. iii. p. 103.
pl. 20, f. 59. D.F.

- 1912 *Peltatus cotyledonis*, Bs., G.-Aust., A.M.N.H. ix. p. 134. A.R.

Specimens ex auct. in University Museum of Zoology, Cambridge.

Hab. CAPE OF GOOD HOPE. Simonstown (Benson). Kalk Bay
(Layard). Fish Hoek; Hermanus; Saldanha Bay and Stumpnose,
Malmesbury District (Lightfoot). Kommetje; Buffelsfontein, near
Cape Point (Connolly).

161. PELTATUS HUDSONÆ (Benson).

- 1864 *Helix hudsoniæ*, Bs., A.M.N.H. xiii. p. 493. D.

- 1868 " " Pfr., Mon. Hel. v. p. 104. D.

- 1890 *Vitrina huttoniæ* " M. & P., A.M.N.H. vi. pp. 467, 468. N.
(Err. typ.)

- 1893 *Pella (Gallandia) hudsoniæ*, Bs., Pilsb., Man. of Conch. viii.
p. 135. N.

Type *ubi* ?

Hab. CAPE OF GOOD HOPE. "On aloes" (Delalande). Port Elizabeth (fide Crawford).

Not the *Helix pellicula*, Fér., of Pfr., 1851 (Conch. Cab. p. 47), nor of Desh., 1850 (Hist. nat. Moll. i. p. 204), which is trifasciate, and apparently a West Indian species. The true *pellicula* would appear to be a *Peltatus*, possibly identical with *aloicola*.

164. PELTATUS PHYTOSTYLUS (Benson).

1864 *Helix phytostylus*, Bs., A.M.N.H. xiii. p. 492. *D.*

1868 " " Pfr., Mon. Hel. v. p. 52. *D.*

1912 *Peltatus phytostylus*, Bs., G.-Aust., A.M.N.H. ix. pp. 127, 137. *N.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Colesberg (Arnott). Riversdale, Swellendam District (Mrs. Hudson). Port Elizabeth (Crawford).

165. PELTATUS TROTTERIANUS (Benson). [S.A.M.]

1848 *Helix trotteriana*, Bs., A.M.N.H. ii. p. 161. *D.*

1852 " " Rve., Conch. Icon. pl. 124, f. 745. *D.F.*

1853 " " Pfr., Mon. Hel. iii. p. 29. *D.*

1854 " " " Conch. Cab. p. 388. pl. 143 (1852),
f. 1, 2. *D.F.*

1887 *Helix (Pella) trotteriana*, Bs., Tryon, Man. of Conch. iii. p. 103.
pl. 20, f. 57. *D.F.*

1912 *Peltatus trotteriana*, Bs., G.-Aust., A.M.N.H. ix. p. 135. pl. 5,
f. 2. pl. 6, f. 1. *D.A.R.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Uitenhage (Trotter). Port Elizabeth (Crawford). Knysna (Purcell). Cradock (Farquhar). Bokkeveldt (Layard).

BASUTOLAND. Maseru (Sclater).

GENUS KERKOPHORUS, Godwin-Austen, 1912.

(A.M.N.H. ix. p. 127.)

Type of Genus, *K. inunctus* (M. & P.).

166. KERKOPHORUS AMPLIATUS (Melv. & Pons.).

1899 *Zingis ampliata*, M. & P., A.M.N.H. iv. p. 196. pl. 3, f. 5. *D.F.*

Type in British Museum.

Hab. NATAL. Durban (Burnup).

Apparently near akin to *natalensis*, Krs.

167. *KERKOPHORUS CINGULATUS* (Melv. & Pons.). [S.A.M.]1890 *Vitrina cingulata*, M. & P., A.M.N.H. vi. p. 466. *D.*1892 " " " " ix. p. 94. pl. 5, f. 8. *F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Bellevue; Tootabi, near Alicedale; Alexandria District (Crawford). Bedford (Farquhar). Port St. John's (Shortridge). Kentani (Miss Pegler).

It is questionable whether this species is separable from the Natalian *poepfigi*, Menke, which it much resembles.

168. *KERKOPHORUS CORNEUS* (Pfeiffer).1846 *Vitrina cornea*, Pfr., Symb. iii. p. 81. *D.*1848 " " Krs., Südafr. Moll. p. 74. *N.*" " " Mon. Hel. ii. p. 505. *D.*1854 " " Conch. Cab. p. 21. pl. 2, f. 31-33. *D.F.*1862 " " Rve., Conch. Icon. pl. 4, f. 24. *D.F.*1885 *Vitrina (Gallandia) cornea*, Pfr., Tryon, Man. of Conch. i. p. 157. pl. 34, f. 92-94. *D.F.*1912 *Kerkophorus corneus?* Pfr., G.-Aust., A.M.N.H. ix. p. 137. pl. 1, f. 1. *A.*

Type in Stettin Museum.

Hab. NATAL. Port Natal (Menke).

CAPE OF GOOD HOPE. Eastern Province (Krauss). Port Elizabeth (fide Morelet).

169. *KERKOPHORUS FUSCICOLOR* (Melv. & Pons.). [S.A.M.]1892 *Vitrina fuscicolor*, M. & P., A.M.N.H. x. p. 240. pl. 13, f. 10. *D.F.*1903 *Natalina* " " Mlldff., Conch. Cab. p. 23. pl. 3, f. 10. *D.F.*

Type in British Museum.

Hab. ORANGE FREE STATE. Rensberg's Kop, Drakensberg (Quekett). Platberg, Harrismith (Connolly).

170. *KERKOPHORUS INUNCTUS* (Melv. & Pons.). [S.A.M.]1860 *Helix congellana*, Krs., von Mts., Die Helic. p. 84. *L.*1899 *Zingis inuncta*, M. & P., A.M.N.H. iv. p. 195. pl. 3, f. 4. *D.F.*1912 *Kerkophorus inunctus*, M. & P., G.-Aust., A.M.N.H. ix. pp. 127, 138. pl. 3, f. 1. *F.A.*

Type of *inunctus* in British Museum; *congellana* in Stuttgart Museum.

Hab. NATAL. Umkomaas ; Alexandra Junction (Burnup). *Congella* (*concellana*, Wahlberg).

ZULULAND. 'Nkandhla Forest (Haygarth). Umbonambi (Toppin). Makowe (Crosly).

Through the kindness of Dr. Lampert, of Stuttgart, I have been enabled to examine the type of the little-known *H. concellana*. It is identical with *inunctus*, but, never having been described or figured, must yield precedence to the last-named species.

171. KERKOPHORUS LEUCOSPIRA (Pfeiffer). [S.A.M.]

1856 *Vitrina leucospira*, Pfr., P.Z.S. p. 326. *D.*

1862 " " Rve., Conch. Icon. pl. 6, f. 42. *D.F.*

1885 *Helicarion leucospirus*, Pfr., Tryon, Man. of Conch. i. p. 168. pl. 28, f. 39. *D.F.*

1899 " *leucospira*, Pfr., M. & P., A.M.N.H. iv. p. 192. *N.*
Type in British Museum.

Hab. NATAL. Pinetown ; Tongaat ; Malvern (Burnup). Umgeni Rivermouth (Quekett).

Described as from South Australia.

172. KERKOPHORUS MELVILLI, Godwin-Austen.

1912 *Kerkophorus melvilli*, G.-Aust., A.M.N.H. ix. p.127. pl.7, f.1. *A.B.*

Type in British Museum.

Hab. NATAL. Equeefa (Burnup).

173. KERKOPHORUS NATALENSIS (Krauss).

1848 *Vitrina natalensis*, Krs., Südafr. Moll. p. 74. pl. 4, f. 17. *D.F.*

" " " Pfr., Mon. Hel. ii. p. 505. *D.*

1862 " " Rve., Conch. Icon. pl. 1, f. 1. *D.F.*

1885 *Vitrina* (*Gallandia*) *natalensis*, Krs., Tryon, Man. of Conch. i. p. 156. pl. 34, f. 83, 84. *D.F.*

1909 *Helicarion subcornea*, Prest., A.M.N.H. iv. p. 498. *D.F.*

Type of *natalensis* in Stuttgart Museum ; *subcornea* in British Museum.

Hab. NATAL. Natal Bay (Krauss).

CAPE OF GOOD HOPE. Somerset East and Tharfield (Miss Bowker), and Hillside, Grahamstown (Miss Glanville), *vide* *Layard*.

Subcornea was described from "Natal" ; it appears quite inseparable from *natalensis*, Krs. *Ampliatus* and *zonamydrus*, M. & P., are also very similar to the last-mentioned shell.

174. *KERKOPHORUS PHÆDIMUS* (Melv. & Pons.). [S.A.M.]1892 *Vitrina phædima*, M. & P., A.M.N.H. x. p. 241. pl. 13, f. 12. *D.F.*1898 " " Stur., S.A. Moll. p. 34. *N.*1912 *Kerkophorus phædimus*, M. & P., G.-Aust., A.M.N.H. ix. p. 139.
pl. 5, f. 3. *A.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg; Durban; Pinetown; Dargle;
Karkloof; Port Shepstone; Ntimbankulu (Burnup).CAPE OF GOOD HOPE. Grahamstown; Bedford (Farquhar). Pirie
Mountain (Godfrey).175. *KERKOPHORUS POEPPIGI* (Menke). [S.A.M.]1846 *Vitrina poeppigii*, Mke., Pfr., Symb. iii. p. 81. *D.*1848 " " Krs., Südafr. Moll. p. 74. *N.*" " " Pfr., Mon. Hel. ii. p. 504. *D.*1854 " " " " Conch. Cab. p. 17. pl. 2, f. 13-15. *D.F.*1862 " " " Rve., Conch. Icon. pl. 7, f. 49. *D.F.*1885 *Vitrina (Gallandia) poeppigii*, Mke., Tryon, Man. of Conch.
i. p. 156. pl. 34, f. 85-87. *D.F.*

Type in Stettin Museum.

Hab. NATAL. Port Natal (Menke). On plants, widely distributed
(Krauss).

TRANSSVAAL. "Moori" (Mooi) River (Craven).

LORENZO MARQUES. Rikatla (Junod).

176. *KERKOPHORUS VITALIS* (Melv. & Pons.). [S.A.M.]1908 *Helicarion vitalis*, M. & P., A.M.N.H. i. p. 133. pl. 7, f. 4. *D.F.*1912 *Kerkophorus* " " G.-Aust., A.M.N.H. ix. p. 138. pl. 3,
f. 3. *A.*

Type in British Museum.

Hab. NATAL. Port Shepstone; Durban (Burnup).177. *KERKOPHORUS ZONAMYDRUS* (Melv. & Pons.). [S.A.M.]1890 *Vitrina zonamydra*, M. & P., A.M.N.H. vi. p. 467. *D.*1892 " " " " ix. p. 94. pl. 5, f. 9. *F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Alexandria District (Crawford).
Kowie (Farquhar).

NATAL. Durban (Penther, fide Sturany).

GENUS MICROKERKUS, Godwin-Austen, 1912.
(A.M.N.H. ix. p. 128.)

Type of Genus, *M. symmetricus* (Crvn.).

178. MICROKERKUS PONDOENSIS, Godwin-Austen. [S.A.M.]
1912 *Microkerkus pondoensis*, G.-Aust., A.M.N.H. ix. p. 128. pl. 4,
f. 2. *A.R.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Kentani (Miss Pegler).

179. MICROKERKUS SYMMETRICUS (Craven).

- 1880 *Helix symmetrica*, Crvn., P.Z.S. p. 614. pl. 57, f. 2. *D.F.*
1887 „ (*Pella*) *symmetrica*, Crvn., Tryon, Man. of Conch. iii.
p. 108. pl. 21, f. 99. *D.F.*
1898 *Pella symmetrica*, Crvn., Stur., S.A. Moll. pp. 39, 40. *N.*
1912 *Microkerkus symmetricus*, Crvn., G.-Aust., A.M.N.H. ix.
pp. 128, 137. pl. 1, f. 2. pl. 3, f. 4. *F.A.*

Type in British Museum.

Hab. TRANSVAAL. Lydenburg (Craven). Pretoria (McBean).

SUB-FAMILY ZONITINÆ, Pilsbry, 1898.
(Nautilus, xi. p. 128.)

GENUS VITREA, Fitzinger, 1833.

(Beiträge zur Landeskunde Oesterreichs u.d. Enns, Wien, iii. p. 99.)
(= *Hyalinia*, Charpentier, 1837, nec Schumacher, 1817.)

Type of Genus, *V. diaphana* (Studer).

180. VITREA CRYSTALLINA (Müller). [S.A.M.]

- 1774 *Helix crystallina*, Müll., Verm. ii. p. 23. *D.*
1805 „ *crystallina* „ Drap., Hist. Moll. Fr. p. 118. pl. 8,
f. 13-18. *D.F.*
1821 „ *eburnea*, Hartm., Neue Alp. i. p. 234.
„ „ *crystallina*, Müll., C. Pfr., Syst. Anordn. deutsch. L.-u.
W. Schn. p. 46. pl. 2, f. 36. *D.F.*
1829 „ *vitrea*, Brown, Edinb. Journ. Nat. & Geogr. Sci. i. p. 12.
pl. 1, f. 12-14. *D.F.*
1830 „ *crystallina*, Müll. (= *vitrea*, Brown), Alder, Cat. New-
castle, p. 11. *D.*

- 1840 *Zonites crystallinus*, Müll., Gray, Turton's Man. p. 176. pl. 4, f. 42. *D.F.*
- 1848 *Helix crystallina*, Müll., Pfr., Mon. Hel. i. p. 59. *D.*
- 1852 " " Pfr., Conch. Cab. p. 128. pl. 88 (1850), f. 27-30. *D.F.*
- 1855 " " Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 89. pl. 9, f. 26-29. *D.F.*
- 1856 *Zonites crystallinus* " Bgt., Amén. malac. i. p. 192. pl. 20, f. 19-24. *D.F.*
- 1862 " " " Jeffr., Brit. Conch. i. p. 170. and v. (1869) pl. 10, f. 3. *D.F.*
- 1864 " *eustilbus*, Bgt., Mal. Algérie, i. p. 76. pl. 4, f. 11-16. *D.F.*
- 1881 *Hyalina cavannæ*, Paulucci, Bull. Soc. Mal. Ital. p. 80. pl. 1 bis, f. 3. *D.F.*
- 1886 *Hyalinia (Vitrea) crystallina*, Müll., Tryon, Man. of Conch. ii. p. 138. pl. 46, f. 3-8. *D.F.*
- 1908 " " " Tayl., Mon. Brit. Moll. p. 108. pl. 2 and pl. 15 (1912). *D.F.A.R.*

Type—*ubi* ?

Hab. CAPE PENINSULA. Cape Town and suburbs (plentiful).

A common European species.

GENUS POLITA, Held, 1837.

(*Isis*, p. 916.)

Type of Genus, *P. cellaria* (Müll.).

181. POLITA ALLIARIA (Miller).

[S.A.M.]

- 1822 *Helix alliararia*, Mill., Ann. Philos. iii. p. 379. *D.*
- 1828 " *fatida*, Stark, Elem. Nat. Hist. ii. p. 59. *D.*
- 1833 " *alliacea*, Jeffr., Linn. Trans. xvi. p. 341. *D.*
- 1840 *Zonites alliararius*, Mill., Gray, Turton's Manual, p. 168. pl. 4, f. 39. *D.F.*
- 1851 *Helix remota*, Bs., A.M.N.H. vii. p. 263. *D.*
- 1854 *Zonites alliararius*, Mill., Schm., Mal. Blätt. i. p. 8. *N.*
- 1855 " " " Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 83. pl. 9, f. 9-11. *D.F.*
- 1859 *Helix alliararia*, Mill., Pfr., Mon. Hel. iv. p. 76. *D.*
- 1862 *Zonites alliararius*, Mill., Jeffr., Brit. Conch. i. p. 161. and v. (1869), pl. 9, f. 2. *D.F.*
- 1886 *Hyalinia (Polita) alliararia*, Mill., Tryon, Man. of Conch. ii. p. 145. pl. 47, f. 91-93. *D.F.*

- 1907, 8 *Hyalinia (Euhyalinia) alliaria*, Mill., Tayl., Mon. Brit. Moll. p. 57. pl. 2 (1908), pl. 6 (1909). *D.F.A.R.*
 Type of *remota* in British Museum; *alliaria—ubi?*
Hab. CAPE OF GOOD HOPE. Grahamstown (Farquhar).
 A common European species, probably of recent importation into South Africa.

182. POLITA CELLARIA (Müller). [S.A.M.]

- 1774 *Helix cellaria*, Müll., Verm. ii. p. 28. *D.*
 1786 „ „ „ Chem., Conch. Cab. ix, 2. p. 102. pl. 127, f. 1129. *D.F.*
 1788 „ „ „ Gmel., Syst. Nat., Ed. 13. i. p. 3634. *D.*
 1803 „ *lucida*, Mont., Test. Brit. p. 425; and Suppl. (1808), pl. 23, f. 4. *D.F.*
 1807 „ *nitens*, Gmel., Mat. & Rack., Linn. Trans. viii. p. 198. pl. 5, f. 7. *D.F.*
 1817 „ *glaphyra*, Say, Nicholson's Encycl. iv. pl. 1, f. 3. *D.F.*
 1821 „ *cellaria*, Müll., C. Pfr., Syst. Anordn. deutsch. L.-u. W. Schn. p. 42. pl. 2, f. 29, 30. *D.F.*
 1822 „ „ „ Lam., Hist. nat. An. s. Vert. vi, 2. p. 91. *D.*
 1830 „ „ „ (= *nitida*, Drap.), Alder, Cat. Newcastle, p. 12. *D.*
 1840 *Zonites cellarius*, Müll., Gray, Turton's Manual, p. 170. pl. 4, f. 40. *D.F.*
 1841 *Helix cellaria*, Müll. (= *glaphyra*, Say.), A. Binn., Boston Journ. Nat. Hist. iii. p. 421. *D.*
 1842 „ *glaphyra*, Say, Pfr., Symb. ii. p. 29. *D.*
 1848 „ *cellaria*, Müll., Pfr., Mon. Hel. i. p. 111. *D.*
 1850 „ „ „ Bs., A.M.N.H. v. p. 217. *L.*
 1852 „ „ „ Pfr., Conch. Cab. p. 102. pl. 84 (1850), f. 8-10. *D.F.*
 1855 *Zonites cellarius*, Müll., Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 78. pl. 9, f. 1, 2. *D.F.*
 1862 „ „ „ (= *lucida*, Pult., nec Drap.), Jeffr., Brit. Conch. i. p. 159. *D.*
 1864 *Helix sydneyensis*, Cox, Cat. Austral. Land Shells, p. 37. *D.*
 1868 „ „ „ Mon. Austral. Land Shells, p. 9. pl. 9, f. 16. pl. 18, f. 3. *D.F.*
 1886 *Hyalinia (Polita) cellaria*, Müll., Tryon, Man. of Conch. ii. p. 155. pl. 50, f. 33-52. *D.F.*
 1907 „ „ (*Euhyalinia*) *cellaria*, Müll., Tayl., Mon. Brit. Moll. p. 30. pl. 2 (1908), pl. 6 (1909). *D.F.A.R.*

1910 *Hyalinia (Polita) cellaria*, Müll., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii, p. 455. *N.*

Specimens ex coll. Müller in University Zool. Mus. Copenhagen.

Hab. CAPE OF GOOD HOPE. Rondebosch (Benson, 1846). Somerset East (Miss Bowker). Stellenbosch (Péringuey). Somerset West (Purcell). Widely distributed in the Cape Peninsula.

RHODESIA. Bulawayo (in S.A. Museum).

The Rev. E. W. Bowell has identified the animal of specimens from St. James, Cape Peninsula, as typical of the common European *cellaria*.

183. *POLITA DRAPARNAUDI* (Beck).

[S.A.M.]

1801 *Helix lucida*, Drap., Tabl. Moll. Fr. p. 96. *D.*

1805 „ *nitida* „ Hist. Moll. Fr. p. 117. pl. 8, f. 23-25. *D.F.*

1815 „ *lucida* „ Brard, Hist. Coq. Paris, p. 34. pl. 2, f. 3, 4. *D.F.*

1828 „ *nitida* „ Stark, Elem. Nat. Hist. ii. p. 59. *D.*

1835 „ *cellaria*, Müll., var., Rossmässler, Icon. i. p. 71. pl. 1, f. 22*. *D.F.*

1837 „ (*Helicella*) *draparnaldi*, Beck (= *nitida*, Drap.), Beck, Index Moll. p. 6.

1853 „ *draparnaldi*, Beck, Pfr., Mon. Hel. iii. p. 86. *D.*

1854 „ „ „ „ Conch. Cab. p. 497. pl. 161, f. 23-25. *D.F.*

1855 *Zonites lucidus*, Drap., Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 75. pl. 8, f. 29-35. *D.F.A.*

1869 „ *cellarius*, “ Müll.,” Jeffr., Brit. Conch. v. pl. 9, f. 1. *F.*

1886 *Hyalinia (Polita) lucida*, Drap., Tryon, Man. of Conch. ii. p. 149. pl. 48, f. 37-43, 46-56. pl. 49, f. 57-59. *D.F.*

1895 *Helix nitida*, Drap., Locard, Ipsa Draparnaudi Conchylia, p. 145. *N.*

1907 *Hyalinia (Euhyalinia) lucida*, Drap., Tayl., Mon. Brit. Moll. p. 18. pl. 2 (1908), pl. 6 (1909). *D.F.A.E.*

1911 „ (*Polita) lucida*, Drap., Germain, Arch. Zool. Exper. vi. p. 234. pl. 13, f. 1-6, 10-12, 22-24, 32-34, 41-43. *N.F.*

Originals of *lucida*, Drap., in Naturh. Hofmus. Vienna (as *nitida*).

Hab. CAPE PENINSULA. Rondebosch (Oakley). Kenilworth (Connolly).

Specimens from Kenilworth have been dissected and identified by the Rev. E. W. Bowell.

I fail to see how the name *lucida*, of Draparnaud, can possibly be retained for this species. The earliest *Helix lucida* is that of Pulteney, 1799 (Cat. Dorset, p. 47), who wrote:—

"*H. lucida*, M.P.; *pellucida*, Pen., 134; Gualt. t. 2, G. Testa *pellucida*, *umbilicata*, *depressa*, *lævissima*.

"Pellucid snail shell, about $\frac{3}{8}$ of an inch long, exactly resembling the foregoing" (*H. ericetorum*, Müll.) "in figure, but quite smooth and glossy, and wholly without striæ, marks, or bands.

"Found on plants in the River Stour."

(Gualtieri's figure, quoted above, appears to represent a roughly striate shell, somewhat high in the spire, with a distinctly expanded peristome, and his letterpress runs, "*Cochlea terrestris umbilicata*, *minor*, *pellucida*, *flavescens*.")

Draparnaud's description of his *Helix lucida* (1801) is as follows:—

"*H. lucide. H. lucida.* Coq. transparente, luisante, corné clair en dessus, blanchâtre en dessous; ouverture grande.

"Haut. 5–6 mill.; larg. 13–16; diam. 11–14.

"*Helix cellaria*, Müll., Verm. Hist. 230. Gualt. t. 2. f. G.

"*H. commune* dans les jardins, sous les haies. (5 tours). Animal pâle, blanchâtre, un peu grisâtre en dessus. Tentacules grisâtres. Yeux noirs."

Müller's original description of *cellaria* is:—

"*H. testa umbilicata, depressa, lutescente, nitida, subtus lactea. Apertura larga.*"

Pulteney's *H. lucida* is probably synonymous with *cellaria*, Müll.; but it is evident that, in using the same name and quoting the same figure as Pulteney, Draparnaud intended to allude to Pulteney's species; while his reference to Müller, whose description of *cellaria* he practically translates, shows that in his opinion *lucida* and *cellaria* were identical. The fact that in 1805 he rechristened his own *H. lucida, nitida*, and gave the name *lucida* to *H. nitida*, Müll., does not tend to simplify the matter.

It appears from the foregoing that if the name *lucida* be allowed to stand at all, it should bear Pulteney's name as author; but under the circumstances it seems preferable to consider *lucida*, Pult., a synonym of *cellaria*, and to follow the majority of Continental authorities in adopting a modification of Beek's name, *draparnaldi*, for the present much-debated species.

Among its other synonyms are *nitens*, von Alten, 1812; *obscurata*, Porro in Villa, 1841; *blauneri*, Shuttll., 1843; *fulgida*, Parreyss, 1851; *planulata*, Stabile, 1864; *septentrionalis, farinesianus*, and *navarricus*, Bgt., 1870; *calabricus*, Paulucci, 1879; *gyrocorta*, Bgt. in Servain, 1880; *porroi*, Paulucci, 1882; *subfarinesiana*, Bgt.; *barbozana*, Castro; and *intermissa*, Locard, 1894.

I have known South African examples display cannibal propensities, devouring other small species, even of *Zonitoides* and *Polita*, which were placed in their box. They were, however, no match for *Natalina coenotera*, which treated them in similar fashion.

SUB-FAMILY ARIOPHANTINÆ, Godwin-Austen, 1888.
(Moll. of India, pt. 6, p. 253, as Arionphantinæ, *emend.* Pilsbry, 1898, Nautilus, xi. p. 129.)

GENUS ZONITOIDES, Lehmann, 1862.
(Mal. Blätt. ix. p. 111.)

Type of Genus, *Z. nitidus* (Müll.).

184. ZONITOIDES AFRICANUS, Böttger.

1910 *Zonitoides africanus*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 436. pl. 28, f. 2. *D.F.*
Type in Senckenberg Museum, Frankfurt.
Hab. DAMARALAND. Gobabis (subfossil, Hermann).

185. ZONITOIDES ARBOREUS (Say). [S.A.M.]

- 1817 *Helix arborea*, Say, Nicholson's Encyclopædia, iv. pl. 4, f. 4. *D.F.*
1821 „ *arborea* „ Fér., Tabl. Syst. Moll. pt. 3. p. 45 (or 41). *N.*
1840 „ *ottonis*, Pfr., Archiv. f. Naturg., vi, 1. p. 251. *D.*
1841 „ *arborea*, Say, Binn., Boston Journ. Nat. Hist. iii. p. 422.
pl. 22, f. 1. *D.F.*
1848 „ „ „ (= *ottonis*), Pfr., Mon. Hel. i. p. 95. *D.*
1852 „ „ „ Pfr., Conch. Cab. p. 114. pl. 85 (1850), f. 33-35. *D.F.*
1866 *Hyalina breweri*, Newcomb, Tryon, Amer. Journ. of Conch. ii. p. 250. pl. 19, f. 27. *D.F.*
1885 *Zonites arborea*, Say, Binn., Bull. U.S. Nat. Mus. xxviii. p. 61. *D.F.* and Synonymy.
1886 *Hyalinia (Polita) arborea*, Say (= *breweri*, Newc.), Tryon, Man. of Conch. ii. p. 161. pl. 51, f. 9-17. *D.F.*
Type—*ubi* ?
Hab. CAPE OF GOOD HOPE. Port Elizabeth (Layard). Grahams-town (Reeve). Kenilworth (Connolly). King Williamstown (Godfrey). Queenstown (Becker).
TRANSVAAL. Pretoria (Connolly).
NATAL. Pietermaritzburg (Ponsonby).

A common American species, introduced into S. Africa and various other parts of the globe.

186. ZONITOIDES CUPIDO, Melv. & Pons. [S.A.M.]

1903 *Zonitoides cupido*, M. & P., A.M.N.H. xii. p. 601. pl. 32, f. 1. *D.F.*
Type in British Museum.

Hab. ZULULAND. Lower Umfolosi Drift (Burnup).

RHODESIA. Victoria Falls (Warren).

SUB-FAMILY ?

("Position most doubtful;" Godwin-Austen, 1908, Fauna of Brit. India, Moll.,
p. 258.)

GENUS KALIELLA, Blanford, 1863.

(A.M.N.H. xi. p. 83.)

Type of Genus, *K. barrakporensis* (Pfr.).

187. KALIELLA EUCONULOIDES, Melv. & Pons. [S.A.M.]

1908 *Kaliella euconuloides*, M. & P., A.M.N.H. i. p. 133. pl. 7, f. 5. *D.F.*
Type in British Museum.

Hab. NATAL. Dargle; Karkloof; Inhluzani; Game Pass
(Burnup).

The generic position of this species is doubtful; Colonel Godwin-Austen informs me that it is not a *Kaliella*.

188. KALIELLA SIGURENSIS, Godwin-Austen. [S.A.M.]

1882 *Kaliella sigurensis*, G.-Aust., L. & F. W. Moll. India, i. p. 5.
pl. 1, f. 11. *D.F.*

1890 *Helix (Trochonanina) pretoriensis*, M. & P., A. M. N. H. vi. p. 469. *D.*

1892 " " " " ix. p. 94. pl. 4,
f. 5. *F.*

Types in British Museum.

Hab. TRANSVAAL. Pretoria District (*pretoriensis*, Farquhar).

NATAL. Pietermaritzburg; Dargle; Equeefa; Karkloof; Tyeloti,
near Botha's Hill (Burnup).

Described from the Nilgherri Hills, India.

Colonel Godwin-Austen has identified the Pretorian form of *Kaliella* as *sigurensis*, and in all probability the Natal localities refer to the same species. E. A. Smith, however (P.Z.S. 1899, p. 582), in chronicling *K. barrakporensis* (Pfr.), from Mount Chirad-

zulu, B.C.A., considered that *pretoriensis*, M. & P., was a synonym of the last named. It is very possible that both these nearly allied Indian species have found their way into South Africa, and may have been mistaken one for another.

189. *KALIELLA VICTORIÆ*, Preston. [S.A.M.]

1912 *Kaliella victoriæ*, Prest., A.M.N.H. ix. pp. 69, f. 2; 70. *F.D.*
Type in coll. Preston.

Hab. RHODESIA. Victoria Falls (Connolly).

FAMILY LIMACIDÆ, Gray, 1821.

(Lond. Med. Repos. xv. p. 230, as Limacideæ, *emend.* 1824, Ann. of Philos. viii. p. 107.)

SUB-FAMILY LIMACINÆ, Swainson, 1840.

(Treatise on Malacology, p. 327.)

GENUS LIMAX, Linné, 1758.

(Syst. Nat., Ed. 10. i. pp. 644, 652.)

Type of Genus, *L. maximus*, Lin.

190. *LIMAX FLAVUS*, Linné. [S.A.M.]

1758 *Limax flavus*, Lin., Syst. Nat., Ed. 10. i. p. 652. *D.*

1774 „ „ Müll., Verm. ii. p. 10. *D.*

1801 „ *variegatus*, Drap., Tabl. Moll. Fr. p. 103. *D.*

1815 *Limacella unguiculus*, Brard, Hist. Coq. Paris, p. 115. pl. 4,
f. 3, 4, 11, 12. *D.F.*

1819 *Limax variegatus*, Drap., Fér., Hist. Nat. Moll. ii, 1. p. 71. pl. 5,
f. 1-6. *D.F.*

1831 *Limacellus unguiculus*, Brard (= *carinatus*, Leach), Turton,
Manual, p. 25. *D.*

1840 *Limax flavus*, Lin., Gray, Turton's Manual, p. 114. pl. 3, f. 16. *D.F.*

1855 „ *variegatus*, Drap., Moq.-Tand., Hist. Nat. Moll. Fr.
ii. p. 25. pl. 3, f. 3-9. *D.F.A.*

1860 „ „ „ Heynem., Mal. Blätt. vii. p. 165.
pl. 1, f. 1-8. *D.F.*

1863 „ „ „ Heynem., Mal. Blätt. x. p. 212. pl. 3,
f. 5. *N.R.*

1869 „ „ „ Lehm., Mal. Blätt. xvi. p. 148. *N.*

1885 „ *flavus*, Lin., Tryon, Man. of Conch. i. p. 200. pl. 49,
f. 63, 70-72. pl. 50, f. 76. *D.F.*

- 1900 *Limax variegatus*, Drap., Cllge., Ann. S.A. Mus. ii. p. 2. *L.*
 1903 „ *flavus*, Lin., Tayl., Mon. Brit. Moll. p. 78. pl. 10 (1905),
 f. 3-9. *D.F.A.R.*
 1910 „ „ „ „ Cllge., Ann. Natal. Mus. ii. p. 160. *N.*
Hab. NATAL. Pietermaritzburg (Burnup).
 CAPE PENINSULA. Cape Town (Lightfoot).
 A well-known and widely distributed species, in whose synonymy
 have been placed *L. umbrosus*, Phil., 1844; *maculatus*, Kalenicz,
 1851; *deshajesii*, Bgt., 1862; *companyoi*, Bgt., 1863; *breck-*
worthianus, Lehm., 1864; *bicolor*, Selenka, 1865; *beticus*, Mabille,
 1868; and *ecarinatus*, Bttg., 1881.
191. LIMAX MAXIMUS, Linné.
- 1678 *Limax cinereus*, Lister, Hist. Anim. Angl. p. 127. pl. 2, f. 15.
D.F. (Pre-Linnean.)
 1758 „ *maximus*, Lin., Syst. Nat., Ed. 10. i. p. 652. *D.*
 1774 „ *cinereus*, Müll., Verm. ii. p. 5. *D.*
 1805 „ „ „ „ Drap., Hist. Moll. Fr. p. 124. pl. 9, f. 11. *D.F.*
 1815 *Limacella parma*, Brard, Hist. Coq. Paris, p. 110. pl. 4, f. 1, 2,
 9, 10. *D.F.*
 1819 *Limax antiquorum*, Fér., Hist. Nat. Moll. ii, 1. p. 68. pl. 4. *D.F.*
 1821 „ *cinereus*, Müll., C. Pfr., Syst. An. u. Besch. deutsch.
 L.-u. W. Schn. p. 20. *D.*
 „ „ *alpinus*, Fér., Tabl. Syst. Moll. pt. 2. p. 21. *D.*
 „ „ *valentianus*, Fér., Tabl. Syst. Moll. pt. 2. p. 21. *D.*
 1831 *Limacellus parma*, Brard, Turton, Manual, p. 24. *D.*
 1840 *Limax maximus*, Lin., Gray, Turton's Man. p. 112. pl. 3, f. 14. *D.F.*
 1855 „ (*Eulimax*) *maximus*, Lin., Moq.-Tand., Hist. Nat. Moll.
 Fr. ii. p. 28. pl. 4, f. 1-8. *D.F.*
 1861 „ *cinereus*, List., Heynem., Mal. Blätt. viii. p. 163. *N.*
 1862 „ „ „ „ Lehm., Mal. Blätt. ix. p. 172. pl. 4, f. 1, 2. *D.A.*
 1863 „ „ „ „ Heynem., Mal. Blätt. x. p. 200. pl. 2, f. 1. *N.R.*
 1885 „ *maximus*, Lin., Tryon, Man. of Conch. i. p. 189. pl. 46,
 f. 31-35, 39. pl. 49, f. 76. pl. 60, f. 81, 82. *D.F.*
 1901 „ *maximus*, Lin., Cllge., Ann. S.A. Mus. ii. p. 229. *N.L.*
 1902 „ „ „ „ Tayl., Mon. Brit. Moll. p. 34. pl. 6 (1903),
 f. 1-15. *D.F.A.R.*

Hab. CAPE PENINSULA. Table Mountain, Newlands (Purcell).

Another European slug, whose recent synonymy includes *L. cyrenæus*, *companyoi*, and *maculatus*, Nunnely; *sylvaticus*, Morelet; and *cornaliæ*, Pini.

GENUS MILAX, Gray, 1855.

(Cat. Pulm. p. 174.)

(=*Amalia*, Moquin-Tandon, 1855.)Type of Genus, *M. gagates* (Drap.).

192. MILAX CAPENSIS (Krauss).

- 1848 *Limax capensis*, Krs., Südafr. Moll. p. 73. *D.*
 1855 „ *kraussii*, H. & A. Ad. (= *campestris*, “Krs.”), H. & A.
 Ad., Gen. rec. Moll. ii. p. 219.
 1862 „ „ „ „ Heynem., Mal. Blätt. ix. p. 217. *N.*
 „ *Amalia capensis*, Krs., Heynem., Mal. Blätt. ix. p. 215. *N.*
 1885 „ „ „ „ Jahrb. d. Deutsch. Mal. Ges.
 xii. p. 294. *N.*
 „ *Limax* „ „ (= *kraussii*, Ads.), Tryon, Man. of Conch.
 i. p. 214. *N.*
 1891 *Amalia* „ „ Ckll., A.M.N.H. vii. p. 336. *N.*
 Type in Stuttgart Museum.
Hab. CAPE OF GOOD HOPE (Krauss).

193. MILAX GAGATES (Draparnaud).

[S.A.M.]

- 1801 *Limax gagates*, Drap., Tabl. Moll. Fr. p. 100. *D.*
 1805 „ „ „ Hist. Moll. Fr. p. 122. pl. 9, f. 1, 2. *D.F.*
 1819 „ „ „ Fér., Hist. Nat. Moll. ii, 1. p. 75. pl. 6,
 f. 1, 2. *D.F.*
 1824 „ *maurus*, Quoy & Gaim., Voy. Uranie, p. 427. *D.*
 1855 *Milax gagates*, Drap., Gray, Cat. Pulm. p. 174. *D.*
 „ *Limax (Amalia) gagates*, Drap., Moq.-Tand., Hist. Nat. Moll.
 Fr. ii. p. 19. pl. 2, f. 1-3. *D.F.*
 1870 „ „ „ Drap., Semp., Reis. in Arch. Philip-
 pin. ii, 3. p. 84. pl. 11, f. 9, 26. *A.E.*
 1885 *Amalia gagates*, Drap., Heynem., Jahrb. d. Deutsch. Mal. Ges.
 xii. p. 293. *N.*
 „ „ „ „ Tryon, Man. of Conch. i. p. 218. pl. 53,
 f. 53, 54. *D.F.*
 1891 „ „ „ Ckll., A.M.N.H. vii. pp. 329, 337. *N.*
 1900 „ „ „ Cllge., Ann. S.A. Mus. ii. p. 2. *L.*
 1901 „ „ „ „ „ „ p. 230. *N.*
 1904 „ „ „ Tayl., Mon. Brit. Moll. p. 139. pl. 15
 (1906), f. 9-14. *D.F.A.R.*
 1907 „ „ „ Srth., Zool. Anz. Leipsig, xxxi. pp. 793,
 798. *N.*
 1910 *Milax gagates*, Drap., Cllge., Ann. Natal Mus. ii. p. 161. *N.*

Hab. CAPE OF GOOD HOPE. Port Elizabeth (fide Cockerell).
Cape Town (Lightfoot). Cape Flats (Schultze). Ashton; Storms
Vlei (Purcell). Simonstown (German South Pole Expedition).

NATAL. Pietermaritzburg (Burnup).

A European species, known from many parts of the globe. Other
synonyms are *hewstoni*, Cooper, 1872; *marginata*, Pini, 1876; *tas-*
manicus and ?*nigricolus*, Tate, 1880; and *abori*, Cllge., 1897.

194 MILAX PONSONBYI (Collinge). [S.A.M.]

1900 *Amalia ponsonbyi*, Cllge., Ann. S.A. Mus. ii. p. 2. pl. 1, f. 1, 2.
pl. 2, f. 13. *D.F.A.*

1910 ,, ,, (?=*capensis*, Krs.), Srth., Deutsch.
Sudpol. Exp. xii. p. 157. *N.*

Type in University Museum of Zoology, Cambridge.

Hab. CAPE PENINSULA. Cape Town (Lightfoot).

GENUS AGRIOLIMAX, Mörch, 1865.

(*J. de C.* xiii. p. 378.)

Type of Genus, *A. agrestis* (Lin.).

195. AGRIOLIMAX AGRESTIS (Linné).

1758 *Limax agrestis*, Lin., Syst. Nat., Ed. 10. i. p. 652. *D.*

1774 ,, ,, Müll., Verm. ii. p. 8. *D.*

,, ,, *reticulatus*, Müll., Verm. ii. p. 10. *D.*

1791 ,, *filans*, Hoy, Linn. Trans. i. p. 183. *D.N.*

1805 ,, *agrestis*, Lin., Drap., Hist. Moll. Fr. p. 126. pl. 9, f. 9. *D.F.*

1815 *Limacella obliqua*, Brard, Hist. Coq. Paris, p. 118. pl. 4, f. 5, 6,
13-15. *D.F.*

1819 *Limax bilobatus*, Fér., Hist. Nat. Moll. ii, 1. p. 74. pl. 5, f. 2. *D.F.*

,, ,, *agrestis*, Lin., Fér., *ibid.* p. 73. pl. 5, f. 7-10. *D.F.*

1831 *Limacellus obliquus*, Brard, Turton, Manual, p. 26. *D.*

1840 *Limax agrestis*, Lin., Gray, Turton's Man. p. 117. pl. 3, f. 17. *D.F.*

1855 ,, ,, ,, Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 22.
pl. 2, f. 18-22. pl. 3, f. 1, 2. *D.F.*

1862 ,, ,, ,, Lehm., Mal. Blätt. ix. p. 183. *D.*

1863 ,, ,, ,, Heynem., Mal. Blätt. x. p. 209. pl. 2, f. 7. *N.R.*

1885 ,, (*Agriolimax*) *agrestis*, Lin., Tryon, Man. of Conch. i.
p. 205. pl. 50, f. 90-94. pl. 51, f. 95-98. *D.F.*

1893 *Agriolimax agrestis*, Lin., Ckll., Conchologist, ii. p. 200. *N.*

1900 ,, ,, Cllge., Ann. S.A. Mus. ii. p. 3. *L.*

- 1903, 4 *Agriolimax agrestis*, Lin., Tayl., Mon. Brit. Moll. p. 104. pl. 15
(1906), f. 1-4. *D.F.A.R.*
- 1907 " " Srth., Zool. Anz. Leipsig, xxxi.
pp. 793, 798. *N.*
- 1910 " " Cllge., Ann. Natal Mus. ii. p. 161. *N.*
Hab. CAPE PENINSULA. Cape Town (Lightfoot). Cape Flats
(Schultze). Green Point (Roebuck). Miller's Point (German South
Pole Expedition).

NATAL. Pietermaritzburg (Burnup).

A species of world-wide distribution, which has been described under many names.

In addition to the early synonymy given above, the following are, by various authorities, considered to be identical with *agrestis*: *Limax salicium*, Bouillet; *tunicata*, Gould; *pallidus*, Schrenk; *niciensis* and *veranyanus*, Bgt.; *heydeni*, Heynem.; *norvegicus*, Westerl.; *fedtschenkoi*, Koch & Heynem.; *panormitanus*, Less. & Poll.; *mentonicus*, Nev.; *varians*, A. Adams; *molestus*, Hutton; and *dymczewiczii*, Kalenicz.

196. *AGRIOLIMAX LÆVIS* (Müller).

- 1774 *Limax lævis*, Müll., Verm. ii. p. 1. *D.*
- 1801 " *brunneus*, Drap., Tabl. Moll. Fr. p. 104. *D.*
- 1821 " *lævis*, Müll., and *brunneus*, Drap., Fér., Tabl. Syst. Moll.
pt. 2. p. 23. *D.*
- 1885 *Agriolimax lævis*, Müll., Srth., Zeitschr. f. wiss. Zool. Leipsig,
xlii. p. 327. pl. 7, f. 17. *D.F.*
- " *Limax (Kryniewkia) lævis*, Müll., Tryon, Man. of Conch. i. p. 211.
pl. 52, f. 21. *D.F.*
- 1898 *Agriolimax lævis*, Müll., Stur., S.A. Moll. p. 36. *N.*
- 1904 " (*Hydrolimax*) *lævis*, Müll., Tayl., Mon. Brit. Moll.
p. 121. pl. 15 (1906), f. 5-8. *D.F.A.R.*

Hab. CAPE OF GOOD HOPE. Queenstown (Dower; Roebuck).

Other synonyms of this world-diffused slug appear to be: *lacustris*, Bonelli, 1822; *campestris*, Binn., 1841; *lombricoides*, Morel., 1845; *parvulus*, Normand, 1852; *arenarius*, Gass., 1867; *marotonganus*, Heynem., 1871; *argentinus*, Strob., 1874; *montanus* and *castaneus*, Ing., and *ingersolli*, Binn., 1875; *hyperboreus*, Westerl., 1876; *meridionalis*, Doering, 1878; *stenurus*, Strebel, 1880; *brasiliensis*, Semper, 1885; *queenlandicus*, Hedley, 1888; and *bevenoti*, Cllge., 1897.

FAMILY UROCYCLIDÆ, Simroth, 1889.

(Nov. Act. Acad. Caes. Leop. liv. p. 62.)

GENUS UROCYCLUS, Gray, 1864.

(P.Z.S. p. 250.)

Type of Genus, *U. kirki*, Gray.

197. UROCYCLUS FASCIATUS, von Martens.

1884 *Urocyclus fasciatus*, von Mts., Heynem., Jahrb. d. Deutsch. Mal. Ges. xi. p. 8. pl. 1, f. 4, 5. *D.F.*

1910 " von Mts., Cllge., Ann. Natal Mus. ii. p. 162. *N.*

Type in Zool. Mus. Berlin.

Hab. MOZAMBIQUE. Quilimane (fide Simroth).

NATAL. Pietermaritzburg (Burnup).

198. UROCYCLUS FLAVESCENS (Keferstein).

1866 *Parmarion flavescens*, Kfstn., Mal. Blätt. xiii. p. 70. pl. 2, f. 1-8. *D.F.A.R.*

1879 *Urocyclus flavescens*, Kfstn. (cum var. *pallida*), Gibbons, Journ. of Conch. ii. p. 138. *D.*

1883 " " Pfeffer, Abhandl. Naturwiss. Verein. Hamburg, vii, 2. p. 12. *D.*

1884 " " Heynem., Jahrb. d. Deutsch. Mal. Ges. xi. p. 6. pl. 1, f. 2, 3. *D.F.*

1885 " " (cum var. *pallida*, Gibb.), Tryon, Man. of Conch. i. p. 163. pl. 35, f. 34-36. *D.F.*

1894 " " Ckll., Journ. of Mal. iii. p. 52. *D.*

1910 " " Cllge., Ann. Natal Mus. ii. p. 162. *L.*

Type in Zool. Mus. Berlin.

Hab. NATAL. Pinetown. Pietermaritzburg (Burnup).

LORENZO MARQUES. Inhambane; Quilimane; Mungurumbe (Peters, 1846). Delagoa Bay (Spencer).

199. UROCYCLUS KIRKI, Gray.

1864 *Urocyclus kirki*, Gray, P.Z.S. p. 251. *D.F.*

1879 " " Gibbons, Journ. of Conch. ii. p. 139. *N.*

1884 " " Tryon, Struct. & Syst. Conch. iii. p. 81. pl. 101, f. 60. *D.F.*

" " " Heynem., Jahrb. d. Deutsch. Mal. Ges. xi. p. 7. pl. 1, f. 1. *D.F.*

- 1864 *Urocyclus kirkii*, Gray, Binn., Ann. N.Y. Acad. Sci. iii. p. 84.
pl. 16, f. K. pl. 17, f. N. *R.*
- 1887 " " Poirier, Bull. Soc. Mal. Fr. iv. p. 196. pl. 5,
f. 1, 2, 6. pl. 6, f. 1, 2. pl. 8, f. 1. *D.F.A.R.*
- 1891 " " Ckll., A.M.N.H. vii. p. 101. *N.*
- 1910 " " Cllge., Ann. Natal Mus. ii. p. 161. *N.*
- Type in British Museum.
Hab. NATAL. Durban (fide Sturany).
MOZAMBIQUE. Near the mouth of the Zambesi (Kirk).
LORENZO MARQUES. Delagoa Bay; Inhambane (fide Sturany).

200. UROCYCLUS KRAUSSIANUS (Heynemann).

- 1848 *Limax (Arion) ? sp.*, Krs., Südafr. Moll. p. 73. *D.*
- 1862 " *kraussianus*, Heynem., Mal. Blätt. ix. p. 217. *D.*
- 1863 " " " " x.p.211.pl.3,f.2. *N.R.*
- 1891 *Urocyclus* " " Ckll., A.M.N.H. vii. p. 102. *N.*
- 1910 " " " Cllge., Ann. Natal Mus. ii. p. 163. *N.*
- Hab.* CAPE PENINSULA. Cape Town (Krauss).
NATAL (fide Sturany).

201. UROCYCLUS PALLESCENS, Cockerell.

- 1891 *Urocyclus pallescens*, Ckll., A.M.N.H. vii. p. 101. *D.*
- 1910 " " Cllge., Ann. Natal Mus. ii. p. 162. *D.*
- Type in British Museum.
Hab. NATAL. Durban (Craven).

FAMILY ARIONIDÆ, Gray, 1840.

(Turton's Manual, pp. 101, 104.)

SUB-FAMILY OPELITINÆ, Cockerell, 1891.

(P.Z.S. p. 216.)

GENUS OPELTA, Mörch, 1867.

(Mal. Blätt. xiv. p. 191.)

Type of Genus, *O. nigropunctata*, Mörch.

202. OPELTA ATERRIMA (Gray).

- Limax (Arion) allerian*, Gray, in British Museum.
- 1855 *Arion aterrimus*, Gray, Cat. Pulm. p. 55. *D.*
- 1890 " " (? *Oopelta*), Ckll., A.M.N.H. vi. p. 387. *D.N.*
- 1901 *Oopelta aterrima* " Cllge., Ann. S.A. Mus. ii. p. 230. *D.*

Type in British Museum.

Hab. SOUTH AFRICA (fide Gray).

203. *OPELTA CAPENSIS*, Pollonera.

1909 *Oopelta capensis*, Pollon., Boll. Mus. Torino, xxiv, 608. p. 11
plate, f. 1-6. *D.F.*

Type in Museum of Zoology, Turin.

Hab. CAPE OF GOOD HOPE (in Mus. Torino).

204. *OPELTA FLAVESCENS*, Collinge. [S.A.M.]

1900 *Oopelta flavescens*, Cllge., Ann. S.A. Mus. ii. p. 6. pl. 1, f. 9, 10.
pl. 2, f. 17. *D.F.A.*

1901 ,, ,, Ann. S.A. Mus. ii. p. 231. *N.*

Type in University Museum of Zoology, Cambridge.

Hab. CAPE OF GOOD HOPE. Kalk Bay; Caledon; Swellendam;
Kogman's Kloof, Ashton (Purcell).

205. *OPELTA GRANULOSA*, Collinge. [S.A.M.]

1900 *Oopelta granulosa*, Cllge., Ann. S.A. Mus. ii. p. 6. pl. 1. f. 11, 12.
pl. 2, f. 18. *D.F.A.*

1901 ,, ,, Ann. S.A. Mus. ii. p. 231. *N.*

Type in University Museum of Zoology, Cambridge.

Hab. CAPE OF GOOD HOPE. Nieuwondtville (Leipoldt). Hot
Springs, Montagu (Purcell). Sir Lowry's Pass (Connolly).

206. *OPELTA MINOR*, Pollonera.

1909 *Oopelta minor*, Pollon., Boll. Mus. Torino, xxiv, 608. p. 12.
plate, f. 7, 8. *D.F.*

Type in Museum of Zoology, Turin.

Hab. CAPE OF GOOD HOPE (in Mus. Torino).

207. *OPELTA NIGROPUNCTATA*, Mörch. [S.A.M.]

1867 *Oopelta nigropunctata*, Mörch, Heynem., Mal. Blätt. xiv. p. 191.
pl. 2, f. 1, 2. *D.R.*

1885 ,, ,, Tryon, Man. of Conch. i. p. 225. *D.*

1900 ,, ,, Cllge., Ann. S.A. Mus. ii. p. 5. pl. 1,
f. 7, 8. pl. 2, f. 16. *D.F.A.*

1901 ,, ,, Cllge., Ann. S.A. Mus. ii. p. 231.
pl. 14, f. 6, 11, 12. *A.*

1909 ,, ,, Pollon., Boll. Mus. Torino, xxiv,
608. p. 10. *D.*

1910 *Oopelta nigropunctata*, Mörch, Srth., Deutsch. Sudpol. Exp. xii, 4.
p. 149, pl. 21, f. 1-14, 16, 17. A.

Hab. CAPE OF GOOD HOPE. Cape Town (Lightfoot). Bergvliet (Schultze). Albany District (Penther). Sir Lowry's Pass (Connolly).

Described from Guinea.

208. *OOPELTA POLYPUNCTATA*, Collinge. [S.A.M.]

1901 *Oopelta polypunctata*, Cllege., Ann. S.A. Mus. ii. p. 232. pl. 14,
f. 3, 4, 7, 8, 9, 10. D.F.A.

Type in University Museum of Zoology, Cambridge.

Hab. CAPE OF GOOD HOPE. Zonder End, Caledon Division (Purcell).

SUB-FAMILY ARIONINÆ, Morse, 1864.

(Journ. Portland Soc. Nat. Hist. i, 1. pp. 5, 7.)

GENUS ARION, Férussac, 1819.

(Hist. Nat. Moll. ii, 1. pp. 50, 53.)

Type of Genus, *A. empiricorum*, Fér.

209. *ARION FUSCUS* (Müller). [S.A.M.]

- 1774 *Limax fuscus*, Müll., Verm. ii. p. 11. D.
1821 " " Fér., Tabl. Syst. Moll. pt. 2. p. 23. D.
1855 *Arion fuscus*, Müll., Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 14.
pl. 1, f. 28-30. D.F.
1863 " " Mörch, Vid. Med. naturh. For. Copenhagen,
p. 273. D.
1873 " " Lehm., Leb. Schneck. Stettins, p. 17. pl. 2,
f. 2. D.F.
1885 " " (= *subfuscus*, Drap., *cinctus*, Dumont, *fasciatus*, Nilss. (part), and *incommodus*, Hutt.), Tryon, Man. of Conch. i. p. 235.
pl. 57, f. 18-21. D.F.
1887 " " Pollon., Atti. Acc. Sci. Torino, xxii. p. 200.
pl. 3, f. 14. D.F.
1890 " " Pollon., Boll. Mus. Zool. Torino, v. p. 12. D.
1893 " " Ckll., Conchologist, ii. p. 211. N.
1897 " " (= *citrinus*, Westerl., 1871, and *stabilis*, Pollon., 1885), Cllege., P. Z.S. p. 443.
pl. 30, f. 13. pl. 31, f. 14-16. D.A.

- 1900 *Arion fuscus*, Müll., Cllge., Ann. S.A. Mus. ii. p. 7. L.
 1910 " " " Ann. Natal Mus. ii. p. 170. L.
Hab. CAPE PENINSULA. Cape Town (Lightfoot).
 NATAL. Pietermaritzburg (Burnup).

210. ARION INTERMEDIUS, Normand.

- 1852 *Arion intermedius*, Norm., Descr. Lim. nouv. p. 6. D.
 1867 *Geomalacus intermedius*, Norm., Mab., Rev. et Mag. Zool. p. 57. D.
 1887 *Arion intermedius*, Norm., Pollon., Atti. Acc. Sci. Torino, xxii.
 p. 207. pl. 3, f. 1-7. D.F.
 1893 " " Gain, Conchologist, ii. p. 55. N.
 " " " Clll., *ibid.* pp. 63, 212. D.A.N.
 1906 " " Tayl., Mon. Brit. Moll. p. 240. pl. 24
 (1907), f. 18-23. D.F.A.R.
 1907 " " Srth., Zool. Anz. Leipsig, xxxi.
 pp. 794, 796. N.
 1910 " " Srth., Deutsch. Sudpol. Exp. xii, 4.
 p. 153. N.

Hab. CAPE PENINSULA. Cape Flats (Schultze).

Although first differentiated at so comparatively recent date, this European species has the following synonyms: *Geomalacus hiemalis*, Drouet, 1867; *mabillei*, Baud, 1868; *veudeanus*, Let., 1869; *Arion verrucosus*, Brev., 1881; *mabillianus*, Baud, 1884; *minimus*, Srth., 1885; and *mollerii*, Pollon., 1889.

FAMILY ENDODONTIDÆ, Crosse, 1894.

(J. de C. xlii. p. 219.)

GENUS ENDODONTA, Albers, 1860.

(Die Helic. p. 90.)

Type of Genus, *E. lamellosa* (Fér.).

SECTION AFRODONTA, Melv. & Pons, 1908.

(A.M.N.H. i. pp. 133, 135.)

Type of Section, *E. bilamellaris*, M. & P.

211. ENDODONTA (AFRODONTA) BILAMELLARIS,

Melv. & Pons.

[S.A.M.]

- 1908 *Afrodonta bilamellaris*, M. & P., A.M.N.H. i. p. 134. pl. 7, f. 6. D.F.
 " " " G.-Aust., *ibid.* p. 135. pl. 8, f. 2. A.R.

1912 *Endodonta (Afrodonta) bilamellaris*, M. & P., Bnp., Ann. Natal Mus. ii. p. 335. pl. 24, f. 18. *D.N.F.*

Type in British Museum.

Hab. NATAL. Dargle; Edendale; Tongaat; Enon bush, Richmond; Hilton Road; Ntimbankulu (Burnup).

212. ENDODONTA (AFRODONTA) FARQUHARI, Burnup.

1912 *Endodonta (Afrodonta) farquhari*, Bnp., Ann. Natal Mus. ii. p. 339. pl. 24, f. 7-10. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown; Port Elizabeth; Kowie; Bathurst (Farquhar).

213. ENDODONTA (AFRODONTA) INHLUZANIENSIS, Burnup.

1912 *Endodonta (Afrodonta) inhluzaniensis*, Bnp., Ann. Natal Mus. ii. p. 342. pl. 24, f. 14-17. *D.F.*

Type in British Museum.

Hab. NATAL. Inhluzani Mountain (Burnup).

214. ENDODONTA (AFRODONTA) NOVEMLAMELLARIS,
Burnup. [S.A.M.]

1912 *Endodonta (Afrodonta) novemlamellaris*, Bnp., Ann. Natal Mus. ii. p. 341. pl. 24, f. 11-13. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown; Kowie (Farquhar). King Williamstown (Godfrey).

215. ENDODONTA (AFRODONTA) PERFIDA, Burnup.

1907 *Trachycystis rotula*, M. & P., A.M.N.H. xix. p. 99. pl. 6, f. 12. *D.F.*

1912 *Endodonta (Afrodonta) perfida*, Bnp. (= *rotula*, M. & P., 1907, nec Hombr. & Jacq., 1854), Bnp., Ann. Natal Mus. ii. p. 337. pl. 24, f. 1-6. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Fern Kloof, Grahamstown (Farquhar).

216. ENDODONTA (AFRODONTA) TRILAMELLARIS,
Melv. & Pons. [S.A.M.]

1908 *Afrodonta trilamellaris*, M. & P., A.M.N.H. i. p. 134. pl. 7, f. 7. *D.F.*

1912 *Endodonta (Afrodonta) trilamellaris*, M. & P., Bnp., Ann. Natal Mus. ii. p. 336. *D.N.*

Type in British Museum.

Hab. NATAL. Dargle (Burnup).

GENUS PHORTION, Preston, 1910.

(A.M.N.H. vi. p. 531.)

(= *Phasis*, Albers, 1850, nec Hubner, in Lepidoptera, 1816.)

Type of Genus, *Ph. menkeanum* (Pfr.).

217. PHORTION CAPENSE (Pfeiffer). [S.A.M.]

- 1841 *Helix capensis*, Pfr., Symb. i. p. 40. *D.*
 1848 " " (= *irrorata*, Zgl. in litt.), Pfr., Mon. Hel.
 i. p. 60. *D.*
 1849 " " Conch. Cab. p. 220. pl. 34 (1848), f. 9-11. *D.F.*
 1850 " " Bs., A.M.N.H. v. p. 217. *N.*
 1851 " " Rve., Conch. Icon. pl. 43, f. 202. *D.F.*
 1853 " " (= *littoricola*, Bs. in litt.), Pfr., Mon. Hel.
 iii. p. 66.
 1887 *Helix (Pella) capensis*, Pfr., Tryon, Man. of Conch. iii. p. 103.
 pl. 20, f. 61. *D.F.*

Type in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE (coll. Pfeiffer). Cape Town and Cape Peninsula (very common). Robben I. (Fisk). Dassen I. (Connolly). Port Elizabeth to Alexandria (Crawford). Port Alfred (Penther). Widely distributed from Port Elizabeth to Namaland. *Ph. paludicola* (Bs.) is possibly a small, and *uitenhagense* (Krs.) a high-spined, form of *capense*, while *namaquanum* (von Mts.) appears to be little more than a variety of the same species, of which examples quite as large as *namaquanum* are known from Muizenberg.

218. PHORTION MENKEANUM (Pfeiffer). [S.A.M.]

- 1842 *Helix menkeana*, Pfr. (*H. capensis*, Menke, ined.), Pfr., Symb.
 ii. p. 33. *D.*
 1848 " " Mon. Hel. i. p. 55. *D.*
 " " " Krs., Südafr. Moll. p. 75. *N.*
 1852 " " Conch. Cab. p. 229. pl. 133, f. 5, 6. pl. 111
 (1850), f. 1-5. *D.F.*
 " " " Rve., Conch. Icon. pl. 106, f. 591. *D.F.*
 1887 *Helix (Pella) menkeana*, Pfr., Tryon, Man. of Conch. iii. p. 103.
 pl. 21, f. 98. *D.F.*
 1893 *Phasis menkeana*, Pfr., Pilsb., Man. of Conch. ix. p. 37. pl. 10,
 f. 1-3. *F.*

Type in Stettin Museum.

Hab. CAPE OF GOOD HOPE (Menke). Elim (Krauss).

CAPE PENINSULA, widely distributed from Table Mountain to Cape Point.

219. PHORTION NAMAQUANUM (von Martens).

1889 *Helix (Pella) namaquana*, von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 161. *D.*

1893 *Phasis namaquana*, von Mts., Pilsb., Man. of Conch. viii. p. 297. *N.*

1894 *Helix* " " Conch. Mitth. iii, 3. p. 4. *D.*

1897 " " " Archiv. f. Naturg. lxiii, i. p. 38. pl. 7, f. 1-4. *D.F.*

Type in Zool. Mus. Berlin.

Hab. LITTLE NAMALAND. Between Port Nolloth and Ananas (Schenck; Day).

220. PHORTION PALUDICOLA (Benson).

1850 *Helix paludicola*, Bs., A.M.N.H. vi. p. 253. *D.*

1853, 54 " " Pfr., Conch. Cab. p. 358. pl. 137, f. 4, 5. *D.F.*

1853 " " " Mon. Hel. iii. p. 66. *D.*

" " " Rve., Conch. Icon. pl. 174, f. 1179. *D.F.*

1887 *Helix (Pella) paludicola*, Bs., Tryon, Man. of Conch. iii. p. 104. pl. 20, f. 64. *D.F.*

Specimens ex auct. in University Museum of Zoology, Cambridge.

Hab. CAPE PENINSULA. "Baszaarms" (Baas Harman's) Kraal, near Retreat (Benson). Seekoe Vlei (Connolly).

221. ? PHORTION SOLLERS (Melv. & Pons.)

1907 ? *Phasis sollers*, M. & P., A.M.N.H. xix. p. 100. pl. 6, f. 14. *D.F.*

Type in British Museum.

Hab. ZULULAND. Melmoth (Miss Hickey).

Probably better placed nearer *Trachycystis*.

222. PHORTION UITENHAGENSE (Krauss).

1846 *Helix uitenhagensis*, Krs., Pfr., Symb. iii. p. 66. *D.*

1848 " " " Mon. Hel. i. p. 61. *D.*

" " " Südafr. Moll. p. 76. pl. 4, f. 22. *D.F.*

1854 " " " Rve., Conch. Icon. pl. 207, f. 1461. *D.F.*

1887 *Helix (Pella) uitenhagensis*, Krs., Tryon, Man. of Conch. iii. p. 104. pl. 20, f. 63. *D.F.*

Type in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE. Winterhoek Mt., Uitenhage

(Krauss). "Moderately plentiful in the neighbourhood of the village of Uitenhage, on the gravelly soil on low bushes" (Layard). Crawford considers this species to be a var. of *capense*, and writes of its occurrence at Port Elizabeth: "*P. uitenhagense* is found only in Zwartkops valley, and is always more conical than *capense*. Same habits as *capense*."

Layard wrote: "I look upon this as the inland variety of the preceding species" (*capense*). "It was not nearly so abundant as *capensis* in its own locality. It has more whorls and a more exerted spire than *capensis*, but partakes of all the varieties from pure white to dark mottled specimens."

GENUS SCULPTARIA, Pfeiffer, 1855.

(Mal. Blätt. ii. p. 135.)

Type of Genus, *S. sculpturata* (Gray).

The subjoined classification is based on J. H. Ponsonby's article in Proc. Mal. Soc., 1910, vol. ix. p. 34.

223. SCULPTARIA COLLARIS (Pfeiffer).

1867 *Helix collaris*, Pfr., Mal. Blätt. xiv. p. 197. *D.*

1868 " " Mon. Hel. v. p. 506. *D.*

1869 " " Novit. Conch. iii. p. 496. pl. 107, f. 5-9. *D.F.*

1886 *Helix sculpturata*, Gray, Kob., Conch. Cab. p. 621. pl. 178, f. 26-28. *D.F.*

1887 *Polygyra (Sculptaria) sculpturata*, Gray, var. *collaris*, Pfr., Tryon, Man. of Conch. iii. p. 138. pl. 24, f. 27, 28. *D.F.*

1910 *Sculptaria collaris*, Pfr., Pons., Proc. Mal. Soc. ix. p. 35. *N.*

" *Helix (Sculptaria) collaris*, Pfr., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 438. *N.*

Type in Stettin Museum.

Hab. DAMARALAND (fide Böttger).

224. SCULPTARIA DAMARENSIS (H. Adams).

1870 *Helix (Corilla) damarensis*, H. Ad., P.Z.S. p. 379. pl. 27, f. 14. *D.F.*

1887 *Polygyra (Sculptaria) sculpturata*, Gray, var. *damarensis*, H. Ad., Tryon, Man. of Conch. iii. p. 138. pl. 25, f. 67, 68. *D.F.*

1890 *Sculptaria chapmani*, Ancey, Bull. Soc. Mal. Fr., vii. p. 156. *D.*

1892 " *melvilliana*, Ancey (= *chapmani*, Ancey, nec Cox), Brit. Nat. p. 126.

1910 " *damarensis*, H. Ad., Pons., Proc. Mal. Soc. ix. p. 35. *N.*

1910 *Helix (Sculptaria) damarensis*, H. Ad., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 438. N.

Type of *damarensis* in British Museum; *melvilliana* in coll. Dautzenberg.

Hab. OVAMPOLAND. Walwich Bay (*melvilliana*, Andersson and Chapman).

Pfeiffer, Clessin, and von Martens have at different times placed the present species in the synonymy of *collaris*, Pfr., and Paetel and Tryon in that of *sculpturata*, Gray. Ponsonby (1910) remarks: "This is the largest species of the Genus; the spire is more raised and the sculpture is weaker than in any of its allies."

225. SCULPTARIA RETISCUPTA (von Martens).

1889 *Helix retisculpta*, von Mts., Nachrichtsbl. d. Deutsch. Mal. Ges. xxi. p. 154. D.

1894 *Sculptaria retisculpta*, von Mts., Conch. Mitth. iii, 3. p. 5. D.

1897 " " Archiv. f. Naturg. lxiii, i. p. 38. pl. 7, f. 5-7. D.F.

1910 " " Pons., Proc. Mal. Soc. ix. p. 36. N.

Type in Zool. Mus. Berlin.

Hab. DAMARALAND. Ussab (ex "*Linnaea*," fide von Martens).

226. SCULPTARIA SCULPTURATA (Gray).

1838 *Helicodonta sculpturata*, Gray, Alexander's Expedition, ii. p. 268. D.

1845 *Helix sculpturata*, Gray, Pfr., Zeitschr. f. Malak. p. 86. D.

1848 " " " Mon. Hel. i. p. 408. D.

1854 " " Rve., Conch. Icon. pl. 208, f. 1471. D.F.

1887 *Polygyra (Sculptaria) sculpturata*, Gray, Tryon, Man. of Conch. iii. p. 138. pl. 25, f. 69. D.F.

1893 *Sculptaria sculpturata*, Gray, Pilsb., Man. of Conch. ix. p. 39. pl. 10, f. 4. F.

1910 " " Pons., Proc. Mal. Soc. ix. p. 34. D.

" *Helix (Sculptaria) sculpturata*, Pfr., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 437. N.

Type in British Museum.

Hab. GREAT NAMALAND. Near the Great Fish River (Alexander). DAMARALAND. "Kurikaubmund am Swakop (Kurikop bei Otjikango)" (Rintelen).

var. RINTELENI, Böttger.

1910 *Helix (sculptaria) sculpturata*, Pfr., var. *rinteleni*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 437. pl. 28, f. 1. D.F.

Type in Senckenberg Museum, Frankfurt.

Hab. DAMARALAND. Huleb, S. of Usakos (Rintelen).

GENUS TRACHYCYSTIS, Pilsbry, 1893.

(*Man. of Conch.* viii. p. 136, and ix. p. 37.)

(= *Pella*, Albers, 1860 (pars), nec Stephens, in Coleoptera, 1835.)

Type of Genus, *T. biscalpta* (Bs.).

During recent years this Genus has been a convenient receptacle for a large number of small South African helicoids, whose soft parts are mostly unknown, and whose conchological characters do not admit of their inclusion in other South African Genera. It has long been obvious that, as more becomes known of the animals, the Genus will have to undergo considerable revision. The fact, too, of *biscalpta* standing as the type will enormously restrict *Trachycystis* s.s., as its animal is a very peculiar one, to which only *charybdis*, and probably *tollini*, *vorticialis*, and *hartvigiana* are near akin.

227. TRACHYCYSTIS ACTINOTRICHA (Melv. & Pons.). [S.A.M.]

1892 *Helix (Pella) actinotricha*, M. & P., A.M.N.H. x. p. 238. pl. 13, f. 5. *D.F.*

1893 *Phasis (Trachycystis) actinotricha*, M. & P., Pilsb., *Man. of Conch.* viii. p. 143. pl. 35, f. 14. *D.F.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg; Karkloof; Nottingham Road (Burnup).

228. TRACHYCYSTIS ÆNEA (Krauss).

1848 *Helix ænea*, Krs., *Südafr. Moll.* p. 75. pl. 4, f. 18. *D.F.*

” ” ” Pfr., *Zeitschr. f. Malak.* p. 92. *D.*

1853 ” ” ” *Mon. Hel.* iii. p. 68. *D.*

1854 ” ” *Rve., Conch. Icon.* pl. 189, f. 1320. *D.F.*

1887 *Helix (Pella) ænea*, Krs., Tryon, *Man. of Conch.* iii. p. 105. pl. 20, f. 71. *D.F.*

Type in Stuttgart Museum.

Hab. NATAL (Wahlberg).

229. TRACHYCYSTIS ALCOCKI, Melv. & Pons. [S.A.M.]

1895 *Helix (Trachycystis) alcocki*, M. & P., A.M.N.H. xv. p. 164. pl. 12, f. 2. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Kowie, Port Alfred to Alexandria District (Crawford). Grahamstown (Farquhar).

230. TRACHYCYSTIS APRICA (Krauss).

1848 *Helix aprica*, Krs., Südafr. Moll. p. 77. pl. 4, f. 26. *D.F.*

” ” ” Pfr., Zeitschr. f. Malak. p. 114. *D.*

1851 ” ” Rve., Conch. Icon. pl. 43, f. 201. *D.F.*

1853 ” ” Pfr., Mon. Hel. iii. p. 123. *D.*

1887 *Helix (Pella) aprica*, Krs., Tryon, Man. of Conch. iii. p. 107. pl. 20, f. 88. *D.F.*

Type in Stuttgart Museum.

Hab. NATAL (Wahlberg).

231. TRACHYCYSTIS AULACOPHORA (Ancy).

1890 *Helix aulacophora*, Ancy, Bull. Soc. Mal. France, vii. p. 153. *D.*

1893 *Phasis (Trachycystis) aulacophora*, Ancy, Pilsb., Man. of Conch. viii. p. 138. pl. 43, f. 60, 61. *D.F.*

Type in coll. Geret.

Hab. CAPE OF GOOD HOPE. Port Elizabeth, North end to Zwartkops River (Crawford).

232. TRACHYCYSTIS BATHYCOELE (Melv. & Pons). [S.A.M.]

1892 *Helix (Pella) bathycoele*, M. & P., A.M.N.H. ix. p. 89. pl. 5, f. 4. *D.F.*

1893 *Phasis (Trachycystis) bathycoele*, M. & P., Pilsb., Man. of Conch. viii. p. 139. pl. 35, f. 13. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Craigie Burn, Somerset East (Miss Bowker). Bedford; Dassie Krantz, Grahamstown (Farquhar). Van Staadens River, Port Elizabeth (Crawford).

NATAL. Pietermaritzburg; Ntimbankulu (Burnup).

233. TRACHYCYSTIS BISCUPTA (Benson). [S.A.M.]

1851 *Helix biscupta*, Bs., A.M.N.H. vii. p. 103. *D.*

1853 ” ” Pfr., Mon. Hel. iii. p. 72. *D.*

” ” Rve., Conch. Icon. pl. 173, f. 1171. *D.F.*

1854 ” ” Pfr., Conch. Cab. p. 380. pl. 141 (1852), f. 17-19. *D.F.*

1887 *Helix (Pella) biscupta*, Bs., Tryon, Man. of Conch. iii. p. 105. pl. 20, f. 72. *D.F.*

1893 *Phasis (Trachycystis) biscalpta*, Bs., Pilsb., Man. of Conch. ix. pp. 37, 38. pl. 10, f. 5-7. pl. 15, f. 3, 4. *F.A.*

Specimens ex auct. in University Museum of Zoology, Cambridge.
Hab. CAPE OF GOOD HOPE. Camps Bay (Benson). Houw Hoek (Lightfoot). Widely distributed over the greater part of the Cape Peninsula, from Lion's Head to Cape Point.

Layard wrote: "There are two forms of this shell; var. *major* is found at Bredasdorp; the var. *minor* I procured among grass roots at the foot of the Round Battery, Simonstown."

A beautiful variety with white, translucent shell, from Signal Hill, Cape Town (Lightfoot), is in the S.A. Museum.

234. TRACHYCYSTIS BURNUPI, Melv. & Pons. [S.A.M.]

1892 *Helix (Pella) burnupi*, M. & P., A.M.N.H. x. p. 239. pl. 13, f. 6. *D.F.*

1893 *Phasis (Trachycystis) burnupi*, M. & P., Pilsb., Man. of Conch. viii. p. 140. pl. 35, f. 5. *D.F.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg (Burnup). Common throughout Natal.

LORENZO MARQUES. Delagoa Bay (Connolly).

235. TRACHYCYSTIS CALORAMA, Melv. & Pons. [S.A.M.]

1899 *Trachycystis calorama*, M. & P., A.M.N.H. iv. p. 196. pl. 3, f. 6. *D.F.*

Type in British Museum.

Hab. NATAL. Pinetown; Inchanga (Burnup).

236. TRACHYCYSTIS CENTRIFUGA, Melv. & Pons. [S.A.M.]

1903. *Trachycystis centrifuga*, M. & P., A.M.N.H. xii. p. 602. pl. 32, f. 9. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Maeström Forest, Bedford (Farquhar). Pirie Forest (var., Godfrey).

237. TRACHYCYSTIS CHARYBDIS (Benson). [S.A.M.]

1856 *Helix charybdis*, Bs., A.M.N.H. xviii. p. 436. *D.*

1859 " " Pfr., Mon. Hel. iv. p. 106. *D.*

1899 " " M. & P., A.M.N.H. iv. p. 194. pl. 3, f. 16. *N.F.*

Specimen ex auct. in University Museum of Zoology, Cambridge.

Hab. CAPE PENINSULA. Table Mountain (Layard; Lightfoot; Connolly). Kalk Bay (Lightfoot).

238. TRACHYCYSTIS CONISALEA (Melv. & Pons.). [S.A.M.]

1892 *Helix (Pella) conisalea*, M. & P., A.M.N.H. x. p.239. pl.13, f.7. *D.F.*1893 *Phasis (Trachycystis) conisalea*, M. & P., Pilsb., Man. of Conch. viii. p. 145. pl. 35, f. 4. *D.F.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg; Nottingham Road; Karkloof; Dargle; Equeefa; Table Mountain, E. of Pietermaritzburg (Burnup).

239. TRACHYCYSTIS CONNOLLYI, Melv. & Pons. [S.A.M.]

1909 *Trachycystis connollyi*, M. & P., A.M.N.H. iv. p.491. pl.8, f.15. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Montagu (Connolly). Kuruman (in coll. Layard).Nearly allied to *T. farquhari* (M. & P.).

240. TRACHYCYSTIS COXI, Preston.

1912 *Trachycystis coxi*, Prest., Proc. Mal. Soc. x. p. 18. *D.F.*

Type in coll. Dautzenberg.

Hab. CAPE OF GOOD HOPE. Knysna Forest (Cox).Resembles *inclara*, Morelet, from which it differs in being imperforate and of a more delicate substance.

241. TRACHYCYSTIS ECTIMA, Melv. & Pons. [S.A.M.]

1899 *Trachycystis ectima*, M. & P., A.M.N.H. iv. p. 197. pl. 3, f. 8. *D.F.*

Type in British Museum.

Hab. NATAL. Umkomaas; Tongaat (Burnup).

242. TRACHYCYSTIS EPETRIMA (Melv. & Pons.).

1892 *Helix (Pella) epetrima*, M. & P., A.M.N.H. ix. p.84. pl.4, f.3. *D.F.*1893 *Phasis (Trachycystis) epetrima*, M. & P., Pilsb., Man. of Conch. viii. p. 146. pl. 35, f. 6. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Somerset District (fide M. & P.). North End, Port Elizabeth (Crawford).

243. TRACHYCYSTIS ERYTHRACTIS, sp. nov., pl. 2, f. 5. [S.A.M.]

Shell depressed-conic, subrimate, rather thin and dull, hardly translucent; with close, faint, regular striation parallel to the curve of the outer lip; pale cream-coloured, prettily marked on the upper side with irregular ruby rays and streaks; the underside, though

similarly striate, is of thinner texture and devoid of red marking. Spire moderately elevated, apex sharp. Whorls $5\frac{1}{2}$, gradually increasing, rounded, with very slight angulation at the periphery. Suture simple, shallow. Aperture compressed oval; peristome thin, simple; columella short, thickened upwards, margin narrowly reflexed, almost entirely concealing the perforation.

Diam. maj. 10.1, min. 8.9; alt. 6.8; Apert. alt. 5.2, lat. 5.4 mm.

Type in South African Museum.

Hab. CAPE OF GOOD HOPE. Caledon Division (Lightfoot).

Possibly nearer *Phortion* than *Trachycystis*, but differing therefrom in one or two important particulars.

244. TRACHYCYSTIS FARQUHARI (Melv. & Pons.).

1892 *Helix farquhari*, M. & P., A.M.N.H. x. p. 240. pl. 13, f. 9. *D.F.*

1893 *Phasis (Trachycystis) farquhari*, M. & P., Pilsb., Man. of Conch. viii. p. 147. pl. 35, f. 12. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Farquhar).

Very nearly allied to *T. connollyi*, from which it possibly differs in having rather less convex whorls and more concave columella.

245. TRACHYCYSTIS GLANVILLIANA (Ancey).

1890 *Helix glanvilliana*, Ancey, Bull. Soc. Mal. Fr. vii. p. 157. *D.*

1893 *Phasis (Trachycystis) glanvilliana*, Ancey, Pilsb., Man. of Conch. viii. p. 147. *N.*

Type in coll. Geret.

Hab. CAPE OF GOOD HOPE. Grahamstown (Miss Glanville).

246. TRACHYCYSTIS GLEBARIA, Melv. & Pons. [S.A.M.]

1903 *Trachycystis glebaria*, M. & P., A.M.N.H. xii. p. 602. pl. 32, f. 15. *D.F.*

Type in British Museum.

Hab. NATAL. Pinetown; Hilton Road (Burnup).

247. TRACHYCYSTIS HARTVIGIANA (Pfeiffer).

1861 *Helix hartvigiana*, Pfr., Mal. Blätt. viii. p. 167. *D.*

1868 " " Mon. Hel. v. p. 239. *D.*

1886 " " Kob., Conch. Cab. p. 617. pl. 178, f. 10-12. *D.F.*

1887 *Helix (Pella) hartvigiana*, Pfr., Tryon, Man. of Conch. iii. p. 107. pl. 20, f. 89-91. *D.F.*

1898 *Pella hartvigiana*, Pfr., Stur., S.A. Moll. p. 39. *N.*

Type in Stettin Museum.

Hab. CAPE OF GOOD HOPE. Gnadenthal, near Stellenbosch (Hartvig). Oudebosch (Layard).

248. TRACHYCYSTIS HOTTENTOTA (Melv. & Pons). [S.A.M.]

1891 *Helix hottentota*, M. & P., A.M.N.H. viii. p. 239. *D.*

1892 " " " ix. p. 94. pl. 4, f. 6. *F.*

1893 *Phasis (Trachycystis) hottentota*, M. & P., Pilsb., Man. of Conch. viii. p. 141. pl. 35, f. 8. *D.F.*

1907 *Trachycystis paula*, M. & P., A.M.N.H. xix. p. 99. pl. 6, f. 11. *D.F.*

Types in British Museum.

Hab. CAPE OF GOOD HOPE. Happy Valley and Rufane Vale, Port Elizabeth (Crawford). Wynberg; Simonstown; Lakeside; Caledon (Connolly).

NATAL. Pietermaritzburg (Penther). Majuba (Connolly). Game Pass, &c. (Burnup).

TRANSVAAL. Johannesburg (*paula*, McBean). Pretoria; Pienaars Poort; Buiskop (Connolly).

A somewhat variable species, in which the beautiful distant costulate sculpture, so noticeable in immature or very fine adult specimens, disappears quickly when exposed to wear. The type of *paula* has been very carefully compared with that of *hottentota*, and is undoubtedly conspecific.

249. TRACHYCYSTIS INCLARA (Morelet). [S.A.M.]

1889 *Helix inops*, Morel., J. de C. xxxvii. p. 6. pl. 1, f. 2. *D.F.*

 " " *inclara*, Morel., (= *inops*, Morel., 1889, nec Mouss., 1872), Morel., J. de C. xxxvii. p. 200.

 " " *bowkeriana*, Ancey, in litt.

1893 *Phasis (Trachycystis) inops*, Morel., Pilsb., Man. of Conch. viii. p. 144. pl. 43, f. 50, 51. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth; Alexandria District (Crawford). Grahamstown (*bowkeriana*, Miss Glanville). Tharfield (*bowkeriana*, Miss Bowker). Bedford; Bathurst (Farquhar). Port St. John's (Shortridge).

250. TRACHYCYSTIS KNYSNAENSIS, Preston.

1912 *Trachycystis knysnaensis*, Prest., Proc. Mal. Soc. x. p. 17. *D.F.*

Type in coll. Dautzenberg.

Hab. CAPE OF GOOD HOPE. Knysna Forest (Cox).

251. TRACHYCYSTIS LATICOSTATA, Melv. & Pons.

1903 *Trachycystis laticostata*, M. & P., A.M.N.H. xii. p. 602. pl. 32, f. 5. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Maeström Forest, Bedford (Farquhar).

252. TRACHYCYSTIS LIGNICOLA, Melv. & Pons.

1898 *Trachycystis lignicola*, M. & P., A.M.N.H. ii. p. 125. pl. 7, f. 1. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Fish River, Cradock (Farquhar).

253. TRACHYCYSTIS LIRICOSTATA (Melv. & Pons.).

1891 *Helix (Pella) liricostata*, M. & P., A.M.N.H. viii. p. 239. *D.*

1892 " " " ix. p. 94. pl. 5, f. 1. *F.*

1893 *Phasis (Trachycystis) liricostata*, M. & P., Pilsb., Man. of Conch. viii. p. 140. pl. 35, f. 9. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. East Griqualand (fide M. & P.). Van Staadens River and Coerney, Port Elizabeth (Crawford).

254. TRACHYCYSTIS LOVÉNI (Krauss).

1848 *Helix lovéni*, Krs., Südafr. Moll. p. 76. pl. 4, f. 21. *D.F.*

" " " Pfr., Zeitschr. f. Malak. v. p. 93. *D.*

1851 " " Rve., Conch. Icon. pl. 43, f. 195. *D.F.*

1853 " " Pfr., Mon. Hel. iii. p. 79. *D.*

1887 *Helix (Pella) loveni*, Krs., Tryon, Man. of Conch. iii. p. 106. pl. 20, f. 74. *D.F.*

1893 *Phasis (Trachycystis) loveni*, M. & P., Stur., S.A. Moll. p. 45. (*Err. typ.*)

Type in Stuttgart Museum.

Hab. NATAL (Wahlberg).

255. TRACHYCYSTIS LYGÆA (Melv. & Pons.). [S.A.M.]

1892 *Helix (Pella) lygæa*, M. & P., A.M.N.H. ix. p. 85. pl. 4, f. 7. *D.F.*

1893 *Phasis (Trachycystis) lygæa*, M. & P., Pilsb., Man. of Conch. viii. p. 138. pl. 35, f. 7. *D.F.*

1899 *Trachycystis lygæa*, M. & P., Moss & Webb, Proc. Mal. Soc. iii. p. 263. *A.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg (Burnup).

CAPE OF GOOD HOPE. Somerset East District (Miss Bowker).

256. TRACHYCYSTIS METALLAKTER, sp. nov., pl. 2, f. 6. [S.A.M.]

Shell small, depressed globose, umbilicate, thin, fulvo-corneous, semitransparent. Spire little raised, apex rounded. Whorls 4, convex, gradually increasing; beautifully sculptured above on the second, third, and part of the fourth with delicate, curved, rather distant, transverse liræ, which are clear, but less pronounced, on the underside; towards the aperture the striation becomes closer and fainter. Suture deep. Aperture sub-ovate, descending slightly; peristome thin, simple. Umbilicus not very wide, but deep, extending to the apex. Columella weak, margin slightly reflexed, but in no way concealing the umbilicus.

Diam. maj. 4.0, min. 3.4; alt. 2.2; apert. alt. 1.9, lat. 1.5 mm.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Caledon (Connolly).

As with the far smaller *hottentota*, M. & P., the distant liræ, which are such a beautiful feature in immature shells, wear off with increasing age, and do not seem to be produced after the first $3\frac{1}{2}$ whorls. I have chosen the type carefully, as being in a transitional stage, for specimens of exceptional size possessing 5 whorls show hardly a trace of the early sculpture, and might well be mistaken for a different species.

257. TRACHYCYSTIS MICROSCOPICA (Krauss).

1848 *Helix microscopica*, Krs., Südafr. Moll. p. 76. pl. 4, f. 20. *D.F.*

” ” ” Pfr., Zeitschr. f. Malak. v. p. 93. *D.*

1853 ” ” ” Mon. Hel. iii. p. 83. *D.*

1887 *Helix (Pella) microscopica*, Krs., Tryon, Man. of Conch. iii. p. 106. pl. 20, f. 77, 78. *D.F.*

Type in Stockholm Museum.

Hab. NATAL. Mooi River (Wahlberg).

Through the courtesy of Dr. S. Théele, of Stockholm, I am enabled to give, on p. 159, a photograph of this little-known species. It will be seen that it can hardly be placed in *Pupisoma*, but its exact generic position is extremely doubtful.

258. TRACHYCYSTIS MICROSTRIATA, Preston.

1912 *Trachycystis microstriata*, Prest., Proc. Mal. Soc. x. p. 18. *D.F.*

Type in coll. Dautzenberg.

Hab. CAPE OF GOOD HOPE. Knysna (Cox).

Zoology, Cambridge. Type of *rhysodes* in British Museum; *tabulæ* in École des Mines, Paris.

Hab. CAPE OF GOOD HOPE. Near Newlands (Benson). Table Mountain (*tabulæ*, Chaper). ? Port Elizabeth (fide Sturany). Widely distributed throughout the Cape Peninsula from Table Mountain to Cape Point.

The type of *rhysodes*, from the Layard collection, from an unknown locality, is identical with *perplicata*, Bs.; and after careful study of Chaper's description and figure of *tabulæ*, I have no hesitation in placing the latter in the same synonymy.

264. TRACHYCYSTIS PETROBIA (Benson).

1851 *Helix petrobia*, Bs., A.M.N.H. vii. p. 105. *D.*

1853 " " Pfr., Mon. Hel. iii. p. 95. *D.*

" " Rve., Conch. Icon. pl. 173, f. 1169. *D.F.*

1854 " " Pfr., Conch. Cab. p. 382. pl. 141 (1852),
f. 25-27. *D.F.*

1887 *Helix (Pella) petrobia*, Bs., Tryon, Man. of Conch. iii. p. 107.
pl. 20, f. 81. *D.F.*

Hab. CAPE OF GOOD HOPE. High Constantia (Benson). Port Elizabeth, North End (Crawford).

265. TRACHYCYSTIS PINGUIS (Krauss).

1848 *Helix pinguis*, Krs., Südafr. Moll. p. 75. pl. 4, f. 19. *D.F.*

" " Pfr., Zeitschr. f. Malak. v. p. 91. *D.*

1851 " " Rve., Conch. Icon. pl. 43, f. 200. *D.F.*

1853 " " Pfr., Mon. Hel. iii. p. 64. *D.*

1887 *Helix (Pella) pinguis*, Krs., Tryon, Man. of Conch. iii. p. 103.
pl. 20, f. 60. *D.F.*

1898 *Pella pinguis*, Krs., Stur., S.A. Moll. p. 39. *N.*

Type in Stuttgart Museum.

Hab. NATAL (Wahlberg).

No recent localities are given, as doubt exists whether the shell, which has of late years been generally accepted as *pinguis*, is in reality that species. von Martens' record of Tette must also be viewed with distrust.

266. TRACHYCYSTIS PLANTI (Pfeiffer).

[S.A.M.]

1854 *Helix platti*, Pfr., P.Z.S. p. 51. (*Err. typ.*) *D.*

" , *planti* " Rve., Conch. Icon. pl. 189, f. 1325. *D.F.*

1859 " " " Mon. Hel. iv. p. 60. *D.*

- 1885 *Helix planti* Pfr., Kob., Conch. Cab. p. 622. pl. 178, f. 29-31. *D.F.*
 1887 „ (*Pella*) *planti*, Pfr., Tryon, Man. of Conch. iii. p. 105.
 pl. 20, f. 73. *D.F.*
 1893 *Phasis (Trachycystis) planti*, Pfr., Pilsb., Man. of Conch. viii.
 p. 142. pl. 43, f. 57-59. *N.F.*

Type in British Museum.

Hab. NATAL (Plant). Lower Umkomaas; Durban; Tongaat (Burnup).

ZULULAND. Umbonambi (Burnup).

? TRANSVAAL. Lydenburg (fide Craven). A very doubtful locality.

CAPE OF GOOD HOPE. Tharfield, near Kleinmont Rivermouth (Miss Bowker, fide Layard).

var. AFRICÆ, Brown.

- 1865 *Helix africæ*, Brown, Amer. Journ. of Conch. i. p. 136. *D.*
 1876 „ „ Pfr., Mon. Hel. vii. p. 459. *D.N.*
 1877 „ „ „ Conch. Cab. p. 527. pl. 162, f. 8, 9. *D.F.*
 1893 *Phasis (Trachycystis) africæ*, Brown, Pilsb., Man. of Conch.
 viii. p. 142. pl. 43, f. 55, 56. *D.F.*
 „ „ *planti*, Pfr., var. *africæ*, Brown, Pilsb.
 Man. of Conch. ix. p. 38.

Type in Philadelphia Museum.

Hab. CAPE OF GOOD HOPE. Great Brakke (Brown).

267. TRACHYCYSTIS PRIONACIS (Benson). [S.A.M.]

- 1864 *Helix prionacis*, Bs., A.M.N.H. xiii. p. 493. *D.*
 „ „ *browningii* „ „ „ *D.*
 1868 „ „ „ Pfr., Mon. Hel. v. p. 178. *D.*
 „ „ *prionacis* „ „ „ p. 183. *D.*
 1892 „ (*Pella*) *eratina*, M. & P., A.M.N.H. ix. p. 88. pl. 5, f. 3. *D.F.*
 1893 *Phasis (Trachycystis) eratina*, M. & P., Pilsb., Man. of Conch.
 viii. p. 137. pl. 35, f. 11. *D.F.*
 „ „ *prionacis*, Bs., Pilsb., *ibid.* p. 137. *D.*
 „ „ *browningii*, Bs., Pilsb., *ibid.* p. 136. *D.*
 „ „ *browningii*, Bs., Pilsb., Man. of Conch.
 ix. p. 38. pl. 10, f. 8, 9. *F.*

- 1898 *Trachycystis eratina*, M. & P., Proc. Mal. Soc. iii. p. 173.

Type of *eratina* in British Museum; originals of *browningii* in University Museum of Zoology, Cambridge; *prionacis* probably in British Museum.

Hab. CAPE OF GOOD HOPE. Bredasdorp (*prionacis*, Layard).

Near Cape Point (*browningii*, Browning). Bredasdorp; Cape Point (*eratina*, Layard).

Prionacis was founded on a single specimen furnished by Layard from Bredasdorp; *browningii* on two found by Browning near Cape Point; *eratina* on shells in coll. Layard from Bredasdorp and Cape Point.

In the recently dispersed Layard collection was a tube labelled "*erateina*" containing shells from Cape Point and Bredasdorp. These were identical with original *browningii* in the Cambridge Museum. *Prionacis* was differentiated by Benson from *browningii* on account of larger size, less close plication, extending further down on the underside, and wider umbilicus. All these points are consistent with the increasing growth of the shell, young examples of which are almost imperforate, and show no basal sculpture. It seems advisable to unite the three species, of which *prionacis* has priority.

268. TRACHYCYSTIS PYCNOTRICHA, Melv. & Pons.

1899 *Trachycystis pycnotricha*, M. & P., A.M.N.H. iv. p. 197. pl. 3, f. 7. *D.F.*
Type in British Museum.

Hab. CAPE OF GOOD HOPE. Kowie River (Cox).

269. TRACHYCYSTIS RARIPLICATA (Benson).

1849 *Helix rariPLICATA*, Bs. in Mss., Pfr., Zeitschr. f. Malak. vi. p. 71. *D.*

1850 " " A.M.N.H. vi. p. 254. *D.*

1853 " " Pfr., Conch. Cab. p. 323. pl. 129 (1852),
f. 31-33. *D.F.*

" " " Rye., Conch. Icon. pl. 174, f. 1183. *D.F.*

" " " Pfr., Mon. Hel. iii. p. 96. *D.*

1879 *Helix (Pella) rariPLICATA*, Bs., Binn., Ann. N.Y. Acad. Sci. i.
p. 361. pl. 14, f. H. *R.*

1884 *Pella rariPLICATA*, Bs., Binn., Ann. N.Y. Acad. Sci. iii. p. 89.
pl. 3, f. I. *R.*

1887 *Helix (Pella) rariPLICATA*, Bs., Tryon, Man. of Conch. iii. p. 107.
pl. 20, f. 82. *D.F.*

Type in Stettin Museum.

Hab. CAPE PENINSULA. Green Point Lighthouse (Benson; Layard).

Examples presented to the British Museum as *rariPLICATA* by Gibbons in 1876 have proved to be not that species, but *sabuletorum*. As Binney obtained his specimens from Gibbons, his articles in all probability refer to the last-mentioned species.

270. TRACHYCYSTIS RIVULARIS (Krauss).

- 1848 *Helix rivularis*, Krs., Südafr. Moll. p. 77. pl. 4, f. 25. D.F.
 " " " Pfr., Zeitschr. f. Malak. v. p. 114. D.
 1853 " " " Mon. Hel. iii. p. 110. D.
 1874 " " " Jick., Fauna N.-O.-Afr. p. 59. N.
 1887 *Helix (Pella) rivularis*, Krs., Tryon, Man. of Conch. iii. p. 107.
 pl. 20, f. 85-87. D.F.

Type in Stockholm Museum.

Hab. NATAL. Source of Mooi River (Wahlberg).

var. DENSESTRIATA, nov. [S.A.M.]

Shell small, rather depressed, umbilicate, thin, bright fulvo-cor-
 neous, covered on both sides with *close*, prominent, regular, curved,



1. *Trachycystis rivularis*, Krs. (Type).
2. " " var. *densestriata*, Zwart Kop.
3. " " " Pietersburg.
4. " " *ordinaria*, M. & P., Bloemfontein.
5. " " " *lirate* var., Rustfontein.

transverse striæ. Whorls $4\frac{1}{2}$, rounded, gradually increasing. Suture impressed. Aperture lunate, descending a little in front; peristome thin, simple; columella weak, concave, margin slightly reflexed, but in no way covering the umbilicus, which, though not wide, is deep, extending to the apex.

274. TRACHYCYSTIS SIMPLEX, Melv. & Pons.

1903 *Trachycystis simplex*, M. & P., A.M.N.H. xii. p. 604. pl. 32, f. 7. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Pondoland (Farquhar).

275. TRACHYCYSTIS SOMERSETENSIS (Melv. & Pons.).

1893 *Helix (Patula) somersetensis*, M. & P., A.M.N.H. xi. p. 19. pl. 3, f. 2. *D.F.*

„ „ „ „ Pilsb., Man. of Conch. viii. p. 295. pl. 43, f. 63. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Somerset East (Miss Bowker).

276. TRACHYCYSTIS SPISSICOSTA, Melv. & Pons. [S.A.M.]

1907 *Trachycystis spissicosta*, M. & P., A.M.N.H. xix. p. 100. pl. 6, f. 13. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown (Farquhar).

ORANGE FREE STATE. Thaba N'chu (Connolly).

Rather near, but smaller than, *T. simplex*, M. & P.

277. TRACHYCYSTIS TERETIUSCULA, Melv. & Pons.

1897 *Trachycystis teretiuscula*, M. & P., A.M.N.H. xix. p. 635. pl. 17, f. 5. *D.F.*

Type in British Museum.

Hab. NATAL. Howick; Pietermaritzburg; Equeefa (Burnup).
Majuba (Connolly).

ORANGE FREE STATE. Platberg, Harrismith (Connolly).

CAPE OF GOOD HOPE. East London (var.) (Godfrey).

A very variable species.

278. TRACHYCYSTIS TOLLINI (Albers.). [S.A.M.]

1855 *Nanina afra*, Pfr., Mal. Blätt. ii. p. 119. (*Without characters.*)

1856 *Helix tollini*, Alb., Bs., A.M.N.H. xviii. p. 436. *D.*

1857 „ „ „ Mal. Blätt. iv. p. 94. *D.*

1859 „ „ „ Pfr., Mon. Hel. iv. p. 171. *D.*

„ „ *afra*, Pfr., Mon. Hel. iv. p. 124. *D.*

1860 „ *roseri*, Krs., von Mts., Die Helic., p. 84. *L.*

1886 „ *tollini*, Alb., Kob., Conch. Cab. p. 618. pl. 178, f. 13-15. *D.F.*

1887 „ (*Pella*) *tollini*, Alb., Tryon, Man. of Conch. iii. p. 108. pl. 21, f. 92-94. *D.F.*

- 1892 *Helix (Pella) tuguriolum*, M. & P., A.M.N.H. ix. p. 88. pl. 5, f. 5. *D.F.*
 1893 *Phasis (Trachycystis) tuguriolum*, M. & P., Pilsb., Man. of Conch. viii. p. 145. pl. 35, f. 1. *D.F.*
 1898 *Pella tollini*, Alb., Stur., S.A. Moll. pp. 39, 40. *N.*

Originals of *tollini* in University Museum of Zoology, Cambridge; types of *afra* and *tuguriolum* in British Museum; *roseri* in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE (*afra*, McGillivray, fide Pfeiffer). Table Mountain (*tollini*, Tollin; Layard). Stellenbosch (Purcell). Kalk Bay; Simonstown; Kommetje; Houw Hoek; Caledon (Connolly). Gordon's Bay; Hermanus (Lightfoot). Bredasdorp (Layard). Swellendam District (*roseri*, Krauss).

Helix afra, Pfr., is identical with *tollini*, Alb., and must yield priority to the latter, which was the earliest name under which the species was either described or figured. The type set of *tuguriolum*, labelled "South Africa" (coll. Layard), are also immature, rather pale examples of the same species.

The type, and only authentic example, of *roseri*, Krauss, is a semi-bleached shell, in form exactly resembling immature *tollini*. Its colour is paler, and the surface, being considerably worn, shows only the cross striation of *tollini* and not the fainter spiral sculpture. The columellar fold is slightly broken, which gives a more open appearance to the umbilical region than is usual in *tollini*, but the underside of the shell and the peculiar shape of the peristome agree with that species. After careful consideration, I think I may safely declare them to be one and the same.

279. TRACHYCYSTIS TRICHOSTIROMA (Melv. & Pons.).

- 1892 *Helix (Pella) trichosteiroma*, M. & P., A.M.N.H. ix. p. 84. pl. 4, f. 9. *D.F.*
 1893 ,, *strobilodes*, M. & P., A.M.N.H. xi. p. 19. pl. 3, f. 1. *D.F.*
 ,, *Phasis (Trachycystis) strobilodes*, M. & P., Pilsb., Man. of Conch. viii. p. 147. pl. 43, f. 62. *D.F.*
 ,, ,, *trichosteiroma*, M. & P., Pilsb., Man. of Conch. viii. p. 143. pl. 35, f. 3. *D.F.*
 1898 *Trachycystis trichosteiroma*, M. & P., Proc. Mal. Soc. iii. p. 174. Types in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (fide M. & P.). Tharfield (Miss Bowker).

The type of *strobilodes* is badly figured, but agrees with the original description. It is quite inseparable from *trichosteiroma*.

280. TRACHYCYSTIS TURMALIS (Morelet).

- 1889 *Helix turmalis*, Morel., J. de C. xxxvii. p. 5. pl. 1, f. 1. *D.F.*
1893 *Phasis (Trachycystis) turmalis*, Morel., Pilsb., Man. of Conch.
viii. p. 144. pl. 43, f. 53, 54. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Zwartkops River, Uitenhage,
19 miles N.N.W. of Port Elizabeth (Crawford).

281. TRACHYCYSTIS VORTICIALIS (Benson). [S.A.M.]

- 1850 *Helix vorticialis*, Bs., A.M.N.H. v. p. 216. *D.*
1853 ,, ,, ,, Pfr., Mon. Hel. iii. p. 108. *D.*
,, ,, ,, ,, Rve., Conch. Icon. pl. 174, f. 1181. *D.F.*
1854 ,, *vorticialis* ,, Pfr., Conch. Cab. p. 382. pl. 141 (1852),
f. 28-30. *D.F. (pessima).*
1887 ,, (*Pella*) *vorticialis*, Bs., Tryon, Man. of Conch. iii. p. 107.
pl. 20, f. 84. *D.F.*

Type in British Museum.

Hab. CAPE PENINSULA. Three Anchor Bay; Rondebosch; Strand,
False Bay (fide Benson). "Generally distributed" (Layard).

? CAPE OF GOOD HOPE. Port Elizabeth (fide Sturany).

FAMILY ACAVIDÆ, Pilsbry, 1902.

(Man. of Conch. xiv. p. iv.)

(= Macroogona, Pilsbry, 1895.)

GENUS DORCASIA, Gray, 1838.

(Alexander's Expedition, ii. p. 268.)

Type of Genus, *D. alexandri*, Gray.

282. DORCASIA ALEXANDRI, Gray. [S.A.M.]

- 1838 *Dorcasia alexandri*, Gray, Alexander's Expedition, ii. p. 268. *D.*
1845 *Helix (Dorcasia) alexandri*, Gray, Pfr., Zeitschr. f. Malak. p. 87. *D.*
1848 ,, ,, ,, ,, Mon. Hel. i. p. 332. *D.*
1854 ,, *alexandri*, Gray, Rve., Conch. Icon. pl. 208, f. 1470. *D.F.*
1877 ,, ,, ,, Pfr., Novit. Conch. v. p. 34. pl. 144, f.
9-12. *D.F.*
1887 ,, (*Dorcasia*) *alexandri*, Gray, Mouss., J. de C. xxxv. p. 292. *N.*
,, ,, ,, Tryon, Man. of Conch. iii.
p. 213. pl. 49, f. 3. *D.F.*
1894 ,, ,, ,, Srth., Ber. Senckenb. Naturf.
Ges. Frankfurt, p. 94. *A.*

- 1895 *Dorcasia alexandri*, Gray, Pilsb., Man. of Conch. ix. p. 172
 pl. 60, f. 6. *R. Frontisp. f. 3. A.*
 1905 " " Pilsb., Proc. Mal. Soc. vi. p. 286. *N.*
 1910 *Helix (Dorcasia) alexanderi*, Gray, Bttg., Abh. Senckenb.
 Naturf. Ges. Frankfurt, xxxii. p. 439. *N.*

Type in British Museum.

Hab. GREAT NAMALAND. Near the Great Fish River (Alexander).

DAMARALAND. Ussab (fide von Martens). "Kurikaubmund am Swakop (Kurikop bei Otjikango)" (Rintelen).

LITTLE NAMALAND. Henkries (Lightfoot).

var. MINOR, Böttger.

- 1886 *Helix (Dorcasia) alexandri*, Pfr., var. *minor*, Bttg., Ber. Senckenb. Naturf. Ges. Frankfurt, p. 22. pl. 2, f. 1. *D.F.*
 1893 *Dorcasia alexandri*, Gray, var. *minor*, Bttg., Pilsb., Man. of Conch. viii. p. 261. pl. 28, f. 98-100. *D.F.*

Type in Senckenberg Museum, Frankfurt.

Hab. BRITISH BECHUANALAND. "Ghous, Gordonia, bed of Hygap, probably W. of Zwart Modder" (Nolte).

GREAT NAMALAND. Geitsi-Gubel, near Bersaba (Schenck).

var. ROTUNDATA, Mousson.

- 1887 *Helix alexandri*, Gray, var. *rotundata*, Mouss., J. de C. xxxv. p. 292. pl. 12, f. 1. *D.F.*
 1893 *Dorcasia alexandri*, Gray, var. *rotundata*, Mouss., Pilsb., Man. of Conch. viii. p. 261. *D.*
 1895 *Dorcasia alexandri*, Gray, var. *rotundata*, Mouss., Pilsb., Man. of Conch. ix. p. 172. pl. 33, f. 6, 7. *N.F.*

Type in Zurich Museum.

Hab. DAMARALAND. Rehoboth (Schinz).

var. TRIVIA, Böttger.

- 1910 *Helix (Dorcasia) alexanderi*, Gray, var. *trivia*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 439. pl. 28, f. 3. *D.F.*

Type in Senckenberg Museum, Frankfurt.

Hab. DAMARALAND. Khomas-Hochland (Schultze).

283. DORCASIA BULBUS (Menke).

- 1848 *Helix bulbus*, Mke., Pfr., Zeitschr. f. Malak. v. p. 116. *D.*
 1853 " " " Conch. Cab. p. 268. pl. 122 (1852),
 f. 4-6. *D.F.*

- 1887 *Helix (Dorcasia) bulbus*, Pfr., Tryon, Man. of Conch. iii. p. 213.
pl. 49, f. 10-12. *D.F.*

Type—*ubi?*

Hab. CAPE OF GOOD HOPE (in coll. Menke).

284. DORCASIA CERNUA (von Martens).

- 1889 *Helix cernua*, von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 161. *D.*
1894 " " Conch. Mitth. iii, 3. p. 2. *D.*
1897 " " Archiv. f. Naturg. lxiii, 1. p. 36. pl. 7, f. 8-
10. *D.F.*
1910 *Helix (Dorcasia) cernua*, von Mts., Bttg., Abh. Senckenb. Naturf.
Ges. Frankfurt, xxxii. p. 439. *N.D.*

Type in Zool. Mus. Berlin.

Hab. GREAT NAMALAND. Angamthal (type) and Rooiberg, near
Bethany (Schenck, 1884). Guibes (Schultze).

285. DORCASIA LUCANA (Müller). [S.A.M.]

- 1774 *Helix lucana*, Müll., Verm. ii. p. 75. *D.*
1786 " " " Chem., Conch. Cab. ix, 2. p. 124. pl. 130,
f. 1155. *D.F. (pessima).*
1788 " *lucana* " Gmel., Syst. Nat., Ed. 13. i, 6. p. 3636. *D.*
1817 " *lucana* " Dillw., Descr. Cat. ii. p. 924. *D.*
1839 " " " Jonas, Archiv. f. Naturg. v, 1. p. 338. pl. 9,
f. 1, 2. *D.F.*
1848 " " " Pfr., Mon. Hel. i. p. 331. *D.*
1850 " " " " Conch. Cab. p. 338. pl. 60, f. 1, 2. *D.F.*
" " " " Desh., Hist. Nat. Moll. i. p. 166. pl. 10 B,
f. 3-5. *D.F.*
1851 " " " Rve., Conch. Icon. pl. 41, f. 187. *D.F.*
1856 " " " Bs., A.M.N.H. xviii. p. 436. *N.*
1887 " (*Dorcasia*) *lucana*, Müll., Tryon, Man. of Conch. iii.
p. 213. pl. 49, f. 2. *D.F.*

Original in University Zool. Mus. Copenhagen.

Hab. CAPE OF GOOD HOPE. George District; Bredasdorp;
Mossel Bay (Layard). Montagu (Connolly). Avontuur (fide Pfr.).

CAPE PENINSULA. Distributed along the coast south of Kalk Bay
and Hout Bay.

Layard wrote: "This species is found chiefly along the southern
seaboard. The brown variety with white band along the suture is
found pretty abundantly about Kalk Bay. A smaller var. with a
brownish purple mouth is found in the George District; a small var.

(axis 6''' , diam. 8''') with a white mouth is not uncommon at Bredasdorp, while a large white form (axis 1'' , diam. 1'' 3''') exists at Mossel Bay."

Chemnitz's figure (1786) is almost unrecognisable, while Lamarek (1822) described *globulus* for *lucana*, and Rossmässler (1837) figured *globulus* as the last-mentioned species. Krauss (1848) included *lucana*, Lam., in the synonymy of *globulus*, Müll., but unaccountably omitted *lucana*, Müll., altogether from his catalogue.

286. DORCASIA PONSONBYI, Fulton.

1910 *Dorcasia ponsonbyi*, Fulton, A.M.N.H. vi. p. 212. *D.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE (fide Fulton). Mossel Bay (Gibbons).

SUB-GENUS TULBAGHINIA, Melv. & Pons., 1898.

(A.M.N.H. i. p. 28.)

Type of Sub-Genus, *D. isomerioides*, M. & P.

287. DORCASIA ISOMERIOIDES, Melv. & Pons. [S.A.M.]

1898 *Dorcasia (Tulbaghinia) isomerioides*, M. & P., A.M.N.H. i. p. 28. pl. 8, f. 10. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Winterhoek Mt., Tulbagh (Marloth).

Owing to its considerable divergence from the type, I append the description of a fine specimen in the South African Museum.

Shell depressed-globose, deeply and openly umbilicate, thin, translucent, thickly covered above with rough, curved striæ, which are continued more smoothly beneath. The upper portion moderately glossy, of dark olive-brown horn colour, beautifully marked on the earlier whorls with pale yellow dots and blotches, merging later into irregular, interrupted concentric streaks; the earlier whorls similarly marked on the underside, but the last is paler, of a greener tint, glossy and unmottled. The interior shows plainly the colour and markings of the epidermis. Spire but little produced, apex flattened. Whorls $4\frac{1}{2}$, rapidly increasing, rounded, with no trace of carination. Aperture ovate, peristome white and glossy, a little thickened and reflexed. The columellar margin, half-way up between the base of the aperture and the umbilicus, shows trace of two small protuberances on its inner side; above these it becomes more widely reflexed, and forms a sharp angle of about 95 degrees, projecting

over, but in no way concealing the umbilicus, before rejoining the base of the shell.

Diam. max. 28, min. 21.5; alt. 16 mm. Apert. 16×11 mm. Distance between angle of columellar margin and its junction with base of shell, 2.5 mm.

GENUS TRIGONEPHRUS, Pilsbry, 1905.

(Proc. Mal. Soc. vi. p. 286.)

Type of Genus, *T. globulus* (Müll.).

288. TRIGONEPHRUS COAGULUM (von Martens).

- 1889 *Helix coagulum*, von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 160. *D.*
 1894 " " Conch. Mitth. iii, 3. p. 3. *D.*
 1897 " " Archiv. f. Naturg. lxxiii, 1. p. 37. pl. 7,
 f. 11-14. *D.F.*

Type in Zool. Mus. Berlin.

Hab. GREAT NAMALAND. On the road from Aos to the Orange River, and near the Lower Orange River (Schenck).

289. TRIGONEPHRUS GLOBULUS (Müller). [S.A.M.]

- 1774 *Helix globulus*, Müll., Verm. ii. p. 68. *D.*
 1786 " " " Chem., Conch. Cab. ix, 2. p. 126. pl. 130,
 f. 1159, 60. ? *D.F.*
 " " *pomatia*, var., Chem., Conch. Cab. ix, 2. pl. 130, f. 1138. *F.*
 1788 " *globulus*, Müll., Gmel., Syst. Nat., Ed. 13. i, 6. p. 3629. *D.*
 1817 " " " Dillw., Descr. Cat. ii. p. 923. *D.*
 1822 " *lucana*, "Müll.," Lam., Hist. nat. An. s. Vert. vi, 2. p. 71. *D.*
 1838 " " " Desh., Hist. nat. An. s. Vert. viii. p. 37. *D.*
 1841 " *globulus*, Müll., Pfr., Conch. Cab. p. 33. pl. 3, f. 11, 12. ? *D.F.*
 1846 " " " (cum var. *rosacea*, Müll.), Pfr., Conch.
 Cab. p. xiii. *D.N.*
 1848 " " " (= *lucana*, Lam., and *rosacea*, Müll.), Krs.,
 Südafr. Moll. p. 77. *N.*
 " " " " Pfr., Mon. Hel. i. p. 319. *D.*
 1850 " " " (cum var. *rosacea*, Müll.), Bs., A.M.N.H. v.
 p. 217. *N.*
 " " " " (= *rosacea*), Desh., Hist. nat. Moll. i.
 p. 250. pl. 26, f. 10-12. pl. 28, f. 11, 12. *D.F.*
 1851 " " " Rve., Conch. Icon. pl. 41, f. 186. *D.F.*
 1859 " " " Pfr., Mon. Hel. iv. p. 249. *D.*

- 1879 *Helix globulus*, Müll., Binn., Ann. N.Y. Acad. Sci. i. p. 361. pl. 14, f. K. *R.*
- 1880 „ *globosus* „ Crvn., P.Z.S. p. 619. (*Err. typ.*) *N.*
- 1884 *Dorcasia globulus*, Müll., Binn., Ann. N.Y. Acad. Sci. iii. p. 106. pl. 6, f. M. *R.*
- 1887 *Helix (Dorcasia) globulus*, Müll., Tryon, Man. of Conch. iii. p. 213. pl. 49, f. 1. *D.F.*
- 1889 „ *globulus*, Müll., von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 160. *N.*
- 1895 *Dorcasia globulus*, Müll., Pilsb., Man. of Conch. ix. pp. 172, 173. pl. 38, f. 8. *N.F.* pl. 51, f. 3. *R.*
- 1905 *Trigonephrus globulus*, Müll., Pilsb., Proc. Mal. Soc. vi. p. 286. pl. 13, f. 6-9. pl. 14, f. 13, 15. *A.*
- 1910 *Helix (Trigonephrus) globulus*, Müll., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. pp. 440, 441. *N.*

Original in University Zool. Mus. Copenhagen.

Hab. CAPE OF GOOD HOPE. Widely distributed along the coast-line from Algoa Bay, westward round the Cape Peninsula, and thence northward as far as Port Nolloth. Robben and Dassen Islands.

Craven collected on Robben Island a fully developed sinistral specimen, which is now in the British Museum.

There is a very wide range of variety in this species. Krauss brought into the synonymy *H. rosacea*, Müll., and many later authorities have followed his example; in fact, until more is known of the animals, it is not possible to decide whether all species of *Trigonephrus*, hitherto described, are not merely forms of *globulus*.

Much confusion existed among the early authors with regard to it. Chemnitz (1786) figured *H. semirugata*, Beck, from Ceylon as *globulus*, while Lamarck (1822) described *semirugata* as *globulus* and *globulus* as *lucana*. *H. globulus*, Lam., of Deshayes' earlier writings is also *semirugata*, and his *lucana*, *globulus*, Müll., an error corrected in Hist. nat. Moll., 1850.

290. TRIGONEPHRUS GYPSINUS (Melv. & Pons.). [S.A.M.]

- 1891 *Helix (Dorcasia) gypsina*, M. & P., A.M.N.H. viii. p. 238. *D.*
- 1892 „ „ „ „ ix. p. 94. pl. 4, f. 10. *F.*
- 1893 „ „ Pilsb., Man. of Conch. viii. p. 262. pl. 28, f. 2. *D.F.*

Type in British Museum.

- 1841 *Helix rosacca*, Müll., Pfr., Conch. Cab. p. 40. pl. 4, f. 5, 6. pl. 55 (1849), f. 7, 8. *D.F.*
- 1859 „ „ Pfr., Mon. Hel. iv. p. 248. *D.*
- 1887 *Helix (Dorcasia) rosacea*, Müll., Tryon, Man. of Conch. iii. p. 213. pl. 49, f. 100. *D.F.*
- 1910 „ (*Trigonephrus*) *rosacea*, Müll., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 440. pl. 28, f. 4. *D.F.*
- Specimen ex coll. Müller in University Zool. Mus. Copenhagen.
- Hab.* CAPE OF GOOD HOPE. Widely distributed along the western seaboard from the south as far as Namaland, often in company with, and apparently merging into, *T. globulus*, Müll., of which it is probably a variety.

FAMILY HELICIDÆ, Gray, 1824.

(Ann. of Philos. viii. p. 107.)

GENUS EULOTA, Hartmann, 1842.

(Erd-u. Sussw.-Gast. Schweiz, p. 179.)

Type of Genus, *E. fruticum* (Müll.).

294. EULOTA SIMILARIS (Férussac).

- 1821 *Helix similaris*, Fér., Tabl. Syst. Moll. pt. 3. p. 47 (or 43). *L.*
- „ „ *addita*, Fér., Tabl. Syst. Moll. pt. 3. p. 71 (or 67).
- 1834 „ *woodiana*, Lea, Obs. G. Unio, i. p. 169. pl. 19, f. 69. *D.F.*
- 1835 „ *translucens*, King, Zool. Journ. v. p. 339. *D.*
- 1836 „ *cestus*, Bs., Journ. As. Soc. Bengal, v. p. 353. *D.*
- 1848 „ „ „ A.M.N.H. ii. pp. 160, 161. *D.N.*
- „ „ *similaris*, Fér., Pfr., Mon. Hel. i. p. 536. *D.*
- 1849 „ „ „ (= *squalida*, Zglr.), Mouss., Moll. von Java, p. 21. pl. 2, f. 4, 5. *D.F.*
- 1850 „ „ „ Pfr., Conch. Cab. p. 341. pl. 60 (1849), f. 13-16. *D.F.*
- „ „ „ „ Desh., Hist. nat. Moll. i. p. 171. pl. 25B, f. 1-4. pl. 27A, f. 1-5. *D.F.*
- 1851 „ „ „ Rve., Conch. Icon. pl. 34, f. 149. *D.F.*, and pl. 127 (1852), f. 767. *F.*
- „ „ *brardiana*, Pfr., P.Z.S. p. 253. *D.*
- 1852 „ „ „ Rve., Conch. Icon. pl. 108, f. 604. *D.F.*
- „ „ *cestus*, Bs., Rve., Conch. Icon. pl. 125, f. 751. *D.F.*
- 1853 „ *brardiana*, Pfr., Mon. Hel. iii. p. 228. *D.*
- 1854 „ „ „ Conch. Cab. p. 385. pl. 142 (1852), f. 7, 8. *D.F.*

- 1854 *Helix brardiana*, Pfr., A.M.N.H. xiii. p. 142. *D.*
 „ „ *stimpsoni* „ P.Z.S., p. 149. *D.*
 „ „ „ „ Rve., Conch. Icon. pl. 195, f. 1370. *D.F.*
 1859 „ „ „ „ Mon. Hel. iv. p. 289. *D.*
 1860 „ *similaris*, Fér. (= *addita*, Fér., and *brardiana*, Pfr.),
 Morel., Séries Conch. ii. p. 58. *N.*
 1861 „ *genulabris*, von Mts., Mal. Blätt. vii. p. 33. *D.*
 1863 „ *borbonica*, Desh., Notes sur l'Île Réunion, ii. E. p. 85.
 pl. 37, f. 9-11. *D.F.*
 „ „ *arcasiana*, Crosse & Debeaux, J. de C. xi. p. 386. *D.*
 1864 „ „ „ „ „ xii. p. 316. pl. 12,
 f. 4. *D.F.*
 1867 „ *similaris*, Fér., von Mts., Ost-Asien, Zool. ii. pp. 7, 19,
 43, 76, 270. *D.N.*
 1868 „ „ „ „ Cox, Mon. Austral. Landshells, p. 58.
 pl. 9, f. 14. *D.F.*
 „ „ *borbonica*, Desh., Pfr., Mon. Hel. v. p. 504. *D.*
 1874 „ (*Rhagada*) *similaris*, Fér., Jick., Fauna N.-O.-Afr. p. 70. *D.*
 1875 „ *similaris*, Fér., Morel., Séries Conch. iv. p. 251. *N.*
 1887 „ (*Dorcasia*) *similaris*, Fér. (= *epixantha*, Pfr., Conch. Icon.
 f. 454, and *squalida*, Zglr.), Tryon, Man. of Conch.
 iii. p. 205. pl. 46, f. 27-30. pl. 47, f. 33-37. *D.F.*
 1895 *Eulota similaris*, Fér., Pilsb., Man. of Conch. ix. p. 203. pl. 55,
 f. 19. *N.F.* pl. 65, f. 3, 4. pl. 66, f. 20. *A.*
 1905 *Helix (Eulota) similaris*, Fér., Dautz. & Fischer, J. de C. liii.
 p. 95. *N.* and Synonymy.

Type—*ubi*?

Hab. NATAL. Durban (Plant; Quekett).

A species of almost world-wide distribution.

GENUS COCHLICELLA, Férussac, 1821.

(Tabl. Syst. Moll. pt. 3. pp. 23 (or 24), 56 (or 52).)

Type of Genus, *H. conoidea* (Drap.).

295. COCHLICELLA ACUTA (Müller). [S.A.M.]

- 1774 *Helix acuta*, Müll., Verm. ii. p. 100. *D.*
 1801 *Bulimus ventricosus*, Drap. (= *H. acuta*, Müll.), Drap., Tabl.
 Moll. Fr. p. 68. *D.*
 1805 „ „ „ „ „ Hist. Moll. Fr. p. 78. pl. 4, f. 31, 32. *D.F.*
 1821 *Helix (Cochlicella) ventrosa*, Fér. (= *ventricosus*, Drap., and
acuta, Müll.), Fér., Tabl. Syst. Moll. pt. 3, pp. 56 (or 52), 74 (or 70). *N.*

- 1822 *Bulimus ventricosus*, Drap., Lam., Hist. nat. An. s. Vert. vi, 2.
p. 125. D.
- 1826 *Cochlicella ventrosa*, Fér., Risso, Hist. nat. Eur. mérid. iv. p. 77. D.
- 1838 *Bulimus ventricosus*, Drap., Desh., Hist. nat. An. s. Vert. viii.
p. 235. D.
- 1841 „ „ „ Küst., Conch. Cab. p. 30. pl. 12,
f. 10-12. D.F.
- 1848 „ *ventrosus*, Fér., Pfr., Mon. Hel. ii. p. 215. D.
- 1849 „ „ „ (= *variabilis*, Hartm.), Rve., Conch.
Icon. pl. 69, f. 499. D.F.
- 1855 *Helix (Cochlicella) bulimoides*, Moq.-Tand., Hist. Nat. Moll. Fr.
ii. p. 277. pl. 20, f. 21-26. D.F.A.
- 1864 „ *barbara*, Bgt., Mal. Algérie, i. p. 286. pl. 32, f. 36-41. D.F.
- 1874 „ (*Cochlicella*) *ventricosa*, Drap., Jick., Fauna N.-O.-Afr.
p. 96. D.
- 1883 „ *acuta*, Müll. (= *B. ventricosus*, Drap.), Fagot, Glanages
Malac. iii. p. 29. D.N.
- 1889 „ „ „ Westerl., Fauna Paläarct. Reg. ii, 1. p. 366. D.
- 1894 „ *ventricosa*, Drap., Coutagne, Mém. Soc. Agr. Sci. et Ind.
Lyon, ii. p. 454. N.
- 1895 *Bulimus ventricosus*, Drap., Locard, Ipsa Draparnaudi
Conchylia, p. 100. N.
- 1908 *Helix (Cochlicella) acuta*, Müll., Germain, Voy. Zool. Khrou-
mirie, p. 233. N.

Originals of *ventricosa* in Naturh. Hofmus. Vienna; *acuta*—*ubi*?
Hab. CAPE PENINSULA. St. James (Connolly).

A South European species, probably of recent introduction. Also
recorded from North Africa, Cape Verde Islands, and West Indies.

GENUS PUPISOMA, Stoliczka, 1873.

(Journ. Asiatic Soc. Bengal, xiii, 2. p. 32.)

Type of Genus, *P. lignicola*, Stol.

296. PUPISOMA JAPONICUM, Pilsbry. [S.A.M.]

- 1902 *Pupisoma japonicum*, Pilsb., Nautilus, xvi. p. 21. D.
- 1909 „ „ Hirase, Conch. Mag. iii, 4. pl. 9,
f. 32, 33. F.
- 1912 „ „ Bnp., Proc. Mal. Soc. x, p. 46. N.
Type in Academy of Natural Science, Philadelphia.
Hab. NATAL. Pietermaritzburg; Ntimbankulu; Edendale;
Karkloof; Game Pass (Burnup).
Described from Japan.

The subjoined figure shows *Trach. microscopica* (Krs.), which may very possibly belong to the present Genus, in the centre, with the larger *orecula* on the left and *japonicum* on the right. ($\times 4\frac{2}{3}$.)



297. PUPISOMA ORCULA (Benson). [S.A.M.]

- 1850 *Helix orecula*, Bs., A.M.N.H. vi. p. 251. *D.*
 1853 " " Pfr., Conch. Cab. p. 357. pl. 136 (1852), f. 18-20. *D.F.*
 " " " " Mon. Hel. iii. p. 42. *D.*
 1855 *Nanina orecula*, Bs., Gray, Cat. Pulm. p. 75. *D.*
 1886 *Pupisoma orecula*, Bs., Tryon, Man. of Conch. ii. p. 177. pl. 53, f. 67. *D.F.*
 1909 " " Hirase, Conch. Mag. iii, 4. pl. 9, f. 30, 31. *F.*
 1912 " " Bnp., Proc. Mal. Soc. x. p. 45. *N.*

Co-types in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford). Grahams-town (Farquhar).

NATAL. Pietermaritzburg; Ntimbankulu; Dargle; Edendale; Game Pass (Burnup). Richmond (Wakefield; Cooper). Karkloof (Taynton).

TRANSVAAL. Pretoria (Connolly).

RHODESIA. Victoria Falls (Warren).

Originally described from India.

GENUS VALLONIA, Risso, 1826.

(Hist. nat. Eur. mérid. iv. p. 101.)

Type of Genus, *V. rosalia*, Risso (*pulchella*, Müll.).

298. VALLONIA EXCENTRICA, Sterki. [S.A.M.]

- 1850 *Helix pulchella*, Müll., Bs., A.M.N.H. v. p. 217. *L.*
 1864 *Vallonia minuta*, Say, Morse, Journ. Portland Soc. Nat. Hist. i, 1. p. 21 (*pars.*).
 1893 " *excentrica*, Sterki, Proc. Acad. Nat. Sci. Phila. pp. 252, 278. pl. 8, f. B, M. *D.A.*
 " " " " Pilsb., Man. of Conch. viii. p. 249. pl. 32, f. 6-9. *D.R.F.*
 1904 " " " " B. B. Woodw., Journ. of Conch. xi. p. 82. *D.*

Type in coll. Sterki.

Hab. CAPE OF GOOD HOPE. High Constantia (Benson, 1846). Cape Town (Layard). Wynberg (Lightfoot). Somerset East (Miss Bowker). King Williamstown (Miss Ross). Grahamstown (Farquhar). Port Elizabeth (Crawford).

NATAL. Pietermaritzburg (Burnup).

TRANSVAAL. Pretoria (McBean).

Very widely distributed over most parts of the globe.

Mr. B. B. Woodward has identified specimens from Wynberg, Pretoria, Grahamstown, Port Elizabeth, and Pietermaritzburg as *excentrica*, and it is probable that the other occurrences of *Vallonia* in South Africa refer to the same species. Of course, many early reports of *pulchella*, such as Benson's in 1850, were made long before *excentrica* was differentiated.

GENUS HELIX, Linné, 1758.

(Syst. Nat., Ed. 10. i. pp. 645, 768.)

Type of Genus, *H. pomatia*, Lin.

SUB-GENUS CRYPTOMPHALUS, Agassiz, 1837.

(Nouv. Mém. Soc. Helv. Sci. Nat. i, 2. p. 5.)

Type of Sub-Genus, *H. aspersa*, Müll.

299. HELIX ASPERSA, Müller.

[S.A.M.]

- 1774 *Helix aspersa*, Müll., Verm. ii. p. 59. *D.*
 1777 „ *hortensis*, Pennant, Brit. Zool. iv. p. 136. pl. 84, f. 129. *D.F.*
 1778 *Cochlea vulgaris*, Da Costa, Test. Brit. p. 72. pl. 4, f. 1. *D.F.*
 1786 *Helix aspersa*, Müll., Chem., Conch. Cab. ix, 2. p. 125. pl. 130, f. 1156-58. *D.F.*
 1788 „ „ „ Gmel., Syst. Nat., Ed. 13. i, 6. p. 3631. *D.*
 „ „ *grisea*, Gmel., Syst. Nat., Ed. 13. i, 6, p. 3649. *D.*
 1797 „ *restitutoris*, Humph., Mus. Calonn. p. 60. *D.*
 1803 „ *aspersa*, Gmel., Mont., Test. Brit. ii. p. 407. *D.*
 1805 „ „ Müll., Drap., Hist. Moll. Fr. p. 89. pl. 5, f. 23. *D.F.*
 1807 „ *hortensis*, Penn., Mat. & Rack., Linn. Trans. viii. p. 208. *D.*
 1815 „ *aspersa*, Brard, Hist. Coq. Paris, p. 7. pl. 1, f. 1. *D.F.*
 1826 „ „ Lin., Risso, Hist. nat. Eur. mérid. iv. p. 63. *D.*
 1828 „ „ Lam., Stark, Elem. Nat. Hist. ii. p. 58. *D.*
 1837 „ (*Pomatia*) *aspersa*, Beck, Index Moll. p. 44.
 1840 „ (*Acavus*) *aspersa*, Müll., Gray, Turton's Man. p. 128. pl. 4, f. 35. *D.F.*

- 1841 *Helix aspersa*, Müll., Pfr., Conch. Cab. p. 34. pl. 3, f. 6-10. *D.F.*
 1846 " " " " " p. xi. *D.*
 1848 " " " " Mon. Hel. i. p. 241. *D.*
 1850 " " " Desh., Hist. Nat. Moll. i. p. 269. pl. 18,
 f. 1-13. pl. 19, f. 1-9. pl. 21B, f. 6, 7.
 pl. 24, f. 3. pl. 24A, f. 1-7. *D.F.*
 1855 " " " Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 174.
 pl. 13, f. 14-32. *D.F.A.*
 1861 " *spumosa*, Lowe, A.M.N.H. vii. p. 111. *D.*
 1879 " *aspersa*, Müll., Layard, The Field, Jan. 11th. *N.*
 1883 " (*Pomatia aspersa*, Müll., Tayl., Journ. of Conch. iv. p. 89.
D.N.A.
 1898 *Pomatia aspersa*, Müll., Stur., S.A. Moll. p. 52. *N.*
 1903 *Helix (Helicogena) aspersa*, Müll., Kob., Conch. Cab. p. 96.
 pl. 319, f. 14-20. pl. 320, f. 1-12. *D.F.*
 1910 " (*Cryptomphalus) aspersa*, Müll., Tayl., Mon. Brit. Moll.
 p. 236. pl. 23 (1911). *D.F.A.R.*
 " " (*Helicogena) aspersa*, Müll., Bttg., Abh. Senckenb. Naturf.
 Ges. Frankfurt, xxxii. p. 456. *N.*

Specimen ex coll. Müller in University Zool. Mus. Copenhagen.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (in coll. Ponsoby).

CAPE PENINSULA. Very common. Robben Island (in coll. Ponsoby).

Several sinistral specimens have been found at Cape Town (Lightfoot).

This species, said to have been introduced into Cape Town by Mons. Dastre, as a table delicacy, about 1870, has now become one of the greatest pests in gardens throughout the Cape Peninsula. It appears also to thrive on the peculiar local type of wild herbage, and thus threatens to oust many of the rarer, indigenous species from their last foothold, by eating them out of house and home.

SUB-GENUS OTALA, Schumacher, 1817.

(Essai d'un Nouveau Système des . . . Vers. p. 191.)

(= *Archelix*, Albers, 1850.)

Type of Sub-Genus, *H. atomaria*, Schum. (*lactea*, Müll.)

300. HELIX LACTEA, Müller.

1774 *Helix lactea*, Müll., Verm. ii. p. 19. *D.*

1786 " " Chem., Conch. Cab. ix, 2. p. 127. pl. 130,
 f. 1161. *D.F.*

- 1822 *Helix lactea*, Müll., Lam., Hist. nat. An. s. Vert. vi, 2. p. 75. *D.*
 1848 " " Pfr., Mon. Hel. i. p. 272. *D.*
 1850 " " Desh., Hist. Nat. Moll. i. p. 291. pl. 39A,
 f. 7, 8. pl. 45, f. 1-10. *D.F.*
 1864 " " Bgt., Mal. Algérie, i. p. 122. pl. 11, f. 1-9. *D.F.*
 1888 " " Tryon, Man. of Conch. iv. p. 130. pl. 39,
 f. 89-97. *D.F.*

Type—*ubi* ?

Hab. CAPE OF GOOD HOPE. Kowie (Barber, in coll. Layard).

A well-known Mediterranean species, whose sole claim to inclusion in South African lists rests on a fine adult specimen, which was taken alive, together with a smaller, empty shell, in a garden on the bank of the Kowie River in 1897.

Tryon (1888) places in the synonymy *irrorata*, Say; *punctatissima*, Jeniss; *flattersiana*, Ancey; *tagina*, Servain; *axia*, Bgt.; *jacquemebana*, Bgt.; and ? *hispanica*, Mich.

SUB-GENUS EUPARYPHA, Hartmann, 1842.

(Erd-und-Sussw.-Gast. Schweiz, p. 204.)

Type of Sub-Genus, *H. rhodostoma*, Drap. (*pisana*, Müll.).

301. HELIX PISANA, Müller. [S.A.M.]

- 1774 *Helix pisana*, Müll., Verm. ii. p. 60. *D.*
 1777 " *zonaria*, Pennant, Brit. Zool. iv. p. 137. pl. 85, f. 133. *D.F.*
 1792 " *petholata*, Olivier, Zool. Adriat. p. 178. *D.*
 1801 " *rhodostoma*, Drap., Tabl. Moll. Fr. p. 74. *D.*
 1803 " *cingenda*, Mont., Test. Brit. ii. p. 418, & Suppl. (1808),
 pl. 24, f. 4. *D.F.*
 1805 " *rhodostoma*, Drap., Hist. Moll. Fr. p. 86. pl. 5, f. 13-15. *D.F.*
 1807 " *cingenda*, Penn., Turton, Brit. Fauna, p. 188. *D.*
 1827 " " Mont., Brown, Illustr. Conch. Gt. Brit. pl. 40,
 f. 27, 28, 33, 35, 58. *F.*
 1840 " *pisana*, Müll., Gray, Turton's Man. p. 158. *D.*
 1848 " " " Pfr., Mon. Hel. i. p. 152. *D.*
 " " " " " Conch. Cab. p. 161. pl. 37, f. 1-12.
 pl. 22 (1843), f. 1-6. *D.F.*
 1855 " " " Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 259.
 pl. 19, f. 9-20. *D.F.A.*
 1864 " " " Bgt., Mal. Algérie, i. p. 234. pl. 26, f. 1-10. *D.F.*
 1874 " (*Euparypha*) *pisana*, Müll., Jick., Fauna N.-O.-Afr.
 p. 85. *D.N.*

- 1895 *Helix (Euparypha) pisana*, Müll., Pilsb., Man. of Conch. ix.
p. 335. pl. 43, f. 37, 38. pl. 61, f. 1-5. *D.F.A.*
1902 *Xerophila pisana*, Müll., Swanton, Journ. of Conch. x. p. 194. *N.*
1910 *Helix (Euparypha) pisana*, Müll., Bttg., Abh. Senckenb. Naturf.
Ges. Frankfurt, xxxii. p. 456. *N.*
1911, 12 ,, ,, Müll., Tayl., Mon. Brit. Moll. p. 368.
pl.30,f.1-21.pl.31,f.1-21.*D.F.A.R.*

Specimen ex coll. Müller in University Zool. Mus. Copenhagen.

Hab. CAPE OF GOOD HOPE. Cape Peninsula (very common). Stellenbosch (Miss Lightfoot). Somerset West; Gordon's Bay (Connolly). Port Elizabeth (Crawford). Robben Island (in coll. Ponsonby).

NATAL. Durban (Longstaff).

The earliest recorded appearance of *H. pisana* in South Africa was in 1881, when Mr. W. G. Fairbridge took three specimens on the now demolished Gallows Hill, near Cape Town Docks. Since that date it has spread enormously along the seaboard of the Peninsula, and its arrival at Stellenbosch appears to denote that it is extending its travels inland.

Taylor (1911) includes in its synonymy *strigata*, Dillw., 1817; *maculata*, Mke., 1828; *catoocyphia*, Bgt., 1860; *pisanshipis* and *hyperplatæ*, Bgt., 1880; *agaroi*, *carpiensis*, *djerbanica*, *gergisensis*, *hamadanica*, *salemensis*, *monroi*, *zitanensis*, Letourneux and Bgt., 1887; *chambardi*, Let., 1887; *couturieri*, *cuttati*, *lenoleuca*, *subpisana*, and *thinophila*, Bgt., 1887; *donatii* and *levesquei*, Berthier, 1887; *byrsa* and *radesiana*, Marés, 1887; *dermoi*, *pisanelia*, and *olivaresi*, Servain, 1887; *barbozana*, *bocagei*, and *machadoi*, Locard, 1899; while immature examples appear to have been named *æstivalis*, Bgt.; *cina*, Klett; and *leucostoma*, Risso.

FAMILY ENIDÆ, B. B. Woodward, 1903.

(Journ. of Conch. x. pp. 354, 358.)

(=Buliminidæ, Auctt.)

GENUS ENA, Leach (Mss. 1820), 1831.

(Turton's Manual, 1831, p. 80, and 1840, p. 181.)

(= *Bulimina*, Ehrenberg, 1831 (*Buliminus*, Auctt.), nec d'Orbigny, in Foraminifera, 1826.)

Type of Genus, *E. montana* (Drap.).

The South African *Enidæ* can be divided, on form alone, into certain well-marked groups, in the following manner:—

(i) *Pachnodus*, Albers, 1860 (Die Helic. p. 230, Type, in error, *velutina*, Pfr.; *emend.*, Bgt., 1889, Moll. de l'Afr. équat. p. 64, Type *spadicea*, Mke.).

Bourguignat's rejection of *velutina* as type of *Pachnodus* seems perfectly sound. If *spadicea* is not acceptable, a new name is necessary for the group, which comprises—

arenicola, Bs.; *carinifera*, M. & P.; *drakensbergensis*, Smith; *mebeaniana*, Bnp.; *natalensis*, Krs. and *spadicea*, Mke. (= *vitellina*, Pfr.).

(ii) *Conulinus*, von Martens, 1895 (Nachr. d. Deutsch. Mal. Ges. p. 180, Type, *conulus*, Rve.).

conulus, Rve.; *metuloides*, Smith; *transvaalensis*, M. & P., and probably *burnupi*, *dinera*, and *maritzburgensis*, M. & P., and *meridionalis*, Pfr.

(iii) *Xerocerastus*, Kob. & Mlldff., 1902 (Conch. Cab. p. 1021, Type, *damarensis*, Ad.).

(= *Eburnea*, Mousson, 1887 (J. de C. p. 295), nec *Eburna*, Lam., 1801, nec *Eburnea*, Flem., 1828).

burchelli, Gray; *damarensis*, Ad.; *hottentota*, Gray (= *pygmæa*, Ad.); *layardi*, M. & P.; *opposita*, Mouss.; *psammophila*, *schultzei*, and *subteres*, Bttg., and *zuluensis*, M. & P.

(iv) *Rhachisellus*, Bourguignat, 1889 (Moll. de l'Afr. équat. p. 68, as *Rachisellus*. Type *punctata*, Anton.)

Thiele (Deutsch. Zent.-af.-Exp., 1911, p. 201) shows that *punctata* is not acceptable as type of *Rhachis*, Albers, but is rightly placed in *Rhachisellus*. Although possibly not belonging to the same Sub-genus, the following shells fall, roughly, into the same group:—

dubiosa, Stur.; *melanaeme*, *mozambicensis*, and *petersi*, Pfr.; *punctata*, Ant. (= *jejuna*, M. & P.); *spiogramma* and *sticta*, von Mts.

Thiele (*l.c.*) has, on account of radular peculiarities, proposed to include *melanaeme* and *mozambicensis* in a new Sub-genus *Rhachidina*, the type of which is the West African *tumefacta* (Rve.).

(v) *Ena pentheri* (Stur.).

(vi) Group of *E. bowkeri* (Sow.).

bowkeri, Sow., and *nuptialis*, M. & P.

(vii) *Ena boivini* (Morel.) (= *morenensis*, Stur.).

In the following pages the species are arranged in alphabetical order.

NOTE.—*Eulimoides*, Gray, and *namibicus*, Bttg., were described as *Enidæ*, but apparently belong to *Zootecus*, Westerl., a Genus of *Stenogyrinæ*.

302. ENA (PACHNODUS) ARENICOLA^a (Benson). [S.A.M].

- 1856 *Bulimus arenicola*, Bs., A.M.N.H. xviii. p. 433. *D.*
 1859 " " Pfr., Mon. Hel. iv. p. 481. *D.*
 1901 *Buliminus (Pachnodes) arenicola*, Bs., Kob., Conch. Cab. p. 757.
 pl. 111, f. 5, 6. *D.F.*

Specimen ex auct. in University Museum of Zoology, Cambridge.

Hab. CAPE OF GOOD HOPE. Caffraria, near Waterloo Bay; near Mossel Bay (Layard).

NATAL. Durban; Pietermaritzburg; Lower Umkomaas; Port Shepstone; Tongaat (Burnup).

ZULULAND. Dukuduku (Toppin).

303. ENA BOIVINI (Morelet).

- 1860 *Glandina boivini*, Morel., Séries Conch. ii. p. 72. pl. 5, f. 5. *D.F.*
 1887 *Bulimus* " " Grandidier, Bull. Soc. Mal. Fr. iv.
 p. 187. *N.*
 1890 " (*Cerastus mamboiensis*, Smith, A.M.N.H. vi. p. 153.
 pl. 5, f. 7. *D.F.*
 1897 *Buliminus boivini*, Morel., von Mts., D.-O.-Afr. p. 61. *N.*
 1898 " *movenensis*, Stur., S.A. Moll. p. 66. pl. 2, f. 44-51. *D.F.*
 1899 " *boivini*, Morel. (= *mamboiensis*), Smith, P.Z.S.
 p. 587. *N.*
 1900 " (*Cerastus boivini*, Morel., Kob., Conch. Cab. p. 635.
 pl. 97, f. 2. *D.F.*
 " " (*Pachnodes movenensis*, Stur., Kob., Conch. Cab.
 p. 632. pl. 96, f. 19-21. *D.F.*

Type of *boivini* in British Museum; *movenensis* in Naturh. Hofmus. Vienna.

Hab. EASTERN ZULULAND. Elscheleselwanhla (Toppin).

LORENZO MARQUES. Delagoa Bay (Connolly). *Movene (movenensis)*, Penther).

Also from several localities in East Africa, the type of *boivini* coming from Mombasa.

There seems no reason for separating *movenensis*, Stur., from the present species. Until connecting links are known, *E. ptychaxis*, Smith (A.M.N.H. vi. 1890, p. 147), which von Martens has placed in the synonymy, appears separable by its more elongate shell and very distinct columellar fold, which is only just traceable in *boivini*.

304. ENA BOWKERI (Sowerby). [S.A.M.]

- 1889 *Buliminus (Mesembrinus ?) bowkeri*, Sow., P.Z.S. p. 581. pl. 56,
 f. 5. *D.F.*

1900 *Buliminus (Pachnodes) bowkeri*, Sow., Kob., Conch. Cab. p. 657.
pl. 101, f. 2. *D.F.*

Originals in British Museum, type not specified.

Hab. CAPE OF GOOD HOPE. Glen Avon Falls, Somerset East
(Miss Bowker).

305. ENA (*XEROCERASTUS*) *BURCHELLI* (Gray). [S.A.M.]

1834 *Bulimus burchellii*, Gray, P.Z.S. p. 66. *D.*

1848 „ „ „ Pfr., Mon. Hel. ii. p. 162. *D.*

1849 „ „ „ Rye., Conch. Icon. pl. 76, f. 548. *D.F.*

1902 „ (*Xerocerastus?*) *burchellii*, Gray, Kob., Conch. Cab.
p. 962. *D.*

Type in British Museum.

Hab. BRITISH BECHUANALAND. Near Lattakoo (Takun), (fide
Gray). Kuruman (Moffatt).

BECHUANALAND. Kalahari (Penderill-Longlands).

CAPE OF GOOD HOPE. Prieska (Gibbons). Douglas (Miss Orpen).

GRIQUALAND WEST. Blaauwbosch Poort, Hay District (Day).
Griquatown (Barrett Hamilton). Griquatown (Gibbons). Riverton
(Miss Wilman).

The loc. "Natal," given by Sturany is improbable.

306. ENA (*CONULINUS*) *BURNUPI* (Melv. & Pons.).

1903 *Buliminus (Pachnodus) burnupi*, M. & P., A.M.N.H. xii. p. 605.
pl. 31, f. 5. *D.F.*

Type in British Museum.

Hab. ZULULAND. Lower Umfolosi Drift (Burnup). Makowe
(Crosly).

307. ENA (*PACHNODUS*) *CARINIFERA* (Melv. & Pons.). [S.A.M.]

1897 *Buliminus (Pachnodus) carinifer*, M. & P., A.M.N.H. xix. p. 637.
pl. 17, f. 8. *D.F.*

1901 „ (*Pachnodes*) *carinifer*, M. & P., Kob., Conch. Cab.
p. 762. pl. 111, f. 21. *D.F.*

Type in British Museum.

Hab. NATAL. Gordon Falls; Pietermaritzburg (Burnup).

CAPE OF GOOD HOPE. Knysna (Purcell). Grahamstown; Bed-
ford; Port Elizabeth (Farquhar). Pirie (Miss Ross).

Although perfectly distinct, this species is at times very closely

approached by *E. natalensis* (Krs.), and it may possibly happen that localities given for it really refer to the latter.

In *carinifera* the keel, especially in mature shells, is always more pronounced, and the whorls, convex below the suture, become concave both immediately above and beneath the keel.

A pretty milk-white variety is found at Gordon Falls.

308. *ENA* (*CONULINUS*) *CONULUS* (Reeve).

1849 *Bulimus conulus*, Rve., Conch. Icon. pl. 78, f. 577. *D.F.*

1853 " " Pfr., Mon. Hel. iii. p. 440. *D.*

1902 *Buliminus (Conulinus) conulus*, Rve., Kob., Conch. Cab. p. 952.
pl. 133, f. 8. *D.F.*

Type in British Museum.

Hab. NATAL. "Port Natal" (Mus. Cuming).

LORENZO MARQUES. Rikatla (Junod).

ZULULAND. Entendweni (var.; Toppin).

309. *ENA* (*XEROCERASTUS*) *DAMARENSIS*, H. Adams.

1870 *Bulimus damarensis*, H. Ad., P.Z.S. p. 9. pl. 1, f. 17. *D.F.*

" " *damarensis*, Pfr., Mal. Blätt. xvii. p. 93. *D.*

" " " " Novit. Conch. iv. p. 3. pl. 109, f. 7, 8.
D.F.

1877 " *damarensis*, Pfr., Mon. Hel. viii. p. 177. *D.*

1887 *Buliminus (Eburnea) damarensis*, H. Ad., Mouss., J. de C. xxxv.
p. 295. *N.*

1889 " *damarensis*, H. Ad., von Mts., Sitz.-Ber. Ges. Nat.
Fr. Berlin, p. 162. *N.*

1900 " (*Zootecus*) *damarensis*, H. Ad., Kob., Conch. Cab.
p. 662. pl. 101, f. 17, 18. *D.F.*

1910 *Ena (Eburnea) damarensis*, H. Ad., Bttg., Abh. Senckenb.
Naturf. Ges. Frankfurt, xxxii. p. 443. *N.*

Type in British Museum.

Hab. DAMARALAND (coll. Adams). Ussab (fide von Martens) and Ubeb, on the Khan River, N. of Tsoachaul (Schenck). Omaruru (Schinz). "Kurikaubmund am Swakop (Kurikop bei Otjikango)" (Rintelen).

OVAMPOLAND. Ovambonde (Chapman, fide Layard). Grootfontein, near Upingtonia, and Epitonna, S.E. of Ondonga (Schinz).

This species was described by H. Adams in January, 1870, and by Pfeiffer in July of the same year; hence the English author has priority.

var. MINOR, Pfeiffer.

- 1870 *Bulimus dammarensis*, var. *minor*, Pfr., Mal. Blätt. xvii. p. 94. *D.*
 „ „ „ „ Novit. Conch. iv. p. 4.
 pl. 109, f. 5, 6. *D.F.*
 1887 *Buliminus (Eburnea) damarensis*, H. Ad., var. *expectata*,
 Mouss., J. de C. xxxv. p. 295. pl. 12, f. 4. *N.F.*
 1904 „ *damarensis*, (?) var. *expectatus*, Mouss., von Mts.,
 Die Kalahari, p. 754. *N.*
 1910 *Ena (Eburnea) damarensis*, H. Ad., var. *minor*, Pfr. (= var.
expectata, Mouss.), Bttg., Abh. Senckenb. Naturf. Ges.
 Frankfurt, xxxii. p. 443.

Type in Stettin Museum.

Hab. DAMARALAND (fide Pfeiffer). Ubeb on the Khan River
 (Schenck). Omaruru (Schinz).

OVAMPOLAND. Upingtonia (Schinz).

BECHUANALAND. Meno a kwena (about 24° E. long. and 20° S. lat.),
 in marly sandstone (Passarge).

var. SUBRADIATA, Böttger.

- 1910 *Ena (Eburnea) damarensis*, H. Ad., var. *subradiata*, Bttg., Abh.
 Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 443. *D.*

Type in Senckenberg Mus. Frankfurt.

Hab. DAMARALAND. “Kurikaubmund am Swakop (Kurikop bei
 Otjikango)” (Rintelen).

310. ENA (CONULINUS) DIMERA (Melv. & Pons.). [S.A.M.]

- 1901 *Buliminus (Rhachis) dimerus*, M. & P., A.M.N.H. viii. p. 320.
 pl. 2, f. 13. *D.F.*

Type in British Museum.

Hab. NATAL. Karkloof Bush (McBean).

CAPE OF GOOD HOPE. King Williamstown (Godfrey).

311. ENA (PACHNODUS) DRAKENSBERGENSIS (Smith).

- 1877 *Bulimus (Pachnodus) drakensbergensis*, Smith, A.M.N.H. xx.
 p. 538. *D.*
 1879 *Buliminus natalensis*, Krs., var. *draakensburgensis*, Smith, Binn.,
 Ann. N.Y. Acad. Sci. i. p. 362. pl. 14, f. J. *R.*
 1901 „ (*Pachnodes*) *drakensbergensis*, Smith, Kob., Conch.
 Cab. p. 758. pl. 111, f. 7, 8. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. East slope of Drakensberg, near Lydenburg Goldfields (ex coll. Sowerby). Pilgrim's Rest (Craven).

312. *ENA* (? *RHACHISELLUS*) *DUBIOSA* (Sturany).

1898 *Buliminus* (*Rhachis*) *dubiosus*, Stur., S.A. Moll. p. 64. pl. 2, f. 45, 46. *D.F.*

1900 " " Kob., Conch. Cab. p. 632. pl. 96, f. 17, 18. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. LORENZO MARQUES. Matolla (Penther).

313. *ENA* (*XEROCERASTUS*) *HOTTENTOTA* (Gray).

1838 *Bulimus hottentota*, Gray, Alexander's Expedition, ii. p. 269. *D.*

1870 *Bulimulus pygmaeus*, H. Adams, P.Z.S. p. 9. pl. 1, f. 18. *D.F.*

1877 " " Pfr., Mon. Hel. viii. p. 123. *D.*

1910 *Ena* (*Eburnea*) *pygmaea*, H. Adams, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 442. *N.*

Types in British Museum.

Hab. GREAT NAMALAND. Near Great Fish River (Alexander).

DAMARALAND (in coll. H. Adams). Flats by the Khan River, N. of Tsoachaul (Sehenck). Ussab (fide von Mts.). 140 kilos from Swakopmund (Rintelen).

OVAMPOLAND. Ovambonde (Chapman, fide Layard).

314. *ENA* (*XEROCERASTUS*) *LAYARDI* (Melv. & Pons.).

1892 *Buliminus layardi*, M. & P., A.M.N.H. ix. p. 90. pl. 5, f. 11. *D.F.*

1901 " " Kob., Conch. Cab. p. 793. pl. 117, f. 3. *D.F.*

Type in British Museum.

Hab. BECHUANALAND. Kobis, probably just S. of Lake Ngami (in coll. Layard).

315. *ENA* (*PACHNODUS*) *MCBEANIANA*, Burnup. [S.A.M.]

1905 *Ena* (*Pachnodus*) *mcbeaniana*, Bnp., Proc. Mal. Soc. vi. p. 302. pl. 16, f. 1, 2. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Pretoria District (McBean). Pietpotgietersrust (Connolly).

Bulimus spadiceus, var., quoted by Krauss (Südafr. Moll., 1848, p. 79) from Mt. Mohapaani, is possibly referable to this species.

316. ENA (CONULINUS) MARITZBURGENSIS (Melv. & Pons). [S.A.M.]
 1893 *Buliminus (Pachnodus) maritzburgensis*, M. & P., A.M.N.H. xii.
 p. 105. pl. 3, f. 5 *D.F.*
 1901 *Buliminus (Pachnodes) maritzburgensis*, M. & P., Kob., Conch.
 Cab. p. 760. pl. 111, f. 16, 17. *D.F.*
 Type in British Museum.
Hab. NATÁL. Thornybush, and other localities near Pietermaritzburg (Burnup).

317. ENA (RHACHIDINA) MELANACME (Pfeiffer).

- 1855 *Bulimus melanacme*, Pfr., P.Z.S. p. 96. pl. 31, f. 8. *D.F.*
 1859 " " " Mon. Hel. iv. p. 486. *D.*
 " " (*Rhachis melanacme*, Pfr., von Mts., Mal. Blätt. vi.
 p. 212. pl. 2, f. 8. *N.F.*
 1860 *Buliminus (Rhachis) melanaeme*, Pfr., von Mts., Die Helic.
 p. 231. (*Err. Typ.*)
 1869 " " *melanacme*, Pfr., von Mts., Nachrichtsbl.
 d. Deutsch. Mal. Ges. p. 152. *N.*
 1889 *Pachnodus sesamorum*, Ancy in Mss., Bgt., Moll. de l'Afr.
 équat. p. 66. pl. 3, f. 2, 3. *D.F.*
 1897 *Buliminus (Rhachis) melanacme*, Pfr., von Mts., D.-O.-Afr. p. 75. *N.*
 1900 " " " Kob., Conch. Cab. p. 623.
 pl. 95, f. 8. *D.F.*

Type in British Museum.

Hab. MOZAMBIQUE. Tette (Peters).

Also found in East Africa. Pfeiffer's loc. Tette is of doubtful authenticity. von Martens (1897) remarks: Pfeiffer gives Tette, on the Zambesi, as the finding-place of the specimens found by Peters; but on Peters' labels in the Berlin Museum only Querimba, not Tette, is written, while for *B. punctatus* both localities are vouched for in his handwriting."

Melvill and Standen (1907) quote this species from Petauke, Northern Rhodesia.

318. ENA (CONULINUS) MERIDIONALIS (Pfeiffer). [S.A.M.]

- 1847 *Bulimus meridionalis*, Pfr., P.Z.S. p. 231. *D.*
 1848 " " " Mon. Hel. ii. p. 108. *D.*
 " " " Rve., Conch. Icon. pl. 56, f. 370. *D.F.*
 1898 *Buliminus (Rhachis) meridionalis*, Pfr., Stur., S.A. Moll. p. 64. *N.*
 1901 " (*Conulinus meridionalis*, Pfr., Kob., Conch. Cab.
 p. 759. pl. 111, f. 14, 15. *D.F.*

Type in British Museum.

Hab. "SOUTH AFRICA" (in coll. Cuming, fide Pfeiffer).

CAPE OF GOOD HOPE. Port Elizabeth (Crawford; Farquhar).

? LORENZO MARQUES. Matolla (Penther, fide Sturany).

319. ENA (CONULINUS) METULOIDES, Smith. [S.A.M.]

1899 *Buliminus (Conulinus) metuloides*, Smith, P.Z.S. p. 587. pl. 33, f. 43. *D.F.*

Type in British Museum.

Hab. RHODESIA. Victoria Falls (Becker).

Described from Zomba, Nyassaland.

The Rhodesian specimens are a little stouter than the type, but do not appear separable.

320. ENA (RHACHIDINA) MOZAMBICENSIS (Pfeiffer).

1846 *Bulimus mozambicensis*, Pfr., Symb. iii. p. 85. *D.*

1848 " " " Mon. Hel. ii. p. 177. *D.*

1849 " " " Rve., Conch. Icon. pl. 58, f. 328. *D.F.*

1859 " *mozambicensis*, Pfr., Mon. Hel. iv. p. 473. *D.*

1869 " (*Rhachis*) *mozambicensis*, Pfr., von Mts., Nachrichtsbl. d. Deutsch mal. Ges. i. p. 150. *D.*

1879 *Buliminus mozambicensis*, Pfr., Gibbons, Journ. of Conch. ii. p. 144. *N.*

" " *spekei*, Bgt., Moll. de l'Égypte, p. 4. *D.*

1897 " (*Rhachis*) *mossambicensis*, Pfr. (cum var. *spekei*, Bgt.), von Mts., D.-O.-Afr. p. 74. *N.D.*

1899 " " *mozambicensis*, Pfr., Junod, Bull. Soc. Vaudoise, xxxv. p. 279. *N.*

1901 " " *mozambicensis*, Pfr., Kob., Conch. Cab. p. 748. pl. 110, f. 7, 8. *D.F.*

Type in British Museum.

Hab. LORENZO MARQUES. Rikatla (Junod).

Originally described from Mozambique (coll. Cuming).

321. ENA (PACHNODUS) NATALENSIS (Krauss). [S.A.M.]

1846 *Bulimus natalensis*, Krs., Pfr., Symb. iii. p. 86. *D.*

1848 " " " Südafr. Moll. p. 78. pl. 5, f. 1. *D.F.*

" " " Pfr., Mon. Hel. ii. p. 48. *D.*

1849 " " " Rve., Conch. Icon. pl. 62, f. 430. *D.F.*
(*pessima*).

- 1898 *Buliminus (Pachnodus) natalensis*, Krs., Stur., S.A. Moll. p. 63. N.
 1899 „ (*Pachnodes*) „ „ Kob., Conch. Cab. p. 621.
 pl. 94, f. 14, 15. D.F.

Type in Stuttgart Museum.

Hab. NATAL. Near Natal Bay (Krauss). Drakensberg (Wahlberg). Umkomaas; Pietermaritzburg; Tongaat; Pinetown; Krantz Kloof (Burnup).

CAPE OF GOOD HOPE. Port Elizabeth; Springfields (Reeve). Kowie (Farquhar). Port St. John's (Shortridge). Knysna (Layard).

LORENZO MARQUES. Rikatla (Junod). Delagoa Bay (smaller var., fide Sturany).

322. *ENA NUPTIALIS* (Melv. & Pons.). [S.A.M.]

- 1894 *Buliminus nuptialis*, M. & P., A.M.N.H. xiv. p. 92. pl. 1, f. 5. D.F.
 1901 „ (*Pachnodes*) *nuptialis*, M. & P., Kob., Conch. Cab.
 p. 762. pl. 111, f. 22. D.F.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Craigie Burn, Somerset East (Mrs. Barber). Elandsberg Mountain, Cradock (Farquhar).

323. *ENA (XEROCERASTUS) OPPOSITA* (Mousson).

- 1887 *Helix (Cochlicella) opposita*, Mouss., J. de C. xxxv. p. 293. pl. 12,
 f. 2. D.F.
 1900 *Buliminus (Zootecus?) oppositus*, Mouss., Kob., Conch. Cab.
 p. 661. pl. 101, f. 13. D.F.
 1904 *Cochlicella opposita*, Mouss., von Mts., Die Kalahari, p. 755. N.
 1910 *Ena opposita*, Mouss., Bttg., Abh. Senckenb. Naturf. Ges.
 Frankfurt, xxxii. p. 444. N.

Hab. OVAMPOLAND. Upingtonia (subfossil, Schinz).

BECHUANALAND. Meno a kwena (subfossil, Passarge).

Described from a single specimen, compared to *Cochlicella ventricosa*, Drap., and *terveriana*, Webb.

324. *ENA PENTHERI* (Sturany).

- 1898 *Buliminus (Rhachis) pentheri*, Stur., S.A. Moll. p. 65. pl. 2, f. 47,
 48. D.F.
 1900 „ „ Kob., Conch. Cab. p. 631.
 pl. 96, f. 15, 16. D.F.

Type in Naturh. Hofmus. Vienna.

Hab. LORENZO MARQUES. Matolla (Penther).

325. ENA (? RHACHISELLUS) PETERSI, Pfeiffer.

- 1855 *Bulimus petersi*, Pfr., P.Z.S. p. 97. D.
 1859 " " von Mts., Mal. Blätt. vi. p. 213. N.
 " " " Mon. Hel. iv. p. 496. D.
 1902 *Buliminus (Rhachis) petersi*, Pfr., Kob., Conch. Cab. p. 986. D.
 Type in British Museum.
 Hab. LORENZO MARQUES. Tette (Peters).

326. ENA (XEROCERASTUS) PSAMMOPHILA (Böttger).

- 1886 *Buliminus (Mastus) psammophilus*, Bttg., Ber. Senckenb.
 Naturf. Ges. Frankfurt, p. 23. pl. 2, f. 2. D.F.
 1887 " *psammophilus*, Bttg., Mouss., J. de C. xxxv. p. 295. N.
 1900 " (*Zootecus psammophilus*, Bttg., Kob., Conch. Cab.
 p. 663. pl. 101, f. 19-21. D.F.
 1910 *Ena (Eburnea) psammophila*, Bttg., Abh. Senckenb. Naturf.
 Ges. Frankfurt, xxxii. p. 443. N.
 Type in Senckenberg Mus. Frankfurt.
 Hab. BECHUANALAND. Khuis, western border of Kalahari (Nolte).
 GREAT NAMALAND. Choarib (Hermann).

327. ENA (RHACHISELLUS) PUNCTATA (Anton). [S.A.M.]

- 1839 *Bulimus punctatus*, Ant., Verz. Conch. Samml. p. 42. D.
 1848 " " Pfr., Mon. Hel. ii. p. 212. D.
 1849 " " Rve., Conch. Icon. pl. 55, f. 452. D.F.
 1851 " " Desh., Hist. Nat. Moll. ii, 2. p. 86.
 pl. 157, f. 7, 8. D.F.
 1854, 55 " " (=*solatus*, Bs. in Mss.), Pfr., Conch.
 Cab. p. 229. pl. 62, f. 22-24. D.F.
 1859 *Bulimus (Rhachis) punctatus*, Ant., von Mts., Mal. Blätt. vi.
 p. 213. N.
 1869 *Buliminus (Rhachis) punctatus*, Ant., von Mts., Nachrichtsbl.
 d. Deutsch. Mal. Ges. i. p. 153. N.
 1876 *Bulimus punctatus*, Ant., Hanley & Theobald, Conch. Indica,
 p. 10. pl. 20, f. 10. F.
 1879 " " Gibbons, Journ. of Conch. ii. p. 144. N.
 1889 *Rachisellus ledoulxi*, Bgt., Moll. de l'Afr. équat. p. 70. pl. 5,
 f. 10, 11. D.F.
 1893 *Buliminus (Pachnodus) jejunus*, M. & P., A.M.N.H. xii. p. 106.
 pl. 3, f. 7. D.F.
 1897 " (*Rhachis) punctatus*, Ant. (cum varr. *ledoulxi*, Bgt.,
 and *variolosus*, Morel.), von Mts., D.-O.-Afr. p. 76. N.

1901 *Buliminus* (*Pachnodes* ?) *jejuna*, M. & P., Kob., Conch. Cab. p. 794. pl. 117, f. 5. *D.F.N.*

Types in British Museum.

Hab. LORENZO MARQUES. Tette (Peters). Lebombo Mountains (Barber).

RHODESIA. Near Gwelo (Dodds).

NORTHERN TRANSVAAL (*jejuna*, Bowker).

? OVAMPOLAND. Upingtonia; Epitonna (fide Sturany).

? DAMARALAND. Omaruru (fide Sturany).

An Indian species imported through commerce, and rather widely distributed in East Africa. Very careful comparison has been made of the type set of *jejuna*, in the British Museum, with immature specimens of *punctata* from Daressalam, and no specific difference can be found between them.

Ena (*Rhachisellus*) *férussaci* (Dkr.), which some writers have included in the synonymy, appears to be a distinct species.

328. *ENA* (*XEROCERASTUS*) *SCHULTZEI*, Böttger.

1910 *Ena* (*Eburnea*) *schantzei*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 442. pl. 28, f. 9. *D.F.*

Type in Senckenberg Mus. Frankfurt.

Hab. BECHUANALAND. Kooa; Sekuma District: Kang; Kakir and Lekututu Districts (Schultze).

GRQUALAND WEST. Near Cypher Krantz (Day).

329. *ENA* (*PACHNODUS*) *SPADICEA* (Menke). [S.A.M.]

1846 *Bulimus spadiceus*, Mke., Pfr., Symb. iii. p. 87. *D.*

” ” ” ” Phil., Abb. u. Besch. ii. p. 123. pl. 13, 1. f. 3. *D.F.*

1848 ” ” ” Krs., Südafr. Moll. p. 79. *D.*

” ” ” ” Pfr., Mon. Hel. ii. p. 192. *D.*

1854, 55 ” ” ” ” Conch. Cab. p. 223. pl. 61, f. 13, 14. *D.F.*

1854 ” *vitellinus*, Pfr., P.Z.S. p. 57. *D.*

1859 ” ” ” Mon. Hel. iv. p. 480. *D.*

1902 *Buliminus* (*Pachnodes*) *vitellinus*, Pfr., Kob., Conch. Cab. p. 997. *D.*

Type of *spadicea* in Stettin Museum; *vitellina* in British Museum.

Hab. NATAL. “In the forests” (Krauss). Umlaas River (fide Sturany). Port Shepstone; Durban (Burnup).

CAPE OF GOOD HOPE. Somerset East (Miss Bowker). Kentani (Kolbe). Port Elizabeth (Crawford). East London (fide Layard).

TRANSVAAL. Barberton (Cregoe).

Vitellina was described from "Natal." The type is simply an example of *spadicea*.

var. MINOR, Pfeiffer.

- 1848 *Bulimus spadiceus*, Mke. var., Krs., Südafr. Moll. p. 79. D.
 " " " var. *minor*, Pfr. (*Bulimus caffer*, Krs.,
 in litt.), Pfr., Mon. Hel. ii. p. 192. D.

Krauss' type in Stockholm Museum.

If the above two quotations refer to the same shell, which is not quite certain, the Hab. is Mt. Mohapaani, probably in the Northern Transvaal, and the variety may possibly be identical with *E. mcbeaniana*, Bnp.

330. ENA (? RHACHISELLUS) SPILOGRAMMA (von Martens).

- 1859 *Bulimus spilogrammus*, von Mts., Mal. Blätt. vi. p. 214. pl. 2, f. 9. D.F.
 1860 " (*Pachnodus*) *spilogrammus*, von Mts., Die Helic. p. 230. D.
 1868 " *spilogrammus*, von Mts., Pfr., Mon. Hel. vi. p. 56. D.
 1900 *Buliminus* (*Pachnodus*) *spilogrammus*, von Mts., Kob., Conch.
 Cab. p. 624. pl. 95, f. 9. D.F.

Type in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Tette (Peters).

331. ENA (? RHACHISELLUS) STICTA (von Martens). [S.A.M.]

- 1859 *Bulimus* (*Rhachis*) *stictus*, von Mts., Mal. Blätt. vi. p. 211. pl. 2,
 f. 6. D.F.
 1860 " " " Die Helic. p. 232. D.
 1868 " " " Pfr., Mon. Hel. vi. p. 131. D.
 1899 *Buliminus* " " Smith, P.Z.S. p. 586. N.
 1900 " " " Kob., Conch. Cab. p. 623.
 pl. 95, f. 7. D.F.

Type in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Tette (Peters). Manica Land (Selous). RHODESIA. Three miles east of Umtali (Dodds).

ZULULAND. Umbonambi (Toppin). White Umfolosi Flats (Gibson).

Also reported from Angoni Land and other localities in Central Africa and Northern Rhodesia.

332. ENA (XEROCERASTUS) SUBTERES, Böttger.

- 1910 *Ena* (*Eburnea*) *subteres*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 444. pl. 28, f. 8. D.F.

Type in Senckenberg Museum, Frankfurt.

attributable to *calaharicus*, Bttg., have often been identified with the West African *senegalensis*, Morel., which was described from Goree. In my opinion, they very possibly are that species; but *senegalensis* was admitted by Morelet himself to be identical with the East Indian *cœnopictus*, Hutton, while the latter, with some twenty other names, has been placed by various authors in varying synonymy, including that of the American *marginatus*, Say (= *fallax*, auctt., nec Say).

It will hence be seen that the whole question of the synonymy of *senegalensis* is an extremely difficult one, and, as it is not yet settled, I prefer to leave this West Coast species altogether out of calculation, and restrict the South African list to the narrowest possible limits, as set forth below.

335. LEUCOCHILOIDES CALAHARICUS, Böttger.

1886 *Buliminus* (*Leucochiloides*) *calaharicus*, Bttg., Ber. Senckenb. Naturf. Ges. Frankfurt, p. 24. pl. 2, f. 3. *D.F.*

1900 *Buliminus* (*Leucochiloides*) *calaharicus*, Bttg., Kob., Conch. Cab. p. 664. pl. 101, f. 22, 23. *D.F.*

Type in Senckenberg Mus. Frankfurt.

Hab. BRITISH BECHUANALAND. Ghaus (Nolte).

GRIQUALAND WEST. Blaauwbosch Poort, Hay District (Day). Hartz River, Taungs (Miss Wilman).

DAMARALAND (Geale, in British Museum).

RHODESIA. Victoria Falls (Connolly).

CAPE OF GOOD HOPE. Jansenville (Farquhar; Crawford). Prieska (Gibbons). Karroo (in British Museum)

A variable species, both as to size and form.

336. LEUCOCHILOIDES MINUSCULUS, Mousson.

1887 *Buliminus* (*Leucochiloides*) *minusculus*, Mouss., J. de C. xxxv. p. 295. pl. 12, f. 5. *D.F.*

1902 ,, (*Pupoides*) *minusculus*, Mouss., Kob., Conch. Cab. p. 956. pl. 133, f. 18, 19. *D.F.*

1904 ,, (*Leucochiloides*) *minusculus*, Mouss., von Mts., Die Kalahari, p. 754. *N.*

1910 *Leucochiloides minusculus*, Mouss., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 445. *N.*

Type in Zurich Museum.

Hab. OVAMPOLAND. Ka-Ganab, S.E. of Ondonga (Schinz). Hoesi (Hermann). Sodanna (Passarge).

BECHUANALAND. Meno a kwena (fossil, Passarge).

Separable by its smaller size, if a constant feature, from *calaharicus*, Bttg.

SUB-GENUS MICROSTELE, Böttger, 1886.

(Ber. Senckenb. Naturf. Ges. Frankfurt, p. 26.)

Type of Sub-Genus, *L. noltei*, Bttg.

337. LEUCOCHILOIDES NOLTEI, Böttger.

1886 *Pupa* (*Microstele*) *noltei*, Bttg., Ber. Senckenb. Naturf. Ges. Frankfurt, p. 25. pl. 2, f. 4. *D.F.*

1908 „ *noltei*, Bttg., M. & P., A.M.N.H. i. p. 78. pl. 2, f. 14, 15. *D.F.*

N.B.—The height line, which should be 3.75 mm., is omitted on this plate.

Type in Senckenberg Museum, Frankfurt.

Hab. BRITISH BECHUANALAND. Ghaus (Nolte).

Founded on a single specimen.

338. LEUCOCHILOIDES OBLONGUS, Böttger.

1910 *Leucochiloides* (*Microstele*) *oblongus*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, p. 445. pl. 28, f. 11. *D.F.*

Type in Senckenberg Museum, Frankfurt.

Hab. DAMARALAND. 140 kilom. inland from Swakopmund (Rintelen).

Founded on a single, live specimen, which, as the author recognises, may be a local form of *noltei*.

GENUS JAMINIA, Leach in Risso, 1826.

(Hist. nat. de l'Europe mérid. iv. p. 88.)

(= *Pupa*, Drap., 1801, nec *Pupa*, Bolten, 1798, nec Lam., 1801.)

Type of Genus, *J. muscorum* (Müll.).

I have adopted the nomenclature suggested by B. B. Woodward in Journ. of Conch. x. 1903, p. 358 et seq. On p. 361 he points out that the Sub-genus *Pupilla*, Leach in Turton, 1831, by the adoption of *Jaminia*, becomes a synonym for *Jaminia* s.s.

339. JAMINIA BISULCATA (Jickeli). [S.A.M.]

1872 *Pupa bisulcata*, Jick., Mal. Blätt. xx. p. 107. *D.*

1874 „ „ Fauna N.-O.-Afr. p. 119. pl. 5, f. 10. *D.F.*

1877 „ „ Pfr., Mon. Hel. viii. p. 380. *D.*

Type in Zool. Mus. Berlin.

Hab. RHODESIA. Victoria Falls (Connolly).

Described from Abyssinia.

It has not been possible to compare the Rhodesian shells with Jickeli's type, but they agree very well with his figure and description of *bisulcata*.

340. JAMINIA CORRUGATA, Preston.

1912 *Jaminia corrugata*, Prest., A.M.N.H. ix. pp. 70, f. 4; 71. *F.D.*
Type in coll. Preston.

Hab. RHODESIA. Victoria Falls (Connolly).

341. JAMINIA CRAWFORDIANA (Melv. & Pons.).

1903 *Fauxulus crawfordianus*, M. & P., A.M.N.H. xii. p. 605. pl. 31,
f. 6. *D.F.*

1908 *Pupa crawfordiana*, M. & P., A.M.N.H. i. p. 71. *N.*

1911 " " Bnp., A.M.N.H. vii. p. 402. pl. 10,
f. 1, 2. *N.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Mossel Bay (Crawford).

342. JAMINIA CRYPTOPLAX (Melv. & Pons.). [S.A.M.]

1899 *Pupa cryptoplax*, M. & P., A.M.N.H. iv. p. 198. pl. 3, f. 11. *D.F.*

1908 " " " i. p. 71. pl. 1, f. 1, 2. *N.F.*

1911 " " Bnp., A.M.N.H. vii. p. 402. *N.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Kragga Kama, Port Elizabeth (Crawford; Reeve).

343. JAMINIA DADION (Benson). [S.A.M.]

1864 *Pupa dadion*, Bs., A.M.N.H. xiii. p. 495. *D.*

1868 " " Pfr., Mon. Hel. vi. p. 320. *D.*

1908 " " M. & P., A.M.N.H. i. p. 72. pl. 1, f. 3. *N.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Simonstown; Ravine near Newlands (Layard). Bedford (Farquhar).

NATAL. Umvoti Country (Lightfoot). Karkloof; Nottingham Road; Inhluzani Mountain; Game Pass (Burnup).

344. JAMINIA DAMARICA (Ancey). [S.A.M.]

1888 *Pupa damarica*, Ancey, Le Naturaliste, x. p. 200. *D.*

1892 " *ovampoensis*, M. & P., A.M.N.H. ix. p. 91. pl. 6, f. 11. *D.F.*

- 1901 *Pupa ridibunda*, M. & P., A.M.N.H. viii. p. 320. pl. 2, f. 11. *D.F.*
 1908 „ *damarica*, Ancey, M. & P., A.M.N.H. i. p. 72. *D.*
 „ „ *ovampoensis*, M. & P. (= *ridibunda*), M. & P., A.M.N.H.
 i. p. 79. pl. 2, f. 16. *D.F.*
 1910 *Leucochilus damaricum*, Ancey (= *ovampoensis*, M. & P.), Bttg.,
 Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 446. *N.*
 1911 *Pupa damarica*, Ancey, Bnp., A.M.N.H. vii. p. 403. *N.*

Type of *damarica*—*ubi* ? ; *ridibunda* and *ovampoensis* in British Museum.

Hab. OVAMPOLAND (*ovampoensis*, in coll. Layard). Disappointment Vlei (*damarica*, Andersson & Chapman).

TRANSVAAL. Rustenberg (McBean). Potchefstroom (Miss Livingston). Pretoria; Heidelberg; Buiskop; Pietersburg; Pruizen (Connolly).

ORANGE FREE STATE. Bloemfontein (Connolly).

CAPE OF GOOD HOPE. Prieska (Gibbons). Elandsberg Mountain, Cradock (*ridibunda*); Port Elizabeth (Farquhar).

345. JAMINIA DYSORATA (Melv. & Pons.).

- 1893 *Pupa dysorata*, M. & P., A.M.N.H. xi. p. 20. pl. 3, f. 4. *F.* and
faulty description.
 „ „ „ „ „ xii. p. 111. (*Emend. Descr.*)
 1898 „ *dysorata* „ Stur., S.A. Moll. p. 71. (*Err. typ.*)
 1908 „ *dysorata* „ A.M.N.H. i. p. 73. pl. 1, f. 4. *D.F.*
 1911 „ „ „ Bnp., A.M.N.H. vii. p. 403. *N.D.*

Type in coll. Sykes.

Hab. CAPE OF GOOD HOPE. Griqualand East (in coll. Sykes).

346. JAMINIA FARQUHARI (Melv. & Pons.). [S.A.M.]

- 1898 *Pupa farquhari*, M. & P., A.M.N.H. ii. p. 128. pl. 7, f. 7. *D.F.*
 1908 „ „ „ „ i. p. 74. pl. 1, f. 7. *N.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Elandsberg Mountain, Cradock (Farquhar).

347. JAMINIA FONTANA (Krauss). [S.A.M.]

- 1841 *Pupa fontana*, Krs., Küst., Conch. Cab. p. 122. pl. 16, f. 9-12. *D.F.*
 1848 „ „ „ Südafr. Moll. p. 80. pl. 5, f. 6. *D.F.*
 „ „ „ Pfr., Mon. Hel. ii. p. 355. *D.*
 1866 „ „ „ von Mts., Mal. Blätt. xiii. p. 96. *N.*
 1870 „ „ „ Blanf., Obs. Geol. & Zool. Abyss. p. 477. *N.*
 1874 „ „ „ Jick., Fauna N.-O.-Afr. p. 120. pl. 5, f. 11. *D.F.*

- 1894 *Pupa charybdica*, M. & P., A.M.N.H. xiv. p. 94. pl. 1, f. 13. *D.F.*
 „ „ *custodita* „ „ xiv. p. 93. pl. 1, f. 9. *D.F.*
 „ „ *frustillum* „ „ xiv. p. 94. pl. 1, f. 14. *D.F.*
 „ „ *keroea* „ „ xiv. p. 94. pl. 1, f. 12. *D.F.*
 „ „ *omicronaria* „ „ xiv. p. 93. pl. 1, f. 11. *D.F.*
 1896 „ *amphodon* „ „ xviii. p. 317. pl. 16, f. 6, 7. *D.F.*
 1898 „ *fontana*, Krs., Stur., S.A. Moll. p. 69. *D.*
 1901 „ *endoplax*, M. & P., A.M.N.H. viii. p. 319. pl. 2, f. 10. *D.F.*
 1908 „ *fontana*, Krs. (= *elizabethensis*, *charybdica*, *custodita*,
frustillum, *keroea*, *omicronaria*, *amphodon* and *endo-*
plax), M. & P., A.M.N.H. i. p. 74. *N.*
 1910 *Pupilla fontana*, Krs., Bttg., Abh. Senckenb. Naturf. Ges.
 Frankfurt, xxxii. p. 445. *N.*
 1911 *Pupa fontana*, Krs., Bnp., A.M.N.H. vii. p. 404. *N.*

Types of *amphodon*, *charybdica*, *custodita*, *endoplax*, *frustillum*, *keroea*, and *omicronaria* in British Museum; *fontana* in Stuttgart Museum.

Hab. TRANSVAAL. Source of Mooi River (Wahlberg). Pretoria District (*custodita*, *keroea*, *omicronaria*, &c., very plentiful). Johannesburg (McBean; Johnson). Potchefstroom; Heidelberg (Miss Livingston). Buiskop (Connolly).

ORANGE FREE STATE. Bloemfontein; Rustfontein (Connolly).

NATAL. Karkloof (McBean). Edendale; Tongaat (Burnup).

CAPE OF GOOD HOPE. Prieska (Lightfoot). Cradock (*endoplax*, Farquhar). Port Elizabeth (*amphodon*, *charybdica*, *frustillum*, Crawford; Penther). East London (Miss Bowker). Victoria East; Pirie Forest (Godfrey).

GRIQUALAND WEST. Blaauwbosch Poort, Hay District (Day).

DAMARALAND. Gobabis (sub-fossil, Hermann).

Also known from Abyssinia and other countries. Nevill cites a variety of this species as collected by Blanford at Agula, Adignat, and Meshek, in North-East Africa. Jickeli (1874) describes and figures a var. *globulosa*, which he collected in Abyssinia in company with the typical form.

var. ELIZABETHENSIS (Melv. & Pons.).

- 1892 *Pupa elizabethensis*, M. & P., A.M.N.H. ix. p. 91. pl. 5, f. 13. *D.F.*
 Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford).

The albino form of *fontana*, and, as such, entitled to varietal rank.

348. JAMINIA GRIQUALANDICA (Melv. & Pons.). [S.A.M.]

1893 *Pupa griqualandica*, M. & P., A.M.N.H. xi. p. 22, pl. 3, f. 9. *D.F.*1908 " " " " i. p. 76. pl. 1, f. 8-10. *D.F.*1911 " " " Bnp., A.M.N.H. vii. p. 405. *N.*

Type in coll. Sykes.

Hab. CAPE OF GOOD HOPE. Griqualand East (Sykes). Cradock (Farquhar). Port Elizabeth (in coll. Ponsonby).

NATAL. Pietermaritzburg; Dargle; Tongaat; Edendale (Burnup).

ZULULAND. Dukuduku (Toppin).

TRANSVAAL. Pretoria District (Farquhar). Heidelberg (Miss Livingston). Buiskop (Connolly).

349. JAMINIA IOTA (Melv. & Pons.). [S.A.M.]

1894 *Pupa iota*, M. & P., A.M.N.H. xiv. p. 93. pl. 1, f. 10. *D.F.*1908 " " " " i. p. 77. pl. 1, f. 11. *D.F.*1911 " " " Bnp., A.M.N.H. vii. p. 406. *N.*

Type in British Museum.

Hab. TRANSVAAL. Pretoria (Farquhar; McBean). Heidelberg (Miss Livingston). Standers Kop (Connolly).

ZULULAND. Dukuduku Forest (Toppin).

var. LIVINGSTONÆ, Burnup.

1908 *Pupa iota*, M. & P., var. *livingstonæ*, Bnp., M. & P., A.M.N.H. i. p. 77. pl. 1, f. 12. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Pretoria; Standerton (Connolly).

350. JAMINIA LAYARDI (Benson). [S.A.M.]

1856 *Pupa layardi*, Bs., A.M.N.H. xviii. p. 435. *D.*1859 " " " Pfr., Mon. Hel. iv. p. 674. *D.*1864 " " " A.M.N.H. xiii. p. 496. *N.*1868 " " " Pfr., Mon. Hel. vi. p. 318. *D.*1876 " " " Sow., Conch. Icon. pl. 15, f. 141. *D.F.*1908 " " " M. & P., A.M.N.H. i. p. 78. pl. 2, f. 13. *N.F.*1911 " " " Bnp., A.M.N.H. vii. p. 407. pl. 10, f. 3, 4. *N.F.*

Originals in University Museum of Zoology, Cambridge.

Hab. CAPE OF GOOD HOPE. Cape Point (Layard). Hermanus (Lightfoot).

var. MINOR, Benson.

1864 *Pupa layardi*, var. *minor*, Bs., A.M.N.H. xiii. p. 496. *D.*1868 " " " " Pfr., Mon. Hel. vi. p. 318. *D.*

Pupa stoaphora, Bs., in litt.

- 1889 " " " Paetel, Catalog, ii. p. 305.
 1908 " *layardi*, var. *minor*, Bs., M. & P., A.M.N.H. i. p. 78. *N.*
 1911 " " " " Bnp., A.M.N.H. vii. p. 408.
 pl. 10, f. 5, 6. *N.F.*

Originals of var. *minor* in University Museum of Zoology, Cambridge; *stoaphora* in British Museum.

Hab. CAPE OF GOOD HOPE. Bredasdorp, at the roots of grasses among stones (*stoaphora*, Layard).

351. JAMINIA PERPLEXA (Burnup). [S.A.M.]

- 1908 *Pupa perplexa*, Bnp., M. & P., A.M.N.H. i. p. 80. pl. 2, f. 17, 18. *D.F.*
 1911 " " " " A.M.N.H. vii. p. 408. *D.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Cradock; Port Elizabeth (Farquhar).

TRANSVAAL. Johannesburg (McBean). Pretoria (in coll. Ponsonby). Potchefstroom (Miss Livingston). Heidelberg (Connolly).

ORANGE FREE STATE. Bloemfontein (Connolly).

352. JAMINIA PRETORIENSIS (Melv. & Pons.). [S.A.M.]

- 1893 *Pupa pretoriensis*, M. & P., A.M.N.H. xi. p. 21. pl. 3, f. 8. *D.F.*
 1908 " " " " i. p. 81. *N.*
 " " *dysorata*, M. & P., var. *intradentata*, Bnp., M. & P.,
 A.M.N.H. i. p. 73. pl. 1, f. 5, 6. *D.F.*
 1911 " *intradentata*, Bnp., A.M.N.H. vii. p. 405. *D.*

Types in British Museum.

Hab. TRANSVAAL. Pretoria and District (Farquhar; Connolly).

The type of *pretoriensis*, which was not available when the revision of the South African *Pupidae* was being prepared (1908), proves to be a slightly immature example of the species better known as *intradentata*, Bnp. *Pretoriensis*, of course, has priority.

353. JAMINIA QUANTULA (Melv. & Pons.).

- 1893 *Pupa quantula*, M. & P., A.M.N.H. xi. p. 20. pl. 3, f. 5. *D.F.*
 1908 " " " " i. p. 81. pl. 2, f. 19. *N.F.*
 1911 " " " " Bnp., A.M.N.H. vii. p. 409. *N.*

Type—*ubi?*

Hab. CAPE OF GOOD HOPE. Port Elizabeth, South of Baakens River to Schoenmakers Kop (Crawford).

1910 *Pupilla tetrodus*, Bttg. (= *sinistrorsa* and *thaumasta*), Bttg.,
Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 446. N.

Types of *sinistrorsa* and *thaumasta* in British Museum; *tetrodus*
in Senckenberg Museum, Frankfurt.

Hab. BECHUANALAND. Gokwe River, 22° S. lat. and 28° E. lon.,
about 30 miles N. of Palapye Road (sub-fossil, Hübner).

CAPE OF GOOD HOPE. Cape Récif; Klein Setjes Bosch, near
Beaufort (*sinistrorsa*, Craven). Port Alfred (Penther). King
Williamstown; Lovedale; Burns Hill (Godfrey). Port Elizabeth
(*thaumasta*, Crawford). Prieska (Gibbons). Grahamstown; Cradock;
Jansenville; Somerset East (Farquhar). Coega (Miss Hickey).

BRITISH BECHUANALAND. Hartz River, Taungs (Miss Wilman).

TRANSVAAL. Pretoria (Connolly). Potchefstroom (Miss Livingston).

ORANGE FREE STATE. Bloemfontein (Godfrey). Kroonstad (Miss
Hickey).

OVAMPOLAND. Disappointment Vlei (in coll. Layard).

SUB-GENUS FAUXULUS, Schaufuss, 1869.

(Paetel's Catalog, p. 15.)

(= *Faula*, H. & A. Adams, 1855, nec Blanchard, 1850.)

Type of Sub-Genus, *J. capensis* (Kurr).

357. JAMINIA (FAUXULUS) CAPENSIS (Kurr). [S.A.M.]

- 1841 *Pupa capensis*, Kurr, Küst., Conch. Cab. p. 10. pl. 1, f. 19, 20. *D.F.*
 „ „ *ovularis* „ „ *ibid.* p. 10. pl. 1, f. 16-18. *D.F.*
 „ „ *pottebergensis*, Krs., Küst., *ibid.* p. 17. pl. 2, f. 20-22. *D.F.*
 „ „ *kurrii*, Krs. (= *ovularis*, Kurr, nec Oliv.), Küst., *ibid.*
 p. 111. pl. 15, f. 5, 6. *D.F.*
 1842 „ *capensis*, Kurr, Pfr., Symb. ii. p. 53. *D.*
 „ „ *kurrii* and *pottebergensis*, Krs., Pfr., *ibid.* p. 54. *D.*
 1848 „ *capensis*, Kurr, *kurrii* and *pottebergensis*, Krs., Pfr., Mon.
 Hel. ii. p. 331. *D.*
 1851 „ *fonticola*, Desh., Hist. nat. Moll. ii. p. 220. pl. 156, f. 26-
 28. *D.F.*
 1878 „ *pottebergensis*, Krs., Sow., Conch. Icon. pl. 18, f. 166. *D.F.*
 „ „ *kurrii*, Krs. (= *fonticola*), Sow., *ibid.* pl. 19, f. 182. *D.F.*
 1898 „ *pottenbergensis*, Krs., Stur., S.A. Moll. p. 67. (*Err. typ.*)
 1908 „ *capensis*, Kurr (cum varr. *kurrii* and *pottebergensis*, Krs.),
 M. & P., A.M.N.H. i. p. 83.
 1911 „ „ „ (= *kurrii* and *pottebergensis*), Bnp.,
 A.M.N.H. vii. p. 411. N.

Types of *capensis*, *kurrii*, and *pottebergensis* in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE. Zoetendals Valley and Potteberg, Swellendam District (Krauss). Port Elizabeth (Crawford). Gordon's Bay (Connolly). St. Helena Bay; recent and fossil at Saldanha Bay (Lightfoot).

BRITISH BECHUANALAND. Kuruman (Moffatt, fide Layard).

CAPE PENINSULA. Widely distributed. A pretty variety with bright yellow brown band below the suture and yellow base comes from Buffelsfontein, Cape Point, where shells of uniform pale orange colour are also found.

Fonticola was described from "Cape of Good Hope" (Verreaux).

358. JAMINIA (FAUXULUS) FRYANA (Benson).

1864 *Pupa fryana*, Bs., A.M.N.H. xiii. p. 495. *D.*

1868 " " Pfr., Mon. Hel. vi. p. 319. *D.*

1908 *Pupa (Fauxulus) fryana*, Bs., M. & P., A.M.N.H. i. p. 83. *N.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Bredasdorp (Fry; At the roots of grasses among stones, Layard).

359. JAMINIA (FAUXULUS) GLANVILLEANA (Ancy).

1888 *Pupa glanvilliana*, Ancy, Le Naturaliste, x. p. 200. *D.*

1908 " (*Fauxulus*) *glanvilleana*, Ancy, M. & P., A.M.N.H. i. p. 83. *D.*

1911 " " " " Bnp., A.M.N.H. vii. p. 411. *N.*

Type—*ubi*?

Hab. CAPE OF GOOD HOPE. East London (Miss Glanville; Miss Bowker):

var. DARGLENSIS, Burnup.

1908 *Pupa (Fauxulus) glanvilleana*, Ancy, M. & P., A.M.N.H. i. pl. 2, f. 23. *F.*

1911 " " " " Ancy, var. *darglensis*, Bnp., A.M.N.H. vii. p. 412. *D.*

Type in British Museum.

Hab. NATAL. Dargle; Game Pass, near Giant's Castle, Drakensberg; Inhluzani Mountain; Karkloof; Ntimbankulu (Burnup).

var. TOMLINI, Burnup.

1911 *Pupa (Fauxulus) glanvilleana*, Ancy, var. *tomlini*, Bnp., A.M.N.H. vii. p. 413. pl. 10, f. 7. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Albany (Miss Glanville). East London (Radford). Gamtoos (Reeve).

360. JAMINIA (FAUXULUS) MCBEANIANA, Melv. & Pons. [S.A.M.]
1901 *Fauxulus (Anisoloma) mcbeanianus*, M. & P., A.M.N.H. viii.
p. 319. pl. 2, f. 9. *D.F.*
1911 *Pupa (Fauxulus) mcbeaniana*, M. & P., Bnp., A.M.N.H. vii.
p. 414. pl. 10, f. 8. *N.F.*

Type in British Museum.

Hab. NATAL. Karkloof Bush (McBean). Majuba (Connolly). Dargle; Nottingham Road (Burnup).

361. JAMINIA (FAUXULUS) PAMPHORODON (Benson). [S.A.M.]
1864 *Pupa pamphorodon*, Bs., A.M.N.H. xiii. p. 495. *D.*
1868 " " " Pfr., Mon. Hel. vi. p. 320. *D.*
1876 " " " Sow., Conch. Icon. pl. 13, f. 120. *D.F.*
1908 " (*Fauxulus*) *pamphorodon*, Bs., M. & P., A.M.N.H. i. p. 84.
pl. 2, f. 24. *N.F.*
1911 " " " " Bnp., A.M.N.H. vii. p. 414. *N.*

Type in British Museum.

Hab. CAPE PENINSULA. Simonstown (Layard). Kalk Bay; Slang Kop; Paul Berg; Cape Point (Connolly).

362. JAMINIA (FAUXULUS) PEREXIMIA (Melv. & Pons.).
1897 *Pupa (Faula) pereximia*, M. & P., A.M.N.H. xix. p. 638. pl. 17,
f. 3. *D.F.*
1908 " (*Fauxulus*) *pereximia*, M. & P., A.M.N.H. i. p. 85. pl. 2,
f. 25. *N.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Buffalo River (fide M. & P.).

363. JAMINIA (FAUXULUS) PONSONBYANA (Morelet).
1889 *Pupa (Faula) ponsonbyana*, Morel., J. de C. xxxvii. p. 9. pl. 1, f. 5. *D.F.*
1901 " (*Anisoloma*) *ponsonbyana*, Morel., Ancy, J. de C. xlix.
p. 140. *N.*
1908 " (*Fauxulus*) *ponsonbyana*, Morel., M. & P., A.M.N.H. i. p. 85. *N.*
1911 " " " " Bnp., A.M.N.H. vii. p. 415.
pl. 10, f. 9-12. *N.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford; Reeve).

Somerset East (Miss Bowker). Grahamstown; Bathurst; Kowie (Farquhar). Alexandria District (Crawford). Pirie (Godfrey).

NATAL. Hilton Road; Zwaart Kop, near Pietermaritzburg (Burnup).

FAMILY CLAUSILIIDÆ, B. B. Woodward, 1903.

(Journ. of Conch. x. pp. 355, 361.)

GENUS BALEA (Prideaux MSS.), Gray, 1824.

(Zool. Journ. i. p. 61)

Type of Genus, *B. fragilis*, Drap. (*perversa*, Lin.).

364. BALEA AFRICANA, Melv. & Pons. [S.A.M.]

1899 *Balea africana*, M. & P., A.M.N.H. iv. p. 198. pl. 3, f. 10. *D.F.*
Type in British Museum.

Hab. NATAL. Van Reenen (Quekett). Karkloof (Burnup).

CAPE OF GOOD HOPE. Bedford (Farquhar). Pirie Forest (Godfrey).

FAMILY ACHATINIDÆ, von Martens, 1879.

(Zoological Record, Moll. p. 65.)

(= Achatinida, Pfr., 1879, Nomenclator, p. 260.)

SUB-FAMILY ACHATININÆ, H. & A. Adams, 1855.

(Gen. rec. Moll. ii. p. 131.)

GENUS METACHATINA, Pilsbry, 1904.

(Man. of Conch. xvi. p. 307.)

Type of Genus, *M. kraussi* (Pfr.).

365. METACHATINA KRAUSSI (Pfeiffer). [S.A.M.]

1846 *Bulinus kraussi*, Pfr., Symb. iii. p. 85. *D.*

1848 " " Krs., Südafr. Moll. p. 78. pl. 5, f. 4. *D.F.*

 " " " Mon. Hel. ii. p. 184. *D.*

1849 " " Rve., Conch. Icon. pl. 63, f. 436. *D.F.*

1860 *Achatina fuscolabris*, von Mts., Die Helic. pp. 202, 204. *N.*

1889 " " (*Bulinus kraussi*, Pfr.), von Mts., Sitz.-
Ber. Ges. Nat. Fr. Berlin, p. 163. *N.*

 " *Livinhacia kraussi*, Pfr. (= *fuscolabris*, von Mts.), Crosse, J. de
C xxxvii. p. 111. *D.*

- 1897 *Limicolaria (Livinhacia) nilotica*, Pfr., von Mts., D.-O.-Afr. pp. 94-98. *D.F. Varr. and Synonymy*.
- 1898 *Livinhacia arnoldi*, Stur., S.A. Moll. p. 59. pl. 2, f. 41. *D.F.*
- 1904 *Burtoa arnoldi*, Stur., Pilsb., Man. of Conch. xvi. p. 307. pl. 26, f. 14. *D.F.*
- „ „ *nilotica*, Pfr., Pilsb., *ibid.* p. 300. pl. 26, f. 15, 16. pl. 27, f. 5, 6. pl. 29, f. 7, 8. pl. 30, f. 18. pl. 35, f. 22, 23. *D.F.*
- 1906 „ *nilotica*, Pfr., Reynell, Proc. Mal. Soc. vii. p. 197. pl. 17, f. 1-3. *A.R.*
- 1907 *Burtoa nilotica*, Pfr. (= *arnoldi*, Stur.), Melv. & Standen, Manchester Memoirs, li, 4. p. 11. *N.*

Type of *nilotica* in British Museum; *arnoldi* in Naturh. Hofmus. Vienna.

Hab. MATEBILILAND. Near the Amanze Inyama River (*arnoldi*, Penther).

RHODESIA. Salisbury (Oakley). Victoria Falls (Soper). Insiza (French).

A most variable form, originally described from The Source of the White Nile (Petherick), and occurring in many parts of Eastern Africa. Crosse (1889) places *Bul. giraudi*, Bgt., in the synonymy, to which von Martens (1897) adds *jouberti*, *sebasmia*, *bridouxiana*, and *lavigeriana*, Bgt. The last-named author also identifies *pethericki*, Bgt., with var. *schweinfurthi*, von Mts., and describes varr. *emini*, *crassa*, *obliqua*, and *oblonga*. Pilsbry (1904) brings in as further varieties *reymondi*, Bgt., and *grandidieri*, Pilsb. (= *Limicolaria bourguignati*, Grandidier).

GENUS ACHATINA, Lamarck, 1799.

(Mém. Soc. Hist. Nat. Paris, p. 75.)

(= *Oncea*, Gistel, 1850; *Urcus* (Klein), Joussemaume, 1884, and *Parachatina*, *Serpæa*, and *Pintoa*, Bourguignat, 1889.)

Type of Genus, *A. achatina* (Lin.).

Pilsbry (1904) places most of the South African forms previously attributed to this Genus in *Cochlitoma*, Fér. (Tabl. Syst. Moll. pt. 3, 1821, pp. 28, 52 (or 24, 48), Type *A. zebra*, Chem.), and Kobelt (1909) follows his example. Apparently there are no anatomical grounds for the subdivision, which rests on a very fragile conchological basis. As many of the leading British and South African authorities are averse to the change, I prefer to retain the older classification.

367. *ACHATINA AMPULLACEA*, Böttger.

1910 *Achatina ampullacea*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 447. pl. 28, f. 13. *D.F.*

Type in Senckenberg Mus. Frankfurt.

Hab. BECHUANALAND. Banks of the Epukiro-Omuramba, 15 kilom. from Komeduve, south of Lake Ngami (Hermann).

A single specimen, likened by Böttger to *A. damarensis*, which, as he says, is found only 5 miles distant from it.

368. *ACHATINA AURORA*, Pfeiffer.

1854 *Achatina aurora*, Pfr., P.Z.S. p. 294. *D.*

1859 " " Mon. Hel. iv. p. 602. *D.*

1904 *Cochlitoma aurora*, Pfr., Pilsb., Man. of Conch. xvii. p. 102. *D.N.*

Type in British Museum.

Hab. NATAL. Durban (coll. Cuming).

The type, and only known specimen, is a semi-bleached, beach-rolled shell, recalling a West African rather than South African form, which may quite possibly have been dropped at Durban in ballast. It has not yet, however, been identified with any other known species.

369. *ACHATINA BISCUPTA*, Smith.

1878 *Achatina bisculpta*, Smith, Quart. Journ. of Conch. i. p. 349. *D.*

1902 " " Ancey, J. de C. l. p. 280, f. 8. *N.F.*

1904 *Cochlitoma* " " Pilsb., Man. of Conch. xvii. p. 94. pl. 13, f. 44. *D.F.*

Type in British Museum.

Hab. "SOUTH AFRICA" (in British Museum).

370. *ACHATINA BURNUPI*, Smith. [S.A.M.]

1890 *Achatina burnupi*, Smith, A.M.N.H. vi. pp. 392, 393. *D.*

1904, 5. *Cochlitoma burnupi*, Smith, Pilsb. Man. of Conch. xvii. p. 97. pl. 32, f. 5. *D.F.*

Type in British Museum.

Hab. NATAL. Van Reenen's Pass, Drakensberg (Burnup). Giant's Castle (Mann).

TRANSVAAL. Carolina District (Horsbrugh).

371. *ACHATINA CHURCHILLIANA*, Melv. & Pons.

1895 *Achatina churchilliana*, M. & P., A.M.N.H. xv. p. 164. pl. 12, f. 3. *D.F.*

1904, 5 *Cochlitoma churchilliana*, M. & P., Pilsb., Man. of Conch. xvii. p. 101. pl. 33, f. 7, 10. *D.F.*

Type in Manchester Museum.

Hab. NATAL. "Port Natal" (Churchill; Grout).

372. *ACHATINA CINNAMOMEA*, Melv. & Pons.

1894 *Achatina cinnamomea*, M.&P., A.M.N.H. xiv. p. 92. pl. 1, f. 6. *D.F.*

1904, 5 *Cochlitoma cinnamomea*, M. & P., Pilsb., Man. of Conch. xvii.
p. 94. pl. 29, f. 42. *D.F.*

Type in Natal Museum, Pietermaritzburg.

Hab. TRANSVAAL. Standerton (Burnup).

373. *ACHATINA CONNOLLYI*, Preston. [S.A.M.]

1912 *Achatina connollyi*, Prest., A.M.N.H. ix. p. 71, f. 5. *D.F.*

Type in coll. Preston.

Hab. RHODESIA. Victoria Falls (Connolly).

374. *ACHATINA CRAWFORDI*, Morelet. [S.A.M.]

1889 *Achatina crawfordi*, Morel., J. de C. xxxvii. p. 8. pl. 1, f. 3. *D.F.*

1897 " " Clapp, Nautilus, xi. p. 69. *N.*

1902 " " Smith, Proc. Mal. Soc. v. p. 169. *N.*

1904, 5 *Cochlitoma crawfordi*, Morel., Pilsb., Man. of Conch. xvii.
p. 93. pl. 26, f. 27, 28. pl. 64, f. 69-71. *D.F.A.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Middleton; Kleinpoort (Crawford).
Somerset East; Bedford (Farquhar). Douglas (Miss Orpen).

Morelet's original locality, Port Elizabeth, is incorrect.

375. *ACHATINA DAMARENSIS*, Pfeiffer.

1870 *Achatina damarensis*, Pfr., Mal. Blätt. xvii. p. 31. *D.*

" " " " Novit. Conch. iv. p. 2. pl. 109,
f. 3, 4. *D.F.*

1877 " " " " Mon. Hel. viii. p. 274. *D.*

1904 " " " " Pilsb., Man. of Conch. xvii. p. 21.
pl. 11, f. 32, 33. *D.F.*

1910 " *damarensis*, " Bttg., Abh. Senckenb. Naturf. Ges.
Frankfurt, xxxii. p. 446. *N.*

Type in Stettin Museum.

Hab. DAMARALAND (Dohrn). Ubeb on the Khan River (Schenck).
Omuramba-Omatuko River, near Okosongoho; Bank of the Black
Nosob, near Gobabis (Hermann).

BECHUANALAND. Banks of the Epukiro-Omuramba, 10 kilom. east of Komeduve, south of Lake Ngami (Hermann).

GREAT NAMALAND. Choarib; Choa's District (Hermann).

376. ACHATINA DIMIDIATA, Smith.

1878 *Achatina dimidiata*, Smith, Quart., Journ. of Conch. i. p. 348. *D.*

1904, 5 *Cochlitoma dimidiata*, Smith, Pilsb., Man. of Conch. xvii. p. 95. pl. 32, f. 6. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Lydenburg (in British Museum; Craven). Piet Retief (Crawshay).

NATAL. Majuba (Connolly).

ORANGE FREE STATE. Near Kopjes Siding (Connolly).

377. ACHATINA FULICA (Férussac).

1821 *Helix (Cochlitoma) fulica*, Fér., Tabl. Syst. Moll. pt. 3. p. 53 (or 49).

„ „ „ *borbonica*, Fér., *ibid.* p. 53 (or 49).

„ „ „ *zebrina*, Fér., *ibid.* p. 53 (or 49).

1822 *Achatina mauritiana*, Lam. (= *fulica*, Fér.), Lam., Hist. nat. An. s. Vert. vi, 2. p. 129. *D.*

1830 „ *couropa*, Lesson, Voy. autour du Monde, Zool. ii. p. 318. pl. 9, f. 2. *D.F.*

1832 „ *mauritiana*, Lam., Quoy & Gaim., Voy. Astrolabe, Moll. p. 152. pl. 11, f. 10-15. pl. 49, f. 21. *D.F.A.*

1838 „ *mauritiana*, Lam. (*fulica*, Fér.), Desh., Hist. nat. An. s. Vert. viii. p. 297. *D.*

1848 „ *fulica*, Fér., Pfr., Mon. Hel. ii. p. 254. *D.*

1849 „ „ „ Rve., Conch. Icon. pl. 2, f. 8. *D.F.*

„ „ „ „ (= *couropa*, Léss.), Phil., Abb. u. Beschr. iii. p. 30. pl. 21, 1, f. 3. *D.F.*

1851 „ „ „ (= *borbonica* and *mauritiana*), Desh., Hist. Nat. Moll. ii, 2. p. 162. pl. 124A, f. 1. pl. 125, f. 3-5. *D.F.*

1869 „ „ „ von Mts., von der Decken's Reisen, iii. p. 58. pl. 2, f. 1. *N.F.*

1870 „ „ „ Semp., Reis. im Arch. Philippin. ii, 3. p. 143. pl. 12, f. 17. *A.*

1880 „ „ „ Mts., Meeresfauna von Mauritius, p. 197. *N.*

1892 „ „ „ Brancsik, Jahrb. Naturwiss. Vereins Trencsiner Com. xv. p. 204. pl. 6, f. 6. *A.*

1897 „ „ „ von Mts., D.-O.-Afr. p. 89. *N.*

- 1904 *Achatina fulica*, Fér., Pilsb., Man. of Conch. xvii. p. 55. pl. 36,
f. 18-20. pl. 37, f. 21-24. *D.F.*

Type—*ubi* ?

Hab. Unknown to Férussac.

NATAL. Durban (Burnup).

A Mauritian species, distributed over East Africa and the neighbouring islands of the Indian Ocean. Its presence in Durban has been traced to introduction in flower-pots from Mauritius. von Martens considers *A. fulva* (Brug.) and *acuta*, Lam., to be nearly related to *fulica*.

378. *ACHATINA GLUTINOSA*, Pfeiffer.

- 1852 *Achatina glutinosa*, Pfr., P.Z.S. p. 86. *D.*
1853 " " " Mon. Hel. iii. p. 485. *D.*
1854 " " " A.M.N.H. xiii. p. 494. *D.*
1859 " *petersi*, von Mts., Mal. Blätt. vi. p. 214. *D.*
1860 " " " Die Helic. p. 294. *N.*
1865 " *glutinosa*, Pfr., Conch. Cab. p. 360. pl. 44 (1854), f. 1. *D.F.*
1868 " *petersi*, von Mts., Pfr., Mon. Hel. vi. p. 213. *D.*
1869 " " " " Novit. Conch. iii. p. 452. pl. 99,
f. 13-15. *D.F.*
1894 " " " Ancey, Mém. Soc. Zool. Fr. vii.
p. 218. *D.*
1899 " *glutinosa*, Pfr. (= *petersi*, von Mts.), Smith, P.Z.S.
p. 589. *N.*
1904 " " " Pilsb., Man. of Conch. xvii. p. 61. pl. 9,
f. 23, 24. *D.F.*

Type in British Museum.

Hab. LORENZO MARQUES. Tette (*petersi*, Peters).

A. glutinosa was described as from "West Africa."

379. *ACHATINA GRANULATA*, Pfeiffer.

[S.A.M.]

- 1852 *Achatina granulata*, Pfr., P.Z.S. p. 66. *D.*
1853 " " " Mon. Hel. iii. p. 484. *D.*
1861 " *semigranosa*, Pfr., P.Z.S. p. 25. *D.*
" " " " Mal. Blätt. viii. p. 78. *D.*
1868 " " " Mon. Hel. vi. p. 216. *D.*
1870 " *granulata*, Pfr., Semp., Reis. im Arch. Philippin. ii, 3.
p. 143. pl. 12, f. 2. pl. 16, f. 14. *A.R.*
1889 " " " (= *zebra*, var. *granulata*, Krs.), von
Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 164.

- 1890 *Achatina granulata*, Pfr. (= *semigranosa*, Pfr.), Smith, A.M.N.H.
vi. p. 391. *N.*
- 1897 „ *drakensbergensis*, M. & P., A.M.N.H. xix. p. 636. pl. 17,
f. 7. *D.F.*
- 1904, 5 *Cochlitoma* „ „ Pilsb., Man. of Conch. xvii.
p. 103. pl. 32, f. 4. *D.F.*

All types in British Museum.

Hab. NATAL (coll. Cuming). Karkloof (McBean). Cape Natal (*semigranosa*, Plant). Inhluzani (*drakensbergensis*); Durban (Bowker). All along the coast from Port Shepstone to Tugela and beyond into Zululand, and at various inland localities as far as Van Reenen's Pass; common at Pietermaritzburg (Burnup and Quekett).

CAPE OF GOOD HOPE. Pondoland (Beyrich).

380. *ACHATINA GREYI*, da Costa.

- 1907 *Achatina greyi*, da Costa, Proc. Mal. Soc. vii. p. 226. pl. 20, f. 1. *D.F.*
- „ „ *ovata* „ „ p. 226. pl. 20, f. 2. *D.F.*
- „ „ *zebrina* „ „ p. 227. pl. 20, f. 5. *D.F.*
- „ „ *subovata* „ „ p. 227. pl. 20, f. 4. *D.F.*

Types in British Museum.

Hab. RHODESIA. Salisbury (Miss Weineck).

Described from the South Congo.

Judging from the types, the foregoing names all refer to forms of one variable species. Examples from Salisbury combine the attributes of two or more of the forms, but are not specifically distinct.

381. *ACHATINA IMMACULATA*, Lamarck. [S.A.M.]

- 1821 *Helix (Cochlitoma) immaculata*, Lam., Fér., Tabl. Syst. Moll.
pt. 3. p. 73 (or 69).
- 1822 *Achatina immaculata*, Lam., Hist. nat. An. s. Vert. vi, 2. p. 128. *D.*
- 1830 „ „ „ „ Desh., Encycl. Méth. Vers. ii. p. 9. *D.*
- 1838 „ „ „ „ Hist. nat. An. s. Vert. viii.
p. 295. *D.*
- 1848 „ „ „ „ Krs., Südafr. Moll. p. 81. *N.D.*
- „ „ „ „ Pfr., Mon. Hel. ii. p. 251. *D.*
- 1851 „ „ „ „ Desh., Hist. Nat. Moll. ii, 2. p. 158.
pl. 127, f. 1, 2. *D.F.*
- 1859 „ „ „ „ Pfr., Mon. Hel. iv. p. 600. *D.*
- 1879 „ „ „ „ Gibbons, Journ. of Conch. ii. p. 143. *N.*
- 1899 „ „ „ „ Smith, Proc. Mal. Soc. iii. p. 309
(*Epiphragm.*)

Hab. CAPE OF GOOD HOPE. Port Elizabeth, "in drift sand, extinct" (Crawford).

385. *ACHATINA LIVINGSTONEI*, Melv. & Pons. [S.A.M.]

- 1897 *Achatina livingstonei*, M. & P., A.M.N.H. xix. p. 636. pl. 17, f. 6. *D.F.*
1904 *Cochlitoma* ,, ,, Pilsb., Man. of Conch. xvii. p. 104.
pl. 14, f. 1. *D.F.*

Type in British Museum.

Hab. BRITISH BECHUANALAND. Kuruman (Livingstone).

CAPE OF GOOD HOPE. Prieska (Gibbons). Buchu Berg, Hay District (Gould).

386. *ACHATINA MACHACHENSIS*, Smith.

- 1902 *Achatina machachensis*, Smith, Proc. Mal. Soc. v. p. 169. *D.F.*
1904, 5 *Cochlitoma* ,, ,, Pilsb., Man. of Conch. xvii.
p. 84. pl. 41, f. 7. *D.F.*

Type in British Museum.

Hab. BASUTOLAND. Mount Machacha (Crawshaw).

387. *ACHATINA NATALENSIS*, Pfeiffer. [S.A.M.]

- 1854 *Achatina natalensis*, Pfr., P.Z.S. p. 294. *D.*
1859 ,, ,, ,, Mon. Hel. iv. p. 602. *D.*
1904 *Cochlitoma* ,, ,, Pilsb., Man. of Conch. xvii. p. 102. *D.*

Type in British Museum.

Hab. NATAL. Port Natal (Plant).

CAPE OF GOOD HOPE. Somerset East (Miss Bowker).

TRANSVAAL. Wakkerstroom (Bowker).

ORANGE FREE STATE. Vredefort Road (Barrett Hamilton).

LORENZO MARQUES. Delagoa Bay (Plant).

388. *ACHATINA ÆDIGYRA*, Melv. & Pons.

- 1894 *Achatina ædigyra*, M. & P., A.M.N.H. xiv. p. 92. pl. 1, f. 7. *D.F.*
1904, 5 *Cochlitoma ædigyra*, M. & P., Pilsb., Man. of Conch. xvii.
p. 94. pl. 26, f. 29. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Craigie Burn, Somerset East (Mrs. Barber).

RHODESIA. Salisbury (in British Museum).

389. *ACHATINA PANTHERA* (Férussac). [S.A.M.]

- 1821 *Helix (Cochlitoma) panthera*, Fér., Tabl. Syst. Moll. pt. 3. p. 53 (or 49).
1838 *Achatina panthera*, Fér., Desh., Hist. nat. An. s. Vert. viii. p. 309. *D.*

- 1846 *Achatina lamareckiana*, Pfr., P.Z.S. p. 115. D.
 1847 " " " A.M.N.H. xix. p. 269. D.
 1848 " " " Mon. Hel. ii. p. 253. D.
 " " *panthera*, Fér., Pfr., Mon. Hel. ii. p. 252. D.
 1849 " " " Rve., Conch. Icon. pl. 3, f. 12. D.F.
 1851 " " " Desh., Hist. Nat. Moll. ii, 2. p. 159.
 pl. 126, f. 1, 2. pl. 132, f. 1, 2. D.F.
 1860, 63 " " " Pfr., Conch. Cab. p. 327. pl. 28, f. 1. D.F.
 1879 " " " Pfr., Gibbons, Journ. of Conch. ii. p. 143. N.
 " " " Fér., Bgt., Moll. de l'Égypte, p. 9. N.
 1889 " " " von Mts., Sitz.-Ber. Ges. Nat. Fr.
 Berlin, p. 164. N.
 1890 " " " von Mts., *ibid.* p. 86. N.
 1894 " " " Ancey, Mém. Soc. Zool. Fr. vii. p. 219. D.
 1897 " " " von Mts., D.-O.-Afr. p. 83. N.
 1899 " " " Smith, P.Z.S. p. 589. pl. 34, f. 1. N.F.
 " " " var. *minor*, Fér., Junod, Bull. Soc.
 Vaudoise, xxxv. p. 278. N.
 1904, 5 " " " Pilsb., Man. of Conch. xvii. p. 41.
 pl. 38, f. 30, 31. pl. 39, f. 32. pl. 62,
 f. 22-24. pl. 63, f. 30, 32. D.F.A.R.

Hab. Unknown to Férussac.

TRANSVAAL. Queensriver, near the Victoria Mine, Barberton District (Schenck). Lebombo Mountains, between Barberton and Delagoa; Kapaira (Beyrich).

LORENZO MARQUES. Inhambane (Gibbons; Bowker). Tette (Peters; Kirk). Rikatla (Junod).

RHODESIA. Sebakwe (Dodds).

Widely distributed through East and Central Africa and the islands of the Indian Ocean. *A. lamareckiana* was described from Madagascar.

In the South African Museum are two shells of this species, recorded as from "Port Elizabeth" (Fairbridge). If the locality is correct, the specimens were almost certainly introduced.

Pilsbry (1904) includes *A. mossambica*, Brancsik, and *A. lechaptoisi*, Ancey, in the synonymy.

390. ACHATINA PARTHENIA, Melv. & Pons. [S.A.M.]

- 1903 *Achatina parthenia*, M. & P., A.M.N.H. xii. p. 605. pl. 32, f. 10. D.F.
 1904 *Cochlitoma* " " Pilsb., Man. of Conch. xvii. p. 100.
 pl. 12, f. 38. D.F.

Type in British Museum.

Hab. ZULULAND. Lower Umfolosi Drift; Makowe (Burnup).
Ubomba (Toppin).

391. *ACHATINA PASSARGEI*, von Martens.

- 1900 *Achatina passargei*, von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin,
p. 119. *D.F.*
1904 „ „ Die Kalahari, pp. 754, 755 (f. 1).
D.F.
„ „ „ Pilsb., Man. of Conch. xvii. p. 70. *D.*
Type in Zool. Mus. Berlin.
Hab. OVAMPOLAND. Sodanna (Passarge).

392. *ACHATINA PENESTES*, Melv. & Pons.

- 1893 *Achatina penestes*, M. & P., A.M.N.H. xii. p. 104. pl. 3, f. 3. *D.F.*
1904, 5 *Cochlitoma penestes*, M. & P., Pilsb., Man. of Conch. xvii.
p. 100. pl. 28, f. 40. *D.F.*
Type in British Museum.
Hab. TRANSVAAL. Pretoria (ex coll. Wotton)

393. *ACHATINA PENTHERI*, Sturany.

- 1898 *Achatina pentheri*, Stur., S.A. Moll. p. 56. pl. 2, f. 40. *D.F.*
1904, 5 *Cochlitoma pentheri*, Stur., Pilsb., Man. of Conch. xvii. p. 81.
pl. 30, f. 50. *D.F.*
Type in Naturh. Hofmus. Vienna.
Hab. NATAL. Durban (Penther).

394. *ACHATINA RHABDOTA*, Melv. & Pons. [S.A.M.]

- 1898 *Achatina rhabdota*, M. & P., A.M.N.H. i. p. 29. pl. 8, f. 11. *D.F.*
1902 „ „ Smith, Proc. Mal. Soc. v. p. 169. *N*
1904, 5 *Cochlitoma rhabdota*, M. & P., Pilsb., Man. of Conch. xvii.
p. 91. pl. 27, f. 37. *D.F.*
Type in British Museum.
Hab. "SOUTH AFRICA" (fide M. & P.).
LITTLE NAMALAND. Port Nolloth (fide Watson).

395. *ACHATINA SCÆVOLA*, Melv. & Pons.

- 1893 *Achatina scævola*, M. & P., A.M.N.H. xii. p. 104. pl. 3, f. 2. *D.F.*
1904, 5 *Cochlitoma scævola*, M. & P., Pilsb., Man. of Conch. xvii.
p. 98. pl. 34, f. 11. *D.F.*
Type in British Museum.
Hab. NORTHERN TRANSVAAL. Zoutpansberg (Bowker).

396. *ACHATINA SCHENCKI*, von Martens.

- 1889 *Achatina schencki*, von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin,
p. 164. *D.*
1894 " " " Conch. Mitth. iii, 3. p. 8. *D.*
1899 " *schrencki* " Gude, Journ. of Malac. vii. p. 90.
(*Err. typ.*)
1904 *Cochlitoma schencki* " Pilsb., Man. of Conch. xvii. p. 96.
pl. 5, f. 1. *D.F.*

Type in Zool. Mus. Berlin.

Hab. TRANSVAAL. "Macmac, near Lyderburg" (Schenck, 1886).

NOTE.—Macmac is in the Barberton District.

397. *ACHATINA SCHINZIANA*, Mousson.

- 1887 *Achatina schinziana*, Mouss., J. de C. xxxv. p. 294. pl. 12, f. 3. *D.F.*
1889 " " " Morel., J. de C. xxxvii. p. 9. *N.*
1904 " " " Pilsb., Man. of Conch. xvii. p. 16.
pl. 17, f. 19. *D.F.*

Type in Zurich Museum.

Hab. OVAMPOLAND. Ondonga (Schinz). Sodanna (Passarge).

? LORENZO MARQUES. Rikatla (Junod).

NOTE.—Considerable doubt attaches to more than one of Junod's localities, as it appears almost certain that some of the species mentioned in his article on Delagoa Bay were wrongly identified.

var. *DEGENERATA*, Böttger.

- 1910 *Achatina schinziana*, Mouss., var. *degenerata*, Bttg., Abh.
Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 447. pl. 28,
f. 12. *D.F.*

Type in Senckenberg Museum, Frankfurt.

Hab. BECHUANALAND. Kakir (Schultze).

398. *ACHATINA SEMIDECUSSATA*, Menke. [S.A.M.]

- 1846 *Achatina semidecussata*, Mke., Pfr., Symb. iii. p. 91. *D.*
1847 " " " Phil., Abb. u. Besch. ii. p. 213.
pl. 16, 1, f. 1. *D.F.*
1848 " " " Krs., Südafr. Moll. p. 81. *N.*
" " " " Pfr., Mon. Hel. ii. p. 257. *D.*
1860, 63 " " " " Conch. Cab. p. 336. pl. 2,
f. 2, 3. *D.F.*
1889 " " " von Mts., Sitz.-Ber. Ges. Nat.
Fr. Berlin, p. 164. *L.*

1904, 5 *Cochlitoma semidecussata*, "Mke." Pfr., Pilsb., Man. of Conch. xvii. p. 80. pl. 30, f. 51-53. *D.F.*

Type in Stettin Museum.

Hab. NATAL (Menke). Durban (Penther). Tongaat (Burnup). Malvern (Miss Bowker).

TRANSVAAL. Upper Olifant River, north of Middelburg (fide von Martens).

399. *ACHATINA SIMPLEX*, Smith. [S.A.M.]

1878 *Achatina simplex*, Smith, Quart. Journ. of Conch. i. p. 350. *D.*

1904 *Cochlitoma* " " Pilsb., Man. of Conch. xvii. p. 98. pl. 12, f. 37. *D.F.*

Type in British Museum.

Hab. NATAL. Port Natal (Sutherland, 1860). Tugela Valley (fide Quekett). Ladysmith (Burnup).

TRANSVAAL. Between Delagoa Bay and Lydenburg (Wilms, fide von Martens).

400. *ACHATINA SMITHI*, Craven.

1880 *Achatina smithii*, Crvn., P.Z.S. p. 617. pl. 57, f. 1. *D.F.*

1889 " " " Morel., J. de C. xxxvii. p. 9. *N.*

1898 " " " Stur., S.A. Moll. p. 57. *N.*

1904 *Cochlitoma* " " Pilsb., Man. of Conch. xvii. p. 91. pl. 11, f. 36. *D.F.*

Original in British Museum.

Hab. TRANSVAAL. Lydenburg (Craven).

MATEBILILAND. Maitengue River (Penther, fide Sturany).

401. *ACHATINA SUBCYLINDRICA*, Preston.

1909 *Achatina subcylindrica*, Prest., A.M.N.H. iii. p. 182. pl. 7, f. 8. *D.F.*

Type in coll. Putzeys.

Hab. NATAL (fide Preston).

402. *ACHATINA TRANSVAALENSIS*, Smith.

1878 *Achatina transvaalensis*, Smith, Quart. Journ. of Conch. i. p. 351. *D.*

1904 *Cochlitoma* " " Pilsb., Man. of Conch. xvii. p. 99. *D.*

Type in British Museum.

Hab. TRANSVAAL. Lydenburg (in British Museum; Craven).

403. *ACHATINA USTULATA*, Lamarck.

1821 *Helix (Cochlitoma) ustulata*, Lam., Fér., Tabl. Syst. Moll. pt. 3. p. 74 (or 70).

ZULULAND. Kosi Bay (Toppin).

LORENZO MARQUES. Delagoa Bay (Plant).

406. ACHATINA ZEBRA (Chemnitz). [S.A.M.]

- 1767 *Bulla achatina*, var. *livida*, Lin., Syst. Nat., Ed. 12. i, 2. p. 1186. *D.*
 1780 „ „ „ Lin.,” Born, Test. Mus. Caes. Vind. p. 208.
 pl. 10, f. 1. *D.F.*
 1785 „ „ var. *livida*, Lin., Sparrman, A Voyage to the
 Cape of Good Hope, ii. p. 347. *N.*
 1786 „ *zebra*, Chem., Conch. Cab. ix, 2. p. 22. pl. 118, f. 1014. *D.F.*
 1788 „ „ Müll., Gmel., Syst. Nat., Ed. 13. 1, 6. p. 3431. *D.*
 1789 *Bulimus zebra*, Brug., Enc. Méth. Vers, i. p. 357. *D.*
 1797 *Chersina* „ „ Humph., Mus. Calonn. p. 63. *N.*
 1810 *Achatinus zebra*, de Roissy, de Montf., Conch. Syst. ii. p. 419.
 pl. 105. *D.F.*
 1817 *Bulla achatina*, Lin. (var. 4), Dillw., Descr. Cat. i. p. 495. *N.*
 1822 *Achatina zebra*, Lam., Hist. nat. An. s. Vert. vi, 2. p. 128. *D.*
 1837 „ „ *borniana*, Beck, Index Moll. p. 75. (*Emend. Nom.*)
 1838 „ „ *zebra*, Lam., Desh., Hist. nat. An. s. Vert. viii. p. 295. *D.*
 1840 „ „ Chem., Küst., Conch. Cab. pl. 2, f. 3. *F.*
 1842 „ „ *chemnitziana*, Pfr., Symb. ii. p. 132. (*Emend.*)
 „ „ *zebra*, Chem., Rve., Conch. Syst. ii. p. 88. pl. 179, f. 17. *F.*
 1848 „ „ „ (= *chemnitziana*), Pfr., Mon. Hel. ii.
 p. 250. *D.*
 „ „ „ Lam., Krs., Südafr. Moll. p. 80. *D.*
 1849 „ „ „ Chem., Rve., Conch. Icon. pl. 7, f. 23. *D.F.*
 1851 „ „ „ Lam., Desh., Hist. Nat. Moll. ii, 2. p. 156. pl. 133.
D.F.
 1853 „ „ „ Chem., Pfr., Mon. Hel. iii. p. 482. *Varr.*
 1857 „ „ „ „ Conch. Cab. p. 291. pl. 23 (1853),
 f. 1. *D.F.*
 1860 „ „ „ „ (cum var. *borniana*, Beck), von Mts.,
 Die Helic. pp. 203, 204. *D.N.*
 „ „ „ *capensis*, Alb., von Mts., Die Helic. p. 203. *N.*
 1868 „ „ „ *zebra*, Chem., var. *borniana*, Beck, Pfr., Mon. Hel. vi.
 p. 212. *D.*
 1870 „ „ „ „ Semp., Reis. im Arch. Philippin. ii, 3.
 p. 144, pl. 12, f. 22. *Embryo.*
 1890 „ „ „ „ Smith, A.M.N.H. vi. p. 392. *N.*
 1898 „ „ „ „ Brug., M. & P., Proc. Mal. Soc. iii. p. 179.
 1902 „ „ „ „ Chem., Smith, Proc. Mal. Soc. v. p. 169. *N.*

1904, 5 *Cochlitoma zebra*, Brug., Pilsb., Man. of Conch. xvii. p. 85.
pl. 28, f. 39. pl. 64, f. 67. *D.F. & Embryo.*

Type—*ubi?*

Hab. CAPE OF GOOD HOPE (*capensis*, in coll. Albers). Sitsicamma (Sparrman). George and Uitenhage Districts (Krauss). Caffraria (Delalande; *borniana*, fide Beck). Port Elizabeth; Alexandria; Mossel Bay; Grahamstown (Crawford). Lovedale; Pirie Forest; East London (Godfrey). Alicedale (Pillens). Toise River, Cathcart (Mrs. Gore). Stutterheim (French). Knysna (Purcell).

CAPE PENINSULA. Camps Bay (Dale; Morris).

var. FULGURATA, Pfeiffer.

[S.A.M.]

1851 *Achatina fulgurata*, Pfr., P.Z.S. p. 258. *D.*

1853 " " Mon. Hel. iii. p. 486. *D.*

1854 " " A.M.N.H. xiii. p. 147. *D.*

1860, 63 " " Conch. Cab. p. 319. pl. 26, f. 1. *D.F.*

1904, 5 *Cochlitoma fulgurata*, Pfr., Pilsb., Man. of Conch. xvii. p. 85.
pl. 27, f. 34. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Somerset East (Miss Bowker). Grahamstown; Kowie (Farquhar).

Described as from "West Africa" (coll. Cuming).

var. GRANULATA, Krauss.

1848 *Achatina zebra*, Lam., var. *granulata*, Krs., Südafr. Moll. p. 80. *D.*

1904, 5 *Cochlitoma granulata*, Krs. (= *granulata*, Pfr.), Pilsb., Man.
of Conch. xvii. p. 79. pl. 29, f. 44. *D.F.*

Type in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE. Outeniqua, George District (Krauss). NATAL (Wahlberg, fide Krauss).

var. KRAUSSI, Reeve.

1842 *Achatina kraussii*, Rve., P.Z.S. p. 55. *D.*

" " " " Conch. Syst. ii. p. 88. pl. 179, f. 19. *F.*

1848 " *kraussii* " Pfr., Mon. Hel. ii. p. 250. *D.*

" " " " Krs., Südafr. Moll. p. 81. *D.N.*

1849 " *kraussii* " Conch. Icon. pl. 6, f. 21. *D.F.*

1860 " " " Pfr., Conch. Cab. p. 329. pl. 23 (1853),
f. 2. *D.F.*

1890 " " " von Mts., Sitz.-Ber. Ges. Nat. Fr.
Berlin, p. 87. *N.*

1898 " " " Stur., S.A. Moll. p. 55. *N.*

1898 *Achatina zebra*, Brug., var. *kraussi*, Rve., M. & P., Proc. Mal. Soc. iii. p. 179.

1904, 5 *Cochlitoma kraussi*, Rve., Pilsb., Man. of Conch. xvii. p. 87. pl. 16, f. 10, 11. pl. 27, f. 36. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Coega River, Algoa Bay (Krauss).

Reeve's original name and loc., Cape Natal (Krans, in coll. Cuming), are incorrect.

Crawford, in locating this shell from Coega (loc. sol.), writes: "I consider this a species, and have not seen it from anywhere else. The form is different from *A. zebra*, and can be intimated from colourless shells."

var. MINOR, Pfeiffer.

1853 *Achatina zebra*, Chem., var. *minor*, Pfr., Mon. Hel. iii. p. 482. *N.*

1857 " " " " Conch. Cab. p. 292. pl. 23 (1853), f. 1. *N.F.*

Hab. "MADAGASCAR and CAPE" (Krauss).

var. OBESA, Pfeiffer.

?1851 *Helix zebra*, Fér., Desh., Hist. Nat. Moll. pl. 133, middle figure.

1854 *Achatina obesa*, Pfr., Mal. Blätt. i. p. 224. *D.*

1859 " " Mon. Hel. iv. p. 600. *D.*

1890 " " "probably only a stunted form of *zebra*,"
Smith, A.M.N.H. vi. p. 393. *N.*

1904, 5 *Cochlitoma zebra*, Fér., var. *obesa*, Pfr., Pilsb., Man. of Conch. xvii. p. 87. pl. 27, f. 35. *D.F.*

Type in Stettin Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth District (Crawford).

Originally described as from West Africa.

407. ACHATINA ZEBRULA, von Martens.

1900 *Achatina zebra*, von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 118. *D.*

1904 *Cochlitoma* " " Pilsb., Man. of Conch. xvii. p. 90. *D.*

Type in Zool. Mus. Berlin.

Hab. TRANSVAAL. Between Delagoa and Lydenburg (Wilms).

GENUS CÆCILIOIDES, Férussac, 1817.

(de Blainv., Dict. Sci. Nat. v. Suppl. p. 129, as *Cæclionides*, and vii. p. 332, as

Cécilioide, *emend.* Herrmannsen, 1846, *Indicis Generum Malac.* i. p. 150)

(= *Cæcilionella*, Bgt., 1856.)

Type of Genus, *C. acicula* (Müll.).

408. CÆCILIOIDES ACICULA (Müller). [S.A.M.]

- 1774 *Buccinum acicula*, Müll., Verm. ii, p. 150. *D.*
 1798 „ *longiusculum*, Adams, Essays on the Microscope,
 p. 630. pl. 14, f. 26. *D.F.*
 1801 „ *obtusulum*, Turt., Syst. Nat. (English Ed.), iv. p. 416. *D.*
 1803 „ *terrestre*, Mont., Test. Brit. i. p. 248. pl. 8, f. 3. *D.F.*
 1805 *Bulinus acicula*, Müll., Drap., Hist. Moll. Fr. p. 75. pl. 4, f. 25. *D.F.*
 1821 „ „ C. Pfr., Syst. Anordn. deutsch. L.-u.
 W.-Sehn. p. 51. pl. 3, f. 8, 9. *D.F.*
 1826 *Achatina eburnea*, Risso, Hist. Nat. Eur. mérid. iv. p. 81. *D.*
 1827 „ *alba*, Brown, Illustr. Brit. Conch. pl. 41, f. 80. *F.*
 1828 „ *acicula*, Mill., Flem., Hist. Brit. An. p. 267. *D.*
 1831 „ „ Lam., Turton, Manual, p. 89. *D.*
 1832 *Columna miliaris*, de Christ. & Jan, Cat. Mantissa, p. 2. *D.*
 1833 *Cionella acicula*, Müll., Jeffr., Linn. Trans. xvi. p. 348. *D.*
 1836 *Achatina pusilla*, Scacchi, Cat. Conch. Reg. Neapol. p. 16.
 1847 *Acicula pellucida*, Leach in Gray, A.M.N.H. xx. p. 269.
 1848 *Achatina acicula*, Müll., Pfr., Mon. Hel. ii. p. 274. *D.*
 1856 *Cæcilionella acicula*, Müll., Bgt., Rev. et Mag. Zool. p. 382. *D.*
 „ „ „ „ „ Amén. malac. i. p. 215. pl. 18,
 f. 1-3. *D.F.*
 1862 *Achatina acicula*, Müll., Jeffr., Brit. Conch. i. p. 297. pl. 7, f. 18-
 21, and v (1869). pl. 18, f. 3. *D.F.*
 1863 „ „ „ Pfr., Conch. Cab. p. 352. pl. 29 (1865),
 f. 12, 13. *D.F.*
 1908 *Cæcilioides acicula* „ Pilsb., Man. of Conch. xx. p. 9. pl. 1,
 f. 1-10, 13, 14, 16-18. *D.F.*

Original of *acicula* in University Zool. Mus. Copenhagen.

Hab. CAPE OF GOOD HOPE. Cradock (in coll. Ponsonby). Wyn-
 berg (Connolly). Prieska (Gibbons; Gould).

GRIQUALAND WEST. Kimberley (Miss Wilman).

TRANSVAAL. Pietpotgietersrust (Connolly).

ORANGE FREE STATE. Bloemfontein (Connolly).

409. CÆCILIOIDES ADVENA (Ancey).

- 1888 *Cæcilianella advena*, Ancey, Le Naturaliste, x. p. 215. *D.*
 1908 *Cæcilioides* „ „ Pilsb., Man. of Conch. xx. p. 35. *D.*
 Type—*ubi?*

Hab. OVAMPOLAND. Disappointment Vlei (Andersson & Chap-
 man).

Ancey's locality, "Disappointment Key," is probably a slip. On labels in the Layard collection the spelling is Disappointment Vlei, which for many reasons seems the more likely name.

410. CÆCILIOIDES GOKWEANUS (Böttger).

- 1870 *Cionella gokweana*, Bttg., Ber. Offenbach. Ver. f. Naturk. xi.
p. 47. pl. 1, f. 2. *D.F.*
1910 ,, ,, Abh. Senckenb. Naturf. Ges. Frank-
furt, xxxii. p. 449. *N.*

Type in Senckenberg Museum, Frankfurt.

Hab. BECHUANALAND. Sub-fossil at the Gokwe River, near 22° S. lat. and 28° E. long. (Hübner).

TRANSVAAL. Pienaars Poort (Connolly).

411. CÆCILIOIDES OVAMPOENSIS (Melv. & Pons.).

- 1892 *Cionella ovampoensis*, M. & P., A.M.N.H. ix. p. 91. pl. 6, f. 1. *D.F.*
1898 ,, (*Cæcilionella*) *ovampoensis*, M. & P., Stur., S.A. Moll.
p. 62. *N.*
1908 *Cæcilioides ovampoensis*, M. & P., Pilsb., Man. of Conch. xx.
p. 36. pl. 3, f. 52. *D.F.*
1910 *Cæcilianella ovampoensis*, M. & P., Bttg., Abh. Senckenb.
Naturf. Ges. Frankfurt, xxxii. p. 448. *N.*

Type in British Museum.

Hab. OVAMPOLAND (in coll. Layard).

LORENZO MARQUES. Matolla (Penther).

After examination with a strong lens, I am unable to find any specific difference between the type set of this species and examples from Pietpotgietersrust, which appear to be *acicula* (Müll.).

As *advena*, Ancey, and *ovampoensis*, M. & P., were founded on shells gathered by the same collectors in the same locality, the two species are in all probability identical, but it has not been possible to compare the types.

SUB-FAMILY STENOGYRINÆ, Fischer, 1883.

(Man. de Conch. p. 486.)

GENUS CURVELLA, Chaper, 1885.

(Bull. Soc. Zool. de France, x. pp. 48, 49.)

(= *Hapalus*, Albers, 1850, nec Billberg, 1820.)

Type of Genus, *C. sulcata*, Chaper.

417. *CURVELLA MAJUBANA*, Connolly.

- 1910 *Curvella majubana*, Conn., A.M.N.H. vi. p. 270. pl. 6, f. 13. *D.F.*
Type in British Museum.
Hab. NATAL. Majuba (Connolly).

418. *CURVELLA MODESTA*, Connolly.

- 1910 *Curvella modesta*, Conn., A.M.N.H. vi. p. 271. pl. 6, f. 15. *D.F.*
Type in British Museum.
Hab. CAPE OF GOOD HOPE. Grahamstown; Cradock (Farquhar).

419. *CURVELLA SAUNDERSÆ*, Connolly. [S.A.M.]

- 1910 *Curvella saundersæ*, Conn., A.M.N.H. vi. p. 270. pl. 6, f. 14. *D.F.*
Type in British Museum.
Hab. ZULULAND. Eshowe (Lady Saunders).

420. *CURVELLA SINUOSA*, Melv. & Pons.

- 1899 *Curvella sinuosa*, M. & P., A.M.N.H. iv. p. 198. pl. 3, f. 12. *D.F.*
1906 ,, ,, Pilsb., Man. of Conch. xviii. p. 61.
pl. 8, f. 32. *D.F.*

Type in British Museum.

Hab. NATAL. Umkomaas (Burnup).

421. *CURVELLA STRAMINEA*, Burnup. [S.A.M.]

- 1905 *Curvella straminea*, Bnp., Proc. Mal. Soc. vi. p. 303. pl. 16, f. 5, 6. *D.F.*
1906 ,, ,, Pilsb., Man. of Conch. xviii. p. 62. pl. 8,
f. 36, 37. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Walmer (Miss Hickey).

422. *CURVELLA SUCCINEA*, Burnup.

- 1905 *Curvella succinea*, Bnp., Proc. Mal. Soc. vi. p. 303. pl. 16, f. 7, 8. *D.F.*
1906 ,, ,, Pilsb., Man. of Conch. xviii. p. 62. pl. 8,
f. 38, 39. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Maeström Forest, Bedford (Farquhar).

GENUS *HYPOLYSIA*, Melvill & Ponsonby, 1901.

(A.M.N.H. viii. p. 318.)

Type of Genus, *H. florentiæ*, M. & P.

- 1863 *Achatina octona*, Chem., Pfr., Conch. Cab. p. 342. pl. 37 (1865),
f. 19, 20. *D.F.*
1868 „ „ „ Morel., Voy. Welwitsch, Moll. p. 80.
pl. 6, f. 5. *N.F.*
1897 *Subulina octona*, Chem., von Mts., D.-O.-Afr. p. 123. *N.*
1906 „ „ Brug., Pilsb., Man. of Conch. xviii. pp. 73, 222.
pl. 12, f. 8, 9, 11, 12. pl. 39, f. 28-37, 39, 40. *D.F.*
1907 *Opeas octona*, Chem., Dixey & Longstaff, Trans. Entom. Soc.
p. 361. *L.*

Type—*ubi?*

Hab. RHODESIA. Rain Forest, Victoria Falls (Dixey & Longstaff).

An American species, introduced into nearly every part of the globe. Pilsbry's synonymy is chiefly followed above.

426. SUBULINA VITREA, MOUSSON.

- 1887 *Stenogyra (Subulina) vitrea*, Mouss., J. de C. xxxv. p. 296.
pl. 12, f. 6. *D.F.*
1892 „ „ *chapmani*, M. & P., A.M.N.H. ix. p. 90. pl. 6, f. 3. *D.F.*
1906 *Subulina vitrea*, Mouss., Pilsb., Man. of Conch. xviii. p. 94.
pl. 14, f. 50. *D.F.*
„ „ „ *chapmani*, M. & P., Pilsb., *ibid.* p. 92. pl. 14, f. 46. *D.F.*
1910 „ „ *vitrea*, Mouss. (= *chapmani*, M. & P.), Bttg., Abh.
Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 148. *N.*

Type of *chapmani* in British Museum; *vitrea* in Zurich Museum.

Hab. OVAMPOLAND (*chapmani*, Chapman). Ku-Ganab, south-east of Ondonga (*vitrea*, Schinz).

Judging from the figures and descriptions, Böttger seems to have good reason for uniting the above-mentioned species, which came from the same district.

GENUS OPEAS, Albers, 1850.

(Die Helic. p. 175.)

Type of Genus, *O. subula*, Pfr. (*gracile*, Hutt.).

427. OPEAS CRAWFORDI (Melv. & Pons.).

- 1893 *Stenogyra crawfordi*, M. & P., A.M.N.H. xii. p. 105. pl. 3, f. 4. *D.F.*
1906 *Opeas crawfordi*, M. & P., Pilsb., Man. of Conch. xviii. p. 149.
pl. 15, f. 74. *D.F.*
1910 „ „ „ Conn., A.M.N.H. vi. p. 265. *N.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Van Staaden's River (Crawford).

428. *OPEAS DURBANENSE*, Sturany.

1898 *Opeas durbanense*, Stur., S.A. Moll. p. 61. pl. 2, f. 42-44. *D.F.*

1906 " " Pilsb., Man. of Conch. xviii. p. 149.
 pl. 15, f. 75, 76. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. NATAL. Durban (Penther).

Founded on a single specimen.

429. *OPEAS EULIMOIDE* (Preston).

1909 *Subulina eulimoides*, Prest., A.M.N.H. iv. p. 499. *D.F.*

1910 *Opeas eulimoide*, Prest., Conn., A.M.N.H. vi. p. 267. *N.*

Type in British Museum.

Hab. NATAL. Howick (Cregoe).

430. *OPEAS LEPIDUM*, Connolly. [S.A.M.]

1910 *Opeas lepidum*, Conn., A.M.N.H. vi. p. 267. pl. 6, f. 12. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Fern Kloof, Grahamstown (Farquhar). Port Elizabeth (Crawford).

431. *OPEAS MCBEANI*, Melv. & Pons.

1903 *Opeas mcbeani*, M. & P., A.M.N.H. xii. p. 604. pl. 31, f. 8. *D.F.*

1906 " " Pilsb., Man. of Conch. xviii. p. 150.
 pl. 15, f. 77. *D.F.*

1910 " " Conn., A.M.N.H. vi. p. 266. *N.*

Type in British Museum.

Hab. TRANSVAAL. Boksburg (McBean, per Burnup). Hennenop's River (Connolly). Middelburg (in coll. Ponsonby).

432. *OPEAS STRIGILE* (Melv. & Pons.). [S.A.M.]

1901 *Subulina strigilis*, M. & P., A.M.N.H. viii. p. 318. pl. 2, f. 7. *D.F.*

1906 *Opeas strigilis*, M. & P., Pilsb., Man. of Conch. xviii. p. 150.
 pl. 15, f. 79. *D.F.*

1910 " *strigile*, M. & P., Conn., A.M.N.H. vi. p. 266. *N.*

Type in British Museum.

Hab. NATAL. Karkloof Bush (McBean). Dargle; Edendale; Pietermaritzburg; Euon Bush, Richmond; Hilton Road (Burnup).

433. OPEAS SUBLINEARE, Böttger. [S.A.M.]

1910 *Opeas sublinearis*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 448. pl. 28, f. 14. *D.F.*

Type in Senckenberg Museum, Frankfurt.

Hab. LITTLE NAMALAND. Muishond (Schultze). Henkries (Lightfoot).

GRIQUALAND WEST. Modder River (Miss Wilman).

434. OPEAS TUGELENSE (Melv. & Pons.).

1897 *Subulina tugelensis*, M. & P., A.M.N.H. xix. p. 637. pl. 17, f. 9. *D.F.*

1906 *Opeas tugelensis*, M. & P., Pilsb., Man. of Conch. xviii. p. 150. pl. 15, f. 78. *D.F.*

1910 ,, *tugelense*, M. & P., Conn., A.M.N.H. vi. p. 266. *N.*

Type in British Museum.

Hab. NATAL. Lower Tugela River; Tongaat; Pinetown; Pietermaritzburg (Burnup).

LORENZO MARQUES. Delagoa Bay (Connolly).

GENUS EUONYMA, Melv. & Pons., 1896.

(A.M.N.H. xviii. p. 316, and Pilsb., 1906, Man. of Conch. xviii. p. 38.)

Type of Genus, *Euonyma læocochlis*, M. & P.

435. EUONYMA CACUMINATA (Melv. & Pons.).

1892 *Stenogyra cacuminata*, M. & P., A.M.N.H. ix. p. 85. pl. 6, f. 2. *D.F.*

1906 *Euonyma* ,, ,, Pilsb., Man. of Conch. xviii. p. 42. pl. 10, f. 71, 73, 74. *D.F.N.*

1910 ,, ,, ,, Conn., A.M.N.H. vi. p. 259. *N.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Bedford (Farquhar).

436. EUONYMA CRYSTALLINA (Melv. & Pons.). [S.A.M.]

1896 *Subulina crystallina*, M. & P., A.M.N.H. xviii. p. 316. pl. 16, f. 4. *D.F.*

1906 *Euonyma* ,, ,, Pilsb., Man. of Conch. xviii. p. 45. pl. 10, f. 81. *D.F.*

1910 ,, ,, ,, Conn., A.M.N.H. vi. p. 255. *N.*

Type in British Museum.

Hab. NATAL. Pietermaritzburg (Burnup). Widely distributed throughout Natal.

ZULULAND. Eshowe (Lady Saunders).

CAPE OF GOOD HOPE. King Williamstown (Godfrey). Widely distributed in the Eastern Province.

On account of its small size, it might be advisable to transfer the present species to *Opeas*, together with *linearis*, Krs., and *pietersburgensis*, Preston.

437. *EUONYMA GOULDI*, sp. nov., pl. 2, f. 7. [S.A.M.]

Shell elongate, turriform, subrimate, olivaceous, thin, slightly glossy, semi-transparent. Spire produced, acute, apex bluntly rounded. Whorls 10, gradually increasing, becoming less convex as they grow in size; the first two smooth, remainder closely covered with faint, almost straight striæ, parallel to the slant of the outer lip. Suture well defined, but not deep. Aperture short, ovate, rounded at base. Peristome thin, simple. Outer lip curved outwards, slightly receding in an almost straight line to the base of the shell. Columella concave, margin very narrowly reflexed, forming a small rima. Shell 19.5×5.1 ; apert. 4.3×2.2 ; last whorl 7.1 mm.

Type in South African Museum.

Hab. CAPE OF GOOD HOPE. Prieska (Gould; van der Merve).

In all the specimens I have seen the sides of the spire are slightly convex about the sixth whorl.

Quite unlike any neighbouring species; *pruizenensis*, Conn., which resembles it in form, has curved, instead of straight, striation.

438. *EUONYMA LÆOCOCHLIS* (Melv. & Pons.).

1896 *Subulina læocochlis*, M. & P., A.M.N.H. xviii, p. 316, pl. 16, f. 3. *D.F.*

1898 *Euonyma læocochlis* „ Stur., S.A. Moll. p. 62. (*Err. typ.*)

1906 „ *læocochlis* „ Pilsb., Man. of Conch. xviii, p. 39, pl. 10, f. 68. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Humansdorp, St. Francis Bay (Fraser).

439. *EUONYMA LANCEOLATA* (Pfeiffer). [S.A.M.]

1854 *Bulimus lanceolatus*, Pfr., P.Z.S. p. 292. *D.*

1857 „ *micans*, Pfr., Mal. Blätt. iv. p. 156. *D.*

1859 „ „ „ Mon. Hel. iv. p. 452. *D.*

„ „ *lanceolatus*, Pfr., Mon. Hel. iv. p. 455. *D.*

1906 *Euonyma lanceolata*, Pfr., Pilsb., Man. of Conch. xviii, p. 40. *D.N.*

1910 „ „ „ Conn., A.M.N.H. vi. pp. 260, 261. *N.F.*

Types in British Museum.

Hab. NATAL. Cape Natal (Plant). Pietermaritzburg; Karkloof (Burnup).

ZULULAND (in British Museum).

LORENZO MARQUES. Delagoa Bay (in British Museum).

440. EUONYMA LINEARIS (Krauss).

- 1848 *Bulimus linearis*, Krs., Südafr. Moll. p. 78. pl. 5, f. 3. *D.F.*
 " " " Pfr., Mon. Hel. ii. p. 157. *D.*
 1856 " " " " Conch. Cab. p. 257. pl. 69 (1855),
 f. 15-17. *D.F.*
 1898 *Opeas lineare*, Krs., Stur., S.A. Moll. p. 61. *N.*
 1906 *Euonyma linearis*, Krs., Pilsb., Man. of Conch. xviii. p. 44.
 pl. 10, f. 79, 80. *D.F.*
 1910 " " " Conn., A.M.N.H. vi. p. 252. pl. 6, f. 4.
D.N.F.

Type in Stuttgart Museum.

Hab. ? TRANSVAAL. Mount Mohapaani, on the Limpopo (Wahlberg).

Not *B. linearis*, Rve., 1850, nor *O. lineare*, Stur., 1898.

Many different species have been attributed by various authorities to *E. linearis*. Morelet's loc., Port Elizabeth, is almost certainly wrong, while Reeve and Sturany appear to have regarded the then undescribed *Hypolysia florentia*, M. & P., as typical of Krauss' species; an error also followed by Preston (A.M.N.H. iv, 1909, p. 499). Craven's locs., Lydenburg, Transvaal, and Winburg, O.F.S., require further substantiation.

441. EUONYMA LYMNEÆFORMIS (Melv. & Pons).

- 1901 *Obeliscus lymneæformis*, M.&P., A.M.N.H. viii. p. 317. pl. 2, f. 5. *D.F.*
 1906 *Euonyma* " " Pilsb., Man. of Conch. xviii. p. 39.
 pl. 10, f. 69. *D.F.*
 1910 " " " " Conn., A.M.N.H. vi. p. 260. *N.*

Type in British Museum.

Hab. NATAL. Karkloof Bush (McBean).

Founded on two specimens; no more have occurred.

442. EUONYMA NATALENSIS (Burnup). [S.A.M.]

- 1905 *Obeliscus natalensis*, Bnp., Proc. Mal. Soc. vi. p. 304. pl. 16, f. 9. *D.F.*
 1906 *Euonyma* " " Pilsb., Man. of Conch. xviii. pp. 41, 339.
 pl. 10, f. 72. pl. 31, f. 12, 13. *D.N.F.*
 1910 " " " " Conn., A.M.N.H. vi. p. 261. *N.*

Type in British Museum.

Hab. NATAL. Umbogintwini; Pietermaritzburg; Equeefa; Table Mountain (Burnup).

443. *EUONYMA PIETERSBURGENSIS* (Preston).

- 1909 *Subulina pietersburgensis*, Prest., A.M.N.H. iv. p. 499. *D.F.*
 1910 *Euonyma* „ „ Conn., A.M.N.H. vi. p. 254. *N.*
 Type in British Museum.
Hab. TRANSSVAAL. Pietersburg (fide Preston).

var. *LEVIS*, Connolly. [S.A.M.]

- 1910 *Euonyma pietersburgensis*, Prest., var. *levis*, Conn., A.M.N.H. vi. p. 255. pl. 6, f. 8. *D.F.*
 Type in British Museum.
Hab. TRANSSVAAL. Buis Kop; Pienaar's Poort; Pietpotgietersrust (Connolly). Zoutpansberg (Cregoe).

444. *EUONYMA PLATYACME*, Melv. & Pons. [S.A.M.]

- 1907 *Euonyma platyacme*, M. & P., A.M.N.H. xix. p. 101. pl. 6, f. 15. *D.F.*
 „ *Stenogyra beckeri*, Fulton, A.M.N.H. xix. p. 154. pl. 10, f. 7. *D.F.*
 1910 *Euonyma platyacme*, M. & P. (= *beckeri*, Fulton), Conn., A.M.N.H. vi. p. 259. *N.*
 Both types in British Museum.

Hab. CAPE OF GOOD HOPE. Kei Road Bush (Miss Hickey). Pondoland (*beckeri*, Becker). Hog's-back Mountain, Queenstown (Farquhar). Pirie Forest (Godfrey).

445. *EUONYMA PRUIZENENSIS*, Connolly. [S.A.M.]

- 1910 *Euonyma pruizenensis*, Conn., A.M.N.H. vi. p. 261. pl. 6, f. 11. *D.F.*
 Type in British Museum.
Hab. NORTHERN TRANSSVAAL. Pruizen; Pietpotgietersrust (Connolly).

446. *EUONYMA PURCELLI* (Melv. & Pons.). [S.A.M.]

- 1901 *Subulina purcelli*, M. & P., A.M.N.H. viii. p. 317. pl. 2, f. 6. *D.F.*
 1906 *Euonyma* „ „ Pilsb., Man. of Conch. xviii. p. 42. pl. 10, f. 75. *D.F.*
 1910 „ „ „ Conn., A.M.N.H. vi. p. 259. *N.*
 Type in British Museum.

Hab. CAPE OF GOOD HOPE. Houw Hoek, Caledon Division (Purcell; Lightfoot).

Described from an immature specimen; the adult shell attains a length of 25 mm.

447. EUONYMA SILIQUA, Connolly.

- 1910 *Euonyma siliqua*, Conn., A.M.N.H. vi. p. 262. pl. 6, f. 10. *D.F.*
 Type in British Museum.
Hab. NATAL. O.R.C. Junction Station (Connolly).

448. EUONYMA STANDERI, Connolly.

- 1910 *Euonyma standeri*, Conn., A.M.N.H. vi. p. 264. pl. 6, f. 9. *D.F.*
 Type in British Museum.
Hab. TRANSVAAL. Stander's Kop (Connolly).

449. EUONYMA TURRIFORMIS (Krauss). [S.A.M.]

- 1848 *Bulimus turriiformis*, Krs., Südafr. Moll. p. 78. pl. 5, f. 2. *D.F.*
 " " " Pfr., Zeitschr. f. Malak. v. p. 121. *D.*
 1853 " " " Mon. Hel. iii. p. 392. *D.*
 1898 *Opeas turriiforme*, Krs., Stur., S.A. Moll. p. 60. *N.*
 1906 *Euonyma turriiformis*, Krs., Pilsb., Man. of Conch. xviii. p. 43.
 pl. 10, f. 77, 78. *D.F.*
 1910 " " " Conn., A.M.N.H. vi. p. 256. pl. 6,
 f. 1. *D.,N.F.*
 1911 " " " " " vii. p. 224. (*Ement.*)
 Not *Bulimus turriiformis*, Reeve, 1850.
 Type in Stuttgart Museum.
Hab. NATAL (Wahlberg). Widely distributed.
 CAPE OF GOOD HOPE. Port Elizabeth (Crawford). Kowie (Penther).
 Port St. John's (Shortridge). Grahamstown (var., Farquhar).
 Craven's loc., Lydenburg, probably refers to another species.

var. *acus*, Morelet.

- 1889 *Stenogyra acus*, Morel., J. de C. xxxvii. p. 8. pl. 1, f. 6. *D.F.*
 1896 *Subulina glaucocyanea*, M. & P., A.M.N.H. xviii. p. 317. pl. 16,
 f. 5. *D.F.*
 1906 *Euonyma acus*, Morel., Pilsb., Man. of Conch. xviii. p. 40.
 pl. 10, f. 70. *D.F.*
 " " *glaucocyanea*, M. & P., Pilsb., *ibid.*, p. 43. pl. 10, f. 76. *D.F.*
 1910 " " *turriiformis*, Krs., var. *acus*, Morel. (= *glaucocyanea*,
 M. & P.), Conn., A.M.N.H. vi. p. 257. pl. 6, f. 2. *D.,N.F.*
 Types in British Museum.
Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford; Fraser).

var. *SARISSA*, Pilsbry.

- 1906 *Euonyma turiformis sarissa*, Pilsb., Man. of Conch. xviii. p. 44.
 pl. 10, f. 84, 85. *D.F.*
 1910 " " Conn., A.M.N.H. vi. p. 258. *N.*
 Type in Acad. Nat. Sci. Philadelphia.
Hab. NATAL (Cassin).

450. *EUONYMA UNICORNIS*, Connolly. [S.A.M.]

- 1910 *Euonyma unicornis*, Conn., A.M.N.H. vi. p. 265. pl. 6, f. 3. *D.F.*
 Type in coll. Connolly.
Hab. TRANSVAAL. Schanz Kop, Pretoria (Connolly). Potchef-
 stroom (Miss Livingston).
 CAPE OF GOOD HOPE. Cradock (var., Farquhar).
 ORANGE FREE STATE. Bloemfontein (var., Connolly).

451. *EUONYMA VARIA*, Connolly. [S.A.M.]

- 1910 *Euonyma varia*, Conn., A.M.N.H. vi. p. 263. pl. 6, f. 5-7. *D.F.*
 Type in British Museum.
Hab. TRANSVAAL. Pienaar's Poort; Pretoria District (Connolly).
 Potchefstroom (Miss Cachet). Zoutpansberg (var., Cregoe).

GENUS *ZOOTECUS*, Westerlund, 1887.

(Fauna Palearct. Reg. iii. pp. 3, 75.)

(= *Chilogymnus*, Jousseaume, 1894.)

Type of Genus, *Z. insularis* (Ehrnb.).

452. *ZOOTECUS EULIMOIDES* (Gray).

- 1838 *Bulimus eulimoide*, Gray, Alexander's Expedition, ii. p. 269. *D.*
 Type in British Museum.
Hab. GREAT NAMALAND. Near Great Fish River (Alexander).

453. *ZOOTECUS NAMIBICUS* (Böttger).

- 1910 *Ena (Eburnea) namibica*, Bttg., Abh. Senckenb. Naturf. Ges.
 Frankfurt, xxxii. p. 444. pl. 28, f. 10. *D.F.*
 Type in Senckenberg Museum, Frankfurt.
Hab. DAMARALAND. 140 kilom. inland from Swakopmund (Rintelen).

SUB-FAMILY CÆLIAXINÆ, Pilsbry, 1904.

(Man. of Conch. xvi. p. 194.)

GENUS CÆLIAXIS, Adams & Angas, 1865.

(P.Z.S. p. 54.)

(= *Bathyaxis*, Ancey, 1887, and *Sphalerostoma*, Girard, 1892.)

Type of Genus, *C. layardi*, Ad. & Ang.

454. CÆLIAXIS LAYARDI, Adams & Angas. [S.A.M.]

- 1865 *Subulina (Cæliaxis) layardi*, Ad. & Ang., P.Z.S. p. 54. pl. 2, f. 1. *D.F.*
1868 *Bulinus layardi*, Ad. & Ang., Pfr., Mon. Hel. vi. p. 95. *D.*
1881 *Cæliaxis* ,, Angas, Layard, P.Z.S. p. 839. *N.*
1892 *Sphalerostoma layardi*, Ad. & Ang., Girard, Journ. de Sci. Lisbon,
ii. p. 245. *N.D.*
1893 ,, ,, ,, ,, *ibid.* iii. pl. 1, f. 3. *F.*
1901 *Bathyaxis* ,, ,, Ancey, J. de C. xlix. p. 223. *N.*
1906 *Cæliaxis* ,, ,, Pilsb., Man. of Conch. xviii.
p. 337, pl. 49, f. 11-14. *D.F.*

Type—*ubi* ?

Hab. CAPE OF GOOD HOPE (fide Adams & Angas). Tharfield (Layard). Kowie (Bowker). Port Alfred; East London (Farquhar). Port Elizabeth (Crawford).

TRANSVAAL. Traces of this, or of a larger, possibly extinct, species have been found at Pienaar's Poort (Connolly).

TRIBE ELASMOGNATHA, Mörch, 1863.

(Vidensk. Med. Naturh. Forenh. Copenhagen, p. 267.)

FAMILY SUCCINEIDÆ, Tryon, 1866.

(Amer. Journ. of Conch. ii. p. 222, as Succinidæ, *emend.* Fischer, 1874, J. de C. xxii. p. 137.)

GENUS SUCCINEA, Draparnaud, 1801.

(Tabl. Moll. Fr. p. 32.)

Type of Genus, *S. amphibia*, Drap. (*putris*, Lin.).

455. SUCCINEA AFRICANA, Krauss.

- 1848 *Succinea amphibia*, Drap., var. *africana*, Krs., Südafr. Moll. p. 73. *N.*
1856 ,, *africana*, Krs., Bgt., Rev. et Mag. Zool. p. 11. *N.*

1856 *Succinea africana*, Krs., Bgt., Amén. malac. i. p. 136. N.

1909 „ „ Bgt., Kob., Abh. Senckenb. Naturf. Ges.
Frankfurt, xxxii. p. 74.

Type in Stuttgart Museum.

Hab. TRANSVAAL. River Limpopo (Wahlberg).

NOTE.—The reference to Bourguignat's Amén. malac., quoted above, and for succeeding species of *Succinea*, is a reprint from the Rev. et Mag. Zool. for the same year. I omit the latter in the following pages.

456. *SUCCINEA ARBORICOLA*, nom. mut.

1887 *Succinea arborea*, Mousson, J. de C. xxxv. p. 297. pl. 12, f. 7. *D.F.*

1904 „ „ von Mts., Die Kalahari, p. 756. N.

Type in Zurich Museum.

Hab. BECHUANALAND. "Kalaruri" (= Kalahari) (Schinz). Lake Ngami; Okavango marshes; Hardekol Drift, Botletle River (Passarge).

As Mousson's name must yield priority to *S. arborea*, Adams & Angas, 1863 (P.Z.S. p. 523), from South Australia, a new name is necessary for the present species.

457. *SUCCINEA BOWKERI*, Melv. & Pons.

1893 *Succinea bowkeri*, M. & P., A.M.N.H. xii. p. 110. pl. 3, f. 18. *D.F.*

Type in British Museum.

Hab. NATAL. Malvern (Bowker).

Probably identical with *S. striata*, Krs.; it has not been possible, however, to compare the types.

458. *SUCCINEA CONNOLLYI*, Preston. [S.A.M.]

1907 *Succinea ? badia*, Morel., Dixey & Longstaff, Trans. Entom. Soc.
p. 361. N.

1912 „ *connollyi*, Prest., A.M.N.H. ix. p. 445. *D.F.*

Type in coll. Preston.

Hab. RHODESIA. Rain Forest, Victoria Falls (Dixey & Longstaff; Connolly, &c.).

This is in all probability the species referred to in 1907 by Dixey and Longstaff, who remark, "Very near *S. putris*, Linn."

459. *SUCCINEA DAKAËNSIS*, Sturany.

1898 *Succinea dakaënsis*, Stur., S.A. Moll. p. 72. pl. 3, f. 52-54. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. RHODESIA. Daka River (Penther).

460. *Succinea delalandei*, Pfeiffer. [S.A.M.]

- 1821 *Helix (Cochlohydra) elongata*, var. γ , Fér., Tabl. Syst. Moll. pt. 3.
p. 31 (or 27). L., and Hist. Nat. Moll. pl. 11A, f. 11. F.
1851 *Succinea delalandii*, Pfr., Zeitschr. f. Malak. viii. p. 28. D.
1853 „ *delalandei* „ Mon. Hel. iii. p. 11. D.
1854, 5 „ „ „ Conch. Cab. p. 37. pl. 3, f. 38-40. D.F.
1856 „ *delalandii* „ Bgt., Amén. malac. i. p. 135. D.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. “Près des marais salés” (Delalande).

CAPE PENINSULA. “Baszaarms” (Baas Harman’s Kraal (Benson).
Hout Bay; Seekoe Vlei; Maitland (Connolly).

BRITISH BECHUANALAND. Kuruman (Layard).

TRANSVAAL. Oliphants River (fide Craven).

var. *KURRI*, von Martens.

- 1869 *Succinea delalandei*, Pfr., var. *kurri*, von Mts., Mal. Blätt. xvi.
p. 211. D.

Type in Zool. Mus. Berlin.

Hab. “SOUTH AFRICA” (Kurr).

461. *Succinea exarata*, Krauss.

- 1848 *Succinea exarata*, Krs., Südafr. Moll. p. 74. pl. 4, f. 15. D.F.
“ „ „ Pfr., Mon. Hel. ii. p. 518. D.
1856 „ „ Bgt., Amén. malac. i. p. 134. D.
1910 „ „ Bttg., Abh. Senckenb. Naturf. Ges.
Frankfurt, xxxii. p. 449. N.

Type in Stuttgart Museum.

Hab. NATAL. In swamps (Krauss). Near Pietermaritzburg (Burnup).

DAMARALAND. Gobabis (subfossil, Hermann, fide Böttger).

462. *Succinea moussoni*, von Martens.

- 1887 *Succinea*, ? Sp., Mouss., J. de C. xxxv. p. 298. N.
1904 „ *moussoni*, von Mts., Die Kalahari, p. 755, f. 2. D.F.
1910 „ Sp., Mouss., Bttg., Abh. Senckenb. Naturf. Ges.
Frankfurt, xxxii. p. 449. N.

Type in Zool. Mus. Berlin.

Hab. OVAMPOLAND. Upingtonia, south-east of Ondonga (subfossil,
Schinz). Sodanna (Passarge).

BECHUANALAND. South of Hardekol Drift, Botletle River, in marly
sandstone (Passarge).

463. *Succinea patentissima*, Menke.

- 1853 *Succinea patentissima*, Mke., Pfr., Zeitschr. f. Malak. x. p. 52. *D.*
 " " " " Mon. Hel. iii. p. 623. *D.*
 1854, 55 " " " " Conch. Cab. p. 55. pl. 6, f. 26-
 28. *D.F.*
 1856 " " " Bgt., Amén. malac. i. p. 135. *D.*

Type—*ubi* ?

Hab. NATAL. Port Natal (Menke). Umgeni Lagoon (Burnup).
 ZULULAND. Lake Sibayi (Toppin).

464. *Succinea piscinalis*, Mely. & Pons.

- 1898 *Succinea piscinalis*, M. & P., A.M.N.H. ii. p. 127. pl. 7, f. 4. *D.F.*
 Type in British Museum.
Hab. CAPE OF GOOD HOPE. Fish River (Farquhar).

465. *Succinea planti*, Pfeiffer.

[S.A.M.]

- 1856 *Succinea planti*, Pfr., P.Z.S. p. 326. *D.*
 1859 " " " Mon. Hel. iv. p. 805. *D.*
 Type in British Museum.

Hab. NATAL. Cape Natal (Plant). Pietermaritzburg (Burnup).

466. *Succinea striata*, Krauss.

[S.A.M.]

- 1848 *Succinea striata*, Krs., Südafr. Moll. p. 73. pl. 4, f. 16. *D.F.*
 " " " Pfr., Zeitschr. f. Malak. v. p. 122. *D.*
 1853 " " " Mon. Hel. iii. p. 11. *D.*
 1856 " " " Bgt., Amén. malac. i. p. 134. *D.*
 1866 " " " von Mts., Mal. Blätt. xiii. p. 97. *N.*
 1874 " " " Jick., Fauna N.-O.-Afr. pp. 172, 173. *N.*
 1910 " " " (var.) Bttg., Abh. Senckenb. Naturf.
 Ges. Frankfurt, xxxii. p. 449. *N.*

Type in Stuttgart Museum.

Hab. TRANSVAAL. River Limpopo (Wahlberg). Pretoria (McBean).
 DAMARALAND. Gobabis (subfossil, Hermann).

NATAL. Pietermaritzburg (Burnup).

CAPE OF GOOD HOPE. Grahamstown (Farquhar). Zuurberg, near
 Coerney (Crawford).

ORANGE FREE STATE. Kopjes Siding (Connolly). Bloemfontein
 (Godfrey).

Also reported from North and Central Africa.

Succinea limicola, Morel. (Ann. Mus. Genova, 1872, iii. p. 191.

pl. 9, f. 8), described from Abyssinia, is considered by Jickeli to be a variety of the present species. *S. bowkeri*, M. & P., and *planti*, Pfr., are probably identical with *striata*.

TRIBE DITREMATA, Fischer & Crosse, 1878.

(Mission au Mexique, i. p. 698.)

FAMILY VERONICELLIDÆ, Gray, 1840.

(Syn. Brit. Mus. pp. 126, 149.)

GENUS VERONICELLA, de Blainville, 1817.

(Journ. de Physique, lxxxv. p. 440.)

Type of Genus, *V. lævis*, de Blainville.

467. VERONICELLA MAURA (Heynemann).

1885 *Vaginula maura*, Heynem., Jahrb. d. Deutsch. Mal. Ges. xii. pp. 7, 104. pl. 1, f. 6, 7. *D.F.*

Type in British Museum.

Hab. LORENZO MARQUES. Delagoa Bay (Mrs. Monteiro).

468. VERONICELLA NATALENSIS (von Rapp).

1848 *Vaginulus natalensis*, von Rapp, Krs., Südafr. Moll. p. 72. *D.*

1855 *Limax natalensis*, "Krs.," H. & A. Ad., Gen. rec. Moll. ii. p. 219.

1862 " " Heynem., Mal. Blätt. ix. p. 217. *N.*

1879 *Vaginula natalensis*, von Rapp, Gibb., Journ. of Conch. ii. p. 140. *N.*

1885 " " Heynem., Jahrb. d. Deutsch. Mal. Ges. xii. p. 103. *D.*

" *Limax natalensis*, Krs. (is *Vaginula ditto*), Tryon, Man. of Conch. i. p. 214.

1893 *Veronicella natalensis*, von Rapp, Ckll., Conchologist, ii. p. 216. *N.*

1910 " " Cllege., Ann. Natal Mus. ii. p. 170. *N.*

Type in Stuttgart Museum.

Hab. NATAL (Krauss). Port Shepstone (Burnup).

CAPE OF GOOD HOPE. Kowie District (Penther).

469. VERONICELLA PETERSI (von Martens).

1879 *Vaginula petersi*, von Mts., Monats-Ber. K. Preuss. Akad. Wiss. Berlin, p. 736. *D.*

1885 " " Heynem., Jahrb. d. Deutsch. Mal. Ges. xii. p. 105. *D.*

Type in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Inhambane (Peters).

470. VERONICELLA SAXICOLA, Cockerell.

1893 *Veronicella saxicola*, Ckll., Conchologist, ii. pp. 194, 216. *D.*

1910 " " Cllge., Ann. Natal Mus. ii. p. 171. *D.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Craven).

NATAL. Pietermaritzburg (Burnup).

FAMILY ONCHIDIIDÆ, Gray, 1824.

(Ann. of Philos. viii. p. 108, as Onchidiadæ, *emend.* H. & A. Adams, 1855, Gen. rec. Moll. ii. p. 232.)

GENUS ONCHIDIUM, Buchanan, 1800.

(Linn. Trans. v. p. 132.)

Type of Genus, *O. typhæ*, Buch.

471. ONCHIDIUM BURNUPI, Collinge.

1902 *Onchidium burnupi*, Cllge., Journ. of Malac. ix. p. 17, f. 1, 2. *D.F.*

1910 " " Ann. Natal Mus. ii. p. 171. *D.*

Type in University Museum of Zoology, Cambridge.

Hab. NATAL. Umlaas Lagoon (Burnup).

472. ONCHIDIUM PERONI, Cuvier. [S.A.M.]

1804 *Onchidium peronii*, Cuv., Ann. Mus. Nat. Hist. Paris, v. p. 38.
pl. 6, f. 1-9. *D.A.*

1817 " " Mém. à l'Hist. et à l'Anat. Moll. 13.
p. 1. pl. 1, f. 1-9. *D.A.*

1821 " " Fér., Tabl. Syst. Moll. pt. 2. p. 6. *N.*

1822 " " Lam., Hist. nat. An. s. Vert. vi. 2. p. 46. *D.*

1825 *Peronia mauritiana*, de Blainv., Man. de Malac. p. 489. pl. 46
(1827), f. 7. *F.*

1832 *Onchidium tonganum*, Quoy & Gaim., Voy. Astrolabe, Moll.
p. 210. pl. 15, f. 17, 18. *D.F.*

1836 " *peronii*, Cuv., Desh., Hist. nat. An. s. Vert. vii. p. 709. *N.*

" " *tonganum*, Quoy & Gaim., Desh., *ibid.* p. 709. *D.N.*

1848 " *peronii*, Cuv., Krs., Südafr. Moll. p. 72. *N.*

1870 " *tonganum*, Quoy & Gaim. (? *O. peronii*, Cuv.), Semp.,
Reis. im Arch. Philippin. ii, 3. p. 258. pl. 19,
f. 2, 9. pl. 22, f. 1, 2, 10. *D.F.A.*

- 1893 *Oncidium peroni*, Cuv. (= *O. melanopneumon*, Bergh, and *tonganum*, Q. & G.), Plate, Zool. Jahrb. Jena, vii, 1, p. 172. pl. 12, f. 85. *D.F.*
1910 ,, *tonganum*, Cunningham, Encycl. Brit. 11th Ed. xi, p. 525, f. 62. *F.*

Type—*ubi* ?

Hab. NATAL coast (Krauss). Congella, near Durban (Burnup).

LORENZO MARQUES. Inhambane (Peters).

CAPE PENINSULA. Green Point (Purcell).

Described from Mauritius.

473. ONCHIDIUM SAVIGNYI, Semper.

- 1870 *Onchidium savignyi*, Semp., Reis. im Arch. Philippin. ii, 3, p. 260. pl. 19, f. 6. pl. 20, f. 1. pl. 22, f. 5-9. *D.F.A.*
1903 *Onchidium savignyi*, Semp., Smith, Proc. Mal. Soc. v. p. 401. *N.*
1910 ,, ,, Cllge., Ann. Natal Mus. ii. p. 172. *L.*

Type—*ubi* ?

Hab. NATAL. Scottburgh (Burnup).

GENUS ONCHIDELLA, Gray, 1850.

(Fig. Moll. Anim. iv. p. 117.)

Type of Genus, *O. nigricans* (Q. & G.).

474. ONCHIDELLA MACULATA, Plate.

- 1893 *Oncidiella maculata*, Plate, Zool. Jahrb. Jena, vii, 1, p. 201. pl. 7, f. 4. pl. 9, f. 43, 44. pl. 10, f. 45-49, 52. pl. 11, f. 68. pl. 12, f. 101. *D.F.A.*

Type—*ubi* ?

Hab. GREAT NAMALAND. Angra Pequena (fide Plate).

SUB-ORDER BASOMMATOPHORA, Keferstein, 1865.

(Bronn's Thier-reichs, iii. p. 1246.)

TRIBE GEHYDROPHILA, Férussac, 1821.

(Tabl. Syst. Moll. pt. 3. p. 95 (or 91), as Géhydrophiles.)

FAMILY AURICULIDÆ, Gray, 1824.

(Ann. of Philos. viii. p. 107, as Auriculadæ, *emend.* 1840, Turton's Manual, p. 101.)
(= Ellobiidæ, H. & A. Adams, 1855.)

SUB-FAMILY MELAMPINÆ, H. & A. Adams, 1855,

(Gen. rec. Moll. ii. p. 242.)

It is doubtful whether many of the foregoing references, which record *M. caffer* from all parts of the Indian and Pacific Oceans, really relate to Küster's species.

var. MINOR, Küster.

- 1839 *Conovulus ater*, Mühlf., Anton, Verz. Conch. Samml. p. 48
(without characters).
1844 *Auricula caffra*, var. *minor*, Küst., Conch. Cab. p. 36. pl. 5 (1843),
f. 6, 8. *D.F.*

Described from Ohetaroa, and probably quite distinct from the South African form.

477. MELAMPUS KÜSTERI (Krauss).

- 1842 ?? *Auricula mouile*, Lam., Rve., Conch. Syst. ii. p. 106. pl. 187, f. 8. *F.*
1844 ,, *küsteri*, Krs., Küst., Conch. Cab. p. 34. pl. 4 (1843),
f. 10-13. *D.F.*
1856 *Melampus* ,, ,, Pfr., Mon. Auric. p. 33. *D.*
1857 ,, ,, ,, ,, Cat. Auric. p. 23. *D.*

Type in Stuttgart Museum.

Hab. NATAL. Mouth of Umlaas River (Krauss).

var. OBLONGUS, Küster.

- 1844 *Auricula küsteri*, Krs., var. *oblonga*, Küst., Conch. Cab. p. 34. *D.*
Hab. NATAL. Mouth of Umlaas River (Krauss).

478. MELAMPUS LIVIDUS (Deshayes).

- 1830 *Auricula livida*, Desh., Enc. Méth. Vers, ii. p. 91. *D.*
1838 ,, ,, Hist. nat. An. s. Vert. viii. p. 338. *D.*
1844 ,, ,, Küst., Conch. Cab. p. 44. pl. 6 (1843),
f. 21. *D.F.*
1848 ,, ,, Krs., Südafr. Moll. p. 81. *N.*
1854 *Melampus lividus*, Lin. (= *livida*, Desh.), H. & A. Ad., P.Z.S. p. 10.
1856 ,, Desh., Pfr., Mon. Auric. p. 40. *D.*
1857 ,, ,, ,, Cat. Auric. p. 29. *D.*
1878 *Auricula livida*, Lin., Sow., Conch. Icon. pl. 7, f. 58. *D.F.*
1882 *Melampus lividus*, Desh., Morel., J. de C. xxx. p. 101. *N.*
1897 ,, ,, von Mts., D.-O.-Afr. p. 264. *D.*

Specimens ex auct. in École des Mines, Paris.

Hab. NATAL. Mouth of Umlaas River (Krauss; Burnup). ? juv.
in Durban Bay (Burnup).

Also chronicled from Mayotte, Réunion, Mauritius, Seychelles, &c.

It is impossible to regard this species as in any way connected with *Bulla livida*, Lin. (Syst. Nat., Ed. 10. i. p. 729) & Gault. (Index Test. pl. 25, f. B), which appears to represent a different Genus.

varr. CÆRULEUS, FASCIATUS, and OVATUS, Küster.

1844 *Auricula livida*, Desh., varr. *cærulea*, *ovata*, and *fasciata*, Küst.,
Conch. Cab. p. 45. pl. 6 (1843), f. 22-26. *D.F.*

Hab. NATAL coast (Krauss).

479. MELAMPUS ORDINARIUS, Melv. & Pons. [S.A.M.]

1901 *Melampus ordinarius*, M. & P., A.M.N.H. viii. p. 321. pl. 2, f. 14. *D.F.*
Type in British Museum.

Hab. NATAL. Mouth of Umlaas River (Burnup).

480. MELAMPUS PARVULUS, Nuttall. [S.A.M.]

1854 *Melampus parvulus*, Nutt., Pfr., Mal. Blätt. i. p. 147 (*without characters*).

1856 " " " Mon. Auric. p. 24. *D.*

1857 " " " Cat. Auric. p. 16. *D.*

1871 " " " von Mts. & Langkavel, Südsee-
Conch. p. 56. pl. 3, f. 10. *F.*

1898 " " " Kob., Conch. Cab. p. 220. pl. 26,
f. 5. *D.F.*

Originals in British Museum.

Hab. NATAL. Durban Bay; mouths of Umlaas and Umkomaas Rivers (Burnup).

Owing to the diverse geographical distribution, it is most unlikely that these Natal specimens are conspecific with the true *parvulus*, which was described from Oahu; but, in the series examined, I have been unable to find valid conchological grounds for their separation. Is it possible that the species can have been introduced alive in ballast?

481. MELAMPUS SEMIARATUS, sp. nov., pl. 2, f. 8. [S.A.M.]

1898 *Melampus granifer*, "Mouss.," M. & P., Proc. Mal. Soc. iii. p. 180. *L.*

Shell small, conic-ovate, subrimate, solid, rather glossy, of uniform dark brown colour, the upper and lower portions covered with spiral grooves which are crossed by faint transverse striæ; the middle portion is destitute of sulcation, and thus has a comparatively smooth appearance. Spire short, conical; apex acute. 6 flat

whorls, the last comprising practically the entire shell. Aperture long and narrow, furnished with one receding white rib half-way up the outer lip; a fold of medium size at the base of the columella; and three sharp white parietal plaits at almost equal, but gradually decreasing distances between the columellar fold and the top of the aperture. Peristome acute, of paler colour. Columellar margin thickly reflexed, almost adnate.

Shell 9.6×5.5 ; aperture 7.5 ; last whorl 8.8 mm.

Type in British Museum.

Hab. NATAL. Durban Bay; mouths of Umlaas and Umkomaas Rivers (Burnup).

A member of the group comprising *M. granifer*, Mouss., from Java; *sulculosus*, von Mts., from Amboina; *corticinus*, Morelet, from Mauritius; *striatus*, Pease, from Tahiti, and *semisulcatus*, Mouss., from Samoa, to the last two of which it must be very nearly allied. The half-furrowed appearance of the new species, though usual, is not always constant, some shells being covered all over with spiral grooving, in which state they much resemble *striatus*; but owing to the widely divergent distribution, it is most improbable that the three species can be the same.

482. MELAMPUS UMLAASIANUS (Krauss).

1844 *Auricula umlaasiana*, Krs., Küst., Conch. Cab. p. 43. pl. 6 (1843), f. 16-18. *D.F.*

1856 *Melampus umlaasianus*, Krs., Pfr., Mon. Auric. p. 34. *D.*

1857 " " " " Cat. Auric. p. 24. *D.*

Not *Auricula umlaasiana*, "Krs.," Sow., Conch. Icon. pl. 6, f. 48.

Type in Stuttgart Museum.

Hab. NATAL. Mouth of Umlaas River (Krauss).

var. OBSCURUS, Küster. [S.A.M.]

1844 *Auricula umlaasiana*, Krs., var. *obscura*, Küst., Conch. Cab. p. 44. pl. 6 (1843), f. 19, 20. *D.F.*

Hab. NATAL. Mouth of Umlaas River (Krauss). Isipingo (Burnup).

Specimens from Isipingo, apparently referable to this variety, have of late years been erroneously attributed to *M. castaneus*, Mühlf. (= *A. fusca*, Phil.), a Sandwich Island species. *M. avellana*, Morelet, from Mauritius, is also near akin, but it appears inadvisable to place either of the three in synonymy.

485. *AURICULASTRA CATONIS* (Melv. & Pons.). [S.A.M.]

- 1899 *Auricula catonis*, M. & P., A.M.N.H. iv. p. 199. pl. 3, f. 13. *D.F.*
 1900 " " Kob., Conch. Cab. p. 265. pl. 31, f. 14.
D.F.

Type in British Museum.

Hab. NATAL. Cato's Creek, Durban; mouths of Umlaas and Umkomaas Rivers (Burnup).

486. *AURICULASTRA RADIOLATA* (Morelet). [S.A.M.]

- 1848 *Auricula pellucens*, "Mke.," Krs., Südafr. Moll. p. 82. *N.*
 1860 *Melampus radiolatus*, Morel., Séries Conch. ii. p. 93. pl. 6, f. 11. *D.F.*
 1876 *Auriculus radiolatus*, Morel., Pfr., Mon. Pneum. iv. p. 359. *D.*
 1877 *Auricula radiolata*, Morel., Nev., Hand List, i. p. 226. *L.*
 1897 *Auriculastra radiolata*, Morel., von Mts., D.-O.-Afr. p. 264. *N.*
 1899 *Auricula durbanica*, M. & P., A.M.N.H. iv. pp. 193, 199. pl. 3, f. 14. *D.F.*
 1900 " " Kob., Conch. Cab. p. 264. pl. 31,
 f. 13. *D.F.*

Types of *radiolata* and *durbanica* in British Museum.

Hab. NATAL (?*pellucens*, Wahlberg; *radiolata*, Nevill). Cato's Creek, Durban; mouths of Umlaas and Umkomaas Rivers (*durbanica*, Burnup).

Radiolata was described from Zanzibar, *durbanica* from Natal; the type of the former has not attained fullest dimensions, but seems inseparable from similar specimens of *durbanica*.

GENUS *CASSIDULA*, Férussac, 1821.

(Tabl. Syst. Moll. pt. 3. p. 109 (or 105).)

(= *Rhodostoma*, Swainson, and *Sidula*, Gray, 1840.)

Type of Genus, *C. auris felis* (Brug.).

487. *CASSIDULA LABRELLA* (Deshayes). [S.A.M.]

- 1830 *Auricula labrella*, Desh., Enc. Méth. Vers, ii. p. 92. *D.*
 " " " " Mag. de Zool. p. 14. pl. 14, f. 1-3. *D.F.*
 1838 " " " " Hist. nat. An. s. Vert. viii. p. 337. *D.*
 1841 " " " " Küst., Conch. Cab. p. 22. pl. 2, f. 4, 5. *D.F.*
 " " *kraussii*, Küst., *ibid.* p. 24. pl. 3, f. 6-8. *D.F.*
 1848 " " " " Krs., Südafr. Moll. p. 82. *N.*
 1856 *Cassidula kraussi*, Küst., Pfr., Mon. Auric. p. 113. *D.*
 " " *lutescens*, Pfr., Mon. Auric. p. 113. *D.*
 " " *labrella*, Desh., Pfr., Mon. Auric. p. 112. *D.*
 1857 " " " " " Cat. Auric. p. 86. *D.*

- 1857 *Cassidula kraussi*, Küst., Pfr., Cat. Auric. p. 86. *D.*
 1874 „ *labrella*, Desh. (= *kraussi* and *lutescens*), Jick.,
 Fauna N.-O.-Afr. p. 186. *D.*
 1878 *Auricula kraussii*, Küst., Sow., Conch. Icon. pl. 5, f. 32. *D.F.*
 1883 *Cassidula labrella*, Desh., Bgt., Ann. Sci. nat. Paris, xv. p. 124. *N.*
 Type of *kraussi* in Stuttgart Museum; *labrella*—*ubi*?
Hab. NATAL. Mouth of Umlaas River (*kraussi*, Krauss). Dur-
 ban (Burnup).
 CAPE OF GOOD HOPE. Zwartkops River marshes, near Port
 Elizabeth (Crawford).
Labrella was described from Mauritius, *kraussi* from Natal, and
 the *Hab.* of *lutescens* was unknown.

GENUS PHYTIA, Gray, 1821.

(London Medical Repository, xv. p. 231.)

(= *Alexia*, Leach in Gray, 1847, nec Stephens, in Coleoptera 1835.)Type of Genus, *P. denticulata*, Mont. (*nyosotis*, Drap.).

488. PHYTIA ACUMINATA, Morelet. [S.A.M.]

- 1889 *Alexia acuminata*, Morel., J. de C. xxxvii. p. 15. pl. 1, f. 11. *D.F.*
 „ „ *pulchella* „ „ „ p. 15. pl. 1, f. 10. *D.F.*
 1898 „ „ „ Kob., Conch. Cab. p. 133. pl. 19, f. 7, 8.
D.F.
 „ „ *acuminata* „ Kob., *ibid.* p. 133. pl. 19, f. 13, 14. *D.F.*
 Types in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford; Far-
 quhar).

The above species were founded on very immature shells, and, in
 a large series, merge into one another. The type of *acuminata*
 measures 4.5 × 2 mm., while the largest examples that I have
 examined from Port Elizabeth are 20 × 4 and 19.5 × 5 mm. respec-
 tively; there seems no doubt, however, that these are the adult of
 Morelet's species. They are closely allied to the variable European
Phytia nyosotis (Draparnaud).

TRIBE HYGROPHILA, Férussac, 1822.

(Tabl. Syst. Moll., pt. 1. p. xxxiii, as Hygrophiles.)

FAMILY LIMNÆIDÆ, Gray, 1824.

(Ann. of Philos. viii. p. 108, as Lymneadæ, *emend.* Broderip, 1839, Penny
 Cyclopædia, xiii. p. 497.)

GENUS LIMNÆA, Lamarek, 1799.

(Mém. Soc. Hist. Nat. Paris, p. 75, as Lymnæa, *emend.* Rang, 1829, Man. de l'Hist. nat.. Moll. p. 176.)

Type of Genus, *L. stagnalis* (Lin.).

489. LIMNÆA DAKAËNSIS, Sturany.

1898 *Limnæus dakaënsis*, Stur., S.A. Moll. p. 74. pl. 3, f. 55. 56. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. RHODESIA. Daka (Penther).

490. LIMNÆA DAMARANA, Böttger.

1910 *Limnæa damarana*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 450. pl. 28, f. 16. *D.F.*

Type in Senckenberg Mus. Frankfurt.

Hab. DAMARALAND. Gobabis (subfossil, Hermann).

Founded on two specimens only.

491. LIMNÆA NATALENSIS, Krauss. [S.A.M.]

1848 *Limnæus natalensis*, Krs., Südafr. Moll. p. 85. pl. 5, f. 15. *D.F.*

1862 ,, ,, ,, Küst., Conch. Cab. p. 31. pl. 6, f. 1-3. *D.F.*

1870 *Limnæa* ,, ,, Blanford, Obs. Geol. & Zool. Abyss. p. 472. *N.*

1872 ,, ,, ,, Sow., Conch. Icon. pl. 7, f. 46. *D.F.*

1874 ,, ,, ,, Jick., Fauna N.-O.-Afr. p. 190. *D.*

1881 ,, ,, ,, Smith, P.Z.S. p. 295. *N.*

1904 ,, ,, ,, ,, Proc. Mal. Soc. vi. p. 98. *N.*

Type in Stuttgart Museum.

Hab. NATAL. "Common" (Krauss). An unusually large form is known from the Botanical Gardens, Durban.

TRANSVAAL. Pretoria District (McBean). Zoutpansberg (Cregoe).

LORENZO MARQUES. Itschonogove (fide von Martens). Rikatla (Junod).

ORANGE FREE STATE. Valsch River, Lindley; Rhenoster River, near Heilbron (Connolly). Kroonstad (Eckersley).

CAPE OF GOOD HOPE. Port Elizabeth (Crawford).

GRIQUALAND WEST. Modder and Vaal Rivers, near Kimberley (Miss Wilman).

BECHUANALAND. Lake Ngami (Woosman).

RHODESIA. Zambesi River, above Victoria Falls (Connolly).

Recorded from most parts of Africa.

Smith (1904) remarks that *L. africana*, *alexandrina*, *debaizei*, *jouberti*, *laurenti*, and *lavigeriana*, Bgt., are probably all forms of *natalensis*, but Pallary (Mém. Inst. Égypt., 1909, vi, 1. p. 47) considers *alexandrina* (= *natalensis*, Auctt., nec Krs.) to be distinct.

var. *EXSERTA*, von Martens.

- 1866 *Limnæus natalensis*, Krs., var. *exsertus*, von Mts., Mal. Blätt. xiii. p. 101. pl. 3, f. 8, 9. *D.F.*
 1874 *Limnæa natalensis*, Krs., var. *exserta*, von Mts., Jick., Fauna N.-O.-Afr. p. 191. *D.*
 1883 „ *exserta*, Bgt., Ann. Sci. nat. Paris, xv. pp. 90, 125. *N.*
 Described from Abyssinia.

var. *OROPHILA*, Morelet.

- 1868 *Limnæa orophila*, Morel., Voy. Welwitsch, Moll. p. 87. pl. 7, f. 4. *D.F.*
 1874 „ *natalensis*, Krs., var. *orophila*, Morel., Jick., Fauna N.-O.-Afr. p. 191. pl. 3, f. 1. *D.R.*
 Described from Benguela, and also recorded from Abyssinia.

492. *LIMNÆA SUBTRUNCATULA*, Böttger.

- 1910 *Limnæa subtruncatula*, Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 451. pl. 28, f. 17. *D.F.*
 Type in Senckenberg Mus. Frankfurt.
Hab. DAMARALAND. Gobabis (subfossil, Hermann).
 Founded on three specimens.

493. *LIMNÆA TRUNCATULA* (Müll.). [S.A.M.]

- 1774 *Buccinum truncatulum*, Müll., Verm. ii. p. 130. *D.*
 1789 *Bulinus truncatus*, Brug., Enc. Méth. Vers, i. p. 310. *D.*
 1801 *Limnæus minuta*, Drap., Tabl. Moll. Fr. p. 51. *D.*
 1803 *Helix fossaria*, Mont., Test. Brit. ii. p. 372. pl. 16, f. 9. *D.F.*
 1821 *Limnæus minutus*, Drap., C. Pfr., Syst. Anordn. d. deutsch. L. u. W.-Schneck. p. 93. pl. 4, f. 27. *D.F.*
 1829 *Limnæa minuta*, Drap., Schubert & Wagner, Conch. Cab. xii. p. 182. pl. 235, f. 4134, 5. *D.F.*
 1840 *Limnæus truncatulus*, Müll., Gray, Turton's Manual, p. 240. *D.* and *Synonymy.*
 1855 *Limnæa truncatula*, Müll., Moq.-Tand., Hist. Nat. Moll. Fr. ii. p. 473. pl. 34, f. 21-24. *D.F.*
 1862 *Limnæus truncatulus*, Müll., Küst., Conch. Cab. p. 17. pl. 3, f. 24-27. *D.F.*

TRANSVAAL. Ranjesfontein ; Potchefstroom (Connolly).

Also recorded from Victoria Nyanza.

497. PLANORBIS GIBBONSI, Nelson. [S.A.M.]

1878 *Planorbis gibboni*, Nels., Quart. Journ. of Conch. i. p. 379.
pl. 4, f. 3. *D.F.*

1897 " " von Mts., D.-O.-Afr. p. 150. *N.*

1908 " " Neuville & Anthony, Ann. Sci. nat.
Paris, viii. p. 260. *N.*

Type in coll. Nelson.

Hab. CAPE PENINSULA. Black River, Maitland (Connolly).

Described from Zanzibar, and known from Central Africa.

None of the original specimens of *Pl. gibboni* have been available for comparison, while the original description and figure do not appear to quite fit the single representative of this species (ex coll. von Martens) in the British Museum, or similar shells in my collection from South and Central Africa. I have, however, submitted a set of the latter to Mr. J. W. Taylor, who kindly replied: "I have carefully examined the *Planorbis* you sent, and am of opinion that they do represent the *Pl. gibboni* of Nelson. I find the lithographic artist made the shape of the mouth in the original figure more angular than I am sure it was. I was much interested in these shells when Gibbons sent them, and gave them considerable attention."

498. PLANORBIS HERMANNI, Böttger.

1910 *Planorbis (Coretus) hermanni*, Bttg., Abh. Senckenb. Naturf.
Ges. Frankfurt, xxxii. p. 452. pl. 28, f. 18. *D.F.*

Type in Senckenberg Mus. Frankfurt.

Hab. DAMARALAND. Okaputa Pan (several dead shells, Hermann).
"Very like *P. Pfeifferi*, Krs." (Bttg.).

499. PLANORBIS LEUCOCHILUS, Melv. & Pons.

1903 *Planorbis leucochilus*, M. & P., A.M.N.H. xii. p. 607. pl. 31, f. 3. *D.F.*

Type in British Museum.

Hab. NATAL. Killarney Lake, Pietermaritzburg (Burnup).

500. PLANORBIS NATALENSIS, Krauss.

1848 *Planorbis natalensis*, Krs., Südafr. Moll. p. 83. pl. 5, f. 9. *D.F.*

1877 " *natalis*, Krs., Sow., Conch. Icon. pl. 4, f. 32. *D.F.*

1883 " *natalensis*, Krs., Cless., Conch. Cab. p. 109. pl. 17
(1882), f. 3. *D.F.*

1910 *Planorbis (Gyraulus) natalensis*, Krs., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 451. N.

Type in Stuttgart Museum.

Hab. NATAL. Umgeni Valley (Krauss).

CAPE OF GOOD HOPE. Port Elizabeth (fide Morelet).

DAMARALAND. Gobabis (subfossil, Hermann).

BRITISH BECHUANALAND. Witkop (subfossil, Schultze).

501. PLANORBIS PFEIFFERI, Krauss. [S.A.M.]

1848 *Planorbis pfeifferi*, Krs., Südafr. Moll. p. 83. pl. 5, f. 7. *D.F.*

1877 " " Sow., Conch. Icon. pl. 4, f. 33. *D.F.*

1882 " " Cless., Conch. Cab. p. 87. pl. 10 (1850), f. 26-28. *D.F.*

1893 *Planorbis bowkeri*, M. & P., A.M.N.H. xii. p. 111. pl. 3, f. 19. *D.F.*

1910 " " c.f. *pfeifferi*, Krs.," Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 451. N.

Co-type of *pfeifferi* in Stockholm Museum; type of *bowkeri* in British Museum.

Hab. NATAL. Umgeni Valley (Krauss). Clairmont; Umbogintwini River (Burnup).

ZULULAND (Burnup).

LORENZO MARQUES. Itschongove (fide von Martens).

RHODESIA. Daka River (Penther). Salisbury (Miss Weineck).

TRANSVAAL. "Northern Transvaal" (*bowkeri*, Bowker). Ranjefonstein and Crocodile River, Pretoria District (Connolly).

BRITISH BECHUANALAND. Witkop (subfossil, Schultze).

Melville and Standen (Manchester Memoirs, li, 4. 1907, p. 7) apparently refer to some other species under the name of *bowkeri*; the type appears inseparable from *pfeifferi*, Krs.

I am not sufficiently well acquainted with *Pl. rüppelli*, Dkr., or *salinarum*, Morel., to confirm the synonymy suggested elsewhere by von Martens and Jickeli.

502. PLANORBIS RÜPPELLI, Dunker.

1848 *Planorbis rüppellii*, Dkr., P.Z.S. p. 42. *D.*

1850 " *rüppelli* " Conch. Cab. p. 41. pl. 5, f. 10-12. *D.F.*

1866 " *rüppellii* " von Mts., Mal. Blätt. xiii. p. 4. N.

1869 " " " (= *salinarum*, Morel.), von Mts., Mal. Blätt. xvi. p. 211. *D.*

1870 " " " Blanf., Obs. Geol. and Zool. Abyss. p. 473. N.

- 1872 *Planorbis rüppelli*, Dkr., Morel., Ann. Mus. Genova, iii. p. 207. *N.*
 1874 " " " Jick., Fauna N.-O.-Afr. p. 211. pl.7,
 f. 17, 18. *D.F.*
 1883 " " " Bgt., Ann. Sci. nat. Paris, xv. pp. 100,
 127. *D.*
 1900 " " Krs., Junod, Bull. Soc. Vaudoise, xxxv.
 p. 279. *L.*
 1908 " " Dkr., Neuville & Anthony, Ann. Sci. nat.
 Paris, viii. pp. 249-253. *N.F.*

Type in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Rikatla (Junod).

Described from Abyssinia.

Jickeli (1874) remarks: "I could not unite *Plan. salinarum*, Morel., from West Africa, with *rüppellii*; according to the figure in Voy. Wellwitsch, the former differs through less height combined with greater diameter. On the other hand, our Abyssinian *Planorbis* appears to me very nearly allied to *Plan. pfeifferi*, Krs.; comparison with examples of this species, which I do not possess, ought to produce synonymy of the two."

503. PLANORBIS SALINARUM, Morelet.

- 1868 *Planorbis salinarum*, Morel., Voy. Welwitsch, Moll. p. 85. pl. 5,
 f. 4. *D.F.*
 1904 " " " von Mts., Die Kalahari, p. 756. *N.*

Type in British Museum.

Hab. BECHUANALAND. Lake Ngami; Sodanna (subfossil, Pas-sarge).

Described from Dungo saltings, Angola.

GENUS SEGMENTINA, Fleming, 1818.

(Encyc. Brit., Suppl. to 4th, 5th, and 6th editions, iii. p. 309.)

Type of Genus, *Nautilus lacustris*, Lightfoot (*nitida*, Müll.).

504. SEGMENTINA EMICANS, Melv. & Pons.

- 1892 *Planorbis (Segmentina) emicans*, M. & P., A.M.N.H. x. p. 241.
 pl. 3, f. 13. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Farquhar).

Type in British Museum.

Hab. NATAL. Gordon Falls; Town Bush Valley and Sweet-water streams, near Pietermaritzburg; Edendale Falls; Nottingham Road; Dargle; Karkloof; Howick Falls and Aasvogel Krantz, Umgeni River (Burnup).

NORTHERN TRANSVAAL. Zoutpansberg (Cregoe).

var. FARQUHARI, Walker.

1912 *Ancylus caffer*, Krs., var. *farquhari*, Walker, Nautilus, xxv. p. 140. *D.*

Type in coll. Walker.

Hab. CAPE OF GOOD HOPE. York, East Griqualand (Farquhar). Teko River, Transkei (Miss Hickey).

var. STENOCHORIAS, Melv. & Pons.

1855 *Ancylus obliquus*, Krs., Küst., Conch. Cab. pl. 1, f. 18-20. *F.*
(non *A. obliquus*, Brod. & Sow., 1832.)

1903 „ *stenochorias*, M. & P., A.M.N.H. xii. p. 607. pl. 31, f. 1. *D.F.*

1912 „ *caffer*, Krs., var. *stenochorias*, M. & P., Walker, Nautilus, xxv. p. 140. *L.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Ebb en Vloed, Bog Farm and Van Staadens River, Port Elizabeth (in coll. Ponsouby). Baakens River, Port Elizabeth; King Williamstown Road Dam and Kowie River, Grahamstown (Farquhar). Upper Retreat and Klipplatz River, Cathcart (Miss Hickey). Käser River, Montagu (Connolly).

var. CAPENSIS, Walker.

[S.A.M.]

1912 *Ancylus caffer*, Krs., var. *capensis*, Walker, Nautilus, xxv. p. 141. *D.*

Type in coll. Walker.

Hab. CAPE OF GOOD HOPE. Lakeside and Hout Bay, Cape Peninsula (Connolly). Woost Hill and Blaauwkrantz Rivers, Grahamstown (Farquhar).

var. TRAPEZOIDEUS, Böttger.

1897 ? *Ancylus caffer*, Krs., von Mts., D.-O.-Afr. p. 151. pl. 1, f. 19
a, c, d. *D.F.*

1907 *Ancylus trapezoideus*, Bttg. in Schultze, Aus Namaland u.
Kalahari, p. 708. *N.*

1910 „ „ „ Abh. Senckenb. Naturf. Ges.
Frankfurt, xxxii. p. 450. pl. 28, f. 15. *D.F.*

- 1912 *Ancylus caffer*, Krs., var. *trapezoideus*, Bttg., Walker, Nautilus, xxv. p. 141. L.

Type in Senckenberg Mus. Frankfurt.

Hab. BRITISH BECHUANALAND. Witkop (subfossil, Schultze).

ORANGE FREE STATE. Valsch River, Lindley (Connolly).

TRANSVAAL. Pretoria District (McBean). Zoutpansberg (Cregoe).

Apparently also found in Central Africa.

507. ANCYLUS MOOIENSIS, Walker.

- 1912 *Ancylus mooiensis*, Walker, Nautilus, xxv. p. 141. D.

Type in coll. Walker.

Hab. TRANSVAAL. Mooi River, Potchefstroom (Miss Livingston).

var. DUBIOSUS, Walker.

- 1912 *Ancylus mooiensis*, var. *dubiosus*, Walker, Nautilus, xxv. p. 142. D.

Type in coll. Walker.

Hab. TRANSVAAL. Pienaars Poort (Connolly).

CAPE OF GOOD HOPE. Woost Hill River, Grahamstown (Farquhar).

508. ANCYLUS TRANSVAALENSIS, Craven.

- 1880 *Ancylus transvaalensis*, Crvn., P.Z.S. p. 617. pl. 57, f. 11. D.F.

- 1910 ? ,, *stenochorias*, M. & P., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 450. N.

Type in British Museum.

Hab. TRANSVAAL. Mooi River (Craven). Pretoria District (Connolly).

ORANGE FREE STATE. Vereeniging (Johnson).

CAPE OF GOOD HOPE. Prieska (in coll. Ponsonby).

? BRITISH BECHUANALAND. Witkop (subfossil, Schultze).

509. ANCYLUS VERREAUXI, Bourguignat.

- 1853 *Ancylus verreauxii*, Bgt., Rev. et Mag. Zool. p. 351. D.

- 1854 ,, ,, ,, pl. 1, f. 1-8. F.

- 1856 ,, ,, ,, Amén. malac. i. p. 12. pl. 1, f. 1-8. D.F.

- 1862 ,, *verreauxi* ,, Spicil. malac. p. 194. N.

- 1882 ,, *verreauxii* ,, Cless., Conch. Cab. p. 60. pl. 5, f. 4. D.F.

Type in Geneva Museum.

Hab. CAPE PENINSULA. "Ville de Constance" (? Constantia) (Verreaux). Retreat (Connolly).

SECTION FERRISSIA, Walker, 1903.

(Nautilus, xvii. p. 15.)

Type of Section, *A. rivularis*, Say.

510. ANCYLUS BURNUPI, Walker.

1912 *Ancylus burnupi*, Walker, Nautilus, xxv. p. 142. D.

Type in coll. Walker.

Hab. NATAL. Equeefa (Burnup).

CAPE OF GOOD HOPE. Brack Kloof, Grahamstown (Farquhar).

511. ANCYLUS CONNOLLYI, Walker.

1912 *Ancylus connollyi*, Walker, Nautilus, xxv. p. 143. D.

Type in coll. Walker.

Hab. CAPE OF GOOD HOPE. Black River, Maitland (Connolly).

King Williamstown Road Dam, Grahamstown (Farquhar).

512. ANCYLUS EQUEEFENSIS, Walker.

1912 *Ancylus equeefensis*, Walker, Nautilus, xxv. p. 143. D.

Type in coll. Walker.

Hab. NATAL. Equeefa (Burnup).

513. ANCYLUS FONTINALIS, Walker.

1912 *Ancylus fontinalis*, Walker, Nautilus, xxv. p. 144. D.

Type in coll. Walker.

Hab. TRANSVAAL. Ranjesfontein; Pienaars Poort (Connolly).

ORANGE FREE STATE. Morgendal (Connolly).

514. ANCYLUS VICTORIENSIS, Walker.

1912 *Ancylus victoriensis*, Walker, Nautilus, xxv. p. 144. D.

Type in coll. Walker.

Hab. RHODESIA. Victoria Falls (Connolly).

515. ANCYLUS ZAMBESIENSIS, Walker.

1912 *Ancylus zambesiensis*, Walker, Nautilus, xxv. p. 144. D.

Type in coll. Walker.

Hab. RHODESIA. Victoria Falls (Connolly).

I am deeply indebted to Mr. Bryant Walker for the whole of the classification and distribution of this Genus.

GENUS ISIDORA, Ehrenberg, 1831.
(Symb. Phys., Evertabrata.)

Type of Genus, *I. hemprichii*, Ehrn. (*contorta*, Mich.).

Kobelt (1909) is probably correct in placing in this Genus all South African species formerly ascribed to *Physa*. Every one, whose animal has been examined, has proved to belong to *Isidora*, and it seems unlikely that *Physa* exists in the subcontinent.

The Genus has suffered severely for a long time from misidentification. It is the merest truism to remark that the speed of a stream and the nature of its soil have so great an effect on the shell of its molluscan inhabitants that colour, epidermal sculpture, and even substance or contour are of little account in the determination of fresh-water species; yet many have been identified, and others founded, on these features alone, without reference to the form of the parietal and columellar regions, which appear to offer the only moderately stable basis for comparison. I regret that the results of my investigation so far have been of a purely destructive nature, but fear that even more of this will be necessary before it is advisable to describe the one or two new species which possibly exist in South Africa. Mr. E. A. Smith has kindly assisted me in the examination of such species as are now, for the first time, brought into synonymy.

516. ISIDORA ANGOLENSIS (Morelet).

- 1866 *Physa angolensis*, Morel., J. de C. xiv. p. 162. D.
 1868 „ „ „ Voy. Welwitsch, Moll. p. 88. pl. 9,
 f. 8. D.F.
 1873 „ *algoensis* „ Sow., Conch. Icon. pl. 7, f. 53. D.F.
 (*Err. typ.*)
 1886 „ *angolensis* „ Cless., Conch. Cab. p. 334. pl. 47
 (1885), f. 2. D.F.

Type in British Museum.

Hab. DAMARALAND (Geale).

Described from Angola.

Specimens of *angolensis* received by the British Museum from Geale in 1869 were incorrectly labelled *algoensis*, which gave rise to Sowerby's use of the latter name. Judging from the figure, *I. parietalis* (Mouss.), from Ovampoland, must be nearly allied to this species. It agrees in form, and the parietal plate, from which Mousson derived the name, is a frequent, and inconstant, feature in other members of the Genus.

517. ISIDORA COMPTA, Melv. & Pons. [S.A.M.]

1903 *Isidora compta*, M. & P., A.M.N.H. xii. p. 606. pl. 32, f. 14. *D.F.*
Type in British Museum.

Hab. TRANSVAAL. Boksburg (McBean, per Burnup).

ORANGE FREE STATE. Kopjes; Morgendal; Valsch River, Lindley (Connolly).

MASHONALAND. Enkeldoorn District (Miss Sharpe-Young).

Near *I. tropica* (Krs.), from which it can be distinguished by the curve of the outer lip, which may be called normal and regular in *tropica*, but in *compta* is usually distinctly flattened and almost incurved for a short way below the suture.

518. ISIDORA CONTORTA (Michaud).

1829 *Physa contortus*, Mich., Bull. Soc. Linn. Bordeaux, iii. p. 268.
plate, f. 15, 16. *D.F.*

1831 ,, *contorta*, Mich., Complément Hist. Moll. Fr. p. 83.
pl. 16, f. 21, 22. *D.F.*

1838 ,, ,, ,, Desh., Hist. nat. An. s. Vert. viii.
p. 403. *D.*

1841, 3 ,, ,, ,, Küst., Conch. Cab. (Limn.) p. 8. pl. 1,
f. 9-11. *D.F.*

1864 ,, ,, ,, Bgt., Mal. Algérie, ii. p. 171. pl. 10,
f. 38-40. *D.F.*

1870 ,, ,, ,, Blanf., Obs. Geol. and Zool. Abyss.
p. 472. *N.*

1874 *Isidora* ,, ,, Jick. (= *tropica*, Krs., and *cyrtota*,
Bgt.), Fauna N.-O.-Afr. p. 203. pl. 3, f. 4. pl. 7, f. 14. *D.R.F.*

,, *Physa contorta*, Mich., Sow., Conch. Iecn. pl. 11, f. 92. *D.F.*

1886 ,, ,, ,, Cless., Conch. Cab. p. 314. *D.N.*

1908 *Isidora* ,, ,, (= *sericina*, Jick.), Neuville &
Anthony, Ann. Sci. nat. Paris, viii. pp. 274, 275. *N.F.*

Type—*ubi?*

Hab. CAPE OF GOOD HOPE. Quarry near Fort England, Grahamstown (Farquhar).

A set of hardly mature shells from the above locality appear inseparable from Michaud's variable species, which is widely diffused through the South of Europe and North Africa, and recorded from West Africa and the Euphrates. Jickeli (1874) was very possibly right in placing *tropica* in the synonymy; but I have so far been unable to confirm his views, and as the last-named species is, typically, a well-marked one in South Africa, with a

special synonymy of its own, it appears advisable to allow it to maintain an individual existence until further material is available for examination.

Jickeli further included, under *contorta*; *truncata* and *harpula*, Fér.; *brocchii* and *hemprichi*, Ehrn.; *rivularis*, Phil.; *marcotica* and *spiracca*, Parr. in coll.; *pyrum*, Poro; and *scalata*, Merian.

519. ISIDORA DIAPHANA (Krauss).

- 1848 *Physa diaphana*, Krs., Südafr. Moll. p. 84. pl. 5, f. 11. *D.F.*
 1856 " " " Bgt., Rev. et Mag. Zool. viii. p. 236. *D.*
 " " " " Amén. malac. i. p. 175. *D.*
 1866 " " " von Mts., Mal. Blätt. xiii. p. 100. *N.*
 1873 " " " Sow., Conch. Icon. pl. 10, f. 81. *D.F.*
 1885 " " " Cless., Conch. Cab. p. 282. pl. 40, f. 12. *D.F.*

Type in Stuttgart Museum.

Hab. NATAL. Umgeni Valley (Krauss).

520. ISIDORA FORSKALI, Ehrenberg. [S.A.M.]

- 1831 *Isidora forskalii*, Ehrn., Symb. Phys., Evert. 3rd Sp. *D.*
 1848 *Physa wahlbergi*, Krs., Südafr. Moll. p. 84. pl. 5, f. 13. *D.F.*
 1856 " " " Bgt., Rev. et Mag. Zool. viii. p. 240. *D.*
 " " *forskalii*, Ehrn. " " viii. p. 235. *D.*
 " " " " " Amén. malac. i. p. 174. *D.*
 " " *wahlbergi*, Krs. " " i. p. 180. *D.*
 1863 " " " Küst., Conch. Cab. (Limn.) p. 71. pl. 12, f. 23, 24. *D.F.*
 1866 " " " von Mts., Mal. Blätt. xiii. p. 100. *N.*
 1869 " " " Dohrn, Mal. Blätt. xvi. p. 15. *N.*
 " " (*Isidora*) *forskalii*, Ehrn., von Mts., Mal. Blätt. xvi. p. 213. *N.*
 1873 " *wahlbergii*, Sow., Conch. Icon. pl. 8, f. 58. *D.F.*
 1874 *Isidora forskali*, Ehrn., Jick., Fauna N.-O.-Afr. p. 198. pl. 3, f. 3. pl. 7, f. 13. *D.R.F.* and *Synonymy*.
 1886 *Physa forskalii*, Ehrn., Cless., Conch. Cab. p. 320. pl. 39 (1884), f. 2. *D.F.*
 1897 *Isidora forskali*, Ehrn., von Mts., D.-O.-Afr. p. 141. pl. 1, f. 15. *D.F.*
 1898 *Physa gradata*, M. & P., A.M.N.H. ii, p. 129. pl. 7, f. 8. *D.F.*
 1899 *Isidora forskali*, Ehrn. (= *gradata*), M. & P., A.M.N.H. iv. p. 193. *N.*
 1908 " " " Neuville & Anthony, Ann. Sci. nat. Paris, viii. pp. 271-273. *N.F.*

Type of *forskali* in Zool. Mus. Berlin; *wahlbergi* in Stuttgart Museum; *gradata* in British Museum.

Hab. TRANSVAAL. River Limpopo (*wahlbergi*, Wahlberg). Pretoria (Farquhar).

CAPE OF GOOD HOPE. Brickfields, Grahamstown (*gradata*, Farquhar).

NATAL. Pietermaritzburg; Durban; Thornville (Burnup).

Also said to be found in North and East Africa, Aden, Cape Verde Islands, Angola and Benguela.

Jickeli (1874) includes in the synonymy *wahlbergi*, Krs.; *lamellosa*, Roth; *scalaris* and *schmidti*, Dkr.; *fischeriana*, Bgt.; *capillacea*, *clavulata*, *semiplicata*, *turriculata* and *apiculata*, Morelet; *beccarii*, Paladilhe; *vitrea*, Parr.; and *jickelii*, Krs.

521. ISIDORA NATALENSIS (Krauss). [S.A.M.]

1841, 43 *Physa natalensis*, Krs., Küst., Conch. Cab. (Limn.) p. 8. pl. 1, f. 12-14. *D.F.*

1848 *Physa natalensis*, Krs., Südafr. Moll. p. 84. pl. 5, f. 10. *D.F.*

1856 " " Bgt., Rev. et Mag. Zool. viii. p. 237. *D.*

" " " " Amén. malac. i. p. 176. *D.*

1869 " " von Mts., Mal. Blätt. xvi. p. 214. *N.*

1873 " " Sow., Conch. Icon. pl. 10, f. 79. *D.F.*

1874 *Isidora natalensis* " Jick., Fauna N.-O.-Afr. p. 196. *N.*

1883 *Physa natalica*, Bgt., Ann. Sci. nat. Paris, xv. pp. 98, 126. *N.*

1903 " *zuluensis*, M. & P., A.M.N.H. xii. p. 606. pl. 32, f. 4. *D.F.*

1910 *Isidora natalensis*, Krs., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 453. *N.*

Type of *natalensis* in Stuttgart Museum; *zuluensis* in British Museum.

Hab. NATAL. Umgeni Valley (Krauss). Durban (Burnup).

EAST ZULULAND (*zuluensis*, Burnup). Lake Sibayi (Toppin).

LORENZO MARQUES. Rikatla and Monguane Lakes (Junod).

BRITISH BECHUANALAND. Witkop (subfossil, Schultze).

Taking into consideration the great range of variation to be found in South African fresh-water shells, it appears impossible to separate *zuluensis*, which was likened by its joint authors to *natalensis*, from the last-named species.

522. ISIDORA PARIETALIS (Mousson).

1887 *Physa parietalis*, Mouss., J. de C. xxxv. p. 298. pl. 12, f. 8. *D.F.*

1904 " " " von Mts., Die Kalahari, p. 756. *N.*

1910 *Isidora* " " Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 452. *N.*

Type in Zurich Museum.

Hab. OVAMPOLAND. Ondonga (Schinz).

DAMARALAND. Okosongoho (Hermann).

BECHUANALAND. Lake Ngami; Garu; fossil, south of Hardeko Drift, Botletle River (Passarge).

BRITISH BECHUANALAND. Witkop (subfossil, Schultze).

?CAPE OF GOOD HOPE. Port Elizabeth (fide Morelet).

Considered by Böttger to be very near *diaphana*; Mousson's figure, however, closely resembles *angolensis*, which is known from Angola and Damaraland.

523. ISIDORA SERICINA, Jickeli. [S.A.M.]

1874 *Isidora sericina*, Jick., Fauna N.-O.-Afr. p. 194. pl. 3, f. 2. pl. 7, f. 11. *D.R.F.*

1886 *Physa* " " Cless., Conch. Cab. p. 325. pl. 39 (1884), f. 12. *D.F.*

1898 " " " M. & P., Proc. Mal. Soc. iii. p. 182. *L.*

" " *schackoi* " " " " "

1908 *Isidora sericina* " Neuville & Anthony, Ann. Sci. nat. Paris, viii. pp. 274, 275. *N.F.*

Type in Zool. Mus. Berlin.

Hab. "SOUTH AFRICA" (in coll. Ponsonby).

CAPE OF GOOD HOPE. Forty-eight miles from Port Elizabeth ("schackoi," in coll. Ponsonby).

Described from Abyssinia.

Careful examination of the two large series, on which the record of *sericina* and *schackoi* from South Africa was originally based, proves them to contain only one species. Professor Thiele has kindly compared this with Jickeli's types, and informs me that it is distinct from *schackoi*, but nearly allied to *sericina*, with which it may be identical. I have therefore removed *schackoi* from the South African list. Neuville and Anthony place *sericina* in the synonymy of *contorta*, Mich. The shells are certainly very similar, and might merge into one another, but Jickeli differentiated the two species by their radula, and, under these circumstances, it may be inadvisable to unite them without more extended investigation.

524. ISIDORA TROPICA (Krauss). [S.A.M.]

1848 *Physa tropica*, Krs., Südafr. Moll. p. 84. pl. 5, f. 12. *D.F.*

1856 " " " Bgt., Rev. et Mag. Zool. viii. p. 236. *D.*

" " " " " Amén. malac. i. p. 175. *D.*

- 1856 *Physa cyrtonota*, Bgt., Rev. et Mag. Zool. viii. p. 238. pl. 15, f. 1, 2. *D.F.*
 „ „ „ „ Amén. malac. i. p. 177. pl. 21, f. 1, 2. *D.F.*
 1873 „ *tropica*, Krs., Sow., Conch. Icon. pl. 5, f. 32. *D.F.*
 1874 *Isidora* „ „ Jick., Fauna N.-O.-Afr. p. 205. *N.*
 1880 *Physa lirata*, Crvn., P.Z.S. p. 617. pl. 57, f. 10. *D.F.*
 1885 „ *tropica*, Krs., Cless., Conch. Cab. p. 288. pl. 41, f. 8, 11. *D.F.*
 1886 „ *cyrtonata*, Bgt., Cless., *ibid.* p. 323. pl. 39 (1884), f. 5. *D.F.*
 „ „ *craveni*, Ancey (= *lirata*, Crvn., 1880, nec Tristram, 1863), Ancey, Le Naturaliste, viii. p. 358.
 1889 „ *lirata*, Crawf., Morel., J. de C. xxxvii. p. 20. (*Err. typ.*)
 1897 *Isidora tropica*, Krs., von Mts., D.-O.-Afr., p. 140. *D.*
 1898 *Physa craveni*, Stur., S.A. Moll. p. 76. *Emend. Nom.*
 1899 „ Ancey, M. & P., A.M.N.H. iv. p. 193. *N.*
 1910 *Isidora tropica*, Krs., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 453. *N.*

Type of *tropica* in Stuttgart Museum; *cyrtonota* in Geneva Museum; *lirata* in British Museum.

Hab. TRANSVAAL. River Lepenula (*tropica*, Wahlberg). Mooi River (*lirata*, Craven).

NATAL. Examples recorded, but require verification.

CAPE OF GOOD HOPE. Port Elizabeth (*lirata*, fide Morelet). Stellenbosch (Péringuey). Montagu; Black River, Maitland (Conolly). Olifant River (*cyrtonota*, Verreaux).

DAMARALAND. Okaputa Pan (subfossil, Hermann).

Jickeli remarks that *cyrtonota* "agrees perfectly with *tropica*." I have not seen an authentic example of Bourguignat's species, but judging from his description and figure, it certainly does so. The type set of *lirata* are slightly immature specimens of *tropica*, of which there is a fine co-type available for comparison in the British Museum. Krauss mentions that the young of *tropica* have a ribbed epidermis, the feature on which Craven founded his species.

525. ISIDORA VERREAUXI (Bourguignat).

- 1856 *Physa verreauxii*, Bgt., Rev. et Mag. Zool. viii. p. 237. pl. 15, f. 3, 4. *D.F.*
 „ „ „ „ Amén. malac. i. p. 176. pl. 21, f. 3, 4. *D.F.*
 1886 „ „ „ „ Cless., Conch. Cab. p. 317. pl. 39 (1884), f. 1. *D.F.*

Type—*ubi?*

Hab. CAPE OF GOOD HOPE. Olifant River; Knysna (Verreaux).

526. ISIDORA ZANZIBARICA (Clessin). [S.A.M.]

1886 *Physa zanzibarica*, Cless., Conch. Cab. p. 362. pl. 51, f. 5. *D.F.*

1889 „ *cornea*, Morel., J. de C. xxxvii. p. 16. pl. 1, f. 8. *D.F.*

1897 *Isidora zanzibarica*, Cless., von Mts., D.-O.-Afr. p. 140. *N.*

Type of *zanzibarica* in Zool. Mus. Berlin; co-types of *cornea* in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford).

von Martens infers that the loc. Zanzibar, originally quoted for *zanzibarica* by Clessin, is incorrect, and that the species is the same as that which was subsequently described by Morelet as *cornea*. It is nearly allied to *contorta*.

I. zanzibarica has recently been recorded by Thiele from Central Africa.

GENUS PHYSOPSIS, Krauss, 1848.

(Südafr. Moll. p. 85.)

Type of Genus, *Ph. africana*, Krs.

527. PHYSOPSIS AFRICANA, Krauss. [S.A.M.]

1848 *Physopsis africana*, Krs., Südafr. Moll. p. 85. pl. 5, f. 14. *D.F.*

1855 „ „ H. & A. Ad., Gen. rec. Moll. iii. pl. 83, f. 10. *F.*

1856 „ „ Bgt., Rev. et Mag. Zool. viii. p. 241. *D.*

„ „ „ „ Amén. malac. i. p. 180. *D.*

1863 „ „ Küst., Conch. Cab. p. 72. pl. 12, f. 29, 30. *D.F.*

1866 „ „ von Mts., Mal. Blätt. xiii. p. 8. *N.*

1874 *Physa africana*, Krs., Sow., Conch. Icon. pl. 1, f. 3. *D.F.*

„ *Physopsis africana*, Krs., Jiek., Fauna N.-O.-Afr. p. 209. *D.*

1879 „ „ „ Bgt., Moll. de l'Égypte, p. 12. *N.*

1886 *Physa* „ „ Cless., Conch. Cab. p. 409. pl. 41 (1885), f. 12. *D.F.*

1897 *Physopsis* „ „ von Mts., D.-O.-Afr. p. 142. *N.*

1907 „ „ „ Melv. & Standen, Manchester Memoirs, li, 1. p. 8. *N.*

1908 „ „ „ Neuville & Anthony, Ann. Sci. nat. Paris, viii. pp. 266-270. *N.F.*

Type in Stuttgart Museum.

Hab. NATAL. Port Natal (Wahlberg). Pietermaritzburg; Pine-town; Lower Umkomaas (Burnup).

ZULULAND (Burnup; Toppin).

TRANSVAAL. Pretoria District (Connolly). Middelburg (Crawford).

RHODESIA. Gwelo (Dodds). Enkeldoorn District, Mashonaland (Miss Sharpe-Young).

LORENZO MARQUES. River Zambesi (Peters; Kirk; Penther).

CAPE OF GOOD HOPE. Port Elizabeth (Crawford). Knysna (Purcell). Also distributed up the eastern side of the Continent.

Melville and Standen, in chronicling this species from Northern Rhodesia, remark: "Our specimens seem intermediate between the type and *ovoidea*, Bgt., which surely can be but a variety." Jickeli places *werneana*, Troschel, in the synonymy of *africana*, and expresses doubt whether "*globularis*, Morel." (*globosa*, Morel., Voy. Welwitsch, p. 93. pl. 9, f. 6, and J. de C., 1866, p. 162), is separable therefrom, while Neuville and Anthony consider that *abyssinica*, von Mts., and *eximia*, Bgt., as well as *ovoidea*, Bgt., merge into Krauss' species.

SUB-CLASS **STREPTONEURA**, Spengel, 1881.

(Zeitschr. f. wissens. Zool. Leipzig, p. 372.)

ORDER **PECTINIBRANCHIA**, Cuvier, 1817.

(Règne Animal, ii. pp. 388, 415, as Pectinibranches.)

SUB-ORDER **TÆNIOGLOSSA**, Troschel, 1847.

(Arch. f. Naturg. xiii, 2. p. 382, and Wiegmann's Handbuch der Zool., Ed. 3. 1848.)

TRIBE **PLATYPODA**, Fischer, 1883.

(Man. de Conch. p. 445.)

FAMILY **CYCLOPHORIDÆ**, Gray, 1847.

(P.Z.S. p. 181.)

SUB-FAMILY **CYCLOPHORINÆ**, Fischer, 1885.

(Man. de Conch. p. 739.)

GENUS **CYCLOPHORUS**, de Montfort, 1810.

(Conch. Syst. ii. p. 290.)

Type of Genus, *C. volvulus* (Müll.).

SUB-GENUS **MAIZANIA**, Bourguignat, 1889.

(Moll. de l'Afr. équat. p. 148.)

(= *Aferulus*, von Mts., 1897; *Natalia*, G.-Aust., 1897; *Hijabia*, G.-Aust., 1898; *Austrocyclus*, Ancey, 1898; and *Cyclophoropsis*, Dautzenberg, 1908.)

Type of Sub-Genus, *C. olivaceus*, Bgt.

528. *CYCLOPHORUS* (*MAIZANIA*) *WAHLBERGI* (Benson). [S.A.M.]

- 1848 *Cyclostoma translucidum*, "Sow.," Krs., Südafr. Moll. p. 83. *N.*
 1852 ,, *wahlbergi*, Bs., A.M.N.H. x. p. 271. *D.*
 ,, ,, ,, ,, Pfr., Mon. Pneum. i. p. 416. *D.*
 1854 ,, ,, ,, ,, Conch. Cab. p. 386. pl. 50, f. 17-19. *D.F.*
 1861 *Cyclophorus* ,, ,, Rve., Conch. Icon. pl. 17, f. 81. *D.F.*
 1881 ,, ,, ,, Smith, P.Z.S. p. 277. *N.*
 1902 ,, (*Maizania*) *wahlbergi*, Bs., Kob., Tierreich, xvi. pp. 148, 152. *F.D.*

Specimens ex auct. in University Museum of Zoology, Cambridge.

Hab. NATAL (Wahlberg, per Stevens). Durban; Isipingo (Penther). Generally in the bush fringing the coast (Burnup).

CAPE OF GOOD HOPE. Pondoland (Beyrich). Port Grosvenor (Bachmann).

Also known in German East Africa and Nyassaland.

Smith (1881) considers that *C. magilensis*, Craven, from Magila, may prove to be only the young state of this species.

GENUS *CHONDROCYCLUS*, Ancy, 1898.

(Bull. Mus. Marseille, i. p. 136.)

Type of Genus, *C. convexiusculus* (Pfr.).

529. *CHONDROCYCLUS CONVEXIUSCULUS* (Pfeiffer). [S.A.M.]

- 1855 *Cyclostoma* (*Cyclophorus*) *convexiusculum*, Pfr., P.Z.S. p. 104. *D.*
 1858 *Cyclophorus convexiusculus*, Pfr., Mon. Pneum. ii. p. 68. *D.*
 1861 ,, ,, Rve., Conch. Icon. pl. 19, f. 92. *D.F.*
 1880 *Cyclotus alabastris*, Craven, P.Z.S. p. 619. pl. 57, f. 9. *D.F.*
 1899 *Chondrocyclus alabastris*, Crvn., M. & P., A.M.N.H. iv. p. 193. *N.*
 1902 ,, *convexiusculus*, Pfr., Kob., Tierreich, xvi. p. 230. *D.*
 ,, *Cyclophorus* (*Maizania*) *alabastris*, Crvn., Kob., *ibid.* p. 149. *D.*
 Types in British Museum.

Hab. CAPE OF GOOD HOPE (Macgillivray). George District; Tharfield; Camps Bay; Simonstown (Layard). Montagu (Connolly). Port Elizabeth (Crawford). Grahamstown; Bedford (Farquhar). Cape Récif, Algoa Bay (*alabastris*, Craven). Pirie Forest (Godfrey).

As Crawford writes, *alabastris* is a beach-rolled and polished specimen of *convexiusculus*, in the synonymy of which it must be placed.

var. MINOR, Benson.

[S.A.M.]

Cyclophorus plicicuttis, Bs., in litt.1856 ,, *convexiusculus*, Pfr., var. *minor*, Bs., A.M.N.H.
xviii. p. 438. D.1858 ,, *convexiusculus*, Pfr., var. *minor*, Bs., Pfr., Mon.
Pneum. ii. p. 68. D.*Hab.* CAPE PENINSULA. Table Mountain (Layard).

The form most commonly found in the Cape Peninsula, but hardly worthy of varietal rank.

530. *CHONDROCYCLUS EXSERTUS*, Melv. & Pons. [S.A.M.]1903 *Chondrocyclus exsertus*, M. & P., A.M.N.H. xii. p. 608. pl. 32,
f. 11. D.F.

Type in British Museum.

Hab. NATAL. Umkomaas; Umbogintwini; Equeefa (Burnup).531. *CHONDROCYCLUS ISIPINGÖENSIS* (Sturany). [S.A.M.]1898 ? *Cyclotus isipingöensis*, Stur., Anz. k. Akad. Wiss. Wien. xvi.
Sonderabdruck, p. 9. D.,, *Cyclophorus minimus*, M. & P., A.M.N.H. ii. p. 129. pl. 7, f. 9. D.F.,, ? *Cyclotus isipingöensis*, Stur., S.A. Moll. p. 81. pl. 2, f. 37-39. D.F.1899 *Cyclophorus minimus*, M. & P., A.M.N.H. iv. pl. 3, f. 15 (*Operculum*).1902 ,, (*Maizania*) *isipingöensis*, Stur., Kob., Tierreich,
xvi. p. 149. D.,, ,, ,, *minimus*, M. & P., Kob., *ibid.* p. 150. D.Type of *minimus* in British Museum; *isipingöensis* in Naturh.
Hofmus. Vienna.*Hab.* NATAL. Durban; Isipingo (Penther). Pietermaritzburg,
and in bush generally, from the coast to Dargle and Karkloof
(Burnup).

CAPE OF GOOD HOPE. Maeström Forest, Bedford (Farquhar).

It seems more natural to place this species in the same Genus as
convexiusculus, which it resembles in miniature, than in *Maizania*.

FAMILY POMATIIDÆ, B. B. Woodward, 1903.

(Journ. of Conch. x. p. 356.)

(= Cyclostomatidæ, Auctt.)

GENUS TROPIDOPHORA, Troschel, 1847.

(Zeitschr. f. Malak. iv. p. 44.)

Type of Genus, *T. cuvieriana* (Petit).

SUB-GENUS LIGATELLA, von Martens, 1880.

(Meeresfauna Mauritius, p. 186.)

(= *Rochebrunia*, Bourguignat, 1881.)

Type of Sub-Genus, *T. listeri* (Gray).

532. TROPIDOPHORA CALCAREA (Sowerby). [S.A.M.]

- 1822 *Cyclostoma sulcata*, Lam., Hist. nat. An. s. Vert. vi, 2. p. 144. *D.*
 1838 " " " Desh., Hist. nat. An. s. Vert. viii.
 p. 354. *D.*
 1841 " " " Delessert, Recueil de Coquilles
 décrites par Lamarek, pl. 29, f. 9. *D.F.*
 1847 " *calcareum*, Sow. (= *sulcata*, Lam., 1822, nec Drap.,
 1805), Sow., Thesaurus Conch. i. p. 118. pl. 26, f. 113. *D.F.*
 1848 *Cyclostoma calcareum*, Sow., Pfr., Conch. Cab. p. 88. pl. 11
 (1847), f. 11, 12. *D.F.*
 1852 *Cyclostomus calcareus*, Sow., Pfr., Mon. Pneum. i. p. 201. *D.*
 1858 " *sulcatus*, Lam. (= *calcareus*, Sow.), Pfr., Mon.
 Pneum. ii. p. 115.
 1861 *Cyclostoma calcareum*, Sow., Rve., Conch. Icon. pl. 3, f. 13. *D.F.*
 1879 " " " Gibb., Journ. of Conch. ii. p. 145. *N.*
 1881 " *insulare* (var.), Smith, P.Z.S. p. 277. pl. 32, f. 1. *N.F.*
 1897 " *calcareum*, Sow., von Mts., D.-O.-Afr. p. 3. *N.*

Originals of *calcareum* in British Museum.

Hab. LORENZO MARQUES. Tette (Kirk; Thomson).

Also known from East and Central Africa.

533. TROPIDOPHORA COMBURENS, Melv. & Pons. [S.A.M.]

- 1903 *Tropidophora comburens*, M. & P., A.M.N.H. xii. p. 608. pl. 32,
 f. 12. *D.F.*

Type in British Museum.

Hab. ZULULAND. Makowe (Burnup).

534. TROPIDOPHORA FOVEOLATA (Melv. & Pons).

- 1895 *Cyclostoma foveolatum*, M. & P., A.M.N.H. xv. p. 164. pl. 12, f. 4. *D.F.*

Type in British Museum.

Hab. "S. AFRICA" (fide M. & P.).

CAPE OF GOOD HOPE. Port Alfred (Farquhar).

? NATAL (fide Sturany).

535. TROPIDOPHORA HARTVIGIANA (Pfeiffer).

- 1862 *Cyclostomus hartvigianus*, Pfr., Mal. Blätt. ix. p. 203. *D.*
 1863 „ „ „ Novit. Conch. ii. p. 225. pl. 59,
 f. 1, 2. *D.F.*
 1865 „ „ „ Mon. Pneum. iii. p. 131. *D.*
 Originals in British Museum.
Hab. "SOUTH AFRICA" (Hartvig).

536. TROPIDOPHORA INSULARIS (Pfeiffer). [S.A.M.]

- 1852 *Cyclostoma insulare*, Pfr., P.Z.S. p. 64. *D.*
 „ *Cyclostomus insularis*, Pfr., Mon. Pneum. i. p. 215. *D.*
 1854 *Cyclostoma insulare*, Pfr., Conch. Cab. p. 351. pl. 45, f. 5, 6. *D.F.*
 1861 „ „ „ Rve., Conch. Icon. pl. 8, f. 41. *D.F.*
 „ „ *kraussianum*, Pfr., Rve., Conch. Icon. pl. 9, f. 52. *D.F.*
 1897 „ *insulare*, Pfr., von Mts., D.-O.-Afr. p. 5. *N.*

The species figured by E. A. Smith (P.Z.S., 1881, p. 277. pl. 32, f. 1) is attributed by von Martens to *calcareo*.

Type in British Museum.

Hab. NATAL. Generally, on the coast and in the Midlands (Burnup).

TRANSVAAL. Pietpotgietersrust (Connolly).

GRIQUALAND WEST. Modder River, near Kimberley (Miss Wilman).

CAPE OF GOOD HOPE. Alexandria District (Crawford).

Originally described as from Mauritius.

537. TROPIDOPHORA KRAUSSIANA, Pfeiffer.

- 1852 *Cyclostoma (Tropidophora) kraussianum*, Pfr., P.Z.S. p. 64. *D.*
 „ *Cyclostomus kraussianus*, Pfr., Mon. Pneum. i. p. 204. *D.*
 1854 *Cyclostoma kraussianum* „ Conch. Cab. p. 334. pl. 43, f. 17,
 18. *D.F.*
 1881 „ „ „ Smith, P.Z.S. p. 278. *N.*
 1897 „ „ „ von Mts., D.-O.-Afr. p. 5. *N.*

Type in British Museum.

Hab. NATAL. Cape Natal (coll. Cuming).

TRANSVAAL. Pilgrim's Rest (Craven).

LORENZO MARQUES. Inhambane (Gibbons).

CAPE OF GOOD HOPE. Port Elizabeth (fide Morelet). Pondoland (Beyrich), and Port Grosvenor (Bachmann), fide von Martens.

The type, from the Cuming collection, appears to be a deformed shell, and the other localities quoted should be accepted with due reservation.

538. TROPIDOPHORA LIGATA (Müller). [S.A.M.]

- 1774 *Nerita ligata*, Müll., Verm. ii. p. 181. *D.*
 1786 *Turbo ligatus*, Müll., Chem., Conch. Cab. ix, 2. p. 60. pl. 123,
 f. 1071, 1072; 3, 4. *D.F.*
 1822 *Cyclostomaligata*, Müll., Lam., Hist. nat. An.s. Vert. vi, 2. p. 147. *D.*
 1831 „ *ligatum*, Müll., Sow., Genera of Shells, pl. 176, f. 4. *F.*
 1838 „ *ligata*, Lam., Desh., Hist. nat. An. s. Vert. viii.
 p. 359. *D.N.*
 1847 „ *ligatum*, Müll., Pfr., Conch. Cab. p. 33. pl. 4 (1843),
 f. 12, 13. pl. 8, f. 3, 4. *D.F.*
 „ „ „ Lam., Sow., Thesaurus Conch. i. p. 98.
 pl. 23, f. 24. *D.F.*
 1848 „ „ Lam., Krs., Südafr. Moll. p. 82. *D.N.*
 1852 *Cyclostomus ligatus*, Müll., Pfr., Mon. Pneum. i. p. 221. *D.*
 1859 *Cyclostoma ligatum* „ von Mts., Mal. Blätt. vi. p. 215. *N.*
 1861 „ „ Rve., Conch. Icon. pl. 9, f. 54. *D.F.*
 1897 „ „ von Mts., D.-O.-Afr. p. 5. *N.*

Original in University Zool. Mus. Copenhagen.

Hab. CAPE OF GOOD HOPE. Simon's Bay (McGillivray). Port Elizabeth; Alexandria District; Uitenhage; Addo (Crawford). Tharfield (Layard). Mossel Bay; Port Alfred (Farquhar). Knysna (O'Connor).

NATAL. Coast and Midlands, generally (Burnup). Kamiesberg (Zeyher).

TRANSVAAL. Lydenburg; Barberton (fide Sturany).

LORENZO MARQUES. Tette (Peters). Rikatla (Junod).

var. CAFFRA, Beck. [S.A.M.]

- 1861 *Cyclostoma caffrum*, Beck, Rve., Conch. Icon. pl. 11, f. 67. *D.F.*
 1865 *Cyclostomus caffer* „ Pfr., Mon. Pneum. iii. p. 129. *D.*

Originals in British Museum.

Hab. CAPE OF GOOD HOPE (Ecklon, in British Museum).

Merely a white form of *ligata*.

var. MINOR, Pfeiffer. [S.A.M.]

- 1828 *Turbo ligatus*, Wood, Index Test. p. 151. pl. 32, f. 122. *F.*
 1847 *Cyclostoma affine*, Sow. (= *Turbo ligatus*, Wood), Sow.,
 Thesaurus Conch. i. p. 98. pl. 23, f. 25, 26. *D.F.*
 1848 *Cyclostoma affine*, Sow., Pfr., Conch. Cab. p. 62. pl. 8 (1847),
 f. 17, 18. *D.F.*
 „ „ „ Krs., Südafr. Moll. p. 82. *N.*

1852 *Cyclostomus ligatus*, Müll., var. *minor*, Pfr. (= *C. affine*, Sow.)
Pfr., Mon. Pneum. i. p. 222. *N.*

Hab. CAPE PENINSULA. Generally distributed.

539. TROPIDOPHORA LINEATA (Pfeiffer).

1852 *Cyclostoma lineatum*, Pfr., P.Z.S. p. 65. *D.*

„ *Cyclostomus lineatus* „ Mon. Pneum. i. p. 222. *D.*

1854 *Cyclostoma lineatum* „ Conch. Cab. p. 350. pl. 45, f. 3, 4. *D.F.*

1881 „ „ Smith, P.Z.S. p. 278. *N.*

Type in British Museum, from “? Madagascar. Coll. Cuming.”

Hab. NATAL (coll. Cuming, in British Museum).

540. TROPIDOPHORA OCHRACEA (Melv. & Pons.).

1896 *Cyclostoma ochraceum*, M. & P., A.M.N.H. xviii. p. 318. pl. 16,
f. 8, 9. *D.F.*

Type in British Museum.

Hab. “SOUTH AFRICA” (fide M. & P.).

541. TROPIDOPHORA PLURILIRATA, Fulton. [S.A.M.]

1903 *Tropidophora plurilirata*, Fulton, Journ. of Malac. x. p. 103.
pl. 9, f. 8. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Grahamstown (Miss Leppan; Farquhar).

NATAL. Pinetown; Pietermaritzburg (Burnup).

542. TROPIDOPHORA SARCODES (Pfeiffer).

1856 *Cyclostoma sarcodes*, Pfr., P.Z.S. p. 339. *D.*

1858 *Cyclostomus* „ „ Mon. Pneum. ii. p. 120. *D.*

1861 *Cyclostoma* „ „ Rve., Conch. Icon. pl. 10, f. 61. *D.F.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Knysna (Cox; O'Connor).

The type-locality—Madagascar (coll. Cuming)—is probably erroneous.

543. TROPIDOPHORA TRANSVAALENSIS (Melv. & Pons.). [S.A.M.]

1891 *Cyclostoma transvaalense*, M. & P., A.M.N.H. viii. p. 237. *D.*

1892 „ „ „ ix. p. 94, pl. 5, f. 6.
N.F.

Type in British Museum.

Hab. TRANSVAAL. Pretoria (Farquhar).

L. solidus was recorded from Quilimane and Nyassa, and *zambesianus* from below Tette.

var. TRAPEZIFORMIS, Furtado.

1886 *Lanistes ellipticus*, von Mts., var. *trapeziformis*, Furtado, J. de C. xxxiv. p. 150. *D.*

Hab. LORENZO MARQUES. River Zambesi, below Tette (Capello & Ivens).

546. LANISTES OLIVACEUS, Sowerby, var. AMBIGUUS, von Martens.

1851, 2 *Ampullaria ovum* (pars), Phil., Conch. Cab. p. 22. pl. 7, f. 7. *D.F.*

1866 *Lanistes olivaceus*, Sow., var. *ambiguus*, von Mts., Novit. Conch. ii. p. 292. pl. 71, f. 3, 4. *D.F.*

1879 *Meladomus ambiguus*, von Mts., Bgt., Moll. de l'Égypte, p. 34.

1897 *Lanistes olivaceus*, Sow., var. *ambiguus*, von Mts., D.-O.-Afr. p. 165. *D.N.*

Type in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Tette (Peters). Delagoa Bay (Junod; native name, Chibyabya). Gorongozo District (Wells-Cole).

547. LANISTES OVUM, Peters. [S.A.M.]

1845 *Lanistes ovum*, Ptrs., Trosch., Archiv. f. Naturg. xi, 1, p. 215. *D.*

1851, 2 *Ampullaria ovum*, Ptrs., Phil., Conch. Cab. p. 22. pl. 6, f. 2. *F.*

1857 *Lanistes ovum*, Ptrs., Trosch., Gebiss der Schnecken, i. p. 90. pl. 6, f. 11. *R.*

1866 " " " von Mts., Novit. Conch. ii. p. 290. *N.*

1870 " " " " Mal. Blätt. xvii. p. 35. *N.*

1874 " " " Jick., Fauna N.-O.-Afr. p. 230. *D.*

1877 " *affinis*, Smith, P.Z.S. p. 716. pl. 74, f. 7. *D.F.*

1881 " " " " p. 290. pl. 34, f. 23. *N.F.*

1891 " " " von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 17. *N.*

1897 " *ovum*, Ptrs. (= *affinis*, Smith), von Mts., D.-O.-Afr. p. 166. *D.N.*

1898 " " " Stur., S.A. Moll. p. 86. pl. 3, f. 62, 63. *N.F.*

1904 " " " von Mts., Die Kalahari, p. 756. *N.*

1907 " *affinis*, Smith, Melv. & Standen, Manchester Memoirs, li, 4. p. 6. *N.*

Type of *affinis* in British Museum; *ovum* in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Tette (Peters). Itschongove, Delagoa Bay (Schenck).

BECHUANALAND. Ngami River (Passarge).

TRANSVAAL. "Libonibo" (? Lebombo) (Wilms).

MATEBILILAND. Meno's Kraal (Penther).

RHODESIA. Victoria Falls (Connolly).

Also known from North, West, and East Africa, and Northern Rhodesia.

von Martens (1897) places *affinis*, Smith, in the synonymy of *ovum*, while Melvill and Standen (1907) remark that *affinis* seems a distinct species.

References to both are given above for purpose of comparison.

var. ELATIOR, von Martens.

1866 *Lanistes ovum*, Ptrs., var. *elator*, von Mts., Novit. Conch. ii. p. 291, pl. 70, f. 7, 8. *D.F.*

1879 *Meladomus elator*, Bgt., Moll. de l'Égypte, p. 35.
Described from Niebohr River, 8° N. lat. (Heuglin).

var. INGENS, Ancey.

1894 *Meladomus ovum*, Ptrs., var. *ingens*, Ancey, Mém. Soc. Zool. Fr. vii. p. 223. *D.*

Described from Karonga, B.C.A.

548. LANISTES PURPUREUS (Jonas).

1839 *Ampullaria purpurea*, Jonas, Archiv. f. Naturg. v, 1. p. 342. pl. 10, f. 1. *D.F.*

„ *Bulinus tristis*, Jay, Catalogue of Shells, p. 121. pl. 7, f. 1. *N.F.*

1840 *Meladomus bulimoides*, Swainson, Treatise on Malac. p. 340. *D.*

1845 *Lanistes purpurea*, Jon. (= *tristis*, Jay), Troseh., Archiv. f. Naturg. xi, 1. p. 216. *D.*

1851, 2 *Ampullaria purpurea*, Jon., Phil., Conch. Cab. p. 22. pl. 6, f. 1. *D.F.*

1854 *Meladomus olivaceus*, "Sow.," H. & A. Ad., Gen. rec. Moll. i. p. 349, and iii. pl. 37, f. 6. *F.*

1859 *Lanistes purpureus*, Jon., von Mts., Mal. Blätt. vi. p. 216. *N.*

1860 *Ampullaria olivacea*, "Sow." (= *purpureus*, Jonas), Morel., Séries Conch. ii. p. 108. *N.*

1866 *Lanistes purpureus*, Jon., von Mts., Novit. Conch. ii. p. 293. *N.*

1881 „ „ Smith, P.Z.S. p. 290. *N.*

1897 „ „ von Mts., D.-O.-Afr. p. 163. *D.N.*

Type of *purpureus* in Zool. Mus. Berlin; *tristis* in American Museum of Natural History, New York.

Hab. LORENZO MARQUES. Tette (Peters).

Also found in East Africa and Zanzibar.

Originally described as from the Swan River, Australia.
 von Martens (1897) considers *M. bloyeti* and *nitidissimus*, Bgt., to be merely varieties of *purpureus*.

FAMILY VIVIPARIDÆ, Gray, 1847.

(P.Z.S. p. 155.)

(= Paludinidæ, Auctt.)

GENUS VIVIPARA, de Montfort, 1810.

(Conch. Syst. ii. p. 247, as *Viviparus*, *emend.* Dupuy, 1851, Hist. nat. des Moll. . . .
 qui vivent en France, p. 534.)

(= *Vivipare*, Lam., 1809, and *Paludina*, Lam., 1812.)

Type of Genus, *V. fluviorum*, de Montf. (*vivipara*, Lin.).

549. VIVIPARA CAPILLATA, von Frauenfeld.

1865 *Vivipara capillata*, Ernfd., P.Z.S. p. 659. *D.*

„ „ „ „ Verh. Zool. Ges. Wien, xv. p. 533.
 pl. 22. *D.F.*

1877 *Paludina* „ „ Smith, P.Z.S. p. 717. pl. 74, f. 3, 4. *F.*

1907 *Vivipara* „ „ Kob., Conch. Cab. p. 174, pl. 34, f. 5-8.
D.F.

Type in British Museum.

Hab. ZULULAND. Lake Sibayi (Toppin).

RHODESIA. ? Victoria Falls (Morrell, fide Preston; Dixey and Longstaff).

LORENZO MARQUES. Rikatla (Junod).

Originally described from Lake Nyassa.

550. VIVIPARA PASSARGEI, von Martens.

1904 *Vivipara passargei*, von Mts., Die Kalahari, pp. 757; 755, f. 3. *D.F.*

Type—*ubi?*

Hab. BECHUANALAND. In marly sandstone at the Letter Tree, Botletle (subfossil, Passarge).

Founded on a single specimen, “similar to the East African *V. unicolor*.”

551. VIVIPARA SAMBESIENSIS, Sturany. [S.A.M.]

1898 *Vivipara unicolor*, Oliv., var. *sambesiensis*, Stur., S.A. Moll.
 p. 85. pl. 3, f. 57-61. *D.F.*

1905 „ *densestriata*, Prest., Proc. Mal. Soc. vi. p. 300, f. 2. *D.F.*

1907 „ *sambesiensis*, Stur., Kob., Conch. Cab. p. 172. pl. 33,
 f. 15, 16. *D.F.*

- 1907 *Vivipara densestriata*, Prest., Kob., Conch. Cab. p. 173. pl. 33,
f. 17. *D.N.F.*
1909 „ *sambesiensis*, Stur. (cum var. *densestriata*, Prest.),
Kob., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 79.
Type of *sambesiensis* in Naturh. Hofmus. Vienna; *densestriata* in
British Museum.

Hab. RHODESIA. Victoria Falls (*sambesiensis*, Penther; *densestriata*, Morrell).

I adopt Kobelt's synonymy, in the belief that only one variable species of *Vivipara* inhabits the Zambesi at the Victoria Falls. It seems probable that the reported occurrence of *V. capillata*, Frnfd., in the same locality also refers to *sambesiensis*.

GENUS CLEOPATRA, Troschel, 1857.

(Gebiss der Schnecken, i. p. 100.)

Type of Genus, *C. bulinoides* (Oliv.).

522. CLEOPATRA FERRUGINEA (Lea).

- 1850 *Melania ferruginea*, Lea, P.Z.S. p. 182. *D.*
1851 „ *zanguébarensis*, Petit, J. de C. ii. p. 263. pl. 7, f. 1. *D.F.*
„ „ *amæna*, Morel., J. de C. ii. p. 192. pl. 5, f. 9. *D.F.*
„ „ „ „ Rev. et Mag. Zool. p. 220. *D.*
1860 „ „ „ „ Séries conch. ii. p. 117. *D.*
„ „ *ferruginea*, Lea, Rve., Conch. Icon. pl. 21, f. 147. *D.F.*
1878 *Paludomus africana*, von Mts., Monats.-Ber. K. Akad. Wiss.
Berlin, p. 297. pl. 2, f. 11-13. *D.F.*
1879 *Cleopatra kinyanica* and *cameroni*, Bgt., Moll. de l'Egypte, p. 21. *D.*
1881 *Paludomus ferrugineus*, Lea, Smith, P.Z.S. p. 294. pl. 34, f. 29. *N.F.*
1894 *Cleopatra ferruginea* „ (= *africana*, von Mts.), Smith, Proc.
Mal. Soc. i. p. 167. *N.*
1897 „ „ „ von Mts., D.-O.-Afr. p. 188. *N.*
„ „ *amæna*, Morel., von Mts., D.-O.-Afr. p. 187. *D.*
1899 „ *ferruginea*, Lea (= *amæna*, Morel.), M. & P., A.M.N.H.
iv. p. 193. *N.*
1909 „ „ „ Kob., Conch. Cab. p. 401. pl. 76, f. 22.
D.F.
„ „ *amæna*, Morel., Kob., *ibid.* p. 396. pl. 76, f. 15. *D.F.*
1911 „ *ferruginea*, Lea, Smith, Proc. Mal. Soc. ix. p. 240. *N.F.*

Types of *ferruginea* and *amæna* in British Museum.

Hab. ZULULAND. Manuan Creek (Anderson).

LORENZO MARQUES. River Quaqua, near the mouth of the Zam-
besi (Stuhlmann). Itschongove (fide Sturany).

CAPE OF GOOD HOPE. Prieska (Gibbons, fide M. & P.).

This species, originally founded on a single specimen collected at Zanzibar, is rather widely distributed in East Africa, and has apparently been described under various different names. Melvill and Ponsonby, after comparison of the types, place *C. amœna* in the synonymy, and von Martens cannot separate *cameroni* and *kynyanica*, Bgt., from *ferruginea*; while Smith (1881) remarks that "*Melania zanguibarica* of Petit appears to be the same as this species; and *P. africanus* of Martens, if not identical, offers but slight distinctions."

553. CLEOPATRA MORRELLI, Preston.

1905 *Cleopatra morrelli*, Prest., Proc. Mal. Soc. vi. p. 300, f. 3. *D.F.*

1909 „ *morelli*, "Smith," Kob., Conch. Cab. p. 391. pl. 76,
f. 6, 7. *D.F.*

Type in British Museum.

Hab. RHODESIA. Victoria Falls (Morrell).

var. COSTATA, Preston.

1905 *Cleopatra morrelli*, var. *costata*, Prest., Proc. Mal. Soc. vi.
pp. 300, f. 4; 301. *F.D.*

Type in British Museum.

Hab. RHODESIA. Victoria Falls (Morrell).

FAMILY MELANIIDÆ, d'Orbigny, 1837.

(Moll. Canar. p. 77, as Melaniidæ.)

SUB-FAMILY MELANIINÆ, H. & A. Adams, 1854.

(Gen. rec. Moll. i. p. 294.)

GENUS MELANIA, Lamarck, 1799.

(Mém. Soc. Hist. Nat. Paris, p. 75.)

Type of Genus, *M. amarula* (Lin.).

554. MELANIA AMARULA (Linné).

1758 *Helix amarula*, Lin., Syst. Nat., Ed. 10. i. p. 774. *D.*

1764 „ „ Mus. Lud. Ulr. p. 672. *D.*

1767 „ „ Syst. Nat., Ed. 12. p. 1249. *D.*

1774 *Buccinum amarula*, Müll., Verm. ii. p. 137. *D.*

1786 *Helix* „ Lin., Chem., Conch. Cab. ix, 2. p. 157.
pl. 134, f. 1218, 19. *D.F.*

1788 „ „ „ Gmel., Syst. Nat., Ed. 13. i. 6. p. 3656. *D.*

Hab. TRANSVAAL. Middelburg (Crawford). Hennop's River and Crocodile River, Pretoria District (McBean; Connolly).

CAPE OF GOOD HOPE. Sundays River, Port Elizabeth (Crawford).

557. MELANIA TUBERCULATA (Müller). [S.A.M.]

- 1774 *Nerita tuberculata*, Müll., Verm. ii. p. 191. *D.*
 1786 " " " Chem., Conch. Cab. ix, 2. p. 189.
 pl. 136, f. 1261, 1262. *D.F.*
 1842 *Melania* " " Phil., Abb. u. Besch. i. p. 4. pl. 1, 1.
 f. 14. *D.F.*
 1849 " " " Mouss., Moll. von Java, p. 73. pl. 11,
 f. 6, 7. *D.F.*
 1859 " " " Rve., Conch. Icon. pl. 13, f. 87. *D.F.*
 " " *inhambanica*, von Mts., Mal. Blätt. vi. p. 216. pl. 2,
 f. 10. *D.F.*
 1874 " *tuberculata*, Müll., Jick., Fauna N.-O.-Afr. p. 251. pl. 3,
 f. 7. pl. 7, f. 36. *D.R.F.*
 1875 " *inhambanica*, von Mts., Brot, Conch. Cab. p. 66. pl. 7,
 f. 6. *D.F.*
 1877 " *tuberculata*, Müll., Brot, *ibid.* p. 247. pl. 26, f. 11. *D.F.*
 1881 " " " Crosse, J. de C. xxix. p. 282. *N.*
 1884 " " " Nev., Hand List, ii. p. 239. *N.*
 1897 " " " von Mts., D.-O.-Afr. p. 193. *D.*
 1904 " " " " Die Kalahari, p. 757. *N.*
 1908 " " " Dautz., J. de C. lvi. p. 23. *References.*
 1909 " " " Kob., Abh. Senckenb. Naturf. Ges.
 Frankfurt, xxxii. p. 39. pl. 10, f. 5, 6. *N.F.*

Original in University Zool. Mus. Copenhagen.

Hab. LORENZO MARQUES. Inhambaue; Tette (Peters). Quaqua River (*inhambanica*, Stuhlmann).

TRANSVAAL. Koidati District (*inhambanica*, Schenck). Middelburg (Crawford).

ZULULAND EAST (Burnup).

NATAL. Umgeni Lagoon (Burnup).

BECHUANALAND. Makarrrikarri Pan; Lake Ngami; Botletle District; Mori Mossetla, Ngami River (fossil, Passarge).

Described from Coromandel, and very widely distributed over Africa and parts of Asia, the coasts of the Mediterranean, Java, Borneo, and other islands of the Pacific Ocean. Jickeli (1874) includes in its synonymy: *Strombus costatus* and *transversim striatus*, Schröt.; *Strombus vibex* and *H. acicula*, Gmelin; *M. fasciolata*, Oliv.; ?*Nerita lacustris*, Brocchi; *M. aspersa*, Troesch.; *porcata*,

Jonas; *tamsii* and *flammigera*, Dkr.; *rivularis*, Phil.; *unifasciata* and *rothiana*, Mouss.; *indefinita*, Lea; *zengana* and *comersoni*, Morel.; ?*newcombii*, Lea; *judaica*, Roth; *tigrina*, Hutt.; *pyramis*, Bs.; *exusta* and *wallacei*, Rve.; *punctulata*, Grat.; *abyssinica*, Rüppell; *beryllina*, Brot; *layardi*, Dohrn; and *rubropunctata*, Tristram.

Brot (1877) adds to the above *M. suturalis*, Phil.; *truncatula*, Lam.; *mauriciæ*, Less.; and *incontaminata*, *muricata*, and *biscaræ*, Parreyss.

558. MELANIA VICTORIÆ, Dohrn.

1865 *Melania victoriae*, Dohrn, P.Z.S. p. 234. D.

1877 " " Brot, Conch. Cab. p.257.pl.26,f.2. D.F.
Originals in British Museum.

Hab. RHODESIA. Victoria Falls (Kirk; Morrell).

FAMILY PALUDESTRINIDÆ, B. B. Woodward, 1903.

(Journ. of Conch. x. p. 355.)

(= Hydrobiidæ, Auctt.)

GENUS PALUDESTRINA, d'Orbigny, 1840.

(Voy. Amer. Merid., Moll. p. 381.)

(= *Hydrobia*, Hartmann, 1821, nec Leach, in Coleoptera 1817.)

Type of Genus, *P. auberiana*, D'Orb.

559. PALUDESTRINA ALABASTRINA (Morelet).

1889 *Hydrobia alabastrina*, Morel., J. de C. xxxvii. p. 19. pl. 2, f. 5. D.F.
Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford).

560. PALUDESTRINA TRISTIS (Morelet). [S.A.M.]

1889 *Hydrobia tristis*, Morel., J. de C. xxxvii. p. 18. pl. 2, f. 4. D.F.
Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford).

NATAL. Lower Umkomaas; Winkel Spruit (Burnup).

561. PALUDESTRINA ZWELLEN DAMENSIS (Küster).

1852, 3 *Paludina zwelendamensis*, Krs., Küst., Conch. Cab. p. 53.
pl. 10, f. 19, 20. D.F.

Type—*ubi*?

Hab. CAPE OF GOOD HOPE. Zoetendals Valley, Swellendam District (Krauss).

Küster wrongly ascribes this species to Krauss' Südafr. Mollusken. The description in Conch. Cab. is from a shell in coll. Küster.

FAMILY TRUNCATELLIDÆ, Gray, 1840.

(Syn. Brit. Mus. pp. 117, 148.)

GENUS TRUNCATELLA, Risso, 1826.

(Hist. nat. Europe mérid. iv. p. 124.)

(= *Truncatula*, Leach, 1818 (*inéd.*); *Erpetrometra*, Lowe, 1831; and *Choristoma*, de Cristofori and Jan, 1832.)Type of Genus, *T. lævigata*, Risso.

562. TRUNCATELLA TERES, Pfeiffer. [S.A.M.]

- 1856 *Truncatella teres*, Pfr., P.Z.S. p. 336. *D.*
 „ „ „ Mon. Auric. p. 188. *D.*
 1857 „ „ „ Cat. Auric. p. 136. *D.*
 1868 „ „ „ Cox, Mon. Austral. Landshells, p. 92.
 pl. 15, f. 9. *D.F.*
 1874 „ „ „ Jick., Fauna N.-O.-Afr. p. 188. *D.*

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Crawford; Penther; Farquhar).

First recorded from Mauritius and Australia; also known from the Red Sea.

GENUS TOMICHIA, Benson, 1851.

(A.M.N.H. vii. p. 378.)

Type of Genus, *T. ventricosa* (Rve.).

563. TOMICHIA VENTRICOSA (Reeve). [S.A.M.]

- 1842 *Truncatella ventricosa*, Sow., Rve., Conch. Syst. ii. p. 94. pl. 182,
 f. 2. *F.*
 1846 „ „ „ Pfr., Zeitschr. f. Malak. iii. p. 189. *D.*
 1848 „ „ „ (= *capensis*, Krs. in litt.), Krs.,
 Südafr. Moll. p. 87. pl. 5, f. 22. *D.F.*
 1851 *Tomichia* „ „ „ Bs., A.M.N.H. vii. p. 379. *D.*
 1855 *Truncatella* „ „ „ Küst., Conch. Cab. p. 13. pl. 2,
 f. 27-31. *D.F.*
 „ *Tomichia* „ „ „ H. & A. Ad., Gen. rec. Moll. ii.
 p. 313, and iii. pl. 88, f. 4. *D.F.*
 1885 *Hydrobia caledonensis*, Chaper, Bull. Soc. Zool. Fr. x. p. 484.
 pl. 11, f. 6. *D.F.*
 1889 „ „ „ Morel., J. de C. xxxvii. p. 18. *N.*

1901 *Tomichia ventricosa*, Sow. (= *caledonensis*, Chaper), Ancey, J. de C. xlix, p. 225. N.

Type of *ventricosa* in British Museum; *caledonensis* in École des Mines, Paris.

Hab. CAPE OF GOOD HOPE. Cape Flats; Zoetendals Valley (Krauss). "Baszaarm's" (Baas Harman's) Kraal; Michelville, or Holloway's Halfway House (Benson). Port Elizabeth (Crawford; Farquhar). Coega (Crawford). Near Caledon (*caledonensis*, Chaper). Milnerton (Connolly). Vogel Vlei, Calvinia Division (fossil, Moffatt).

var. BREVIS, Krauss.

1848 *Truncatella ventricosa*, Sow., var. *brevis*, Krs., Südafr. Moll. p. 87. D.

Type in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE. Cape Flats; Zoetendals Valley (Krauss). Eerste River (Connolly). Lorens River, Somerset District (Holub).

FAMILY ASSEMANIIDÆ, H. & A. Adams, 1856.

(Gen. rec. Moll. ii. p. 314, as *Assiminiidæ*, *emend.* B. B. Woodward, 1903, Journ. of Conch. x. p. 356.)

GENUS ASSEMANIA, Leach in Fleming, 1828.

(Hist. Brit. Anim. p. 275, as *Assiminea*, *emend.* Knight, 1900, Journ. of Conch. ix. p. 275, and B. B. Woodward, 1903, Journ. of Conch. x. pp. 356, 366.)

(= *Assiminia*, *Assaminea*, Auctt.)

Type of Genus, *A. grayana*, Leach.

564. ASSEMANIA BIFASCIATA, Nevill. [S.A.M.]

1880 *Assiminia bifasciata*, Nev., Journ. As. Soc. Bengal, xlix, 2, p. 162. D.

1887 *Assimineia* ,, ,, Bttg., Jahrb. d. Deutsch. Mal. Ges. xiv. p. 161. D.

Type in Indian Museum, Calcutta.

Hab. NATAL. Port Natal (Nevill). Umhlatasani; Umlaas and Umkomaas Rivers (Burnup).

565. ASSEMANIA FASCIATA (Krauss).

1848 *Paludina fasciata*, Krs., Südafr. Moll. p. 86. pl. 5, f. 18. D.F.

1887 *Assimineia* ,, ,, Bttg., Jahrb. d. Deutsch. Mal. Ges. xiv. p. 174. D.

Type in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE. Knysna and Zoetendals Valleys (Krauss).

570. ASSEMANIA SINICA, Nevill.

1880 *Assiminia sinensis*, Nev., Journ. Asiat. Soc. Bengal, xlix, 2, p. 161. *D.*

1887 *Assimineia sinica*, Nev. (for *sineusis*, Nev., not *chinensis*, Pfr.),
Bttg., Jahrb. d. Deutsch. Mal. Ges. xiv. p. 203. *D.*

Type in Indian Museum, Calcutta.

Hab. NATAL. Wydenham; Umkomaas (Burnup).

Described from Hong Kong.

571. ASSEMANIA UMLAASIANA, Smith. [S.A.M.]

1902 *Assiminia umlaasiana*, Smith, Journ. of Conch. x. p. 248. pl. 4,
f. 3. *D.F.*

Type in British Museum.

Hab. NATAL. In an ocean cave at Isipingo Rocks, half a mile
south of Umlaas River mouth (Burnup).

ORDER ASPIDOBRANCHIA, Schweigger, 1820.

(Naturges. d. Skeletlose Thiere, p. 720, as Aspidobranchiata; *emend.* Menke, 1830.)

SUB-ORDER RHIPIDOGLOSSA, Troschel, 1847.

(Archiv. f. Naturg. xiii, 2. p. 385, and Wiegmann's Handbuch der Zool.,
Ed. 3. 1848.)

FAMILY HYDROCENIDÆ, Bourguignat, 1877.

(Descr. de deux nouveaux Genres Algériens, p. 38.)

GENUS HYDROCENA, Parreyss, 1846.

(Hermannsen's Indiciis Generum Malac. i. p. 546.)

Type of Genus, *H. cattaroensis* (Pfr.).

572. HYDROCENA NOTICOLA, Benson. [S.A.M.]

1856 *Hydrocena noticola*, Bs., A.M.N.H. xviii. p. 439. *D.*

1858 " " Pfr., Mon. Pneum. ii. p. 158. *D.*

1897 *Assimineia tyttha*, M. & P., A.M.N.H. xix. p. 639. pl. 17, f. 11. *D.F.*

Type of *tyttha* in British Museum; *noticola*—*ubi*?

Hab. CAPE OF GOOD HOPE. Table Mountain, Camps Bay
(Layard). Simonstown; Hout Bay (Connolly). Grahamstown;
Kowie; Bathurst; Port Elizabeth (Farquhar).

NATAL. Howiek (*tyttha*); Scottburgh; Karkloof; Dargle; Game
Pass; Ntimbankulu (Burnup).

The type set of *tyttha* has been most carefully compared with a
large series of *noticola* from Table Mountain, with the result that no
specific difference has been found between them.

FAMILY NERITIDÆ, Fleming, 1828.

(Hist. Brit. Anim. p. 318, as Neritidæ, *emend.* Turton, 1831, Manual, pp. 10, 138.)

GENUS THEODOXIS, de Montfort, 1810.

(Conch. Syst. ii. p. 350.)

(= *Neritina*, Lam., 1822 [*Neritine*, 1809].)Type of Genus, *T. lutetianus*, de Montf. (*fluviatilis*, Lin.).

573. THEODOXIS KNORRI (Récluz).

- 1841 *Neritina knorri*, Récl., Rev. Zool. Soc. Cuv. p. 274. *D.*
 1849 „ *knorrii*, Récl., Sow., Thesaurus Conch. ii. p. 511.
 pl. 111, f. 78. pl. 113, f. 150. *D.F.*
 „ „ *beckii*, Récl., Sow., *ibid.* p. 512. pl. 109, f. 13. *D.F.*
 1850 „ *knorri*, Récl. (= *beckii*, Sow.), Récl., J. de C. i. p. 144.
 1855 „ „ „ Rve., Conch. Icon. pl. 2, f. 6. *D.F.*
 „ „ *beckii* „ „ „ pl. 3, f. 11. *D.F.*
 1869 „ *knorri* „ von Mts., Nachrichtsbl. d. Deutsch. Mal.
 Ges. i. p. 154. *D.*
 1875 „ „ „ „ Conch. Cab. p. 55. pl. 8, f. 4-6.
D.F.
 1897 „ „ „ „ D.-O.-Afr. p. 213. *D.*
 1899 „ „ „ M. & P., A.M.N.H. iv. p. 194. *N.*

Type—*ubi*?*Hab.* LORENZO MARQUES. Inhambane (Peters).

Described from Madagascar and also known from Zanzibar.

M. & P. (1899) remark “Probably a form of *N. pulligera*.”

574. THEODOXIS NATALENSIS (Reeve). [S.A.M.]

- 1848 *Neritina zebra*, “Lam.,” Krs., Südafr. Moll. p. 88. *N.*
 1855 „ *natalensis*, Rve., Conch. Icon. pl. 16, f. 75. *D.F.*
 1877 „ „ „ von Mts., Conch. Cab. p. 96. pl. 11,
 f. 10, 11, 15. *D.F.*
 1897 „ „ „ „ D.-O.-Afr. p. 213. *D.*

Originals in British Museum, type not specified.

Hab. NATAL. Umgeni River (Krauss). Umkomaas (Burnup).

LORENZO MARQUES. Inhambane; Tette (Peters). Delagoa (Junod).

Also found in Central East Africa.

575. THEODOXIS SOUVERBIANUS (Montrouzier).

- 1861 *Neritina souverbiana*, Montr., Gassies, Act. Soc. Linn. Bordeaux,
 xxiv. p. 309. pl. 8, f. 7. *D.F.*

- 1863 *Neritina souverbiana*, Montr., J. de C. xi. pp. 75, 175. pl. 5, f. 5. *D.F.*
 1871 „ *pulcherrima*, Angas, P.Z.S. pp. 19, 96. pl. 1, f. 25. *D.F.*
 1879 „ *souverbiana*, Montr. (= *pulcherrima*, Ang.), von Mts.,
 Conch. Cab. p. 251. pl. 23, f. 29–31. *D.F.*
 1881 „ „ Montr., Morel., J. de C. xxix. p. 208. *D.*
 1883 „ „ „ „ „ xxxi. p. 204. *N.*
 1910 „ „ „ Smith, Ann. Natal Mus. ii. p. 204. *N.*

Type of *pulcherrima* in British Museum.

Hab. NATAL. Congella (Burnup).

Souverbianus was originally described from New Caledonia, and *pulcherrima* from Port Jackson.

CLASS LAMELLIBRANCHIA, de Blainville, 1816.

(Bull. Soc. Philom. p. 122, as Lamellibranches.)

ORDER EULAMELLIBRANCHIA, Pelseneer, 1892.

(Bull. Sci. Fr. et Belg. p. 365.)

SUB-ORDER SUBMYTILACEA, de Blainville, 1825.

(Man. de Malac. p. 537.)

FAMILY UNIONIDÆ, Fleming, 1828.

(Hist. British Animals, p. 415.)

Dr. F. Haas, of Frankfurt-am-Main, has very kindly furnished me with much valuable information regarding this family, which he has collected for his own forthcoming monograph on the subject; an act of exceptional courtesy, for which I am greatly indebted to him.

GENUS CAFFERIA, Simpson, 1900.

(Proc. U.S. Nat. Mus. xxii. p. 824.)

Type of Genus, *C. caffra* (Krs.).

576. CAFFERIA CAFFRA (Krauss). [S.A.M.]

- 1848 *Unio caffer*, Krs., Südafr. Moll. p. 18. pl. 1, f. 14. *D.F.*
 „ „ *zeyheri*, Mke., Zeitschr. f. Malak. v. p. 28. *D.*
 1851 „ *cyanus*, Phil., „ v. p. 125. *D.*
 1856 „ *verreauxi*, Charpentier, Küst., Conch. Cab. p. 150. pl. 43
 (1855), f. 6. *D.F.*
 „ „ *verreauxianus*, Lea, Proc. Acad. Nat. Sci. Phila. viii. p. 94. *D.*
 „ „ *africanus*, Lea, *ibid.* p. 94. *D.*
 „ „ *caffra*, Krs., Küst., Conch. Cab. p. 143. pl. 42 (1855), f. 2, 3. *D.F.*

- 1857 *Unio verreauxianus*, Lea, Obs. G. Unio, vi. p. 21. pl. 27, f. 16. *D.F.*
 „ „ *africanus*, Lea, *ibid.*, p. 20. pl. 27, f. 15. *D.F.*
 „ „ „ „ Rve., Conch. Icon. pl. 22, f. 100. *D.F.*
 1858 „ „ „ „ Journ. Acad. Nat. Sci. Phila. iii. p. 300.
 pl. 27, f. 15. *D.F.*
 „ „ *verreauxianus*, Lea, *ibid.* p. 301. pl. 27, f. 16. *D.F.*
 1859 „ *navigioliiformis* „ „ Proc. Acad. Nat. Sci. Phila. viii.
 p. 152. *D.*
 „ „ „ „ „ Obs. G. Unio, vii. p. 63. pl. 37, f.
 124. *D.F.*
 1860 „ „ „ „ „ Journ. Acad. Nat. Sci. Phila. iv.
 p. 245. pl. 37, f. 124. *D.F.*
 1864 „ *natalensis* „ „ Proc. Acad. Nat. Sci. Phila. p. 113. *D.*
 „ „ „ „ „ Obs. G. Unio, xi. p. 63. pl. 20, f.
 57. *D.F.*
 1865 „ *navigioliiformis* „ „ Rve., Conch. Icon. pl. 24, f. 114. *D.F.*
 1866 „ *caffer*, Krs., Rve., Conch. Icon. pl. 41, f. 226. *D.F.*
 „ „ *natalensis*, Lea, Journ. Acad. Nat. Sci. Phila. vi. p. 59.
 pl. 20, f. 57. *D.F.*
 1868 „ „ „ „ „ Sow., Conch. Icon. pl. 71, f. 362. *D.F.*
 „ „ *verreauxianus* „ „ „ „ „ pl. 69, f. 352. *D.F.*
 „ „ *rectilinearis*, Sow., Conch. Icon. pl. 65, f. 332. *D.F.*
 1880 „ *caffer*, Krs., Crvn., P.Z.S. p. 618. *N.*
 1885 „ *vaalensis*, Chaper, Bull. Soc. Zool. Fr. x. p. 480. pl. 11,
 f. 1-3. *D.F.*
 1889 „ *natalensis*, Lea, and *verreauxi*, Charp., von Mts., Sitz-
 Ber. Ges. Nat. Fr. Berlin, p. 165. *L.*
 1891 „ *caffer*, Krs., Smith, A.M.N.H. viii. p. 317. *D.* and *Synonymy.*
 „ „ *verreauxi*, Charp., Smith, *ibid.* p. 319. *N.*
 1898 „ *caffer*, Krs., var. *pentheri*, Stur., S.A. Moll. p. 91. pl. 3,
 f. 64, 65. *D.F.*
 1900 *Nodularia (Cafferia) caffer*, Krs., Simpson, Proc. U.S. Nat.
 Mus. xxii. p. 825. *Synonymy.*

Type of *caffer* in Stuttgart Museum; *vaalensis* in École des Mines, Paris; *zeyheri* lost; *africanus*, *natalensis*, and *verreauxianus* in U.S. National Museum, Washington; *navigioliiformis* and *rectilinearis* in British Museum; var. *pentheri* in Naturh. Hofmus. Vienna.

Hab. "SOUTH AFRICA" (*cyamus*, in coll. Largilliert).

NATAL (Wahlberg). Umsinduzi River, Pietermaritzburg (Burnup). Umpingave River (*natalensis*, McKen).

TRANSVAAL. Common round Pretoria and in Crocodile River (Connolly). Vaal River, Standerton (Miss Livingston). Between

Kimberley and Christiania (*natalensis*, Schenck). Kalkspruit, between Vaal and Heidelberg (*verreauxi*, Schenck, fide von Martens).

ORANGE FREE STATE. Riet River, Winburg (fide Sturany). Rhenoster River, south of Heilbron (Connolly).

CAPE OF GOOD HOPE (*africanus* and *verreauxianus*, Verreaux; *zeyheri*, Zeyher). Izeli River, near King Williamstown (Godfrey). Port Elizabeth District (Crawford). Retreat (Lightfoot). Vaal River, Barclay (*vaalensis*, Chaper). "Soutenthal" (Zoetendals Valley (*verreauxi*, Verreaux).

LITTLE NAMALAND. Orange River, Henkries (Lightfoot).

GRIQUALAND WEST. Imvani and Riverton, Vaal River (Miss Wilman).

BRITISH BECHUANALAND. Hartz River, Taungs (Miss Wilman).

RHODESIA. Panda ma tinka, R. Zambesi (var. *pentheri*, Penther).

Smith (1891) places *africanus*, *natalensis*, *verreauxianus*, and *vaalensis* in the synonymy of *caffra*; Simpson (1900), while further admitting *navigioliformis* and *rectilinearis*, considers *africanus* and *vaalensis* worthy of varietal rank. Dr. Haas writes that *verreauxianus*, *navigioliformis*, *natalensis*, *rectilinearis*, *africanus*, *vaalensis*, and *pentheri* are inseparable from *caffra*, and that *zeyheri* and *cyamus* must also belong to this species.

577. *CAFFERIA MASHONÆ* (Preston).

1910 *Unio mashonæ*, Prest., A.M.N.H. vi. p. 61. pl. 4, f. 10. *D.F.*

Type in British Museum.

Hab. RHODESIA. A sluit about 16 miles from Enkeldoorn, Mashonaland (Miss Sharpe-Young).

Very similar to *caffra*, from which it may be separable through the absence of the umbonal scar.

578. *CAFFERIA MOSSAMBICENSIS* (Peters).

1859 *Unio mossambicensis*, Ptrs., von Mts., Mal. Blätt. vi. p. 218.
pl. 3, f. 3-5. *D.F.*

1885 ,, ,, Charmes, Bull. Soc. Mal. Fr. ii.
p. 166. *N.*

1897 ,, ,, von Mts., D.-O.-Afr. p. 225. pl. 7,
f. 2. *D.F.*

Type in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Tette (Peters).

Also reported from Central Africa.

GENUS UNIO, Retz, 1788.

(Dissert. Nov. Test. Genera, Lund. p. 16.)

Type of Genus, *U. pictorum* (Lin.).

The four species which follow are left in *Unio*, to which they were originally attributed, pending further investigation. I have Dr. Haas' authority for stating that they do not really belong to that Genus, but that it is doubtful whether either of them can be placed in *Cafferia*.

579. UNIO FISSIDENS, Böttger. [S.A.M.]

- 1886 *Unio* (*Hyridella*) *fissidens*, Bttg., Ber. Senckenb. Naturf. Ges. Frankfurt, p. 27. pl. 2, f. 6, 7. *D.F.*
 1910 „ „ Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 453. *N.*

Type in Senckenburg Mus. Frankfurt.

Hab. BRITISH BECHUANALAND. Nosob-Hygap watercourse, east of Kebeum (subfossil, Nolte). Witkop (subfossil, Schultze; Rogers).

580. UNIO HYGAPANUS, Böttger.

- 1886 *Unio* (*Hyridella*) *hygapanus*, Bttg., Ber. Senckenb. Naturf. Ges. Frankfurt, p. 26. pl. 2, f. 5. *D.F.*

Type in Senckenberg Mus. Frankfurt.

Hab. BRITISH BECHUANALAND. Nosob-Hygap watercourse, east of Kebeum (subfossil, Nolte).

Described from a single left valve; possibly only a less highly sculptured form of *fissidens*.

581. UNIO KUNENENSIS, Mousson.

- 1887 *Unio kunenensis*, Mouss., J. de C. xxxv. p. 300. pl. 12, f. 10. *D.F.*
 1891 „ „ Smith, A.M.N.H. viii. p. 319. *N.*
 1904 „ „ von Mts., Die Kalahari, p. 758. *N.*

Type in Zurich Museum.

Hab. OVAMPOLAND. Kunene River (Schinz).

BECHUANALAND. Okavango and Botletle District, and in the salt pans of the Makarrikarri brook (fossil, Passarge).

“ Nearly allied to *U. hauttecoeri*, Bgt., and other species from the East African Lakes ” (von Martens).

582. UNIO ZAMBESIENSIS, Preston.

- 1905 *Unio zambesiensis*, Prest., Proc. Mal. Soc. vi. pp. 300, f. 1; 301. *D.F.*
 Type in British Museum.

Hab. RHODESIA. Victoria Falls (Morrell).

FAMILY MUTELEDIDÆ, Gray, 1847.

(P.Z.S. p. 197, as Muteladæ, *emend.* H. & A. Adams, 1857, Gen. rec. Moll.
ii. p. 505.)

GENUS SPATHA, Lea, 1838.

(Trans. Amer. Phil. Soc. vi. p. 141.)

Type of Genus, *S. rubens*, Lea.

583. SPATHA MAITENGENSIS, Sturany.

1898 *Spatha maitenguensis*, Stur., S.A. Moll. p. 92. pl. 3, f. 66. *D.F.*

Type in Naturh. Hofmus. Vienna.

Hab. RHODESIA. Maitengue River (Penther).

Described from a single example, very nearly allied to *wahlbergi* (Krs.).

584. SPATHA PETERSI, von Martens.

1859 *Spatha petersi*, von Mts., Mal. Blätt. vi. p. 218. pl. 3, f. 1, 2. *D.F.*

1864 „ „ „ „ *modesta*, Lea, Proc. Acad. Nat. Sci. Phila. p. 109. *D.*

„ „ „ „ Obs. G. Unio, xi. p. 41. pl. 13, f. 35. *D.F.*

1889 „ „ „ „ *petersi*, von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 164. *N.*

1897 „ „ „ „ (= *modesta*, Lea), von Mts., D.-O.-Afr.
p. 251. *D.*

Type of *petersi* in Zool. Mus. Berlin; *modesta* in U.S. National Mus. Washington.

Hab. LORENZO MARQUES. Tette (Peters). Itschongove (Schenck). Rikatla; Nkomati River (Junod).

Also found in Central Africa. *S. modesta* was described from Mozambique.

585. SPATHA WAHLBERGI (Krauss).

1848 *Iridina wahlbergi*, Krs., Südafr. Moll. p. 19. pl. 2, f. 1. *D.F.*

1859 *Spatha* „ „ „ „ von Mts., Mal. Blätt. vi. p. 217. *N.*

1864 „ „ „ „ *natalensis*, Lea, Proc. Acad. Nat. Sci. Phila. p. 113. *D.*

1866 „ „ „ „ Journ. Acad. Nat. Sci. Phila. vi. p. 64.
pl. 20, f. 58. *D.F.*

„ „ „ „ *hartmanni*, von Mts., Mal. Blätt. xiii. p. 10. *D.*

1867 „ „ „ „ *natalensis*, Lea, Obs. G. Unio, xi. p. 68. pl. 20, f. 58. *D.F.*

„ „ „ „ *Anodon tabula*, Sow., Conch. Icon. pl. 18, f. 68. *D.F.*

1874 *Spatha hartmanni*, von Mts., Jick., Fauna N.-O.-Afr. p. 263.
pl. 8, f. 2. *D.F.*

1875 „ „ „ „ Class., Conch. Cab. p. 190. pl. 61,
f. 2, 3. *D.F.*

- 1875 *Spatha natalensis*, Lea, Cless., *ibid.* p. 189. pl. 62, f. 7, 8. *D.F.*
 „ „ *wahlbergi*, Krs. „ „ p. 187. pl. 63, f. 1. *D.F.*
 1891 „ „ „ von Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin,
 p. 17. *N.*
 „ *Mutela* „ „ Smith, A.M.N.H. viii. p. 319. *N.*
 1897 *Spatha* „ „ von Mts., D.-O.-Afr. p. 247. *D.*
 1900 „ „ „ Simpson, Proc. U.S. Nat. Mus. xxii.
 p. 898. *Synonymy.*
 1909 „ „ „ Kob., Abh. Senckenb. Naturf. Ges.
 Frankfurt, xxxii. p. 50. *N.*

Type of *wahlbergi* in Stockholm Museum; *natalensis* in U.S. National Mus. Washington.

Hab. TRANSVAAL. Aapies River (Wahlberg; Farquhar). Crocodile River (Day). Middelburg (Crawford).

LORENZO MARQUES. Tette (Peters).

ZULULAND. Enseleni River (Anderson).

NATAL. Umpingave River (*natalensis*, McKen).

RHODESIA. Bulawayo (in coll. Crawford).

Also found in East Africa.

von Martens (1897) remarks that *S. natalensis*, Lea, appears to differ little from *bloyeti*, Bgt.; Sturany and Simpson, however, place it in the synonymy of *wahlbergi*.

Kobelt (1909) states that he is unable to separate *spathuliformis*, Bgt., from *wahlbergi*, and includes *Spathella bourguignati*, Ancy, as a variety of Krauss' species.

var. DORSALIS, von Martens.

1859 *Spatha wahlbergi*, "Krs.," von Mts., Mal. Blätt. vi. p. 217.

1897 „ „ Krs., var. *dorsalis*, von Mts., D.-O.-Afr.
 p. 247. *D.*

Hab. LORENZO MARQUES. Tette; Sena (Peters).

FAMILY CYRENIDÆ, Gray, 1840.

(Syn. Brit. Mus. pp. 133, 149.)

GENUS CORBICULA, von Mühlfeld, 1811.

(Mag. Ges. Naturf. Fr. Berlin, p. 56.)

Type of Genus, *C. fluminalis* (Müll.).

It would require intimate acquaintance with the types, and long sets of each variety, to unravel the extraordinary tangle into which the African species of *Corbicula* have been woven.

C. fluminalis (Müll.) was described from the River Euphrates in 1774, and *consobrina*, Calilaud (Voy. à Meroe, ii. pl. 61, f. 10, 11), from Egypt in 1823.

C. radiata, Parr. and *pusilla*, Parr. (Abb. u. Besch. ii. p. 78. pl. 11, 4. f. 7), from Egypt, owe their origin to Philippi, 1846.

In 1848, however, Krauss propounded the name *africana*, comprising two South African varieties, *olivacea* and *albida*, with which he identified *radiata* and *pusilla* respectively. *Olivacea* is the type form of *africana*: *albida* was raised by Clessin (1877) to the rank of a species, and will probably prove to be identical with, and have precedence of, *C. oliphantensis*, Crvn. Clessin also described and figured a *C. natalensis*, Krs., of which no notice has been taken by subsequent authors.

Jickeli (1874) dealt with *radiata* and *pusilla* as distinct species, but had not sufficient material to express an opinion as to the correctness of Krauss' views on the subject.

von Martens (1897) united *pusilla* with *radiata*, but separated the latter from *africana*, var. *olivacea*; Böttger, however (1910), considered *radiata* and *africana* identical.

Pallary (Mém. Instit. Égypt. vi, 1. 1909, pp. 71, 72) appears to prove that *radiata* and *pusilla* are both immature forms of *consobrina*, which last was placed by Jickeli (1874) and Westerlund (1890) in the synonymy of *fluminalis*, Müll.

The localities given in the following pages are, for the most part, correct for the varieties to which they refer, but the true degree of inter-relationship of the latter is obviously far too large a subject to admit of adequate discussion within the limits of the present work.

586. CORBICULA AFRICANA (Krauss). [S.A.M.]

- 1848 *Cyrena africana*, var. *olivacea*, Krs. (= *gauritziana*, Krs. in litt. and *radiata*, Parr.), Krs., Südafr. Moll. p. 8. pl. 1, f. 8. *D.F.*
 1854 *Corbicula africana*, Krs., Desh., Cat. Conchif. p. 222. *D.*
 1859 *Cyrena* „ „ von Mts., Mal. Blätt. vi. p. 220. *N.*
 1866 *Corbicula* „ „ Prime, Ann. Lye. N.H. New York, viii. p. 224, f. 57. *D.F.*
 1877 „ „ „ Cless., Conch. Cab. p. 156. pl. 27, f. 22-24. *D.F.*
 1904 „ „ „ von Mts., Die Kalahari, p. 758. *N.*

Type in Stuttgart Museum.

Hab. CAPE OF GOOD HOPE. Gauritz River (Krauss). Swellendam (Layard). Gamtoos R. (Farquhar). Port Elizabeth (Crawford).

GRIQUALAND WEST. Riverton, Vaal River (very large specimens, 19 × 17 mm., Miss Wilman).

LITTLE NAMALAND. Orange River, Henkries (Lightfoot).

BRITISH BECHUANALAND. Hartz River, Taungs (Miss Wilman).

BECHUANALAND. Letter Tree, Botletle River (Passarge).

LORENZO MARQUES. Itschongove (Schenek). Tette (Peters).

ZULULAND EAST (Toppin; Burnup).

NATAL. Nonoti River (Miss Brown).

ORANGE FREE STATE. Kroonstad (Miss Hickey).

TRANSVAAL. Vaal River, Standerton (Miss Livingston). Lepenula River (Wahlberg).

587. *CORBICULA ALBIDA* (Krauss).

1848 *Cyrena africana*, var. *albida*, Krs. (= *pusilla*, Parr.), Krs., Südafr. Moll. pp. 8, 9. *D.*

1877 *Corbicula albida*, Krs., Cless., Conch. Cab. p. 156. pl. 27, f. 25, 26. *D.F.*

Type in Stockholm Museum.

Hab. TRANSVAAL. River Lepenula (Wahlberg).

588. *CORBICULA ASTARTINA* (von Martens).

1859 *Cyrena astartina*, von Mts., Mal. Blätt. vi. p. 219. pl. 3, f. 6, 7. *D.F.*

1897 *Corbicula* „ „ D.-O.-Afr. p. 260. *D.*

Type in Zool. Mus. Berlin.

Hab. LORENZO MARQUES. Tette (Peters).

Also recorded from Nyassa and the Schire River, East Africa, and Mterize River, Northern Rhodesia.

589. *CORBICULA FLUMINALIS* (Müller). [S.A.M.]

1774 *Tellina fluminalis*, Müll., Verm. ii. p. 205. *D.*

1782 *Venus* „ „ Chem., Conch. Cab. vi. p. 319. pl. 30, f. 320. *D.F.*

1854 *Corbicula* „ „ Desh., Cat. Conchif. p. 222. *D.*

1871 *Cyrena* „ „ von Mts., Mal. Blätt. xviii. pp. 61, 66. pl. 1, f. 12-14. *N.F.*

1874 *Corbicula* „ „ Jick., Fauna N.-O.-Afr. p. 283. pl. 11, f. 4-9. *D.F.*

1899 „ „ „ Pons., Proc. Mal. Soc. iii. p. 334. *N.*

1907 „ „ „ Schultze, Aus Namaland und Kalahari, pp. 616, 708. *N.*

1910 „ „ „ Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 454. *N.*

Type—*ubi*?

Hab. BRITISH BECHUANALAND. Witkop (subfossil, Schultze ; Rogers).

Chroniced, living, from North-East, West, and Central, but not from East or South Africa.

The following species have, rightly or wrongly, been included by various authors in the synonymy of *fluminalis* :—

euphratica, *cor*, *orientalis*, and *fuscata*, Lam. ; *consobrina*, Caill. ; *sauleyi*, Bgt. ; and *frivaldskyana*, Zelebor.

590. CORBICULA NATALENSIS, Krauss.

1877 *Corbicula natalensis*, Krs. in litt., Cless., Conch. Cab. p. 155. pl. 27, f. 19–21. *D.F.*

Type in Stuttgart Museum.

Hab. NATAL (Queinzis).

591. CORBICULA OLIPHANTENSIS, Craven. [S.A.M.]

1880 *Corbicula oliphantensis*, Crv., P.Z.S. p. 618. pl. 57, f. 12. *D.F.*

Type in British Museum.

Hab. TRANSVAAL. Oliphants River (Craven).

CAPE OF GOOD HOPE. Gamtoos River (Crawford).

It seems hardly possible that this species will eventually prove to be separable from *albida*, Krs.

592. CORBICULA RADIATA (Parreyss). [S.A.M.]

1846 *Cyrena radiata*, Parr., Phil., Abb. u. Beschr. ii. p. 78. pl. 11, 4, f. 8. *D.F.*

1848 „ „ „ Krs., Südafr. Moll. p. 8. *N.*

1854 *Corbicula* „ „ Phil., Desh., Cat. Conchif. p. 222. *D.*

1866 *Cyrena* „ „ von Mts., Mal. Blätt. xiii. p. 14. *N.*

1874 *Corbicula* „ „ Jick., Fauna N.-O.-Afr. p. 287. pl. 11, f. 10. *D.F.*

1877 „ „ Parr., Smith, P.Z.S. p. 718. *N.*

1878 „ „ „ Cless., Conch. Cab. p. 162. pl. 28 (1877), f. 16–18. *D.F.*

1881 „ „ „ Smith, P.Z.S. p. 295. *N.*

1892 „ „ „ „ A.M.N.H. x. p. 126. *N.*

1897 „ „ Phil., von Mts., D.-O.-Afr. p. 259. *D.*

1904 „ „ Parr., Smith, Proc. Mal. Soc. vi. p. 100. *N.*

1906 „ „ „ Germain, Bull. Mus. Hist. Nat. Paris, p. 307. *N.*

1910 *Corbicula radiata*, Phil., Bttg., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii, p. 454. N.

Type—*ubi*?

Hab. TRANSVAAL. Potchefstroom (Miss Livingston).

BRITISH BECHUANALAND. Witkop (subfossil, Schultze).

LORENZO MARQUES. River Zambesi (Brancksik).

Described from Egypt, and recorded from East and Central Africa and Northern Rhodesia. Smith (1904) includes *C. tanganykana*, Bgt., in the synonymy of *radiata*, to which Germain (1906) adds *C. nyassana*, Bgt.

GENUS SPHÆRIUM, Scopoli, 1777.

(Introd. ad. Hist. nat. p. 397.)

(= *Cyclas*, Brug., 1792.)

Type of Genus, *S. corneum* (Lin.).

593. SPHÆRIUM CAPENSE (Krauss).

1848 *Cyclas capensis*, Krs., Südafr. Moll. p. 7. pl. 1, f. 6. D.F.

1854 *Sphærium capense*, Krs., Desh., Cat. Conchif. p. 265. D.

1874 *Cyclas capensis*, Krs., Jick., Fauna N.-O.-Afr. p. 291. pl. 11, f. 14. D.F.

1877 *Sphærium capense*, Krs., Cless., Conch. Cab. p. 93. pl. 10, f. 3-5. D.F.

1883 „ *subcapense*, Bgt. (= *capensis*, Jick.), Bgt., Ann. Sci. nat. Paris, xv. p. 133. N.

1908 „ *capense*, Krs. (= *subcapense*, Bgt.), Neuville & Anthony, Ann. Sci. nat. Paris, viii. p. 338. N.

Type of *capense* in Stuttgart Museum; *subcapense* in Geneva Museum.

Hab. CAPE OF GOOD HOPE. Knysna River (Krauss).

RHODESIA. Makabusi Falls, near Salisbury (Miss Weineck).

Without knowledge of the types it is impossible to say whether Bourguignat (1883) was right in separating Jickeli's Abyssinian form from *capense*, Krs., but, judging from the respective figures, there appears to be good ground for his decision.

594. SPHÆRIUM FERRUGINEUM (Krauss).

1848 *Cyclas ferruginea*, Krs., Südafr. Moll. p. 7. pl. 1, f. 7. D.F.

1854 *Pisum parasiticum*, Parreyss, Desh., Cat. Conchif. p. 280. D.

„ „ *ferrugineum*, Krs., Desh., Cat. Conchif. p. 281. D.

1874 *Limosina ferruginea*, Krs., Jick., Fauna N.-O.-Afr. p. 293. pl. 11, f. 16, 17. D.F.

1879 „ „ Cless., Conch. Cab. p. 247. pl. 46, f. 1-4. D.F.

- 1883 *Eupera parasitica*, Parr., Bgt., Ann. Sci. nat. Paris, xv. p. 133. N.
 „ „ *jickelii*, Bgt., *ibid.* p. 134. D.
 1892 *Limosina parasitica*, Parr., Smith, A.M.N.H. x. p. 126. N.
 1897 *Eupera* „ „ Desh., von Mts., D.-O.-Afr. p. 261. N.
 1909 „ „ „ Parr., Pallary, Mém. Inst. Égypt. vi, 1.
 p. 75. pl. 4, f. 18-20. F.

Type of *ferrugineum* in Stuttgart Museum; *parasiticum* in British Museum; *jickelii* in Geneva Museum.

Hab. CAPE OF GOOD HOPE. Knysna River (*ferrugineum*, Krauss).

RHODESIA. Victoria Falls (Connolly).

Jickeli (1874) placed examples of *E. parasitica*, which he collected in Abyssinia, in the synonymy of *ferruginea*, Krs., but the weight of more recent opinion, which in this case appears to me to be correct, is against these species being identical. References to both, as well as to *jickelii*, Bgt., are given above for purposes of comparison.

Parasitica is recorded from East and North-East Africa; *jickelii* from Abyssinia. Until more is known of Krauss' species, I prefer to leave it in its original Genus, rather than in *Eupera*, Bgt., which was constituted for two Brazilian shells. *Limosina*, Cless., 1872, is preoccupied by *Limosina*, Macq., in *Diptera*, 1835.

GENUS PISIDIUM, C. Pfeiffer, 1821.

(Syst. Anordn. u. Beschr. deutscher L.-und W.-Schnecken, pp. 17, 123.)

(= *Pisum*, Gray, 1847, and *Fluminina*, Clessin, 1873.)

Type of Genus, *P. obliquum* (Lam.).

595. PISIDIUM LANGLEYANUM, Melv. & Pons.

- 1891 *Pisidium langleyanum*, M. & P., A.M.N.H. viii. p. 237. D.
 1892 „ „ „ „ „ ix. p. 94. pl. 5, f. 7. F.

Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Langley).

596. PISIDIUM OVAMPICUM, Ancey.

- 1890 *Pisidium ovampicum*, Ancey, Bull. Soc. Mal. Fr. vii. p. 162. D.
 1910 ? „ „ c.f. *langleyanum*, M. & P., Bttg., Abh. Senckenb.
 Naturf. Ges. Frankfurt, xxxii. p. 455. pl. 28, f. 19. D.F.

Type—*ubi* ?

Hab. OVAMPOLAND. Ovambonde (Andersson and Chapman).

BRITISH BECHUANALAND. Witkop (? *langleyanum*, subfossil, Schultze).

It appears probable, on geographical grounds, that Böttger's note may refer to *P. ovampicum*, which he seems to have overlooked

in his article on German South-West Africa. It is, however, impossible to recognise this species, of which I have been unable to trace an authentic example. It was not figured, and was apparently described from a closed shell, as no mention was made of the hinge or interior of the valves.

Species which have been erroneously attributed to South Africa, or whose names may, for various reasons, be removed from the list of collectible South African varieties.

CERATOCONCHA SCHULTZEI, Simroth.

- 1907 *Ceratoconcha schultzei*, Srtth., Zool. Anz. Leipsig, xxxi. p. 794,
&c. *D.F.*
1910 " " Bttg., Abh. Senckenb. Naturf.
Ges. Frankfurt, xxxii. p. 433. *N.*

Hab. CAPE PENINSULA. Cape Flats (Schultze).

Böttger points out that this is the larva of *Microdon*, Meig., and consequently has no place in Mollusca.

ENNEA ZANGUEBARICA, Morelet.

- 1889 *Ennea zanguebarica*, Morel., J. de C. xxxvii. p. 10. pl. 1, f. 7. *D.F.*
Type in British Museum.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (Morelet, *laps. cal.*).

Owing to an obvious omission in Morelet's article, this species was erroneously attributed to Port Elizabeth. It is a synonym of *E. obesa*, Gibbons, an East African shell.

MARTENSIA JENYNSI (Pfeiffer).

- 1845 *Helix jenyinsi*, Pfr., P.Z.S. p. 131. *D.*
1859 *Nanina jenyinsi*, Pfr., von Mts., Mal. Blätt. vi. p. 211. *L.*
1897 *Trochonanina jenyinsi*, Pfr., von Mts., D.-O.-Afr. p. 48. *N.L.*
Type in British Museum.

Hab. LORENZO MARQUES. Tette (Peters).

In 1859 and 1879 von Martens included *M. jenyinsi* in the list of shells brought from Tette by Dr. Peters, but in 1897, though a large number of localities are quoted for this species by the same

author, no mention is made of Tette or any other place within the limits of the present work. It may therefore be advisable to await further confirmation before including it in South African lists.

RHYTIDA BULLACEA (Pfeiffer).

- 1854 *Helix bullacea*, Pfr., P.Z.S. p. 53. D.
1889 " " Morel., J. de C. xxxvii. p. 19. L.
Hab. CAPE OF GOOD HOPE. Port Elizabeth (fide Morelet).
An Australian species, erroneously referred to South Africa.

NANINA PISOLINA, Gould.

- 1859 *Nanina pisolina*, Gld., Proc. Boston Soc. N.H. vi. p. 423. D.
1862 " " " Otia Conch. p. 102. D.
1868 *Helix* " " Pfr., Mon. Hel. v. p. 54. D.
Hab. "CAPE OF GOOD HOPE?" (Ringold & Rodgers).

As the description of this unfigured species is insufficient, no authentic example can be traced, and its original habitat is doubtful, there can be no object in retaining its name among collectible varieties.

HELIX COMATULA, Férussac.

- 1821 *Helix (Helicella) comatula*, Fér., Tabl. Syst. Moll. pt. 3. p. 45 (or 41). L.
1874 *Helicella comatula*, Beck, von Mts., Jahrb. d. Deutsch. Mal. Ges. p. 120. N.
Hab. CAPE OF GOOD HOPE. On aloes (Delalande).
Nomen nudum.

HELIX CONNEXIVA, Férussac.

- 1821 *Helix (Helicostyla) connexiva*, Fér., Tabl. Syst. Moll. pt. 3. p. 50 (or 46). L.
1874 " *connexiva*, Fér., von Mts., Jahrb. d. Deutsch. Mal. Ges. p. 120. N.
Hab. CAPE OF GOOD HOPE (Delalande).
Nomen nudum.

HELIX DOLOSA, Férussac.

- 1821 *Helix (Helicostyla) dolosa*, Fér., Tabl. Syst. Moll. pt. 3. p. 50 (or 46). L.
1874 " *dolosa*, Fér., von Mts., Jahrb. d. Deutsch. Mal. Ges. p. 120. N.
Hab. CAPE OF GOOD HOPE (Delalande).
Nomen nudum.

HELIX EKLONIANA, Beck.

1837 *Helix (Theba) ekloniana*, Beck, Index Moll. p. 11. *L.*1874 *Theba eckloni*, Beck, von Mts., Jahrb. d. Deutsch. Mal. Ges. p. 120. *N.**Hab.* "Afr. aust. Alg." (fide Beck).

Nomen nudum.

HELIX FANULUS, Pfeiffer.

1856 *Helix fanulus*, Pfr., P.Z.S. p. 33. *D.*

Type in British Museum.

Hab. PORT NATAL (coll. Cuming).

This shell, whose name was intended to be *janulus*, proved to be the top of an *Ennea*, and was omitted from Pfeiffer's Nomenclator in 1881.

HELIX MONTICOLA, Beck.

1837 *Helix (Bradybæna) monticola*, Beck, Index Moll. p. 20. *L.**Hab.* CAPE OF GOOD HOPE (fide Beck).

Nomen nudum.

HELIX SECTILIS, Férussac.

1821 *Helix (Helicella) sectilis*, Fér., Tabl. Syst. Moll. pt. 3. p. 46 (or 42). *L.*1874 *Theba sectilis*, Beck, von Mts., Jahrb. d. Deutsch. Mal. Ges. p. 120. *N.**Hab.* CAPE OF GOOD HOPE. Caffraria (Delalande).

Nomen nudum.

ENA PICTURATA (Morelet).

1889 *Bulimus picturatus*, Morel., J. de C. xxxvii. p. 7. pl. 1, f. 4. *D.F.*1898 *Buliminus (Rhachis) picturatus*, Morel., Stur., S.A. Moll. p. 64. *L.**Hab.* CAPE OF GOOD HOPE. Port Elizabeth (fide Sturany).

Sturany's locality is erroneous, the species having been described from Mogadoxo, Zanzibar.

JAMINIA CYLINDRACEA (Da Costa).

1778 *Turbo cylindraceus*, Da Costa, Test. Brit. p. 89. pl. 5, f. 16. *D.F.*1801 *Pupa umbilicata*, Drap., Tabl. Moll. Fr. p. 58. *D.*1898 " " M. & P., Proc. Mal. Soc. iii. p. 184. *L.**Hab.* CAPE TOWN (fide M. & P.).

This common European species may possibly exist in South Africa, but I have failed to trace any instance of its actual occurrence there.

JAMINIA HAPLOA (Mely. & Pons.).

1893 *Pupa haploa*, M. & P., A.M.N.H. xi. p. 21. pl. 3, f. 7. *D.F.*1908 " " " i. p. 77. *N.*

Hab. TRANSVAAL. Pretoria (fide M. & P.).

Founded on a single specimen, "seemingly allied to *P. pretoriensis*" (M. & P., 1908).

JAMINIA PSICHION (Melv. & Pons.).

1894 *Pupa psychion*, M. & P., A.M.N.H. xiv. p. 93. pl. 1, f. 8. *D.F.*

1908 " " " i. p. 81. *N.*

1911 " " Bnp., A.M.N.H. vii. p. 409. *N.*

Hab. TRANSVAAL. Pretoria (fide M. & P.).

It appears advisable to transfer both the foregoing to the list of doubtful species. *J. haploa* was founded on a single specimen, which can only be regarded as lost, since it has proved quite impossible to trace its whereabouts. In the case of *psychion*, the type, the only known specimen, is so hopelessly broken that it is quite impossible even to determine to what group of the Genus it belonged. The original descriptions and figures of these minute forms are hardly in themselves sufficient, and the Pretoria District, whence they were recorded, has since been often carefully searched, and yielded only the species mentioned on pp. 180-185. It is probable that, if ever the missing type of *haploa* or co-types of *psychion* turn up, they will prove to be identical with some forms already named; meanwhile no useful purpose can be served by retaining them in the list of collectible varieties.

RUMINA DECOLLATA (Linné).

1758 *Helix decollata*, Lin., Syst. Nat., Ed. 10. i. p. 773. *D.*

1898 *Rumina* " " M. & P., Proc. Mal. Soc. iii. p. 184. *L.*

Hab. CAPE OF GOOD HOPE. Port Elizabeth (coll. Layard).

In the Layard collection were two large examples of this species, found at Port Elizabeth in 1897. There is no record of their having been taken alive, and it is hardly possible that this destructive pest would have gained a footing in the country so many years ago without making its presence felt ere now. It is reasonable to suppose, therefore, that these shells, on which the South African record of *R. decollata* is based, were imported in dead condition, probably in flower-pots, and the name may be expunged from the South African list until, as is to be feared, a second, and more successful, invasion takes place.

AURICULASTRA PELLUCENS (Menke).

1830 *Auricula pellucens*, Mke., Syn. Meth. Moll. p. 131. *D.*

1848 " " Krs., Südafr. Moll. p. 82. *N.*

Described from South America.

Krauss attributed to *A. pellucens* specimens collected by Wahlberg in Natal. It is unlikely that they were that species; Nevill (Hand List, i. p. 226) assigns them definitely to *radiolata*, Morel.; M. & P. (A.M.N.H. iv, 1899, p. 193) suggest their identity with *durbanica*, M. & P., which appears to be inseparable from *radiolata*.

AURICULASTRA PUSILLA (H. & A. Adams).

1854 *Ellobium pusillum*, H. & A. Ad., P.Z.S. p. 8. D.

1855 *Tralia pusilla*, H. & A. Ad., Gen. rec. Moll. iii. pl. 82, f. 8. F.

1898 *Auricula pusilla*, H. & A. Ad., M. & P., Proc. Mal. Soc. iii. p. 180. L.

Type in British Museum.

Hab. NATAL. Cato's Creek, Durban.

Described from the Philippines. The South African record was based on a single specimen, which appears to have been incorrectly identified.

PLANORBIS CAFFER, "Krauss."

1889 *P. caffer*, Krs., Morel., J. de C. xxxvii. p. 19. L.

1898 *Planorbis caffer*, Krs., Stur., S.A. Moll. p. 77. N.

Hab. CAPE OF GOOD HOPE. Port Elizabeth (fide Morelet).

Sturany points out that the above appellation is probably a lapsus calami, as no such species can be traced in literature. Possibly Morelet's "*P.*" *caffer* was intended for "*Unio*" *caffer*, Krs., which is known from Port Elizabeth, but not included in his list of shells from that district.

CYCLOTUS NATALENSIS, Pfeiffer.

1861 *Cyclotus natalensis*, Pfr., P.Z.S. p. 388. D.

1898 " " Ancy, Bull. Mus. Marseille, i. p. 136. N.

1899 " " M. & P., A.M.N.H. iv. p. 193. N.

Type in British Museum.

Hab. CAPE NATAL (coll. Cuming).

"*Cyclotus natalensis*, Pfr., has been shown by Ancy to be the *Cyclophorus klobukowskii*, Morlet, from Tonkin (J. de C., 1884, p. 391), and must therefore be removed from South African lists."

TROPIDOPHORA GOUDOTIANA (Sowerby).

1847 *Cyclostoma goudotianum*, Sow., Thesaurus Conch. i. p. 130.
pl. 29, f. 193. D.F.

1848 " " Krs., Südafr. Moll. p. 82. N.

1861 " " Rve., Conch. Icon. pl. 8, f. 42a,

but not f. 42b, which is *insularis*, Pfr.

The type, in the British Museum, is labelled "Natal," but the species is Madagascan, not South African, and the locality is almost certainly erroneous.

TROPIDOPHORA LETOURNEUXI (Ancey).

1889 *Cyclostoma letourneuxi*, Ancey, Bgt., Moll. de l'Afr. équat. p. 152. *D.*

1909 *Ligatella letourneuxi*, Ancey (= *zanguebarica*, Pfr., nec Petit),
Kob., Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii. p. 78. *L.*

Hab. SOUTH-EAST AFRICA (fide Kobelt).

Recorded from Zanzibar, Nyassa, &c., but not yet from south of the Zambesi.

TROPIDOPHORA ZANGUEBARICA (Petit).

1850 *Cyclostoma zanguebaricum*, Petit, J. de C. i. p. 53. pl. 3, f. 5. *D.F.*

1854 " *parvispirum*, Pfr., P.Z.S. p. 128. *D.*

1889 " " " Morel., J. de C. xxxvii. p. 20. *L.*

1894 " *zanguebaricum*, Petit (= *parvispira*, Pfr.), Smith,
Proc. Mal. Soc. i. p. 166. *N.*

Type of *parvispira* in British Museum; *zanguebarica*—*ubi*?

Hab. CAPE OF GOOD HOPE. Port Elizabeth (fide Morelet).

Zanguebaricum was described from Zanzibar, *parvispira* from
" ——— ? "

After careful research, I have failed to trace any authentic instance of the occurrence of this species south of the Zambesi.

MELANIA HISTRIONICA, Reeve.

1860 *Melania histrionica*, Rve., Conch. Icon. pl. 29, f. 192. *D.F.*

1878 " " Brot, Conch. Cab. p. 365. *N.*

1899 " " M. & P., A.M.N.H. iv. p. 193. *N.*

Type in British Museum.

Hab. "CAPE COLONY" (fide Reeve).

M. & P. remark that *M. histrionica* was described from Cape Colony on the authority of the Cumingian collection. The type appears to be closely allied to, if not a variety of, *Pachymelania aurita* (Müll.), a West African species whose presence in South Africa appears to require further confirmation. Brot places *histrionica* in the synonymy of *Claviger balteatus* (Phil.) from Senegal, which he states is nearly allied to *aurita*.

MELANOPSIS PRINCEPS, Lea.

1837 *Melanopsis princeps*, Lea, Trans. Amer. Phil. Soc. v. p. 82.
pl. 19, f. 74. *D.F.*

Hab. CAPE OF GOOD HOPE (fide Lea).

Placed by Brot (Conch. Cab., 1879, p. 411) in the synonymy of *Faunus ater* (Linn.). Lea's locality is in all probability erroneous.

THEODOXIS CREPIDULARIUS (Lamarck).

1822 *Neritina crepidularia*, Lam., Hist. nat. An. s. Vert. vi. 2. p. 186. *D.*

1848 " " Krs., Südafr. Moll. p. 88. *D.N.*

1899 " " M. & P., A.M.N.H. iv. p. 194. *N.*

Hab. NATAL COAST (Wahlberg).

Krauss expresses some doubt as to the correctness of Wahlberg's locality. M. & P. remark, "This species has been found in Ashanti, but we have not met with it at present from South Africa."

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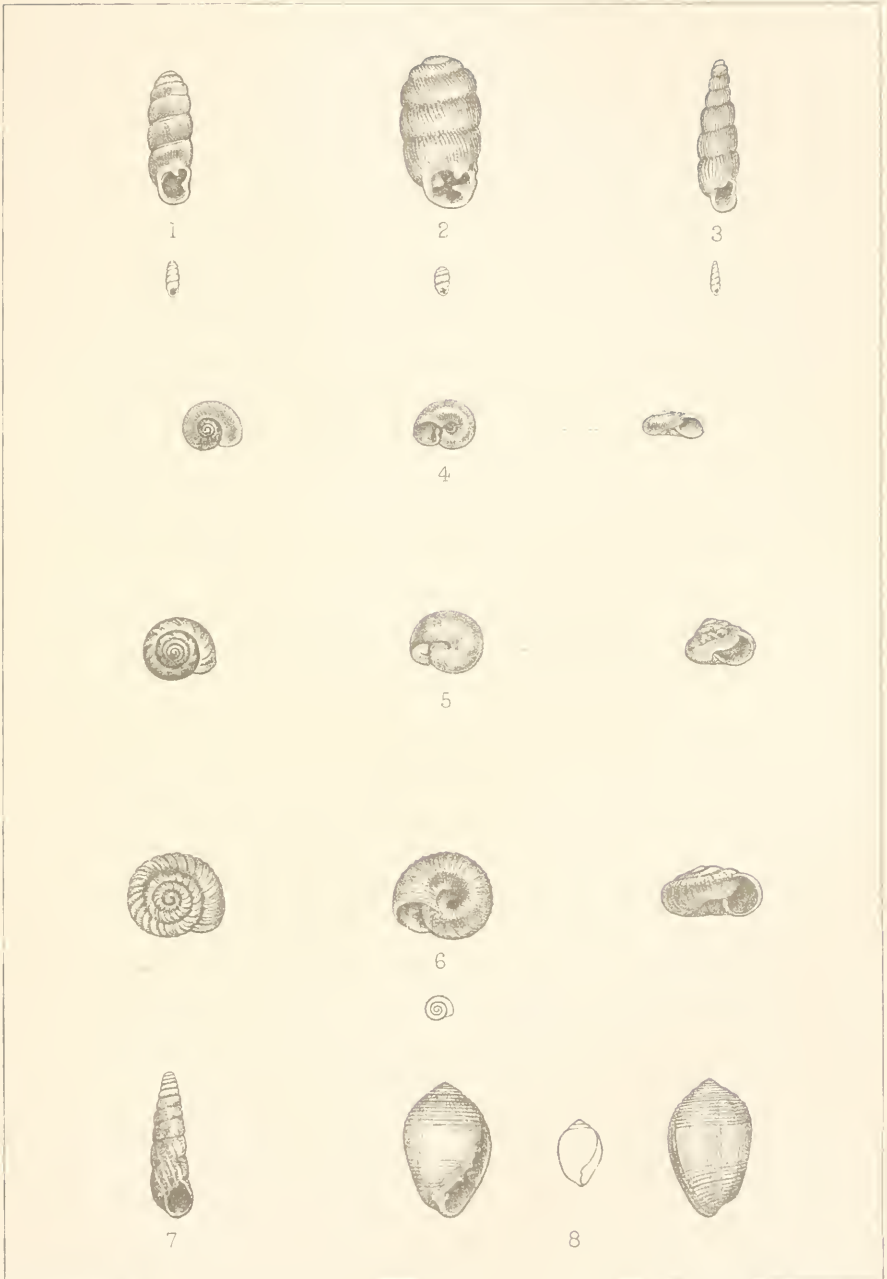
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T.B. Storer del.

West. Newman sculp.

- | | |
|------------------------------------|-------------------------------------|
| 1. <i>Ennea magnolia.</i> | 2. <i>Ennea rhodesiana.</i> |
| 3. <i>Streptostele herma.</i> | 4. <i>Natalina tarachodes.</i> |
| 5. <i>Trachycystis erythracus.</i> | 6. <i>Trachycystis metallakter.</i> |
| 7. <i>Euonyma gouldi.</i> | 8. <i>Melampus semiaratus.</i> |

ALPHABETICAL INDEX.

Names of higher rank than Genera are printed in CAPITALS; Genera and Subgenera, in SMALL CAPITALS; species in ordinary type (roman); varieties, synonyms, and forms not actually known in South Africa, in *italics*.

When a valid species is attributed to a Genus other than that in which it was originally placed, the author's name is printed in brackets; but in the case of synonyms and invalid species the original Genus is printed in brackets after the author's name.

The synonyms of the following species, though mentioned in the text, are omitted from the index:—*P. draparnaudi*; *L. flavus*; *A. agrestis* and *larvis*; *H. lactea* and *pisana*; *C. acicula*; and *M. tuberculata*.

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4.—*The South African Hirudinea*—Part I.—By E. J. GODDARD, B.A., D.Sc., and D. E. MALAN, B.A.

THE present paper deals with some members of the Hirudinea collected in the Orange River Colony and Cape Colony.

Comparatively little is known of the South African representatives of the group, and the few which have been described are imperfectly known. The name of one of the described forms appears to be erroneously applied to any *Hirudo* found in the South African Union.

The first mention of the South African forms in scientific literature appears to be in the accounts of the results of the *Novara* Expedition which visited these parts in 1868. In this Grube has described two species of *Hirudo*—*H. septemstriata* and *H. capensis*.

In 1871 Grube described a form from Port Natal under the name *Aulacostomum Kraussi*.

Blanchard in 1898 described forms from German East Africa under the following names:—

Glossiphonia Stuhlmanni (sp. nov.).

Helobdella tricarinata (gen. et sp. nov.).

Hirudo Hildebrandti (sp. nov.).

Salifa perspicox (gen. et sp. nov.).

Beyond these accounts we know of no others referring to Hirudinea in the region including the above-mentioned areas and the intervening country. Up to the present time, as the result of a short period of collecting we have succeeded in finding representatives of Ichthyobdellidæ, Glossiphoniidæ, and Gnathobdellidæ; and as Blanchard has described one representative of the Herpobdellidæ, viz., *Salifa*, we now know that the Hirudinea are represented in the southern half of the continent by members of all the divisions of the group. This was to be expected, as all continental areas have supplied representatives of each of the divisions.

However, we have not yet found any terrestrial forms, or rather, land leeches, but this is readily explicable, since the country so far

investigated is by no means suited to the existence of such. It is, nevertheless, highly probable that such forms will eventually be found in the moister and well-wooded parts of the Union, or more especially in the more tropical country north of the same. Such forms, if obtained, should in all probability possess a special interest as indicated by one of us (E. J. G.) in the *Proc. Linn. Soc. of N.S.W.*, 1910.

In this paper we restrict attention to representatives of the Glossiphoniidæ and Gnathobdellidæ.

The types of the species described are preserved in the South African Museum.

I. GLOSSIPHONIIDÆ.

We know of no previous record of any representatives of this group south of German East Africa.

The occurrence of *Placobdella* sp. calls for no special remarks, since at the most it cannot have any more than mere specific importance, and as we have only a single and poorly preserved specimen for examination we can do little more than record the genus for these parts, and note any characters which we deem reliable in a preserved specimen. The absence of the genus from South Africa would give more ground for surprise than does its occurrence. It is perhaps not out of place to remark here that, although like so many other fresh water groups of animals, the fresh water Hirudinea enjoy a wide distribution (most parts of the earth possessing characteristic species), yet, at least in the main fresh water group, Glossiphoniidæ, this distribution cannot be rashly attributed to the same ready means of dispersal as serve to explain the distribution of other fresh water groups. This is supported not only by the occurrence of definite characteristic species in most large areas, but also by the facts that the eggs are carried in most Glossiphoniidæ attached to the ventral surface, and experiments indicate that they cannot withstand the effects of sea water or desiccation. This may be taken to indicate that their dispersal has been carried out over short distances and that their present universal distribution must signify vast changes in geography in the past. In other words their distribution seems to prove that the family is an ancient one. This is strengthened by the simple nature of the somite, the comparatively well-preserved cœlorne, &c.

For the second representative of the group described in this paper we institute a new generic name, *Marsupiobdella*.

Whereas in other Glossiphoniidæ the young attached to the ventral surface are protected in a temporary "marsupium" formed by the inflection of the lateral margins of the body, we find in this new genus that the greater portion of the much thickened trunk region is occupied by a large internal brood pouch, which displaces the tissues of the body and has reduced the same to a remarkable extent. This pouch opens to the exterior through a longitudinally elongate aperture situated behind the centre of the ventral surface. We may remark here preliminarily that this is the most extreme and peculiar morphological development in the Glossiphoniidæ.

In this case dispersal over long distances is practically impossible, since the accidental dropping of eggs from the ventral surface, which might possibly happen in other forms, cannot take place in *Marsupiobdella*.

MARSUPIOBDELLA gen. nov.

Glossiphoniidæ of small size; sensory annulus occupying the middle region of the triannulate somite.

Male genital pore opening to exterior between somites xi, xii, and between post-oral annuli 21, 22.

Female genital pore originally situated between annuli 2, 3 of somite xii, but functionless in adult.

Trunk portion of body greatly thickened, and containing a large brood pouch which opens to the exterior on the ventral surface through an elongate aperture.

Somites v-xxvii triannulate; xxvii biannulate. Eyes two.

MARSUPIOBDELLA AFRICANA gen. et sp. nov.

This interesting form was obtained in some abundance from the surface of a fresh water crab by Dr. Purcell at Backen's River, C.C.

The specimens, which were preserved in spirit for some years, show no pattern and have a homogeneous greenish-grey colour, except that the head region and the posterior sucker have an opaque white appearance. The head region shows an annulation which is so faint and indistinct that it has been neglected in making a count of the annuli on the dorsal surface. On the ventral surface the two annuli immediately behind the anterior sucker have the same white colouration, and are regarded as indicating the posterior limits of the head region. The furrow separating these two annuli is indicated on the dorsal surface of the head, and although distinct it is so faint in comparison with the succeeding grooves separating

the post-cephalic annuli that it is deemed better in referring to structures on the dorsal surface to do so in terms of post-cephalic annuli. The head region is marked off from the succeeding annulus by a deep constriction.

Behind the head the body may be divided into a narrow "neck" region, which increases in width gradually and extends as far as the 21st post-oral annulus, and into a much thickened trunk region which in many individuals bulges anteriorly on the ventral aspect. Viewed dorsally the body in general is fusiform. The appearance of this trunk region appears to depend on the condition of the young forms and developmental stages contained in the brood pouch.

The dimensions of several individuals are given in a table below :—

| | A | B | C |
|---|-----------|-----------|-----------|
| Greatest length | 3.90 mm. | 3.71 mm. | 3.52 mm |
| Greatest breadth | 1.57 | 1.50 | 1.28 |
| Diameter of oral sucker | .45 × .45 | .42 × .44 | .32 × .41 |
| Diameter of posterior sucker | .58 | .58 | .51 |
| Breadth of neck behind posterior sucker..... | .54 | .52 | .51 |

Behind the male genital aperture there is a gradual increase of the body in depth, so that this is taken to lie on the posterior region of the neck. This is well seen in a longitudinal section, in which also a noticeable feature is the discontinuity of the longitudinal muscle fibres in the dorsal median line through three or four annuli which correspond in position to the transitional annuli of the posterior portion of the neck and the anterior portion of the trunk on the ventral aspect.

The total number of post-cephalic annuli on the dorsal side is 66, and on the ventral aspect are 64 annuli. Since the two anterior annuli of the ventral surface belong to the head region we have four less annuli on the ventral than on the dorsal. Behind the thirty-third (33rd) annulus of the ventral side the annuli, with the exception of the nineteen in front of the posterior sucker are difficult to make out; much more so in sections than in entire specimens. This indistinctness is due to the tension of the skin as the result of the capaciously developed brood pouch. In the centre of this area is a very peculiar longitudinally elongate slit with prominent lips. The annuli related to it are modified, including annuli 33-44. Annuli 36-43 converge towards each side of the pore, in such fashion that the middle elements of this group only run throughout in a strictly transverse direction, those anterior to these as they pass

towards the aperture curving backwards, and those posterior curving forwards. Further, the furrow separating annuli 35, 36 is not continuous, so that the thirty-fifth (35th) annulus sweeps back mesially to form the anterior border of the pore. Similarly the furrow separating annuli 43, 44 is incomplete, and annulus 44 is continued forwards mesially to form the posterior margin of the aperture. That separating the thirty-fourth and thirty-fifth, although continuous, is somewhat drawn backwards in the middle line.

Sensory papillæ are present on all the annuli, but are very difficult to make out in the middle portion of the body. In the posterior part of the dorsal surface it is seen that they are more prominent on every third annulus, so that the triannulate nature of the somite is definitely made out. That the sensory annulus of the triannulate somite is the middle ring, as in most Glossiphoniidæ with a similarly constituted somite is concluded on the following grounds: (1) The thirtieth and every succeeding third annulus as far back as the sixty-third are sensory (we refer to post-cephalic annuli). (2) The genital apertures, although not visible on an external examination, were readily made out in longitudinal sections. The male pore was found to lie between the twenty-first and twenty-second post-oral annuli. Between the twenty-third and twenty-fourth annuli is situated the remains of the female genital pore, as indicated by the definitely prolonged furrow in the median line extending towards, but not meeting, the female duct, which no longer opens to the exterior directly but into the brood pouch. The genital apertures in their original condition are separated then by two annuli. In all Glossiphoniidæ, without exception, whenever the pores are separated by two annuli the male lies between somites xi and xii, and the female between annuli 2 and 3 of somite xii. Since this is supported so strongly phylogenetically we can safely conclude that the same holds in this case.

This indicates then that the twenty-first post-oral annulus is the last annulus of somite xi; in other words the twentieth post-oral annulus, which is really the eighteenth post-cephalic annulus, is sensory. This fits in with the fact that the thirtieth post-cephalic, and each succeeding third annulus, is sensory and the middle annulus of its somite. We can then denote the somitic constitution of the genus as follows:—

- Somites i-v = Head + first post-cephalic annulus.
- Somites vi-xxvi = post-cephalic annuli 2-64.
- Somite xxvii = post-cephalic annuli 65-66.

Somites v-xxvi are then triannulate, somite xxvii biannulate, but nothing can be said in regard to somites i-iv, except that the annulation is very indistinct or absent. It is interesting to note that somite v, which is triannulate ventrally, shows a much more indistinct furrow between annuli 1, 2 than between 2, 3; further it is biannulate dorsally and the anterior annulus is decidedly broader than the posterior. These facts bear out the idea that the order of origin of the annuli is, as in the majority of Glossiphoniidæ.

1, 2, 3 (annuli)
c a b (order of origin).

In a number of the individuals examined the brood pouch aperture was a very prominent structure. At first it was supposed that it was an abnormally developed genital aperture, and it so happened that one specimen had a minute structure protruding through the aperture. The fact that no genital aperture other than this could be made out on an external examination supported this idea, and suggested that the protruding structure was a penis. The posterior position of such a genital aperture, and the presence of penis in an undoubted Glossiphonid, were so unique that it was found necessary at this stage to section an individual. It was then found that in several individuals which were sectioned, the pore led into a large pouch which extended through six somites, and in this were found, in different individuals, young in all stages of development. One such individual contained segmentation stages only, and although the position of the pore or slit is very definitely indicated, no communication to the exterior was found. Several other specimens examined externally showed no definite aperture, although the position of such if it did exist was clearly indicated. It seems then that the absence of such in some specimens is due not to its being obscured by contraction, but by the fact that the aperture exists only when the contained young are well advanced. The supposed "penis" mentioned above was found to be a young individual protruding through the aperture. It has been stated already that the female ducts no longer open directly to the exterior, but into the brood pouch; so that the ova would pass directly into this chamber. Hypodermic impregnation which we know takes place in some Glossiphoniidæ, and probably in all, as previously suggested by one of us (E. J. G.), would seem to be necessary here owing to the absence of a female pore opening to the exterior. This is strongly supported by the remarkable tenuity of the body wall in the brood

pouch region, and the fact that sections reveal loose packets of spermatozoa in this region. Otherwise it must be suggested that spermatozoa are obtained from the individual itself, which is certainly not the case, as the male ducts have direct communication with the exterior, well-developed muscular terminal portions, and further in the specimens sectioned were found to have an abundance of mature spermatozoa in the terminal portions, thus indicating that spermatozoa pass to the exterior.

Although anatomical details of this form will be published at a later date, it may not be out of place to remark here on the character of the brood pouch. Since *Glossiphonia* carries its eggs and young attached to the ventral surface, and protected in an external pouch or "marsupium," formed by the curvature or inflection of the thin lateral margins of the body, it might reasonably be suggested that the brood pouch in this new form was the result of the concrescence of such inflected margins. Sections indisputably show that such is not the case. It is found, for instance, that the nerve cord retains its ventral position as far as the brood pouch, and then is directed upwards to the dorsal side to pass over the hump of the brood sac, afterwards descending on the posterior side of this sac to the ventral surface. The dorsal body wall in the region of the sac is most markedly attenuated. Again this region of the body which, were the marsupium or brood pouch so derived, would possess typical dorsal and ventral musculature, possesses only the dorsal set. Similarly the ventral floor of the brood sac, instead of being provided with both dorsal and ventral musculatures possesses only a ventral set. This seems to indicate that the pouch has been formed as an excavation in the substance of the ventral portion of the body, or as a modification of part of the ventral sinus. Supporting the latter of these suggestions is the fact that the ovary is a very short structure more or less spherical in form, and not of the elongate sac-like character as found in other *Glossiphoniidæ*.

II. GNATHOBDELLIDÆ.

Numerous members of the *Hirudinidæ* have been obtained which show that there occur a large number of varieties or species bridging the differences between *H. septemstriata* and *H. capensis*. Unfortunately no specimens of the latter species have been accessible. Although all the species including the above-mentioned forms have

been placed in the genus *Hirudo*, we regard this as a tentative step, since the differences between such structures as the jaws and those of *Hirudo* (in its restricted sense) are very great. However, we deem it better to leave them in this genus until anatomical details have been made out.

One interesting feature about most of the specimens dealt with is that the annuli are arranged in groups between which the furrows are much more pronounced. This grouping of the annuli corresponds not only with the metameres, but also with order of origin of the annuli.

GEN. *HIRUDO*, Lin.

Syst. nat. 10th Ed., 1758.

HIRUDO SEPTEMSTRIATA Grube.

Two specimens of this species were obtained from Rosmead and three from Richmond, C.C.

All the specimens are small, and no doubt represent young individuals, but are interesting as corroborating Grube's account of the occurrence of the species in South Africa. This seems to us very important since the species occupies an important position in the series comprising the various species noted in this paper together with *H. capensis* Grube and *H. Hildebrandti* Blanchard.

There seems no necessity to alter the main portion of Grube's definition of the species, namely, that referring to the coloration beyond instituting in place of "ventre concolore," "ventre concolore autem paulo pallidior."

The most marked distinction between this and any of the other species is the absence of the marginal yellow band of the dorsal surface. Grube states, "Am Cap von einem Apotheker erhalten, vielleicht aus Ostindien stammend." With this we disagree, since the relationship of this form to the other species indicates that it is an endemic form, or at least we maintain that it has been established in South Africa too long to justify such a conclusion.

Grube figures an obscure band on either side of the median line in the middle and posterior region of the body, but we have been unable to note the existence of such in any of our specimens. Except in the case of the median band there is great difficulty in making out the pigment areas in our preserved specimens, and this may account for the apparent absence of such. At the same time we cannot make out the white bands figured by Grube on the dorsal surface of the posterior sucker. Perhaps we have in this good reasons for instituting a new species.

HIRUDO MORRISII sp. nov.

Locality.—Wit River, Bain's Kloof, Wellington.

Diagnosis.—Body flattened and elongate in living condition.

Dorsal surface greenish brown with seven dark bands continuous along the length of the body, the outermost on each side broader than the others.

Papillæ not very distinct in living condition, two in each of outermost dark bands, one in dark band within this, and a fourth to the outer side of the median dark band.

Ventral surface slate colour, the ventral surfaces of anterior and posterior suckers much lighter.

Outermost limits of dorsal surface, where it meets ventral surface ornamented with a prominent yellow band.

Two specimens of this species were obtained and kept alive for some time. The specimens eventually died in an expanded condition, but appear to have a much greater body depth than when alive.

| | | |
|------------------------------------|-------|-----|
| Greatest length | 46 | mm. |
| „ breadth | 4·5 | „ |
| „ depth..... | 3-3·5 | „ |
| Posterior sucker (longitud.) | 3·5 | „ |
| „ „ (transv.) | 4 | „ |

The species is quite distinct from *H. septemstriata*; indeed the only point of resemblance concerns the number of dorsal dark bands.

HIRUDO NOTABILIS, sp. nov.

Locality.—Ceres, Cape Colony.

Diagnosis.—Body distinctly flattened and very broad. (Killed condition.) Dorsal surface yellowish brown with seven very prominent dark bands extending along the whole length of the body. On either side of the median band in the middle and posterior region of the body is a discontinuous faint dark band which merges at intervals into inner side of the main band on its outer side.

Papillæ distinct in the preserved specimens, one in each outermost lateral band and one in each band on the inner side of this.

Ventral surface slate colour, the ventral surfaces of the anterior and posterior suckers much lighter.

Dorsal surface with a broad prominent yellow marginal band.

A large number of specimens of this species was kindly forwarded

to us by J. H. Hoffmeyer, Esq., Inspector of Schools. Below are given the average measurements of a number of these:—

| | |
|------------------------------------|--------|
| Greatest length | 30 mm. |
| „ breadth | 7 „ |
| „ depth | 2 „ |
| Posterior sucker (longitud.) | 3 „ |
| „ „ (transv.) | 3·5 „ |

This species bears a close resemblance to *H. septemstriata*, and a comparison with Grube's figure might well on first examination justify its inclusion in that species. The resemblances concern measurements and pigment pattern of dorsal surface.

We quote Grube's diagnosis in part to explain the differences: "Ex olivaceo grisea, depressa, laevis, dorso vittis longitudinalibus fuscioribus 7 ornata, media ceteris, aequae distantibus, latiore, a proximis paulo longius remota, externis marginem tangentibus, ventre concolore. . . . Discus posterior radiis albidis 5 ad 7 striatus. . . ."

Although in both forms there are seven (7) dorsal bands, and a faint linear pigmentation in the middle and posterior regions of the body between the median band and that on either side, yet not only are the lateral bands as important as the median in the species under consideration, but the intermediate bands are much larger than in *H. septemstriata*. Further, in our species there is no ornamentation on the dorsal surface of the posterior sucker; the ventral surface is a strong contrast in colour to that of the dorsal surface, whereas both are similar in *H. septemstriata*; and there is a strongly marked yellow margin to the dorsal surface as in other species noted in this paper, but of which no mention is made, and apparently correctly so, by Grube.

Both species agree in that the outermost dark band of the dorsal surface bears only a single sensory papilla.

HIRUDO INTERMEDIA, sp. nov.

Locality.—Smithfield, Orange River Colony.

We are indebted to the authorities of the South African Museum for a large number of specimens of this species.

Diagnosis.—Body elongate, flattened?

Dorsal surface yellowish-brown with series of dark pigment bands extending along the whole length of the body and consisting of a double band in the middle line, with three bands on either side of

this, of which the innermost two of each side may be double in nature and may be more important than the outermost.

A yellow marginal band at margin of dorsal surface.

The ventral surface has the same coloration as dorsal, and is provided with a marginal dark band where it meets the yellow band of the dorsal region.

All the specimens are poorly preserved internally, and judging from the extended condition they had evidently died some little time before being placed in preservative. This would account for the more or less cylindrical nature of the body, which, in the light of experience, was probably flattened as in the other species.

The dimensions of a number of specimens are given below :—

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|---------------------------------|----|----|----|-----|-----|-----|-----|----|-----|
| Greatest length | 34 | 23 | 28 | 35 | 32 | 33 | 30 | 24 | mm. |
| „ breadth | 5 | 5 | 5 | 5 | 5.5 | 5.5 | 4.5 | 5 | „ |
| Length of posterior sucker ... | 3 | 3 | 3 | 3.5 | 4 | 3.5 | 3.5 | 2 | „ |
| Breadth of posterior sucker ... | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | „ |
| „ between genital pores | 4 | 5 | 4 | 3.5 | 4.5 | 4 | 4 | 4 | „ |

The species in regard to colour pattern might well be placed in Blanchard's species—*H. Hildebrandti*, but differences of a much more important nature prevent such. Unfortunately we are not in a position to make any note on the papillæ, as even if such were present, as they probably were, they cannot be seen in our specimens.

There is no trace of the groove on the under side of the anterior sucker as is figured by Blanchard in *H. Hildebrandti*.

Remarks.—It will be readily noted that the various species described, form together a more or less continuous series, which might be regarded as quite sufficient for justifying the inclusion of them all under one specific name, the differences being of no more importance than “local variations.” With this to a great extent we are in agreement, but, realising that later anatomical work may result in the removal of all the forms mentioned in this paper into a genus distinct from *Hirudo*, such a step is extremely inadvisable.

At the present day the various species of *Hirudo*, even in its amended and limited condition, are distinguishable almost solely on their colour pattern and the arrangement of papillæ. How far these distinctions agree with true specific differences awaits a settlement on anatomical and experimental lines. At the same time a discussion in such cases as to whether a species or variety is to be founded serves very little scientific purpose where invertebrates are concerned.

We have been particularly struck in examining these specimens with the special opportunities they offer for experiments on Mendelian lines, and no doubt much satisfactory information would be gained in that way.

All the species noted in this account are characterised by very small jaws provided with minute teeth which number about fifty. In this respect they stand in marked contrast to *Hirudo*, in which the jaws are very large and the teeth sharp. Furthermore, as in *Limnobdella*, there is no muscular dilatation between the epididymis and the base of the penis such as is found in *Hirudo medicinalis*.

It seems to us that it is advisable that all species should be described in such a way as to give information regarding the jaws, genital apertures, number of testes, and male reproductive ducts. Experience indicates that these should form the basis for a correct classification of the Hirudininae.

We hope to deal in greater anatomical details of the forms described in a later paper.

All the species noted possess seven dorsal black bands, which differ only in regard to the prominence of any particular one in a species.

All are characterised by a yellow marginal band except *H. septemstriata*, and the individuals examined in the case of the latter species did not show the faint additional bands in the posterior region of the body as figured by Grube. Yet as the bands other than the median were very difficult to make out the absence of such bands as mentioned may be only apparent.

H. Morrisii and *H. notabilis* agree in that the ventral and dorsal surfaces are quite different, and the latter species has the rudimentary pigment bands represented by Grube in his drawing of *H. septemstriata*. However, as the surfaces (dorsal and ventral) are similar according to Grube, and no mention is made of the very prominent marginal yellow band in *H. septemstriata*, there can be no confusion in this case. The resemblance lends special interest to these two forms, and if it has any significance at all bridges to some extent the gap between *H. septemstriata* and the other species, all of which bear the marginal yellow band.

H. intermedia closely approximates to *H. Hildebrandti* in that both surfaces are alike, both possess a yellow marginal band, and there is in each a dark marginal band on the ventral surface. The latter in every probability represents the dark ventral surface coloration of *H. Morrisii* and *H. notabilis*. *H. capensis* also possesses a dark ventral marginal band. It is thus seen that all

the species with the exception of *H. septemstriata* form a very complete series, and at the same time the latter species agrees with all except *H. capensis* in the possession of seven dorsal pigment bands, and in another detail, if Grube's account is accurate, approximates as a variation to *H. notabilis*.

5.—*The Freshwater Fishes of South Africa*.—By J. D. F. GILCHRIST, M.A., D.Sc., Ph.D. ; and W. WARDLAW THOMPSON, F.Z.S.

THE following account of the Freshwater Fishes of South Africa is based on collections in the South African, Bulawayo and Transvaal Museums.* Much of the material was procured by the aid of grants from the British Association and the South African Association for the Advancement of Science. The species have been fully described from as many specimens as possible ; it is hoped that this may contribute towards their clearer determination and delimitation. Some species are not represented in the collections of the South African Museum, or kindred institutions, and for the sake of completeness the description has been taken over from Boulenger's "Catalogue of the Freshwater Fishes of Africa." The bulk of the illustrations are from the blocks used in Dr. Boulenger's book, which have been kindly placed at the disposal of this Institution by the Trustees of the British Museum.—L. P.

ORDER DIPNEUSTI.

FAMILY LEPIDOSIRENIDÆ.

PROTOPTERUS.

Owen, Proc. Linn. Soc., 1839, p. 27 ; Peters, Reise Mossamb., iv., p. 2 (1868) ; Bouleng., Cat. Freshw. Fish. Afr., i., p. 19 (1909).

Protomelus, Hogg, Ann. and Mag. N.H., vii., 1841, p. 359.

Rhynocryptis, Peters, Mon. Berl. Ac., 1844, p. 414.

"Body cylindrical, more or less elongate, with pointed tail at the end of which the elongate dorsal and anal fins meet ; limbs slender, styliiform ; external gills often distinct, especially in the young."

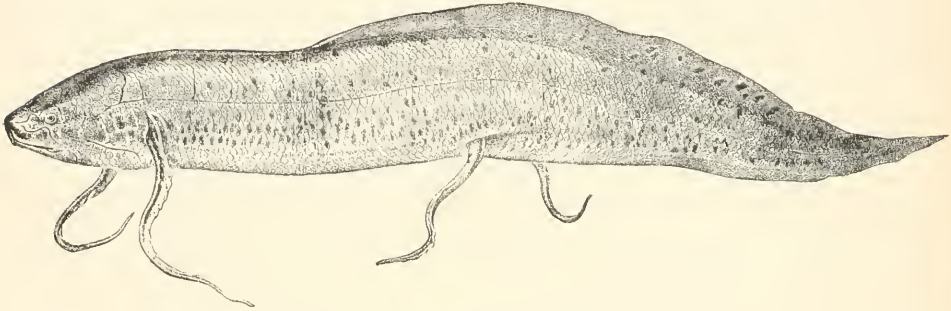
* The asterisk before a name indicates that the species is not represented in the Collections of the South African Museum.

PROTOPTERUS ANNECTENS, Owen.

(The Lung-fish.)

Lepidosiren annectens, Owen, Proc. Linn. Soc., 1839, p. 27.*Protopterus anguilliformis*, Owen, Pr. Linn. Soc., t.c., p. 332; Peters, Reise n. Mossamb., iv., Flussfische, Berlin, 1868, p. 6.*Rhinocryptos amphibia*, Peters, Mon. Berl. Ac., 1844, p. 414.*Protopterus annectens*, Bouleng., Cat. Freshw. Fish. Afr., i., p. 20 (1909).

Depth of body $8\frac{1}{2}$ times in total length. Length of head 4 times in distance from point of snout to vent; snout broadly rounded, about $\frac{1}{4}$ length of head; eye small, its diameter nearly 12 times in length of head, $3\frac{3}{5}$ times in interocular width. External gills distinct.

FIG. 1.—*Protopterus annectens*. $\frac{1}{3}$.

Dorsal originating nearer to occiput than to vent. Fore limb longer than hind limb and provided with a well-developed fringe; hind limb with a more or less distinct or rudimentary fringe. 48 to 50 scales from gill-opening to above vent, 36 round middle of body.

Colour (of preserved specimen) bluish brown above, yellow reticulated with bluish-brown markings on belly; sides indistinctly mottled.

One specimen, 358 mm. in length, found in dried ground at Villa Machado, Portuguese East Africa; collected by Rogers and Chubb. Bulawayo Museum. One example from West Africa.

This fish is also reported from Chiromo, Shire River; West Africa, from the Senegal to the Niger; Chad Basin; East Africa, as far south as the Zambezi. It grows to a length of at least 650 mm.

Mr. Peters (Reise n. Mossamb, t.c., p. 6) states: "I found this animal fairly common in the small stagnant pools in the district of

Quellimane, Licuare, and Zambeze. . . . It buries itself during the dry season in the mud and surrounds itself with a protective coat of slime until the return of the rainy season. The formation of this coat and the giving out of a screaming (kreischend) sound have been observed by McDonnell (Zeits. f. Wiss. Zool. Leipzig, 1860, x., p. 409) and A. Duméril (Compt. Rend. Ac. Paris, 1866, lxii., p. 97), but not by me."

ORDER TELEOSTEI.

FAMILY MORMYRIDÆ.

Synopsis of Genera.

A. Anal fin $\frac{3}{8}$ to twice the length of the dorsal.

(a) Teeth on the entire edge of both jaws; 10-36 in each jaw.

Mouth terminal or sub-inferior; nostrils distant from each other and remote from the eye; body more or less elongate 1. *Mormyrops*.

Mouth inferior, below the eyes; nostrils close together, close to the eye; body short 2. *Petrocephalus*.

(b) Teeth only in the middle of the jaws; 3-10 in each jaw.

Mouth inferior or sub-inferior, below level of eye; teeth moderate or small; posterior nostril remote from mouth 3. *Marcusenius*.

Mouth terminal; dorsal and anal equal or sub-equal in length 4. *Gnathonemus*.

B. Anal fin less than $\frac{1}{2}$ the length of the dorsal.

Mouth terminal 5. *Mormyrus*.

1. MORMYROPS.

Mormyrus, part., Linn. Syst. Nat., i., p. 522 (1766).

Mormyrops, part., J. Müll., Arch. f. Nat., 1843, p. 324.

Mormyrus, Bouleng., Cat. Freshw. Fish. Afr., i., p. 30 (1909).

"Teeth in jaws conical, truncate, or notched; minute conical teeth on parasphenoid and tongue; on the entire edge of both jaws. Mouth terminal or sub-inferior; nostrils moderately far apart, remote from the eye. Body more or less elongate."

* MORMYROPS DELICIOSUS, Leach.

Oxyrhynchus deliciosus, Leach, in Tuckey, Exped. R. Zaire, p. 410 (1818):

Mormyrus tuckeyi, Cuv. and Val., Hist. Poiss., xix., p. 263 (1846).

Mormyrops tuckeyi, Marcusen, Bull. Ac. St. Petersb., xii., 1854, p. 14.

Mormyrops deliciosus, Bouleng., Cat. Fresh. Fish. Afr., i., p. 32 (1909).

“Teeth conical or truncate in the adult, more or less distinctly notched in the young, 24 to 36 in each jaw. Depth of body 5 to $6\frac{1}{2}$ times in total length, length of head $3\frac{1}{2}$ to $4\frac{1}{4}$ times. Head nearly twice as long as deep, upper profile slightly concave; snout rounded; jaws equal; width of mouth nearly equal to length of snout; eye small, in anterior third of head, its diameter 2 (young) to 4 times in length of snout or in interocular width.

Dorsal 21–27, $\frac{1}{2}$ to $\frac{2}{3}$ length of anal, originating 2 to $2\frac{1}{2}$ times as far from end of snout as from base of caudal. Anal 40–51, origi-

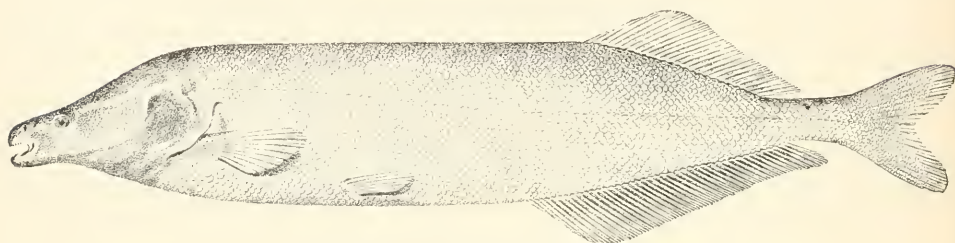


FIG. 2.—*Mormyrops deliciosus*. $\frac{1}{3}$.

nating considerably in advance of dorsal (its 12th to 16th ray corresponding to the first dorsal ray) and a little nearer to head than to root of caudal. Pectoral rounded, $\frac{2}{5}$ to $\frac{1}{2}$ length of head, ventral $\frac{1}{4}$ to $\frac{1}{3}$. Caudal rather small, densely scaled, with rounded lobes; caudal peduncle 2 to $2\frac{1}{2}$ times as long as deep, $\frac{1}{3}$ to $\frac{1}{2}$ length of head. 85–100 scales in lateral line, $\frac{15-18}{18-22}$ in transverse series on body, 22–26 in transverse series between dorsal and anal, 14–18 round caudal peduncle.

Colour, brownish or olive above, silvery beneath.

Total length 1500 mm.

Habitat: Zambezi, Lake Nyassa, Senegal, Gambia, Niger, Chad Basin, Congo, Wedi Shebeli and Juba.”

2. PETROCEPHALUS.

Petrocephalus, part., Marcusen, Bull. Ac. St. Petersb., xii., 1854, p. 14.

Mormyrus, part., Günth., Cat. Fish., vi., p. 214 (1866).

Petrocephalus, Bouleng., Cat. Freshw. Fish. Afr., i., p. 47 (1909).

Teeth bicuspid, in single series on entire edge of both jaws; mouth inferior, below eyes; nostrils close together, close to the eye; body short.

Key to Species.

12 rows of scales round caudal peduncle.

Teeth $\frac{12}{18}$; D. 20-22, A. 27-29; Lat. l. 37-40 1. *P. catostoma*.

16 rows of scales round caudal peduncle.

Teeth $\frac{14}{20}$; D. iii 17, A. iii 23; Lat. l. 36 2. *P. stuhlmanni*.

PETROCEPHALUS CATOSTOMA, Günth.

Mormyrus catostoma, Günth., Cat. Fish., vi., p. 222 (1866).

Petrocephalus catostoma, Bouleng., Proc. Zool. Soc., 1898, p. 790, and Cat. Fresh. Fish. Africa, i., p. 57 (1909).

Teeth, 12 in upper 18 in lower jaw. Depth of body 3 to a little more than 3 times in total length excluding caudal, length of head $3\frac{1}{2}$ to $3\frac{7}{10}$ times. Head a little longer than deep, with convex upper profile; snout short, $\frac{1}{3}$ length of head, rounded, projecting

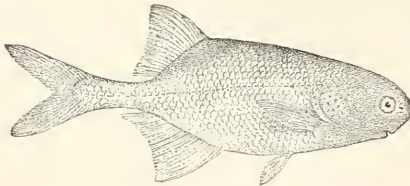


FIG. 3.—*Petrocephalus catostoma*.

beyond mouth; mouth situated below eye, its width $\frac{1}{3}$ length of head; diameter of eye 3 to 5 times in length of head, as long as or slightly longer than snout, and $\frac{2}{3}$ to nearly equal to interorbital width.

Dorsal 20-22, originating slightly behind beginning of anal, its length about $\frac{1}{2}$ its distance from head. Anal 27-29, slightly nearer to base of ventral than to base of caudal. Pectorals pointed, $\frac{2}{3}$ to nearly $\frac{3}{4}$ length of head, twice as long as ventral and extending beyond base of latter. Caudal with pointed lobes; caudal peduncle $2\frac{1}{2}$ to 3 times as long as deep, a little shorter than head. 37-40 scales in lateral line, $\frac{10}{13}$ rows of scales in transverse series on body, $\frac{10}{11}$ rows in transverse series between dorsal and anal fins, 12 rows round caudal peduncle.

Colour (of preserved specimens), silvery, darker on back.

Five specimens, ranging from 50 mm. to 59 mm. in length, from Kafue River, Upper Zambezi (J. Drury).

PETROCEPHALUS STUHLMANNI, Blgr.

Mormyrus catostoma (non Günth.), Pfeffer, Thierw. O.-Afr. Fische, p. 39 (1896).

Petrocephalus catostoma, Pappenh., Mitth. Zool. Mus. Berl., iii., 1907, p. 344.

Petrocephalus stuhlmanni, Bouleng., Cat. Fresh. Fish. Afr., i., p. 56 (1909).

Teeth, 14 in upper jaw, 20 in lower. Depth of body equals length of head, and is $3\frac{3}{4}$ times in total length excluding caudal; head slightly longer than deep, with convex upper profile; snout very short, about $\frac{1}{2}$ length of head, rounded, strongly projecting beyond

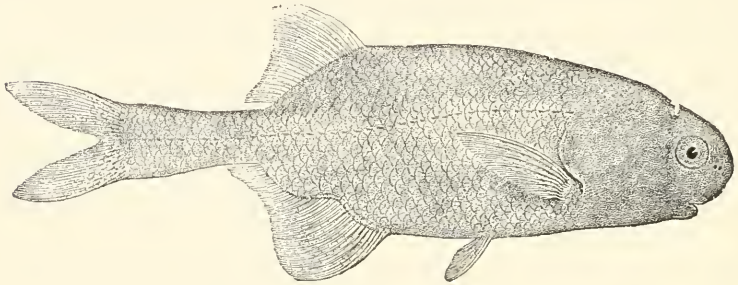


FIG. 4.—*Petrocephalus stuhlmanni*.

mouth; mouth situated below the eye, its width a little less than $\frac{1}{4}$ length of head; eye rather large, 4 times in length of head, about equals snout, $\frac{3}{4}$ interorbital width. Snout and top of head covered with scars or pits of tubercles; a row of open pores on each side of back as far as origin of dorsal fin.

Dorsal iii 17, originating slightly in advance of, or over, anal; its length barely $\frac{1}{2}$ its distance from the head. Anal iii 23, slightly nearer to base of ventrals than to base of caudal. Pectoral pointed, nearly twice length of ventral and extending beyond base of latter. Caudal with pointed lobes; caudal peduncle nearly $2\frac{1}{4}$ times as long as deep, $\frac{4}{5}$ length of head. 36 scales in lateral line, $1\frac{1}{1}$ scales in transverse series on body, 16 round caudal peduncle.

Colour (of preserved specimen), uniform brown, lighter below.

One specimen, 90 mm. in length, from Leydsdorp, Transvaal (J. Naughton).

3. MARCUSENIUS.

Petrocephalus, part., Marcusen, Bull. Ac. St. Petersb., xii., 1854, p. 14.

Marcusenius, Gill, Proc. Ac. Philad., 1862, p. 129; Bouleng., Cat. Freshw. Fish. Afr., i., p. 60 (1909).

Mormyrus, part., Günth., Cat. Fish., vi., p. 214 (1866).

Teeth only in the middle of the jaws, truncate or notched; minute conical teeth on parasphenoid and tongue; mouth inferior or sub-inferior, below level of eyes; nostrils widely separated.

Key to Species.

Anal originating in advance of dorsal.

Teeth $\frac{8}{8}$; D. 16-17, A. 22; Lat. 1. 53 1. *M. isidori*.

Teeth $\frac{5}{5}$; D. 17, A. 23; Lat. 1. 48-50 2. *M. castelnaui*.

Dorsal originating in advance of anal.

Teeth $\frac{6}{6}$; D. 30-36, A. 23-27; Lat. 1. 65-70 3. *M. discorhynchus*.

MARCUSENIUS ISIDORI, C. and V.

Mormyrus isidori, Cuv. and Val., Hist. Poiss., xix., p. 285 (1846).

Petrocephalus isidori, Marcusen, Bull. Ac. St. Petersb., xii., 1854, p. 14.

Marcusenius isidori, Bouleng., Proc. Zool. Soc., 1898, p. 798, and Cat. Fresh. Fish. Africa, i., p. 76 (1909).

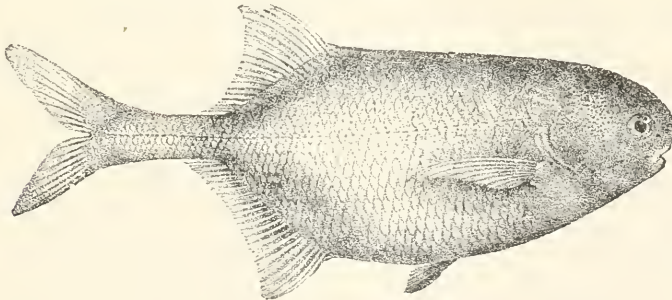


FIG. 5.—*Marcusenius isidori*.

Teeth bicuspid, 8 in the upper 8 in lower jaw. Depth of body 3 to $3\frac{1}{2}$ times in total length excluding caudal, length of head 4 to $4\frac{1}{3}$ times; head as long or nearly as long as deep; snout $\frac{1}{5}$ to $\frac{3}{10}$ length of head, rounded, projecting beyond mouth; mouth situated below nostrils, its width $3\frac{3}{4}$ to $4\frac{1}{2}$ times in length of head; anterior nostril in a line with centre of eye, midway between eye and point

of snout; posterior nostril close to eye, near its lower border; eye slightly less than snout, 5 to $5\frac{3}{5}$ times in length of head and $\frac{1}{2}$ to $\frac{3}{4}$ interocular width. Head and snout covered with numerous small tubercles.

Dorsal 16-17, originating above 4th ray of anal, its length about $\frac{1}{2}$ its distance from head. Anal 22, nearly equidistant from base of ventrals and base of caudal. Pectorals pointed, sub-falcate, a little shorter than head, about twice as long as ventrals and extending beyond root of latter. The caudal lobes in two of the specimens are somewhat pointed, but in the third rounded; caudal peduncle about 3 times as long as deep, about $\frac{3}{4}$ length of head. Scales in lateral line 53; $1\frac{2}{4}$ scales in transverse series across body, $1\frac{1}{1}$ in transverse series between dorsal and anal, 16 round caudal peduncle.

Colour (of preserved specimens), mottled brown.

Three specimens, 54 mm., 54 mm., 67 mm. in length respectively, from Kafue River, Upper Zambezi (J. Drury).

* *MARCUSENIUS CASTELNAUI*, Blgr.

Bouleng., Trans. Zool. Soc., Lond., vol. xviii., part v., p. 402,
May, 1911.

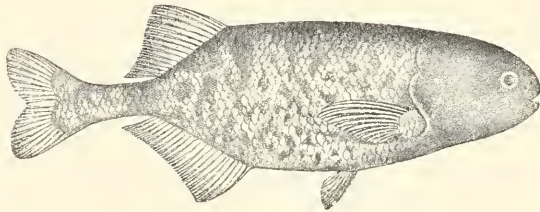


FIG. 6.—*Marcusenius castelnaui*.

“Depth of body 3 times in total length, length of head $3\frac{2}{3}$ times. Head as long as deep, twice as long as broad; snout rounded, $\frac{1}{5}$ length of head, projecting very slightly beyond mouth; mouth small, well below level of lower border of eye; teeth small, notched, 7 in upper jaw, 8 in lower; eye rather indistinctly defined, nearly as long as snout, its diameter not $\frac{1}{2}$ interocular width; posterior nostril a little lower down than upper, close to eye.

Dorsal fin 17, originating above 4th ray of anal, its length half its distance from head, upper border slightly convex in front, longest ray $\frac{2}{3}$ length of head. Anal 23, similar to dorsal but longer, equally distant from base of ventrals and from base of caudal. Pectoral

pointed, a little shorter than head, twice as long as ventral, extending to middle of latter. Caudal fin with rather short, rounded lobes. Caudal peduncle $2\frac{1}{2}$ times as long as deep, a little shorter than head. 48-50 scales in lateral line, $\frac{10-11}{14-15}$ in transverse series on body, $\frac{8}{7}$ in transverse series between dorsal and anal, 12 round caudal peduncle.

Colour, pale brownish, darker on the back, spotted and marbled with dark brown; fins brown.

Total length 70 mm."

From Lake Ngami Basin, Bechuanaland.

"This small Mormyr, of which two specimens are in the collection, is most nearly related to *M. lluyssi*, Stdr., from the Senegal, which differs principally in the higher number of dorsal and anal fin-rays."

* *MARCUSENIUS DISCORHYNCHUS*, Peters.

Mormyrus discorhynchus, Peters, Mon. Berl. Ac., 1852, p. 275.

Marcusenius discorhynchus, Bouleng., Proc. Zool. Soc., 1898, p. 7, and Cat. Fresh. Fish. Africa, i., p. 81 (1909).

Marcusenius tanganicanus, Bouleng., Tr. Zool. Soc., xvii., 1906, p. 545, pl. xxx., fig. 1.

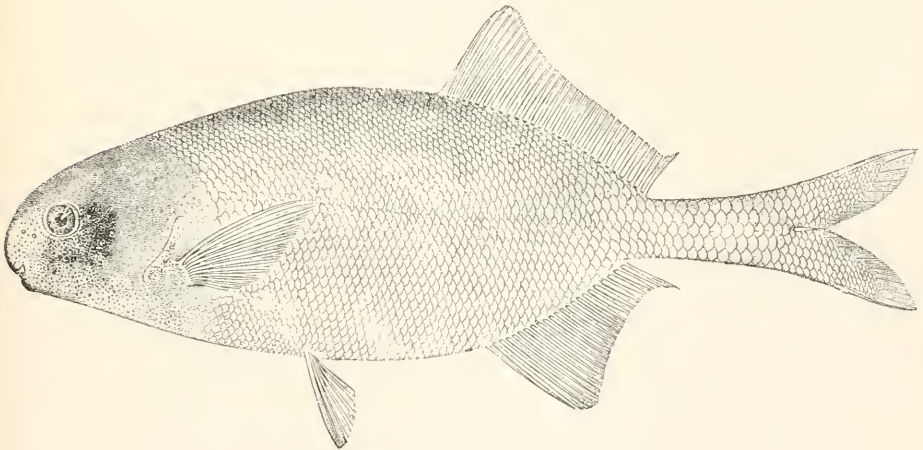


FIG. 7.—*Marcusenius discorhynchus*. $\frac{3}{8}$.

"Teeth small, notched, 5 in upper jaw, 6 in lower. Depth of body 3 to $3\frac{1}{2}$ times in total length, length of head $4\frac{1}{3}$ to $4\frac{2}{3}$ times. Head as long as deep; snout rounded, $\frac{2}{7}$ length of head; mouth

small, sub-inferior, its width $\frac{1}{5}$ to $\frac{1}{4}$ length of head; nostrils on a line with lower border of eye, nearer latter than end of snout; eye moderate, as long as or a little shorter than snout, $\frac{2}{3}$ interorbital width.

Dorsal 30-36, its length $1\frac{1}{4}$ to $1\frac{1}{2}$ times in its distance from head. Anal 23-27, originating below 8th to 12th ray of dorsal, equally distant from base of ventral and from base of caudal. Pectoral pointed, nearly as long as head, $1\frac{1}{2}$ times length of ventral, extending to base of latter or a little beyond. Caudal with obtusely pointed lobes. Caudal peduncle 2 to $2\frac{1}{2}$ times as long as deep, a little shorter than head. 65-70 scales in lateral line, $\frac{17-20}{20-22}$ in transverse series on body, $\frac{12-15}{13-15}$ in transverse series between dorsal and anal, 12 or 14 round caudal peduncle.

Colour, dark olive or brownish above, silvery white beneath.

Total length 160 mm. (grows to 260 mm.).

Habitat: Lower Zambesi; Lake Nyassa; Katanga; Lake Tanganyika."

4. GNATHONEMUS.

Mormyrus, part., Linn., Syst. Nat., i., p. 522 (1766).

Mormyrops, part., Marcusen, Bull. Ac. St. Petersb., xii., 1854, p. 14.

Gnathonemus, Gill, Proc. Ac. Philad., 1862, p. 443; Bouleng., Cat. Freshw. Fish. Afr., i., p. 94 (1909).

Teeth only in the middle of the jaws, conical, truncate or notched; mouth terminal; dorsal and anal fins about equal in length.

GNATHONEMUS MACROLEPIDOTUS, Peters.

Mormyrus macrolepidotus, Peters, Mon. Ac. Berl., 1852, p. 275.

Mormyrops macrolepidotus, Marcusen, Mem. Ac. St. Petersb. (7), vii., 1864, No. 4, p. 142.

Gnathonemus macrolepidotus, Bouleng., Proc. Zool. Soc., 1898, p. 804, and Cat. Fresh. Fish. Africa, i., p. 112 (1909).

Teeth conical, 3-5 in upper jaw, 6 in lower. Depth of body $3\frac{2}{3}$ to $3\frac{9}{10}$ times in total length excluding caudal, length of head $4\frac{2}{3}$ to over 5 times. Depth of head $\frac{1}{5}$ to $\frac{9}{10}$ its length, upper profile curved; snout $3\frac{2}{3}$ to 4 times in length of head; chin with a globular dermal appendage; eye moderate, $5\frac{2}{3}$ to $7\frac{1}{3}$ times in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ length of snout, $\frac{1}{3}$ to $\frac{1}{2}$ interorbital width.

Dorsal 20-22, originating above 2nd to 5th ray of anal, its length $2\frac{1}{2}$ to $2\frac{7}{10}$ times in its distance from the head. Anal 27-28, nearer to

base of caudal than to base of ventrals. Pectoral pointed, shorter than head, reaching or nearly reaching base of ventral (in smaller and larger specimen respectively). Caudal scaled in basal half, with obtusely pointed lobes; caudal peduncle about twice as long as deep, nearly as long as head. 68-70 scales in lateral line; $\frac{14-15}{18}$ scales in transverse series on body, $\frac{1}{2}$ in transverse series between dorsal and anal, 16 round caudal peduncle.

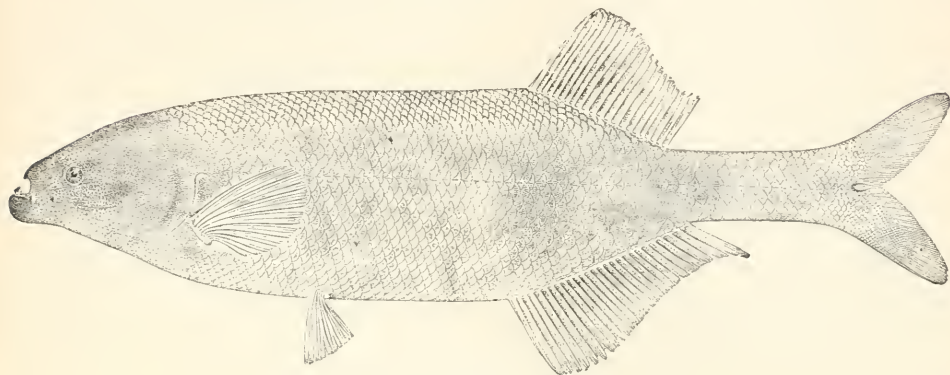


FIG. 8.—*Gnathonemus macrolepidotus*. $\frac{1}{2}$.

Colour (of preserved specimens), brownish.

Two specimens: one 128 mm. in length from Waterberg District; one 200 mm. in length from Crocodile River, Pretoria District, Transvaal; Pretoria Museum.

One specimen, 129 mm. in length, from Sabi River, Transvaal. (Major J. Stevenson-Hamilton.)

5. MORMYRUS.

Linn., Syst. Nat., i, p. 522 (part.); Bouleng., Cat. Freshw. Fish. Afr., i, p. 126 (1909).

Teeth small, notched; few in number, $\frac{5-12}{8-14}$; minute conical teeth on parasphenoid and tongue; mouth terminal; nostrils moderately far apart, remote from eye.

MORMYRUS ANCHIETÆ, Guim.

Guimaraes, Jorn. Sc. Lisb., x., 1884, p. 4, pl. i., fig. 3; Bouleng., Cat. Fresh. Fish. Afr., i, p. 129 (1909).

Teeth notched, 6 in upper 9 in lower jaw. Depth of body 4 times in total length excluding caudal, length of head nearly $3\frac{3}{4}$ times.

Head nearly $1\frac{1}{2}$ times as long as deep, with curved upper profile; snout a little more than $\frac{1}{2}$ length of postorbital part of head; chin slightly swollen; eye small, 10 times in length of head, about $\frac{3}{10}$ length of snout and a little more than $\frac{1}{2}$ interorbital width.

Dorsal 63, originating well in advance of the ventrals and $4\frac{1}{10}$ times as long as anal. Pectorals $\frac{3}{5}$ length of head, with rounded angles. Ventrals a little more than $\frac{1}{3}$ length of head. Anal 18, originating nearer to base of caudal than to base of pectorals. Caudal densely scaled (damaged in specimen); caudal peduncle $1\frac{1}{2}$ times as long as deep and $\frac{1}{3}$ length of head. 88 scales in lateral

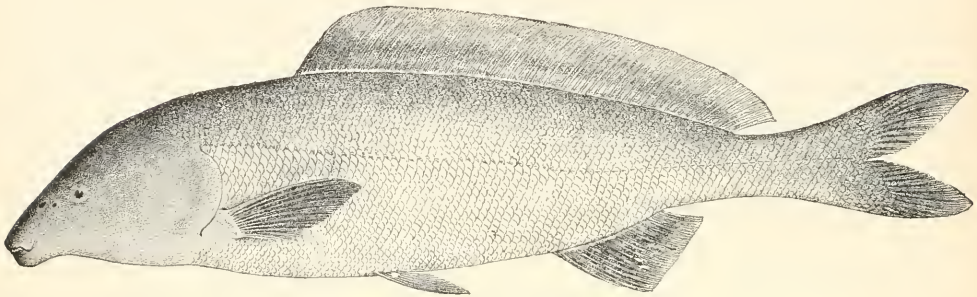


FIG. 9.—*Mormyrus anchietae*.

line, $\frac{1.3}{8}$ in transverse series on body, $\frac{1.2}{1.2}$ in transverse series between dorsal and anal fins, 22 round caudal peduncle.

Colour (of preserved specimen), dark grey above, lighter below.

One specimen, 335 mm. in length, from the Zambezi River, near Livingstone. (A. Stephenson.)

It is also reported from Angola.

FAMILY PANTODONTIDÆ.

PANTODON.

Peters, Mon. Berl. Ac., 1876, p. 195; Bouleng., Poiss. Bass. Congo, p. 121, and Cat. Freshw. Fish. Afr., i., p. 151 (1909).

“Body moderately elongate, compressed, the back, as well as the head, flattened, keeled below; scales large; lateral line distinct, canals straight and simple. Mouth large, with small sharp teeth; similar teeth on the palate (vomer, palatines, pterygoids) and on the tongue. Nostrils widely separated, the posterior large and close to the eye. A very short dorsal fin; anal fin longer and inserted

further forward. Pectoral fin very large, the lower ray adnate to a fleshy process. Vertebrae 16 + 14.

A single species."

* PANTODON BUCHHOLZI, Peters.

Peters, t.c., p. 196, pl.; Bouleng., l.c.; Popta, Notes Leyd. Mus. xxiii., 1902, p. 111.

"Depth of body $3\frac{1}{3}$ to $3\frac{2}{3}$ times in total length, length of head 4 to $4\frac{1}{3}$ times. Snout shorter than eye, the diameter of which is $3\frac{1}{2}$ times in length of head, $1\frac{2}{3}$ times in interocular width; mouth very oblique, directed upwards, extending beyond posterior border of eye.

Dorsal 6, above last rays of anal, $3\frac{1}{2}$ to 4 times as distant from head as from caudal; third ray nearly as long as head. Anal 9-14, sometimes divided into two by a notch, posterior rays shortest.

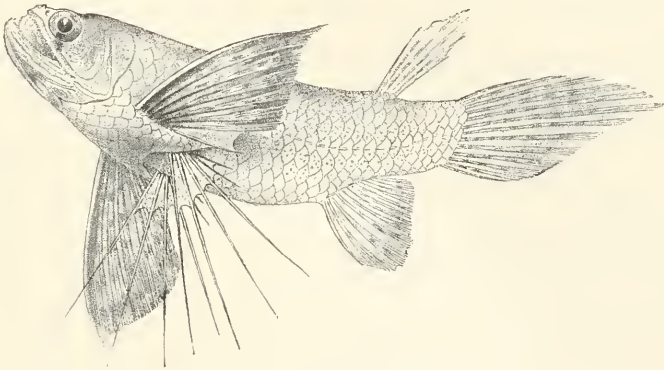


FIG. 10.—*Pantodon buchholzi*.

Pectoral $\frac{2}{5}$ to $\frac{1}{2}$ total length, formed of 8 rays, first longest and strong. First 4 ventral rays more or less produced, sometimes reaching caudal. Caudal pointed, median rays nearly twice as long as head. Caudal peduncle as long as deep. 28-30 scales in lateral line, $3\frac{1}{2}$ -5 in transverse series, 22 or 23 between occiput and dorsal.

Olive above, yellow or silvery beneath, more or less tinged with carmine; a few blackish dots on the body; sometimes dark bands across the back; fins pink, with small, round, purplish-brown spots forming cross-bands on the pectorals, which are dark purple on the inner side and towards the end; dark bars across the lower jaw.

Total length 95 mm.

Niger, Old Calabar, Cameroon, Congo."

This fish is also reported from Chirundu, Upper Zambezi. It is said that in order to escape from the Tiger-fish (*Hydrocyon*) it skips across the surface of the water, touching it at intervals; the longest flight or run being about 30 feet.

FAMILY KNERIIDÆ.

"Margin of the upper jaw formed by præmaxillaries; mouth not protractile, inferior, toothless; supraoccipital widely separating the very small parietals; opercular bones well developed; symplectic present. Gill-opening very narrow. Body scaly. Ribs sessile. Pectoral fin inserted low down, folding like the ventrals."

KNERIA.

Steind., Verh. zool.-bot. Ges. Wien, xvi., 1866, p. 769; Günth., Cat. Fish., vii., p. 372 (1868); Bouleng., Cat. Fresh. Fish. Afr., i., p. 169 (1909).

"Mouth rather small and toothless, inferior, transverse, sharp-edged. Gill-opening very narrow, lateral; 3 branchiostegal rays. Body elongate, cylindrical or slightly depressed, covered with very small, finely striated scales. Dorsal and anal fins short, the former above or behind vertical of ventrals, which have 9 rays. Vertebrae 40 (26 + 14). Air-bladder long and slender, extending along the whole præcaudal part of the body. Intestinal tract very long, with several convolutions.

Tropical Africa."

KNERIA ANGOLENSIS, Steind.

Steind., Verh. zool.-bot. Ges. Wien, xvi., 1866, p. 770, pl. xvii., fig. 1; Günth., Cat. Fish., vii., p. 372 (1868); Bouleng., Cat. Fresh. Fish. Afr., i., p. 170, fig. 134 (1909).

"Body cylindrical in front, its depth $6\frac{1}{3}$ to 7 times in total length. Head deeper than broad, $1\frac{1}{2}$ times as long as broad, its length $5\frac{1}{2}$ to 6 times in total length; snout half as long as postorbital part of head, with spine-like tubercles in the male; eye lateral, well visible from below, 3 to $3\frac{1}{2}$ times in length of head; interorbital width $\frac{2}{5}$ length of head.

Dorsal ii 8, originating behind vertical of base of ventrals and at

equal distance from eye and from root of caudal, longest ray nearly as long as head. Anal iii 9, equally distant from root of ventrals and from root of caudal. Pectoral $\frac{3}{4}$ length of head. Caudal deeply forked, with pointed lobes. Caudal peduncle twice and $\frac{1}{2}$ as long as deep. 95–100 scales in lateral line. Yellowish to dark brown above, whitish beneath; a lateral series of black dots; a black dot at base of ventral and usually two at base of anal.

Total length 90 millim.

Angola.—Type in Vienna Museum.”

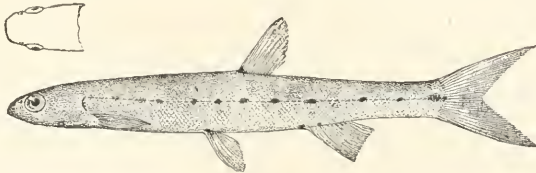


FIG. 10A.—*Kneria angolensis*.
(From Brit. Mus. Cat. Afr. Fishes.)

A single specimen, 52 mm. in length, has been obtained by the Bulawayo Museum from the Zambezi River. Unfortunately it is not in a good condition for examination, but although it differs in some respects from the description—notably, in possessing a broad mental flap on lower jaw, fewer dorsal and anal rays, and has the eye slightly nearer to point of snout—it has been referred to this species until an examination of further specimens proves whether the differences are constant and represent a new species.

FAMILY CHARACINIDÆ.

Synopsis of Genera.

1. HYDROCYONINÆ. Dentition powerful; upper jaw immovable or slightly movable; maxillaries well developed, bordering the mouth; gill-membranes free or very narrowly attached to isthmus; scales not ciliated; lateral line nearer ventral than dorsal outline.
 - A. Teeth unicuspid.

Teeth very numerous, unequal, conical, in two series; dorsal fin well behind ventrals. 1. *Sarcodaces*.

Teeth not very numerous, compressed, uniserial; dorsal fin above ventrals 2. *Hydrocyon*.
 - B. Teeth pluricuspid, in 2 or 3 series in the upper jaw. A pair of conical teeth behind the pluricuspid teeth of the lower jaw.

Teeth in 2 series in the upper jaw, the inner with obliquely truncated or molariform excavated crowns; dorsal fin originating above or behind ventrals 3. *Alestes*.

- Teeth in 2 series in the upper jaw, both simply compressed, the front side not concave; dorsal fin originating above or behind ventrals. 4. *Micralestes*.
2. **DISTICHODONTINÆ.** Teeth small, notched or bicuspid; upper jaw immovable or but slightly movable; maxillary well developed; scales ciliated; lateral line along the middle of the side.
- Gill-membranes attached to isthmus. No teeth on maxillary; suborbitals large, protecting the cheek; dorsal with 16-27 rays 5. *Distichodus*.

1. SARCODACES.

Sarcodaces, Günth., Cat. Fish., v., p. 352 (1864).

Snout elongate; mouth very large, with pointed teeth intermingled with large canines; two series of teeth on the lower jaw, the outer with canines; premaxillaries immovable, with a posterior process bearing small teeth, between the maxillary and the palatines; maxillary long, toothed, slipping under the pre- and sub-orbitals. Cheek covered by large sub-orbitals; nostrils near the eye, close together, separated by a valvular flap. A small adipose dorsal fin.

SARCODACES ODOË, Bl.

Salmo odoë, Block, Aust. Fische, viii., p. 122, cccclxxxvi. (1794).

Sarcodaces odoë, Günth., l.c. and Ann. and Mag. N.H. (3) xx., 1867, p. 114; and Bouleng. Cat. Fresh. Fish. Africa, i., p. 177 (1909).

Teeth generic. Depth of body $4\frac{1}{3}$ times in total length excluding caudal, length of head $3\frac{3}{10}$ times. Head $2\frac{3}{5}$ times as long as broad, flat above, with straight upper profile; bones of head rugose and striated; premaxillary part of snout narrowed, rounded, projecting beyond jaw; snout a little more than $2\frac{3}{4}$ times in length of head; eye lateral, sub-inferior, $2\frac{2}{5}$ times in length of snout, $6\frac{3}{5}$ times in length of head, nearly twice in interorbital width; maxillary extending to beyond posterior border of eye; a triangular dermal fold on each side of lower jaw, covering a notch between premaxillary and maxillary bones. Gill-rakers long, longest nearly $\frac{1}{2}$ diameter of eye, 12 on lower part of anterior arch.

Dorsal ii 7, situated above the space between ventrals and anal, $2\frac{1}{2}$ times as distant from end of snout as from base of caudal; longest ray nearly $\frac{2}{3}$ length of head. Anal ii 9. Pectoral pointed, a little more than $\frac{1}{2}$ length of head and not reaching to ventral. Caudal forked, with pointed lobes; caudal peduncle $1\frac{3}{10}$ times as long as

deep. Scales slightly rugose; scales 54, lat. tr. $\frac{10}{9}$; $4\frac{1}{2}$ rows of scales between lateral line and base of ventral; no distinct scaly process on ventral in specimen.

Colour (of preserved specimen), dull dark brown from end of snout to tail, membranes of dorsal fin yellow with black spots; black spots on anal and caudal and about the middle of the body; caudal peduncle yellowish with dark spots, these become few and faint

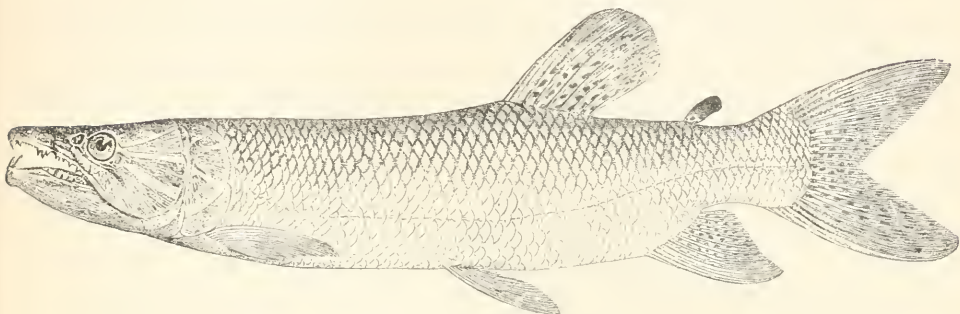


FIG. 11.—*Sarcodaces odoë*. $\frac{1}{3}$.

ventrally till the ventral surface is white; 3 marked dark brown streaks radiating from eye back over preoperculum; adipose fin black with whitish base.

2 specimens, 284 and 360 mm. in length, respectively, from Kafue River, Upper Zambezi (J. Drury).

It is also reported from the rivers of West Africa, Shari, Congo, and Lake Ngami.

2. HYDROCYON.

Hydrocinus, part., Cuv. Règne Anim., ii., p. 167 (1817).

Hydrocyon, Cuv., Mém. Mus. Paris, v., 1819, p. 353.

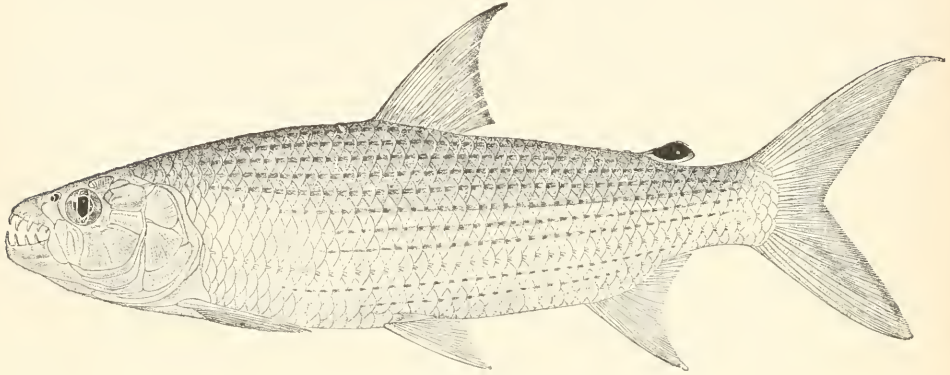
Snout rather elongate; mouth large, with strong, pointed, more or less compressed, sharp-edged teeth, wide apart and forming a single series; maxillary toothless, moderately large and slipping under the preorbital; cheek covered by the large sub-orbitals; nostrils near the eye close together, separated by a valvular flap; gill-membranes free from the isthmus. Part of the eye in front and behind covered by an adipose lid. Tubules of lateral line straight and short, most of them with a short spur downwards or a few scales here and there having the spur directed upwards. A small adipose dorsal fin.

HYDROCYON LINEATUS, Blkr.

(Tiger-fish; Ingwesi (Barotse); Sinwenyi (Batoke).)

Hydrocyon lineatus, Bleek., Nat. Verh. Ver. Haarl. xviii., 1862, No. 2, p. 125; Bouleng., Cat. Fresh. Fish. Africa, i., p. 182 (1909).

Teeth; 10 on each jaw, of which 4 on each jaw are larger and stronger than the others, the posterior tooth on each side of the lower jaw being minute and close to the preceding one. Depth of body a little more than 5 times in total length excluding caudal; length of head 4 times. Head $2\frac{1}{7}$ times as long as broad; snout a little more than $\frac{1}{3}$ length of head; diameter of eye $5\frac{1}{2}$ times in length of head, interorbital width $3\frac{1}{2}$ times; mouth extending to below

FIG. 12.—*Hydrocyon lineatus*. $\frac{1}{3}$.

nostrils; maxillary bone, which is strongly curved on anterior border, reaches to vertical of anterior border of eye; suborbital and opercular bones feebly striated. Gill-rakers shorter than gill-fringes, 8 on lower part of anterior arch.

Dorsal ii 8, equally distant from eye and base of caudal, originating in front of ventral; second simple ray longest and nearly $\frac{9}{10}$ length of head. Anal iii 12, 3rd simple ray longest. Pectoral $\frac{3}{4}$ length of head. Ventral $\frac{2}{3}$ length of head, situated below anterior 3rd of dorsal. Caudal deeply forked, with long pointed lobes; caudal peduncle $1\frac{1}{4}$ times as long as deep. Scales 46, lat. tr. $\frac{8}{43}$; 2 rows of scales between lateral line and scaly process at base of ventral, 3 rows between lateral line and base of ventral.

Colour (of preserved specimen), grey, lighter on abdomen; about 7 longitudinal streaks on body above lateral line and one below, the

lateral line scales being also indistinctly marked in places; anal with a row of dark marks on lower portion; caudal with a dark lunate band near base extending along the lobes, extremity of caudal rays tipped with black; adipose fin dark except at base.

The colour when fresh is bright silver, the longitudinal streaks are jet-black, the fins a bright orange-red.

One specimen, 288 mm. in length, from Zambezi River, at Livingstone; F. W. Sykes.

One specimen, 470 mm. in length, from Zambezi River; J. Drury.

One specimen, 370 mm. in length from White River, Transvaal; A. T. Cooke.

Mr. Sykes reports that this fish abounds in the Zambezi, above and below the Falls and in most of the tributary streams; it feeds on smaller fish, including its own species, is very voracious and can readily be caught with spoon bait, giving excellent sport. It has peculiar hook-shaped bones, which are very numerous, and has to be eaten soon after being caught, otherwise it becomes insipid and flabby.

Major J. Stevenson Hamilton, Warden of the Sabi River Game Reserve, states that in the Sabi River, Transvaal, its spawning season is the month of January.

This species is also reported from the White and Blue Niles, the Niger to Lake Ngami (?), and the Limpopo River.

3. ALESTES.

Alestes, part., Müll. and Trosch., Hor. Ichthyol., i., p. 12 (1846).

Teeth pluricuspid; in 2 series in the upper jaw, the inner molar-like; origin of dorsal above or behind ventrals; a small adipose dorsal fin.

Key to Species.

Dorsal fin originating above middle or last rays of ventrals.

A. ii-iii 14-16; scales 23-25, $4\frac{1}{2}$ series of scales above lateral line; gill-rakers 16-20 1. *A. imberi*.

A. iii 16; scales 33, $5\frac{1}{2}$ series of scales above lateral line; gill-rakers 25 2. *A. lateralis*.

ALESTES IMBERI, Peters.

Alestes imberi. Peters, Mon. Berl. Ac., 1852, p. 276, and Reise Mossamb. iv., p. 66, pl. xii., fig. 3 (1868); Bouleng., Cat. Fresh. Fish. Africa, i., p. 209 (1909).

Teeth 16 in upper jaw ($\frac{8}{8}$), 10 in lower ($\frac{5}{5}$). Depth of body $2\frac{9}{10}$ to $3\frac{2}{3}$ times in total length excluding caudal, length of head $3\frac{7}{10}$ to

$\frac{4\frac{1}{3}}$ times. Head $1\frac{1}{5}$ to $1\frac{2}{6}$ times as long as broad, a little longer than deep; snout equal to or a little longer than diameter of eye, which is lateral and $3\frac{1}{3}$ to 4 times in length of head; adipose eyelid not very strongly developed; interorbital region slightly convex, its width $2\frac{2}{5}$ to $2\frac{3}{4}$ times in length of head; maxillary reaching to vertical of posterior nostril; lower border of 2nd suborbital as long as or a little longer than the eye. Gill-rakers moderately long, 18 on lower part of anterior arch.

Dorsal ii 8, originating above base of ventral and equally distant from middle of eye and base of caudal; longest ray $\frac{3}{4}$ to about as

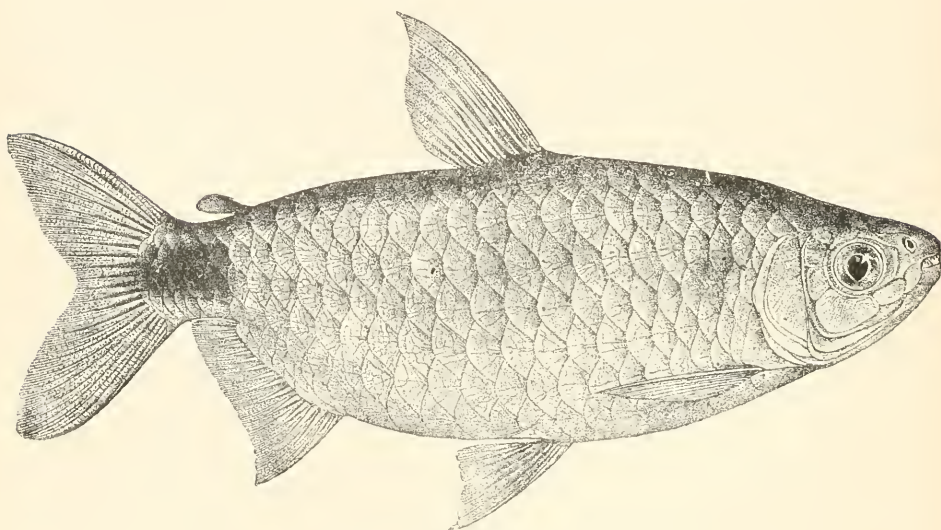


FIG. 13.—*Alestes imberi*. $\frac{5}{7}$.

long as head. Anal ii-iii 14-16. Pectoral nearly as long as head, not reaching ventral. Caudal forked; caudal peduncle 1 to $1\frac{1}{2}$ times as long as deep. Scales with radiating and anastomosing canals, $23-25\frac{4\frac{1}{3}}{3\frac{1}{2}}$, 2 between lateral line and base of ventral.

Colour (of preserved specimens), bright silvery, brownish on the back; a dark spot on caudal peduncle, sometimes extending as a streak along median rays of caudal; a fainter dark spot above lateral line behind gill-openings.

One specimen, 157 mm. in length from Bulawayo, Rhodesia.

Two specimens 98 mm. 87 mm. in length respectively, from Ummiati River, Rhodesia; Mr. Mennell. Bulawayo Museum.

One specimen, 121 mm. in length, from Malalane, Transvaal; Rev. Rogers.

Numerous specimens from the Sabi River, Transvaal.

It is also reported from the Congo and Rovuma to the Quanza and Limpopo Rivers.

ALESTES LATERALIS, Blgr.

Alestes lateralis, Bouleng., Ann. Mus. Congo, Zool., i., p. 130, pl. xlvi., fig. 2 (1900), and Poiss. Bass. Congo, p. 153, 1901, and Cat. Fresh. Fish. Africa, i., p. 204 (1909).

Teeth, 16 in upper jaw ($\frac{8}{3}$), 10 in lower ($\frac{5}{3}$). Depth of body a little more than $3\frac{1}{2}$ times in total length excluding caudal, length of head $4\frac{1}{3}$ times. Head $1\frac{2}{3}$ times as long as deep, $\frac{1}{2}$ as broad as deep;

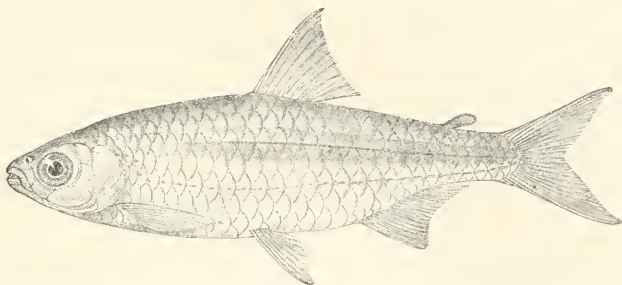


FIG. 14.—*Alestes lateralis*. $\frac{1}{5}$.

upper profile straight; snout $3\frac{1}{3}$ times in length of head, lower jaw projecting beyond upper; diameter of eye $3\frac{1}{3}$ times in length of head and $1\frac{1}{3}$ times in interorbital width, adipose lid feebly developed; length of lower border of 2nd suborbital about equals diameter of eye; maxillary reaches to vertical of nostrils. Gill-rakers long and closely set, about 25 on lower part of anterior arch.

Dorsal ii 8; originates above origin of ventral and is slightly nearer to base of caudal than to point of snout; longest ray about equals length of head. Anal iii 16. Pectoral nearly $\frac{9}{10}$ length of head, does not reach to ventral. Caudal forked, with pointed lobes; caudal peduncle $1\frac{2}{3}$ times as long as deep. Scales, with a tubular canal crossing them lengthways, on the back the scales have radiating canals, $33\frac{5}{4}$; $2\frac{1}{2}$ rows of scales between lateral line and base of ventrals, 12 rows round caudal peduncle.

Colour (of preserved specimen), dark above, silvery below; with a dark lateral band from head extending on to middle rays of caudal

where it becomes quite black; top of head chestnut-brown; dark specks on dorsal and caudal fins.

One specimen, 103 mm. in length, from Kafue River, Upper Zambezi (J. Drury). The specimen closely resembles *A. lateralis*, but the depth of the body does not equal the length of the head.

It is also reported from Katanga (Lake Dilolo), Zululand and Natal.

4. MICRALESTES.

Brachyalestes, part., Günth., Cat. Fish, v., p. 314 (1864).

Micralestes, Bouleng., Ann. Mus. Congo, Zool., i., p. 87 (1889).

Teeth pluricuspid, simply compressed, in 2 series in the upper jaw. Dwarfed *Alestes*.

Key to Species.

Dorsal originating above base of ventrals.

A. iii 16-17; scales 28-30; gill-rakers 12-15; inner premaxillary teeth inserted immediately behind outer 1. *M. acutidens*.

Dorsal originates immediately behind vertical of base of ventrals.

A. iii 15-17; scales 28-30; gill-rakers 14 2. *M. humilis*.

MICRALESTES ACUTIDENS, Peters.

Alestes acutidens, Peters, Mon. Berl. Ak., 1852, p. 276.

Brachyalestes acutidens, Günth., Cat. Fish. v., p. 316 (1864).

Micralestes acutidens, Bouleng., Ann. Mus. Congo, Zool., i., p. 87 (1899), and Cat. Fresh. Fish. Africa, i., p. 224 (1909).

Teeth, 14 in upper jaw ($\frac{9}{2}$), 10 in lower ($\frac{8}{2}$); inner premaxillary teeth inserted directly behind the outer. Depth of body equals, or

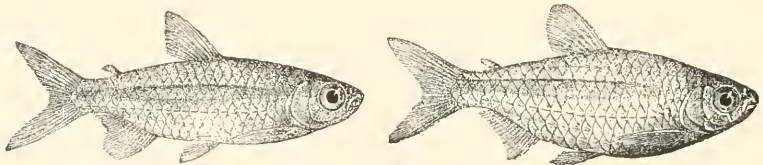


FIG. 15.—*Micralestes acutidens*.

nearly equals, the length of head, and is $3\frac{3}{4}$ to $4\frac{1}{2}$ times in total length excluding caudal. Head 2 to $2\frac{1}{3}$ times as long as broad, a little longer than deep, with nearly straight upper profile; lower jaw slightly longer than upper; snout $\frac{3}{2}$ to $\frac{4}{5}$ diameter of eye, which is $2\frac{3}{4}$ to $3\frac{1}{4}$ times in length of head and slightly longer than interorbital width; lower border of 2nd suborbital not longer than eye; maxillary

reaches almost to vertical of anterior border of eye. Gill-rakers short, 12 to 15 on lower part of anterior arch.

Dorsal ii-iii 8; originating above base of ventrals, sometimes slightly in advance or behind, and midway between point of snout, nostrils, or anterior margin of eye and base of caudal; longest ray $\frac{2}{3}$ to nearly as long as head. Anal iii 16-17. Pectoral about $\frac{9}{10}$ length of head, not reaching base of ventrals. Caudal peduncle $1\frac{2}{3}$ times to twice as long as deep. Scales 28-30 $\frac{4\frac{1}{2}}{3\frac{1}{3}}$, 2 between lateral line and base of ventral.

Colour (of preserved specimens), silvery; a darkish silvery lateral band on body; distal extremity of dorsal black.

Numerous specimens ranging from 42 to 65 mm. in length, from Sabi River, Transvaal; Major J. Stevenson Hamilton.

One specimen, 49 mm. in length, from Lydenburg district, Transvaal.

Four specimens, ranging from 51 to 59 mm. in length, from Dwaars River, Transvaal.

It is also reported from the Nile, Omo, Niger, Congo, Zambezi, and Limpopo.

MICRALESTES HUMILIS, Blgr.

Bouleng., Ann. Mus. Congo, Zool., i., p. 87, pl. xxxvi., fig. 4 (1899);

Poiss. Bass. Congo, p. 161 (1901); and Cat. Fresh. Fish. Africa, i., p. 226 (1909).

Teeth, 14 in upper jaw ($\frac{4}{2}$), 10 in lower ($\frac{8}{2}$). Depth of body $3\frac{1}{10}$ to $3\frac{7}{10}$ times in total length excluding caudal, length of head about

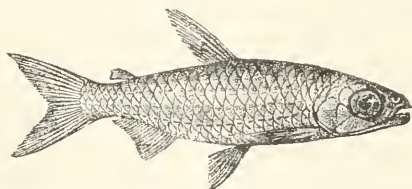


FIG. 16.—*Micralestes humilis*.

4 times. Head twice to $2\frac{1}{4}$ times as long as broad, $1\frac{1}{3}$ times as long as deep; snout $\frac{2}{3}$ to $\frac{1}{3}$ diameter of eye, which is $2\frac{2}{3}$ to 3 times in length of head and equals or slightly exceeds interorbital width; maxillary reaches nearly to vertical of anterior border of eye. Gill-rakers short, 14 on lower part of anterior arch.

Dorsal ii 8; originates immediately behind base of ventral and nearer to root of caudal than to point of snout; longest ray $\frac{4}{5}$ to nearly same length as head. Anal iii 15-17. Pectoral $\frac{4}{5}$ to nearly same length as head, not reaching ventral. Caudal deeply forked, lobes pointed; caudal peduncle $1\frac{1}{3}$ to $1\frac{2}{3}$ times as long as deep. Scales 28-30 $\frac{4\frac{1}{2}}{3\frac{1}{2}}$; 2 rows of scales between lateral line and base of ventrals. Scales with a duct along centre.

Colour (of preserved specimens), silvery, dark above, with a broad silvery lateral band; extremity of dorsal fin black.

Seven specimens, ranging from 38 mm. to 58 mm. in length, from Maromba River, a tributary of the Zambezi River (A. Stephenson).

6. DISTICHODUS.

Müll. and Trosch., *Hor. Ichthyol.*, i., p. 12 (1845).

"Mouth small, inferior or sub-inferior; teeth small, bicuspid, usually in two series on each jaw, no teeth on maxillary; nostrils close together, separated by valvular flap; gill-membranes attached to isthmus. Dorsal with 16-27 rays. Body strongly compressed."

A small or moderately large adipose dorsal fin. Small scales cover the whole or the greater part of the caudal and adipose dorsal fins.

* DISTICHODUS MOSSAMBICUS, Peters.

Peters, *Mon. Berl. Ac.*, 1852, p. 275; and *Reise Mossamb.*, iv., p. 71, pl. xiii., fig. 1 (1868); and Bouleng., *Cat. Fresh. Fish. Africa*, i., p. 268 (1909).

"Teeth in one or two series in each jaw, those of the inner series, if present, very small; 14-18 teeth in outer series. Depth of body $2\frac{2}{3}$ to 3 times in total length, length of head $3\frac{1}{2}$ to $4\frac{1}{2}$ times. Head longer than deep, 2 to $2\frac{1}{3}$ times as long as broad; snout feebly compressed, rounded, but little shorter than postocular part of head, about $1\frac{1}{2}$ times diameter of eye, which is 4 to $4\frac{1}{2}$ times in length of head; interorbital width $2\frac{1}{2}$ to 3 times in length of head; maxillary not extending to below nostrils.

Dorsal 23-27 (4 unbranched), equally distant from occiput and from caudal, its base twice as long as its distance from adipose fin. Anal 14-16 (4 unbranched), its base much shorter than that of dorsal. Pectoral shorter than head. Caudal forked, with obtusely pointed lobes; caudal peduncle deeper than long. Scales 67-70 $\frac{13-14}{16}$, 11 or 12 between lateral line and root of ventral.

Colour silvery, olive-brown on the back; 6 or 7 very indistinct dark bars on the body, not extending much below lateral line; dorsal with dark dots.

Total length, 300 mm.

Habitat: Zambezi, Shiré River; Loangwa River, N.W. Rhodesia."

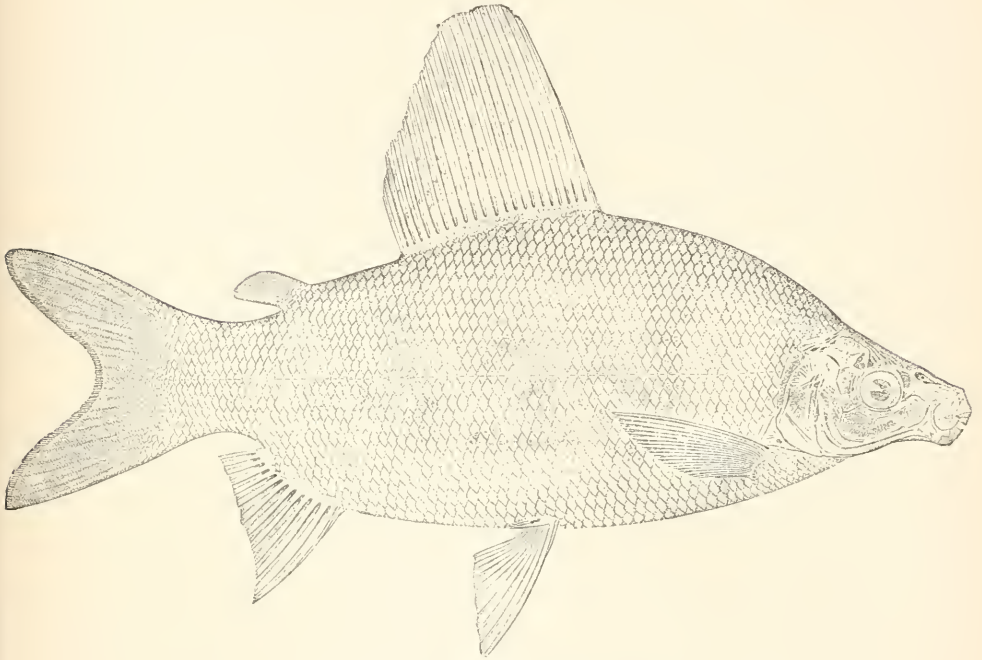


FIG. 17.—*Distichodus mossambicus*. $\frac{1}{2}$.

FAMILY CYPRINIDÆ.

Synopsis of Genera.

A. Anal with not more than 7 branched rays.

Suborbitals narrow, not covering the cheek; lateral line running along the middle or nearly the middle of the side of the caudal region of the body.

Mouth inferior, with much-developed lips forming a sort of sucker and furnished on the inner side with a sharp cutting-edge covered with a horny sheath; dorsal fin originating well in advance of the ventrals 1. *Labeo*.

Mouth inferior, without lips, the lower jaw completely exposed and showing a sharp cutting-edge covered with a horny sheath; dorsal fin originating above or a little in advance of the ventrals. 2. *Varicorhius*.

Mouth terminal or inferior, with more or less developed lips, with or without a sharp edge; dorsal fin originating above, or a little behind, or a little in advance of ventrals 3. *Barbus*.

B. Anal with 10 or more branched rays.

Suborbitals large, covering the cheek; lateral line on lower part of caudal peduncle.

Dorsal fin originating in advance of origin of anal; belly, in front of ventrals, rounded 4. *Barilius*.

Dorsal fin originating above or a little behind origin of anal; belly, in front of ventrals, rounded 5. *Engraulicypris*.

1. LABEO.

Labeo, Règne Anim., ii., p. 194 (1817); Cuv. and Val., Hist. Poiss. xvi., p. 335 (1842); Heckel, Russegger's Reise, ii., p. 1024 (1843); Günth., Cat. Fish., vii., p. 45 (1868); Bouleng., Poiss. Bass. Congo, p. 209 (1901); Fish. Nile, p. 160 (1907); and Cat. Fresh. Fish. Afr., i., p. 300 (1909).

Abrostomus, A. Smith, Ill. Zool. S. Africa, Fish. (1841).

Tylognathus, Heckel, t.c., p. 1027; Günth., t.c., p. 62.

Rohitichthys, Bleek., Atlas Ichthyol., iii., p. 25 (1863).

"Body more or less compressed, covered with small, moderate, or large scales. Lateral line equally distant from the back and from the belly or a little nearer the latter. Mouth moderate or large, protractile, inferior, with more or less developed lips forming a sort of sucker and furnished on the inner side with a sharp cutting edge covered with a horny layer; barbels present or absent. Sub-orbitals not covering the cheek. Dorsal fin with 11 to 26 rays, 8-23 of which are branched, originating in advance of the ventrals. Anal short, with 7 to 8 rays. A scaly process at base of ventrals. Pharyngeal teeth in three series . . . with the crowns spoon-shaped and close together.

Southern Asia and Africa."

Key to Species.

A. Barbels absent, or one on each side.

(a) Transverse plicæ on lips.

1. Dorsal fin with concave or notched upper edge.

D. iv 9, Sc. 83²⁰/₃₀, 16, 32; eye lateral 1. *L. seeberi*, Gilchr. and Thomp.

- D. iii 10 (rarely 9 or 11), Sc. $40 \frac{6\frac{1}{2}}{7\frac{1}{2}}$, 4, 16,
 (rarely 18); eye supero-lateral 2. *L. forskalii*, Rüpp.
- D. iii 10, Sc. 38-39 $\frac{5-6\frac{1}{2}}{6-8\frac{1}{2}}$, 4-5, 18-20; eye
 supero-lateral; caudal peduncle $1\frac{1}{8}$ to $1\frac{1}{4}$
 as long as deep; anal iii 5 3. *L. cylindricus*, Peters.
- D. iii 10, Sc. 36-39 $\frac{6\frac{1}{2}}{6\frac{1}{2}}$, 4-5, 16-20; eye nearly
 perfectly lateral; caudal peduncle scarcely
 longer than deep; anal ii 5 4. *L. darlingi*, Blgr.
- D. iii 9, Sc. 35 $\frac{4\frac{1}{2}}{7\frac{1}{2}}$, $3\frac{1}{2}$, 14; eye supero-lateral 5. *L. parvulus*, n. sp.

2. Dorsal fin with straight or convex upper edge.

- D. iv 11, Sc. 38-39 $\frac{5\frac{1}{2}}{6\frac{1}{2}}$, $4\frac{1}{2}$, 16; dorsal edge con-
 vex; caudal peduncle as long as or a little
 longer than deep 6. *L. congoro*, Peters.
- D. iii 11, Sc. 36-38 $\frac{6\frac{1}{2}-7\frac{1}{2}}{7-7\frac{1}{2}}$, 4-5, 18; dorsal edge
 straight or feebly concave; caudal peduncle
 deeper than long 7. *L. rubropunctatus*, n. sp.

(b) No transverse plicæ on lips.

1. Dorsal fin with notched upper edge.

- D. iii 9, Sc. 40-41 $\frac{8\frac{1}{2}-9\frac{1}{2}}{8\frac{1}{2}}$, $4-4\frac{1}{2}$, 20-21 8. *L. ruddi*, Blgr.
- D. iii 11, Sc. 38-39 $\frac{6\frac{1}{2}}{7\frac{1}{2}}$, 5, 18 9. *L. roseæ*, Stndr.

2. Dorsal fin with convex upper edge.

- D. iii-iv 11-13, Sc. 36-39 $\frac{5\frac{1}{2}-6\frac{1}{2}}{6\frac{1}{2}-7\frac{1}{2}}$, $3\frac{1}{2}-4\frac{1}{2}$, 16-18. 10. *L. altivelis*, Peters.

B. Two barbels on each side.

- D. iii 9, Sc. 43 $\frac{8\frac{1}{2}}{9\frac{1}{2}}$, $6\frac{1}{2}$, 20 11. *L. rubromaculatus*, n. sp.
- D. iii 10-11, Sc. 44-50 $\frac{8\frac{1}{2}-9\frac{1}{2}}{10\frac{1}{2}-11\frac{1}{2}}$, 6-7, 20-24 12. *L. capensis*, A. Smith.
- D. iv 10-11, Sc. 58-65 $\frac{13\frac{1}{2}-15\frac{1}{2}}{15\frac{1}{2}-16\frac{1}{2}}$, 9-10, 30-34 13. *L. umbratus*, A. Smith.
- D. iii 9, Sc. 60 $\frac{11\frac{1}{2}}{13\frac{1}{2}}$, $7\frac{1}{2}$, 28 14. *L. steningi*, n. sp.

1. LABEO SEEBERI, Gilchr. and Thomp.

Ann. and Mag. Nat. Hist., viii., 1911, p. 477.

Depth of body nearly 5 times in total length excluding caudal, length of head $4\frac{1}{2}$ times; width of head nearly $\frac{2}{3}$ its length. Snout prominent, projecting, rounded and slightly pointed, longer than postocular part of head and $2\frac{1}{10}$ times in length of head; eye lateral,

nearer gill-opening than to point of snout, 7 times in length of head and $3\frac{1}{5}$ times in interorbital width; width of mouth, with lips, a little more than $\frac{1}{2}$ length of head; lips well developed, with transverse plicæ on inner surface, fringed with papillæ, the lower lip with prominent papillæ scattered on it and festooned on lower edge; rostral flap fringed; no visible barbel.

Dorsal iv 9; nearly equidistant from nostril and base of caudal, upper border emarginate, longest branched ray about $\frac{4}{5}$ length of head. Anal iii 5; does not reach to base of caudal. Pectoral $\frac{4}{5}$ length of head; does not reach to ventral which is inserted below

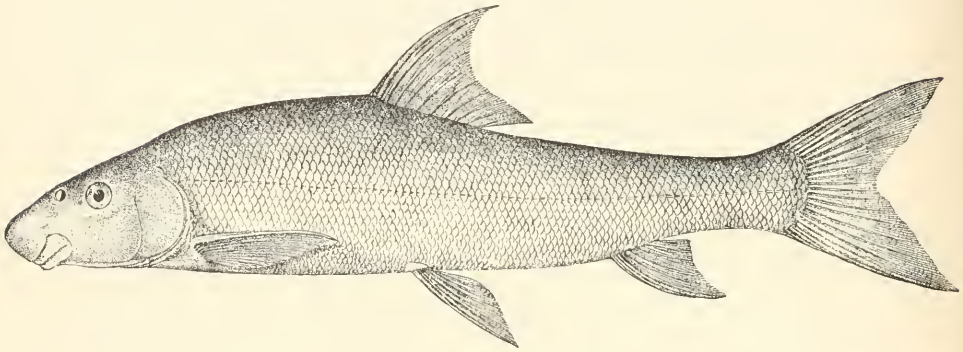


FIG. 18.—*Labeo seeberi*. $\frac{5}{12}$.

4th branched ray of dorsal. Caudal deeply forked, the lower lobe pointed and longer than upper; caudal peduncle nearly twice as long as deep. Scales 83, lat. tr. $\frac{2}{3}0$; 16 rows between lateral line and root of ventral; about 32 round caudal peduncle.

Colour (of preserved specimen), dark bluish brown above, light-coloured on belly; body covered with minute dark spots.

One specimen, 268 mm. in length, from Olifants River, Transvaal (Dr. Seeber).

2. LABEO FORSKALII, Rüpp.

Cyprinus niloticus, var. *b*, Forskäl., Deser. Anim., p. 71 (1775).

Labeo forskalii, Rüpp., Mus. Senckenb., ii., p. 18, pl. iii., fig. 1 (1835); Cuv. and Val., Hist. Poiss., xvi., p. 343 (1842); Heckel, Russegger's Reise Egypt., iii., p. 301, pl. xx., fig. 2 (1846); Bouleng., Fish. Nile, p. 176, pl. xxvii., fig. 2, and pl. xxxi., fig. 3 (1907), and Cat. Fresh. Fish. Afr., i., p. 329, fig. 248 (1909).

Labeo forskalii, part., Günth., Cat. Fish., vii., p. 50 (1868), and Petherick's Trav., ii., p. 260 (1869).

Body more or less compressed, its depth $3\frac{9}{10}$ times in total length excluding caudal, length of head $4\frac{1}{10}$ times; width of head nearly $\frac{2}{3}$ its length. Snout rounded, strongly projecting, more or less swollen, with a curved transverse groove upon it, $\frac{1}{2}$ length of head; eye supero-lateral, 5 times in length of head; interorbital width nearly $\frac{1}{2}$ length of head; width of mouth $\frac{2}{5}$ length of head; lips well developed, the upper straight-edged, the lower more or less expanded, bordered in front with a feeble row of papillæ and festooned on its posterior border; the inner surface of both lips with small papillæ forming transverse plicæ; rostral flap large, completely

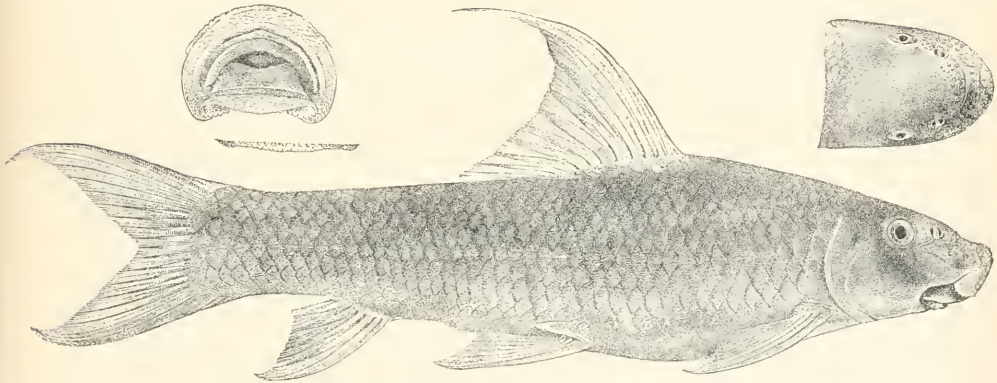


FIG. 19.—*Labeo forskalii*. $\frac{1}{2}$.

detached at sides and its lower border feebly denticulated; barbel minute and more or less hidden under folds of skin; crater-like scars of tubercles on snout.

Dorsal iii 10; equally distant from eye and from root of caudal, upper border concave; last simple ray and first branched ray produced and about twice as long as head. Anal iii 5; reaching caudal $\frac{3}{10}$ length of head. Pectoral slightly longer than head, not reaching ventral, the first ray of which falls below 4th branched ray of dorsal. Caudal deeply emarginate, crescentic when fully spread out; caudal peduncle as long as deep. Scales $40\frac{6\frac{1}{2}}{7\frac{1}{2}}$, 4 between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimen), brown, dark above, yellowish beneath; scales dark in the centre.

One specimen, 185 mm. in length, from Victoria Falls, Zambezi River (F. W. Sykes).

It is also reported from the Lower Nile to the upper tributaries of the Blue Nile.

3. LABEO CYLINDRICUS, Peters.

Labeo cylindricus, Peters, Mon. Berl. Ac., 1852, p. 684, and Reise Mossamb., iv., p. 47, pl. x., fig. 1 (1868); Bouleng., Cat. Fresh. Fish. Africa, i., p. 331 (1909).

Tylognathus cantini, Sauv., Bull. Soc. Philom. (7), vi., 1882 p. 175.

Body slightly compressed; its depth $3\frac{1}{5}$ to $3\frac{3}{4}$ times in total length excluding caudal, length of head 4 to 5 times; width of head $\frac{2}{3}$ to

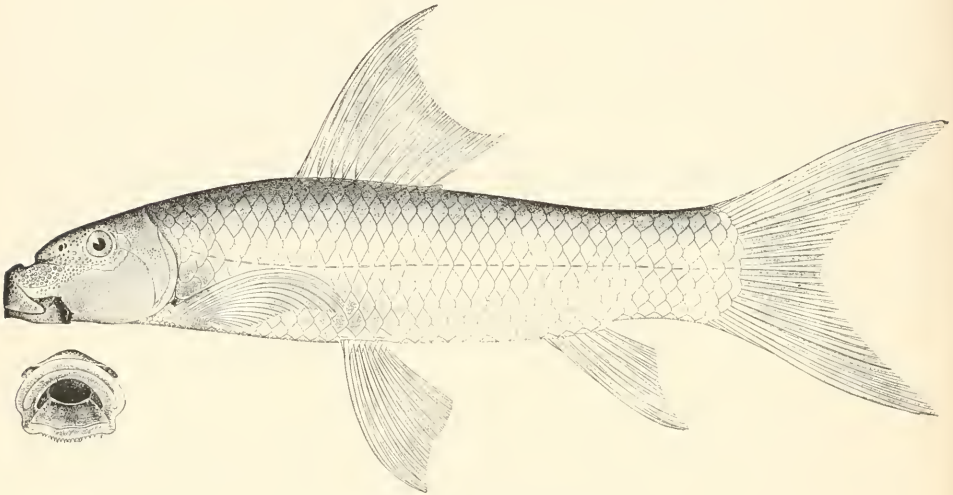


FIG. 20. — *Labeo cylindricus*. $\frac{1}{2}$.

$\frac{3}{4}$ its length; snout about $\frac{1}{2}$ length of head, strongly projecting beyond mouth, more or less swollen and pointed at extremity, ending in some specimens with a more or less turned-up appendage with a transverse groove behind it; eye supero-lateral, $5\frac{1}{3}$ to 7 times in length of head, situated nearer to gill-opening than to point of snout; interorbital width $\frac{2}{3}$ to $\frac{1}{2}$ length of head; lips well developed, the upper lip straight edged the lower with a fringe of papillæ and the border more or less festooned, inner surface of lips with transverse plicæ; rostral flap large, completely detached at sides, its edge

more or less denticulated; no barbel visible; crater-like scars of horny tubercles on snout and across it in front of nostrils and below anterior part of eye.

Dorsal iii 10; situated nearer to nostrils than to base of caudal, upper edge concave, longest branched ray about same length or slightly shorter or longer than head. Anal iii 5; shorter than head and barely or not reaching to root of caudal. Pectoral slightly less to a little more than length of head, not reaching ventrals, which commence below 4th or 5th branched ray of dorsal. Caudal deeply notched; caudal peduncle $1\frac{1}{8}$ to $1\frac{1}{4}$ times as long as deep. Scales 38-39, lat. tr. $\frac{5-6\frac{1}{2}}{6-8\frac{1}{4}}$; 4-5 rows of scales between lateral line and base of ventral, 18-20 rows round caudal peduncle.

Colour (of preserved specimens), brown or slaty grey above, lightish below.

One specimen, 205 mm. in length, from Six-mile Spruit, Pretoria District, Transvaal. Pretoria Museum.

One specimen, 232 mm. in length, from Crocodile River, Transvaal. Pretoria Museum.

One specimen, 227 mm. in length, from Lydenburg District, ? Olifants River, Transvaal. Pretoria Museum.

Four specimens, ranging from 202-235 mm. in length, from Thabina and Letsikela Rivers, Zoutpansberg District, Transvaal.

Seven specimens, ranging from 223-240 mm. in length, from Magalies River, Transvaal.

Fourteen specimens, ranging from 140-212 mm. in length, from Sabi River, Transvaal; Major J. S. Hamilton.

This species is also reported from Abyssinia, East Africa to the Zambezi, Lakes Tanganyika and Nyassa.

4. LABEO DARLINGI, Blgr.

Bouleng., Proc. Zool Soc, 1902, ii., p. 13, pl. ii fig 1, and Cat. Fresh. Fish. Africa, i., p. 321 (1909).

“Body strongly compressed, its depth nearly equal to length of head and contained 4 times in total length. Head $1\frac{1}{2}$ times as long as broad; snout rounded, strongly projecting beyond mouth, with scars of small tubercles; eye nearly perfectly lateral, in middle of head, its diameter $4\frac{1}{2}$ times in length of head, $2\frac{1}{4}$ times in width of interorbital region, which is flat; width of mouth, with lips, $\frac{2}{3}$ that of head; rostral flap and anterior border of lip not denticulated; lower lip with a series of papillæ forming a denticulation; inner surface of lip with numerous transverse plicæ, formed of closely-

set obtuse papillæ; a minute barbel, hidden in folds at side of mouth.

Dorsal iii 10; with strongly notched upper border, equally distant from nostril or end of snout and from caudal; longest ray equal to or exceeding length of head. Anal ii 5; longest ray nearly as long as the head and reaching root of caudal. Pectoral as long as head, not reaching ventral. Ventral nearly reaching vent, 1st ray falling

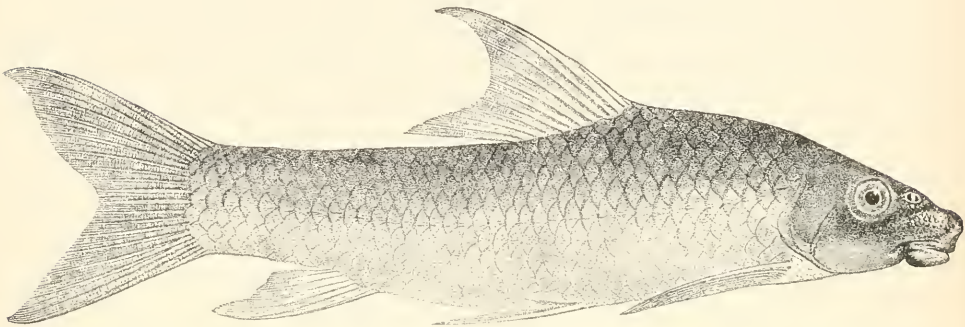


FIG. 21.—*Labeo darlingi*. $\frac{5}{7}$.

under 7th of dorsal. Caudal deeply forked; caudal peduncle scarcely longer than deep. Scales 36–39 $\frac{6\frac{1}{2}}{6\frac{1}{2}}$, 4–5 between lateral line and root of ventral, 16–20 round caudal peduncle.

Colour, olive-brown above, whitish beneath; fins dark.

Total length 160 mm.

Habitat: Southern Rhodesia (Mazoe River) and Limpopo (Olifants River) Systems.”

5. LABEO PARVULUS, n. sp.

Body compressed, its depth $4\frac{1}{3}$ times in total length excluding caudal, length of head $3\frac{9}{10}$ times. Width of head $\frac{2}{3}$ its length; snout swollen, prominent, projecting beyond mouth, $2\frac{1}{5}$ times in length of head; eye $4\frac{1}{10}$ times in length of head, supero-lateral, a little nearer to gill-opening than to point of snout, $1\frac{3}{4}$ times in interorbital width; width of mouth, with lips, twice in length of head; upper lip with feeble denticulations, inner surface with feeble transverse plicæ; lower lip with a row of papillæ on upper border, posterior border festooned; rostral flap detached at sides, feebly denticulated; anterior nostril with a flap. A single barbel on each side, $\frac{3}{10}$ diameter of eye, more or less concealed under folds of skin. A deep, curved, transverse

depression in front of nostrils, and behind it a line of pearl-like tubercles; a patch of similar tubercles, disposed in two rows of 4 and 2, on point of snout, with a similar patch adjoining on each side.

Dorsal iii 9; equally distant from nostrils and from root of caudal, border concave; longest ray slightly longer than head. Anal iii 5; not reaching caudal. Pectoral $\frac{4}{5}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal deeply forked, with acutely pointed lobes; caudal peduncle $1\frac{1}{3}$ times as long as deep. Scales $35\frac{4\frac{1}{2}}{7\frac{1}{2}}$, $3\frac{1}{2}$ between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimen), olive-brown, darker above than below: a yellowish patch on occiput and an orange blotch on throat

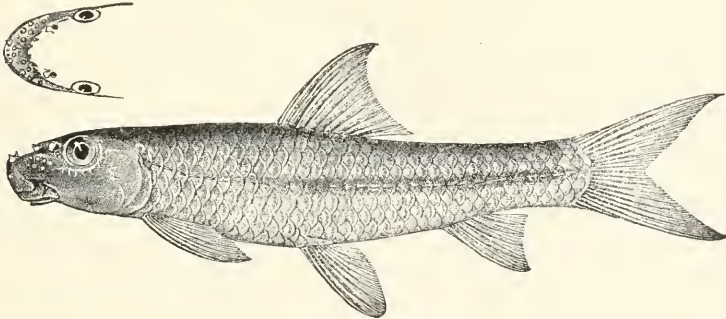


FIG. 22.—*Labeo parvulus*.

and on lower opercular border. In life a darkish lateral streak is said to be present.

One specimen, 72 mm. in length, from Crocodile River, Transvaal. (A. T. Cooke.) It is said to grow to about twice the size.

* 6. LABEO CONGORO, Peters.

Peters, Mon. Berl. Ac., 1852, p. 683, and Reise Mossamb., iv., p. 45, pl. ix. (1868); Bouleng., Cat. Fresh. Fish. Africa, i., p. 319 (1909).

“Body strongly compressed, its depth 3 to $3\frac{2}{3}$ times in total length. Head 4 to $4\frac{3}{4}$ times in total length in adult, 3 to 4 times in young, its width $\frac{3}{5}$ to $\frac{3}{4}$ its length; snout rounded, often more or less swollen, $\frac{2}{3}$ to $\frac{1}{2}$ length of head, at least as long as and often longer than postocular part of head; eye nearly perfectly lateral, $4\frac{1}{2}$ to 7 times in length of head in adult, 3 to 4 times in young;

interorbital width $\frac{1}{2}$ to $\frac{3}{5}$ length of head; width of mouth, with lips, 2 to 3 times in length of head; lips not distinctly fringed on the edge, with small papillæ forming transverse plicæ on inner side; rostral flap large, completely detached at the sides, its edge entire or feebly denticulate; a minute barbel, usually hidden under folds of skin; tubercles on the snout, or their crater-like scars, much developed in adult.

Dorsal iv 11; longest rays about $1\frac{1}{2}$ times length of head, equally distant from anterior or posterior border of eye and from caudal,

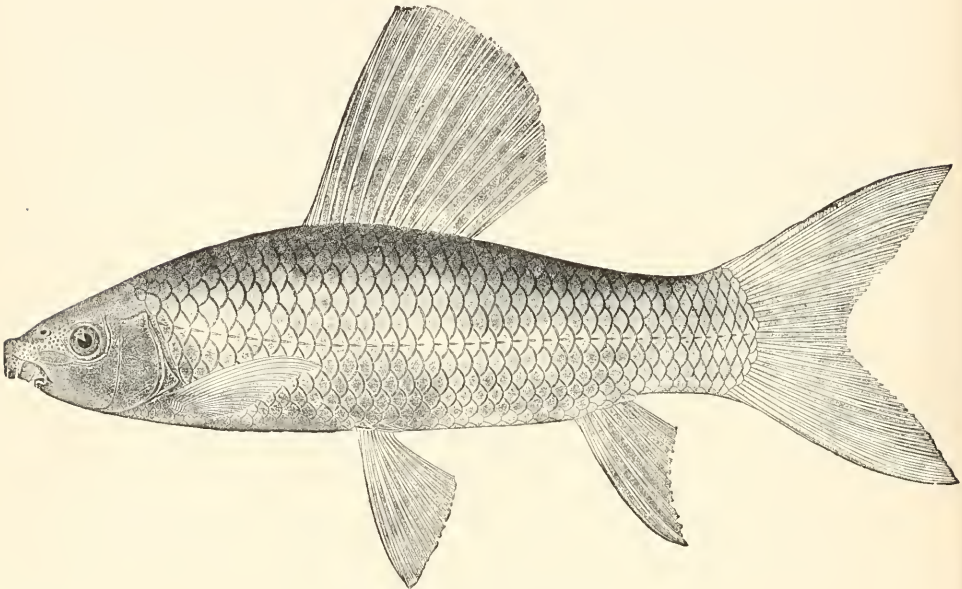


FIG. 23.—*Labeo congoro*. $\frac{1}{2}$.

upper edge more or less convex in adult. Anal iii 5; reaching root of caudal or beyond. Pectoral nearly as long as or a little longer than head, not reaching ventral, the first ray of which falls below 4th or 5th branched ray of dorsal. Caudal deeply emarginate; caudal peduncle as long as deep or a little deeper than long. Scales 38–39 $\frac{5\frac{1}{2}}{6\frac{1}{2}}$, $4\frac{1}{2}$ between lateral line and root of ventral, 16 round caudal peduncle.

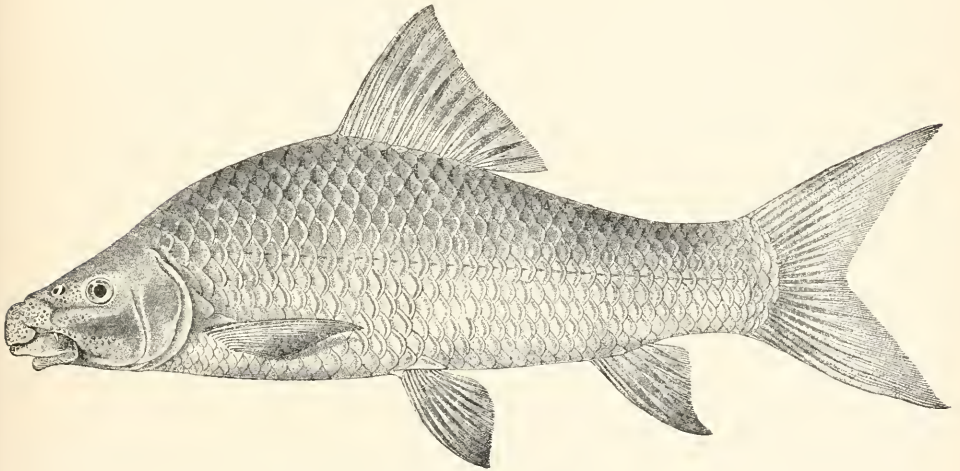
Colour, golden above, darker on the back, silvery white beneath dorsal bluish black, anal and caudal reddish black.

Total length, 330 mm.

Habitat: Zambezi."

7. LABEO RUBROPUNCTATUS, n. sp.

Body compressed; its depth 3 to $3\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{2}{10}$ to $4\frac{1}{10}$ times. Width of head $\frac{3}{5}$ to $\frac{2}{3}$ its length; snout rounded, swollen, strongly projecting, longer than postocular part of head and $\frac{2}{5}$ to $\frac{1}{2}$ length of head; eye perfectly lateral, situated in posterior half of head, 5 to 7 times in length of head; interorbital width $\frac{1}{2}$ to $\frac{2}{5}$ length of head; width of mouth, with lips, 2 to 3 times in length of head; lips with small papillæ forming transverse plicæ on inner side, upper lip not distinctly fringed on the edge, lower with papillæ on upper border and festooned on lower edge; rostral flap entire or very feebly denticulate, more or less

FIG. 24.—*Labeo rubropunctatus*. $\frac{2}{7}$.

detached at its sides; a small barbel, more or less hidden under folds of skin; tubercles on snout, or their crater-like scars, much developed in adult.

Dorsal iii 11; equally distant from nostrils or eye and from base of caudal, border feebly concave or straight; longest ray $\frac{9}{10}$ to $1\frac{1}{8}$ (in young) length of head. Anal iii 5; reaching to caudal. Pectoral $\frac{3}{4}$ to $\frac{2}{3}$ length of head, not reaching ventral, the first ray of which falls below 4th or 5th branched ray of dorsal. Caudal deeply emarginate, crescentic when spread out; caudal peduncle $1\frac{1}{10}$ to $1\frac{1}{4}$ as deep as long. Scales 36–38 $\frac{6\frac{1}{2}-7\frac{1}{2}}{7-7\frac{1}{2}}$, 4–5 between lateral line and ventral, 18 round caudal peduncle.

Colour (of preserved specimens), dark brown or bronze-green

above, lighter beneath. The specimens from Sabi River have more of a greyish tint and the scales (especially of the smallest) have a bright red spot or bar in the centre, forming longitudinal lines on the body. Fins dark; in two of the specimens the caudal has a white edge or border on inner margin of lobes.

Three specimens, 400 mm., 370 mm., 177 mm. in length respectively, from Sabi River, Transvaal; Major J. Stevenson Hamilton.

One specimen, 394 mm. in length, from Karino, Crocodile River, Transvaal (A. T. Cooke).

This species closely resembles *L. coubie*, from the Nile, but the dorsal and pectoral fins are smaller and the caudal peduncle deeper; the colouring also differs. Major J. Stevenson Hamilton writes in connection with the specimens sent by him from Sabi River that the fish clings "with its peculiar rubber-like mouth to rocks, usually at the side of deep and rather swift streams. So far as I know it will take no bait. I have plenty of opportunities of observing its habits from the top of the railway bridge here, and the specimens sent were secured by means of a rifle. I have never known them caught either by white men or natives. The local name is 'sucker,' significant of its habits."

8. LABEO RUDDI, Blgr.

Bouleng., Ann. and Mag. N.H. (7), xix., 1907, p. 392, and Cat. Fresh. Fish. Africa, i., p. 314 (1909).

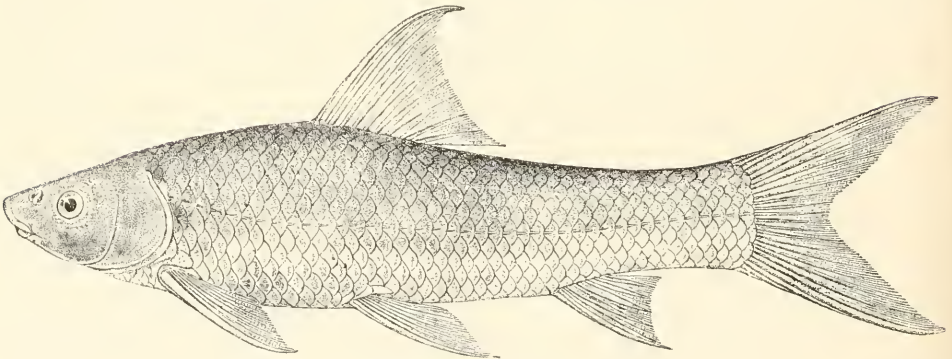


FIG. 25.—*Labeo ruddi*. $\frac{1}{2}$.

Body strongly compressed; its depth $3\frac{2}{3}$ to $4\frac{1}{10}$ times in total length excluding caudal, length of head $4\frac{3}{10}$ to $4\frac{1}{5}$ times; snout rounded, $\frac{1}{3}$ to $\frac{2}{5}$ length of head; interorbital width $\frac{1}{2}$ length of head;

eye lateral, $4\frac{1}{3}$ to $5\frac{2}{3}$ times in length of head; width of mouth, with lips, 3 to $3\frac{1}{3}$ times in length of head; both lips with a fringe of conical papillæ; edge of rostral flap entire; a small posterior barbel; no tubercles on snout.

Dorsal iii 9; equally distant from snout and base of caudal, upper edge concave, longest branched ray as long as or a little longer than head. Anal iii 5; not reaching caudal. Pectoral about as long as head, not reaching ventral, which is situated below middle of dorsal. Caudal deeply notched; caudal peduncle $1\frac{1}{5}$ to $1\frac{1}{4}$ times as long as deep. Scales 40–41, lat. tr. $\frac{8\frac{1}{2}-9\frac{1}{2}}{8\frac{1}{2}}$; 4 to $4\frac{1}{2}$ rows of scales between lateral line and base of ventral, 20–21 rows round caudal peduncle.

Colour (of preserved specimens), dark olive-brown above, whitish below; body and head covered with numerous dark specks.

Three specimens, 129 mm., 205 mm., 231 mm. in length respectively, from Dwaars River, Transvaal. Pretoria Museum.

9. LABEO ROSÆ, Stndr.

Labeo rosæ, Steind., Sitz. Ak. Wien, ciii., i., 1894, p. 457, pl. v., fig. 1; and Bouleng., Cat. Fresh. Fish. Afr., i., p. 312, fig. 234 (1909).

Labeo transvaalensis, Methuen, Ann. Trans. Mus., 1911, p. 251, cum fig.

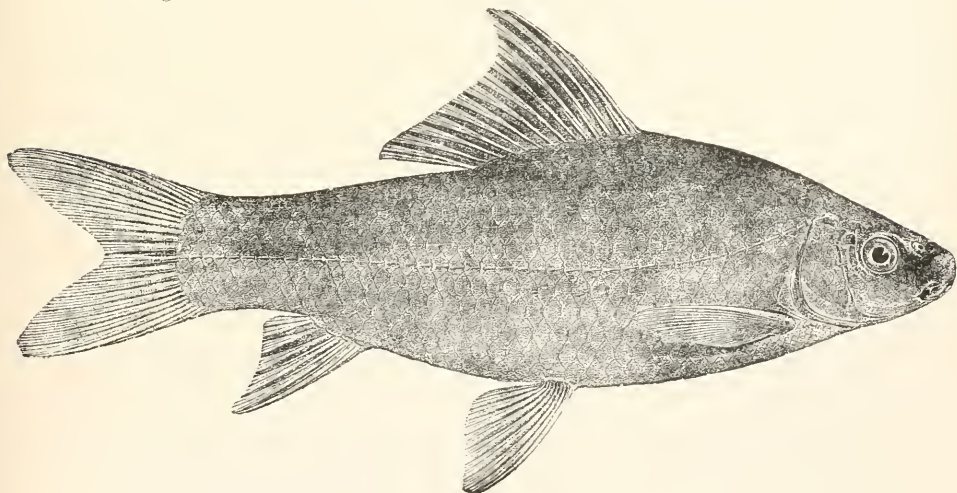


FIG. 26.—*Labeo rosæ*. 3.

Body strongly compressed, its depth 3 to $3\frac{1}{2}$ times in total length. Head $4\frac{2}{3}$ times in total length, its width nearly $\frac{3}{4}$ its

length; snout rounded; eye perfectly lateral, in middle of head, $4\frac{2}{5}$ times in length of head, $\frac{2}{5}$ interorbital width; width of mouth, with lips, 3 times in length of head; both lips with several rows of conical papillæ, the outer forming a fringe; edge of rostral flap entire with slight incipient crenulations; a minute barbel, more or less hidden under folds of skin; small tubercles or their crater-like scars on the snout.

Dorsal iii 12; equally distant from centre of eye and from caudal, notched, longest ray a little longer than head. Anal iii 5; nearly reaching root of caudal. Pectoral as long as head, not reaching ventral, the first ray of which falls below 3rd or 4th branched ray of dorsal. Caudal deeply notched, crescentic. Caudal peduncle as long as deep. Scales $39\frac{7}{7\frac{1}{2}}$, 5 between lateral line and root of ventral, 20 round caudal peduncle.

Colour, grey above, silvery white beneath.

One specimen, 245 mm. in length, from Crocodile River, Rustenburg District, Transvaal. Pretoria Museum.

It is also reported from the Limpopo System: Klein Letaba River, tributary of Olifants River, Transvaal.

* 10. *LABEO ALTIVELIS*, Peters.

Peters, Mon. Berl. Ac., 1852, p. 683, and Reise n. Mossamb., iv., p. 43, pl. viii. (1868); Bouleng., Cat. Fresh. Fish. Africa, i., p. 309 (1909).

“Body strongly compressed, its depth 3 to $3\frac{1}{4}$ times in total length. Head $1\frac{1}{2}$ to $1\frac{2}{3}$ times as long as broad, $4\frac{1}{2}$ to 5 times in total length; snout rounded, moderately prominent; eye perfectly lateral, in middle of head, 4 to 6 times in length of head; interorbital width $\frac{1}{2}$ to $\frac{2}{5}$ length of head; width of mouth, with lips, $2\frac{1}{2}$ to 3 times in length of head; both lips with several rows of papillæ, those of the outer row large and sub-conical, forming a strong fringe; edge of rostral flap entire; a minute barbel, hidden under folds of skin; tubercles on snout very small or absent.

Dorsal iii-iv 11-13; equally distant from head or eye and from caudal, its upper edge convex, longest rays $1\frac{1}{2}$ to $2\frac{1}{3}$ times length of head. Anal iii 5; reaching, or nearly reaching, root of caudal. Pectoral as long as head or slightly shorter, not reaching ventral, the first ray of which falls below 3rd or 4th branched ray of dorsal. Caudal deeply emarginate, crescentic. Caudal peduncle as long as deep, or a little deeper than long. Scales $36-39\frac{5\frac{1}{2}-6\frac{1}{2}}{6\frac{1}{4}-7\frac{1}{2}}$, $3\frac{1}{2}-4\frac{1}{2}$

between lateral line and root of ventral, 16-18 round caudal peduncle.

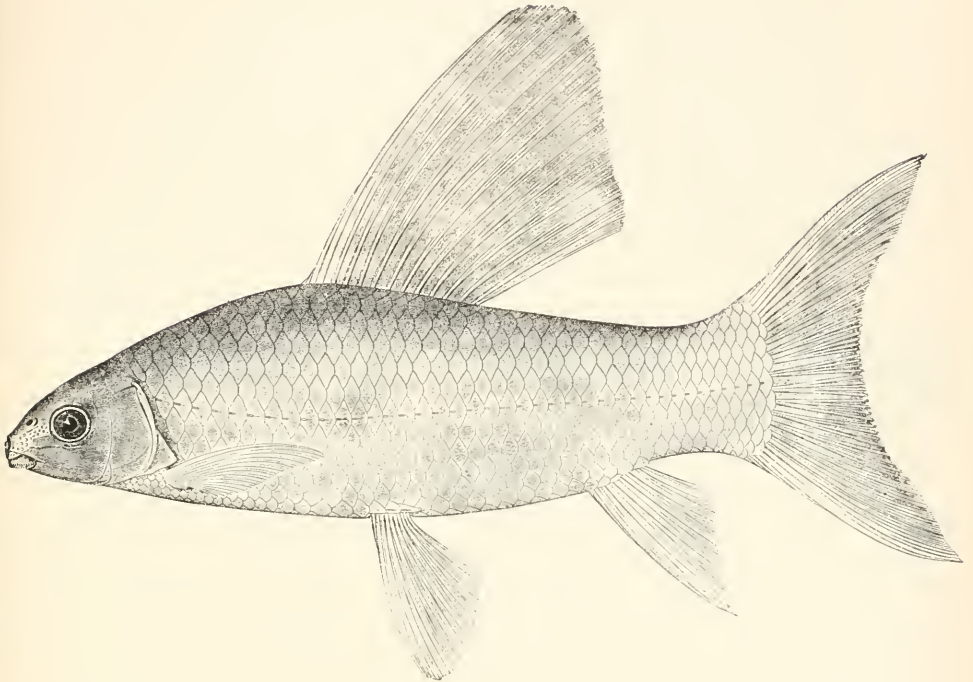


FIG. 27.—*Labeo altivelis*. $\frac{1}{2}$.

Colour, olive above, yellowish beneath, with or without pink streaks along the series of scales; fins grey.

Total length 400 mm.

Habitat: Zambezi; Nyassa; Lake Bangweu."

11. LABEO RUBROMACULATUS, n. sp.

Body compressed, its depth $3\frac{1}{2}$ times in total length excluding caudal, length of head $4\frac{2}{3}$ times. Head $1\frac{2}{3}$ times as long as broad; snout rounded, feebly extending beyond upper lip, longer than postocular part of head and $2\frac{1}{8}$ times in length of head; eye lateral, $6\frac{2}{3}$ times in length of head; interorbital width a little more than $\frac{1}{2}$ length of head; width of mouth, with lips, a little more than $\frac{2}{3}$ length of head; lips rather feebly developed, upper lip entire, lower feebly fringed with rounded papillæ and with the lower margin festooned; rostral flap with a denticulate fringe. Two barbels on

each side, the anterior $\frac{3}{8}$ diameter of eye, the posterior $\frac{5}{8}$. Dorsal profile nearly straight.

Dorsal iii 9; equally distant from nostrils and from root of caudal, border concave; longest ray nearly as long as head. Anal ii 5; not reaching caudal. Pectoral about as long as head, not reaching ventral; base of latter below 3rd or 4th branched ray of dorsal. Caudal deeply notched, crescentic, with pointed lobes;

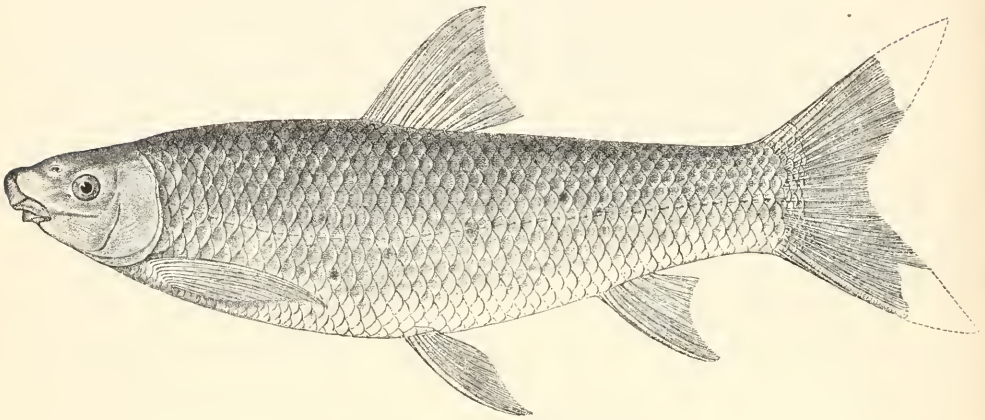


FIG. 28.—*Labeo rubromaculatus*. $\frac{5}{9}$.

caudal peduncle $1\frac{1}{10}$ times as long as deep. Scales $43\frac{8\frac{1}{2}}{9\frac{1}{2}}$, $6\frac{1}{2}$ between lateral line and root of ventral, 20 round caudal peduncle.

Colour (of preserved specimen), dark olive-brown above, silvery beneath; tail of a greenish tinge; scales dark at the base.

When alive, 6 or 8 gold-red spots are said to be present on the body, but these fade rapidly after death. The fish is reported to attain a length of 2 feet.

One specimen, 243 mm. in length, from M'fongosi, Zululand (W. E. Jones).

12. LABEO CAPENSIS, A. Smith.

Abrostomus capensis, A. Smith, Ill. Zool. S. Africa, Fish., pl. xii., fig. 2 (1841).

Labeo tenuirostris, Steind., Sitzb. Ak. Wien, ciii., i., 1894, p. 459, pl. v., fig. 2.

Labeo capensis, Bouleng., Ann. and Mag. N.H. (7), xii., 1903, p. 362, and Cat. Fresh. Fish. Africa, i., p. 340 (1909).

Body strongly compressed, its depth $3\frac{1}{4}$ to $4\frac{1}{4}$ times in total length excluding caudal, length of head 4 to 5 times. Head $1\frac{2}{5}$ to $1\frac{3}{5}$ times as long as broad; depressed, often very markedly so in larger specimens, the nape rising in a sharp curve; snout rounded, prominent, about equal to or slightly longer than postocular portion of head; eye lateral, 6 to 8 times in length of head; interorbital width $\frac{1}{2}$ to $\frac{2}{5}$ length of head; width of mouth, with lips, $\frac{1}{3}$ to $\frac{1}{2}$ length of head; lips moderately developed, fringed with rounded or conical papillæ and with transverse plicæ on inner surface; rostral flap more or less fringed; two barbels on each side, equal or unequal in length, the longest about equal to diameter of eye.

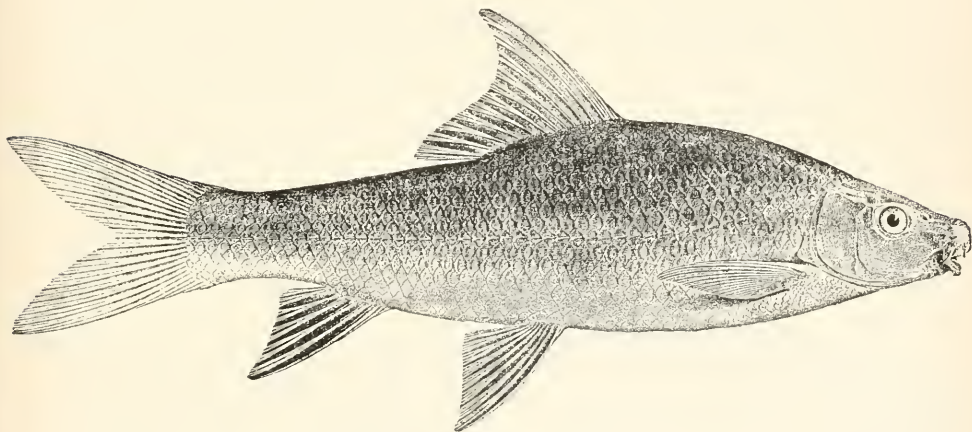


FIG. 29. —*Labeo capensis*. $\frac{1}{5}$.

Dorsal iii-iv 10-11; about equidistant between eye and base of caudal, upper edge concave, longest branched ray from a little less to a little longer than head. Anal iii 5; reaching or nearly reaching to base of caudal. Pectoral $\frac{9}{10}$ to the same length as head, not reaching to ventral which is inserted below middle or posterior half of dorsal. Caudal forked, with long pointed lobes; caudal peduncle $1\frac{1}{4}$ to $1\frac{3}{10}$ as long as deep. Scales 44-48, lat. tr. $\frac{8\frac{1}{2}-9\frac{1}{2}}{11-12\frac{1}{2}}$; $6\frac{1}{2}$ to $7\frac{1}{2}$ rows of scales between lateral line and root of ventral, 20 rows round caudal peduncle.

Colour (of preserved specimens), brown above, flesh colour on belly.

Four specimens, ranging from 178-218 mm. in length, from Zak River, Fraserburg, Cape Province (Mr. Jacobs).

Three specimens, ranging from 229–253 mm. in length, from Kimberley Reservoir, Cape Province.

Two specimens, 253 mm. and 323 mm. in length respectively, from Modder River, Cape Province.

One specimen, 306 mm. in length, from Crocodile River, Transvaal Province. Pretoria Museum.

Two specimens, 88 mm. and 123 mm. in length respectively, from Durban Museum.

One specimen, 438 mm. in length (locality unknown).

13. LABEO UMBRATUS, A. Smith.

Abrostomus umbratus, A. Smith, Ill. Zool. S. Africa, Fish., pl. xii., fig. 1 (1841).

Labeo umbratus, Bouleng., Ann. and Mag. N.H. (7), xii., 1903, p. 362, and Cat. Fresh. Fish. Africa, i., p. 339 (1909).

Body compressed, its depth $3\frac{2}{3}$ to $4\frac{2}{3}$ times in total length excluding caudal, length of head 4 to $4\frac{2}{3}$ times. Head $1\frac{2}{3}$ to $1\frac{1}{2}$ times as

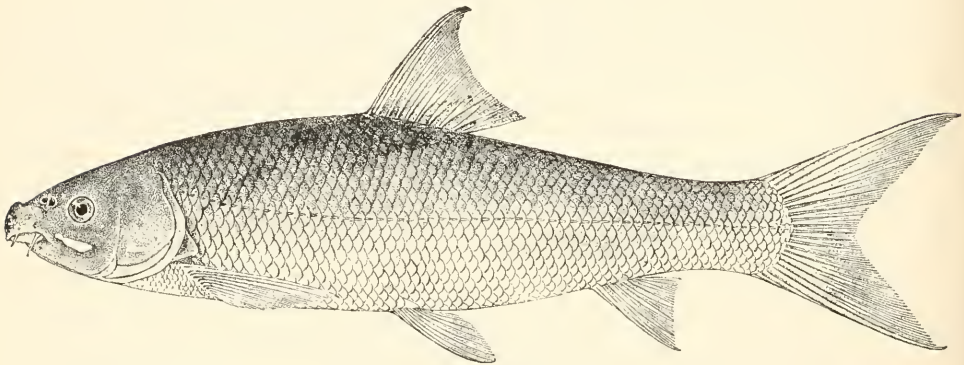


FIG. 30.—*Labeo umbratus*. $\frac{1}{2}$.

long as broad; snout rounded, feebly prominent, shorter than post-ocular portion of head, $2\frac{3}{4}$ to 3 times in length of head; eye lateral, $5\frac{1}{2}$ to nearly 6 times in length of head; interorbital width $\frac{1}{2}$ length of head; width of mouth, with lips, about $\frac{1}{3}$ length of head; lips rather feebly developed, with rounded or conical papillæ forming a fringe; two barbels on each side, about equal in length or the posterior one shorter, less than diameter of eye.

Dorsal iii 9; equidistant from nostril or eye and base of caudal, upper edge concave, longest branched ray $\frac{5}{8}$ to $\frac{9}{10}$ length of head. Anal iii 5; not reaching root of caudal. Pectoral $\frac{3}{4}$ to almost length

of head, not reaching ventral which is inserted below middle of dorsal. Caudal forked, with long pointed lobes; caudal peduncle $1\frac{1}{2}$ times to twice as long as deep. Scales 56-59, lat. tr. $\frac{12-14}{14\frac{1}{2}-16\frac{1}{2}}$; 9 to 10 rows of scales between lateral line and root of ventral, 30 rows round caudal peduncle.

Colour (of preserved specimens), brown above, yellowish below; scales on sides and upper part of body with numerous minute dark specks.

One specimen, 173 mm. in length, from Gamka River, Cape Province.

Three specimens, ranging from 158-171 mm. in length, from Grobelaars River, Cape Province.

Three specimens, ranging from 200-228 mm. in length, from Alice, Tyumi River, Cape Province.

14. LABEO STENNINGI, n. sp.

Depth of body $4\frac{2}{5}$ times in total length excluding caudal, length of head $4\frac{1}{10}$ times. Width of head a little more than $\frac{3}{5}$ its length; snout rounded and feebly projecting, shorter than postocular portion of head and $2\frac{7}{10}$ times in length of head; eye lateral, nearer to point of snout than to gill-opening, $6\frac{1}{7}$ times in length of head and nearly $3\frac{1}{2}$

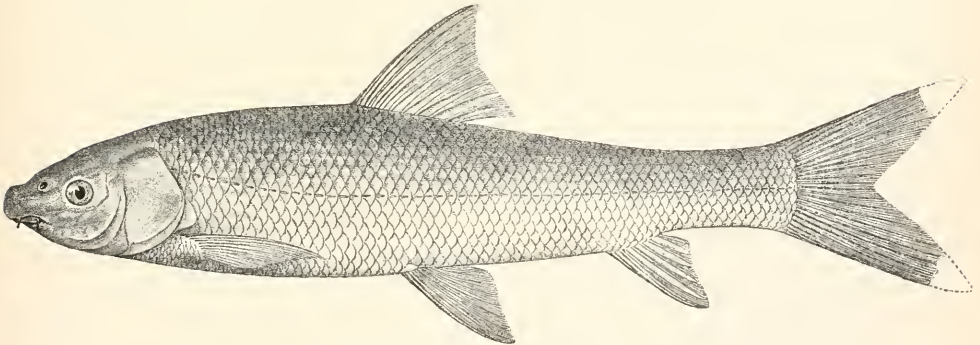


FIG. 31.—*Labco stenningi*. $\frac{3}{9}$.

times in interorbital width; mouth small, its width, with lips, $\frac{3}{10}$ length of head; lips feebly developed, upper lip with a short fringe of papillæ on upper edge, lower lip with a fringe of papillæ on lower margin; rostral flap entire, slightly emarginate. Two inconspicuous barbels on each side, posterior slightly longer than anterior and slightly more than $\frac{1}{4}$ diameter of eye.

Dorsal iii 9; equidistant from nostrils and from root of caudal, upper border slightly concave; longest branched ray $\frac{4}{5}$ length of head. Anal iii 5; not reaching caudal. Pectoral nearly $\frac{3}{4}$ length of head, not reaching ventral; base of latter below 4th branched ray of dorsal. Caudal deeply forked; caudal peduncle $1\frac{5}{6}$ times as long as deep. Scales radiately striated $60\frac{11\frac{1}{2}}{13\frac{1}{2}}$, $7\frac{1}{2}$ between lateral line and root of ventral, 28 round caudal peduncle.

Colour (of preserved specimen), silvery, dark above, lighter below the lateral line.

One specimen, 190 mm. in length, from Potchefstroom, Transvaal (Mr. Stenning).

2. VARICORHINUS.

Rüpp., Mus. Senckenb., ii., p. 21 (1837); Bouleng., Fish. Nile, p. 190 (1907).

"Body strongly compressed, covered with small, moderate, or large scales. Lateral line nearer the belly than the back, but running along the middle of the caudal peduncle. Mouth large, inferior, transverse, feebly protractile, without lips, the upper jaw partly covered by a rostral fold, the lower completely exposed and showing a sharp cutting-edge covered with a horny sheath; barbels absent or present. Sub-orbitals not covering the cheek. Dorsal fin with or without ossified ray, with 11-14 rays, 8-11 of which are branched. Anal fin short, with 7 or 8 rays. Pharyngeal teeth in three series . . . with spoon-shaped crowns, which may be close together as in *Labeo* or more wide apart as in *Barbus*.

South-Western and Central Asia, and Africa."

Key to Species.

A. With two barbels on each side.

D. iv 9; Sc. $30\frac{2}{3}$; last simple ray ossified 1. *V. bruchii*.

B. Barbels absent.

D. iii 8-9; Sc. $34-35\frac{5\frac{1}{2}-6}{6-6\frac{1}{2}}$; no ossified ray 2. *V. nelspruitensis*.

1. VARICORHINUS BRUCHI, Blgr.

Bouleng., Proc. Zool. Soc., 1907, p. 310, pl. xix., and Cat. Fresh. Fish. Africa, i., p. 354 (1909).

Depth of body $3\frac{1}{5}$ to $3\frac{3}{5}$ times in total length excluding caudal, length of head $4\frac{1}{10}$ to $4\frac{1}{5}$ times. Snout rounded, prominent, broader than long, about $\frac{1}{3}$ length of head; eye lateral, 4 to $5\frac{1}{5}$ times in length of head, $2\frac{1}{5}$ to $2\frac{3}{4}$ times in interorbital width ($1\frac{1}{5}$ to $1\frac{3}{4}$ times in young);

mouth feebly curved, its width $\frac{1}{3}$ to $\frac{1}{2}$ length of head; two barbels on each side, the posterior being the longer and equal to, or slightly greater or less than, diameter of eye. The largest specimen has conical tubercles on head, which are not apparent in the smaller specimens.

Dorsal iv 9; last simple ray strong, bony, not serrated, its rigid part $\frac{2}{3}$ to $\frac{4}{5}$ length of head; border of fin concave; longest branched ray a little shorter than or equal to length of head. Anal iii 5; not reaching or barely reaching base of caudal. Pectoral a little shorter than or equal to head, not reaching ventral which is inserted below middle of dorsal. Caudal deeply forked, with pointed lobes; caudal peduncle $1\frac{1}{2}$ to $1\frac{3}{5}$ times as long as deep. Scales 28-32, lat. tr. $\frac{4\frac{1}{2}-5\frac{1}{2}}{4\frac{1}{2}-6}$;

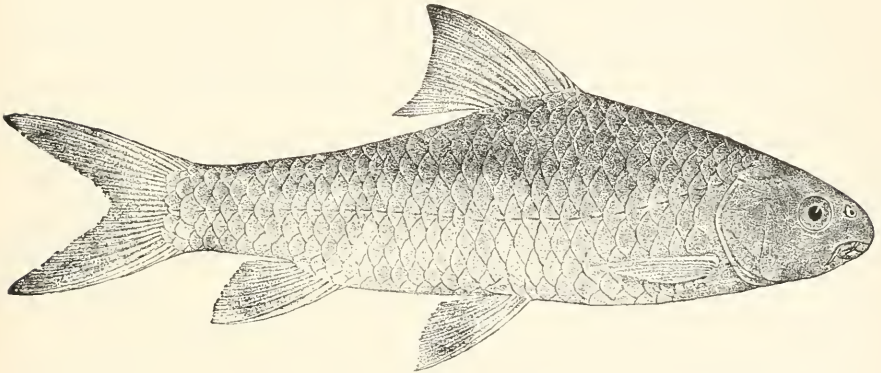


FIG. 32.—*Varicorhinus brucei*. $\frac{2}{3}$.

$2\frac{1}{2}$ to 3 rows of scales between lateral line and base of ventral, 12 rows round caudal peduncle.

Colour (of preserved specimens), dark brown on back, lighter below; often with small dark spots here and there on body and fins, especially on caudal.

Nine specimens, ranging from 102-263 mm. in length, from Thabina and Letsikela Rivers, Zoutpansberg District, Transvaal.

Five specimens, ranging from 84-204 mm. in length, from Six-mile Spruit, Pretoria District, Transvaal.

One specimen, 217 mm. in length, from Crocodile River, Transvaal.

One specimen, 223 mm. in length, from Transvaal (locality unknown).

2. VARICORHINUS NELSPRUITENSIS, Gilchr. and Thomp.

Ann. and Mag. Nat. Hist., viii., 1911, p. 478.

Body compressed, depth $3\frac{2}{3}$ to 4 times in total length excluding caudal, length of head $4\frac{1}{2}$ to $4\frac{2}{3}$ times; width of head $\frac{3}{5}$ to $\frac{2}{3}$ its length. Snout prominent, rounded, shorter than postocular portion of head; eye lateral, $4\frac{3}{5}$ to $4\frac{1}{5}$ times in length of head and about 2 to $2\frac{2}{5}$ times in interorbital width; width of mouth about $\frac{1}{2}$ length of head; no barbel; small tubercles on snout; mouth feebly curved.

Dorsal iii 8-9; upper edge slightly emarginate, no ossified ray, longest branched ray $\frac{1}{3}$ to about same length as head. Anal ii 5; similar to dorsal, does not reach to base of caudal. Pectoral $\frac{1}{3}$ to about same length as head, does not reach ventral which is inserted

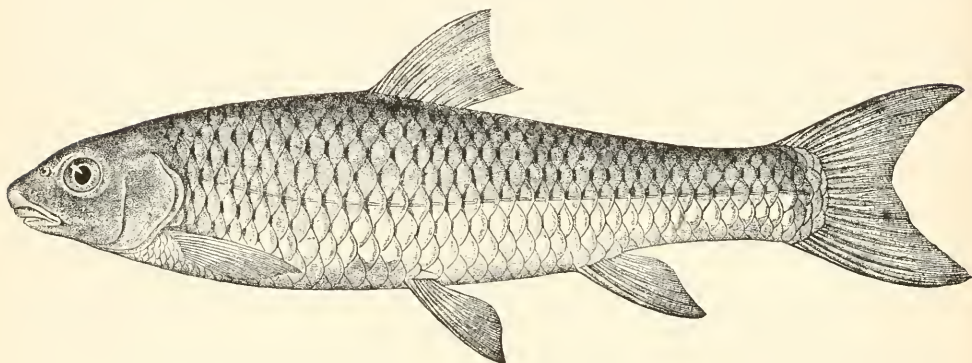


FIG. 33.—*Varicorhinus nelspruitensis*. $\frac{5}{6}$.

below 2nd branched ray of dorsal. Caudal forked, the lobes pointed; caudal peduncle $1\frac{1}{5}$ times to twice as long as deep. Scales 34-35, lat. tr. $\frac{5\frac{1}{2}-6}{6-6\frac{1}{2}}$; $2\frac{1}{2}$ rows of scales between lateral line and base of ventrals; 14 rows round caudal peduncle.

Colour (of preserved specimens), bluish black, darker above than below.

Two specimens, 145 mm. and 158 mm. in length respectively, from Nelspruit, Transvaal.

3. BARBUS.

Barbus, Cuv., Règne Anim., ii., p. 197 (1817); Cuv. and Val., Hist. Poiss., xvi., p. 122 (1842); Heck., Russegger's Reis., ii., p. 1017 (1843); Günth., Cat. Fish., vii., p. 82 (1868); Bouleng.,

Poiss., Bass. Congo, p. 221 (1901); Fish. Nile, p. 195 (1907), and Cat. Fresh. Fish. Afr., ii., p. 1 (1911).

Labeobarbus, Rüpp., Mus. Senckenb., ii., p. 14 (1837); Heck., l.c., p. 1019.

Cheilobarbus, A. Smith, Ill. Zool. S. Afr. Fishes (1841).

Pseudobarbus, A. Smith, l.c.

Capoëta, part., Cuv. and Val., t.c., p. 278.

Systemus, part., Heck., l.c., p. 1016.

Luciobarbus, Heck., l.c., p. 1019.

Puntius, Bleek., Nat. Verh. M. Wetensch. Haarl., xvii., 1862, p. 112.

Enteromius, Cope, Trans. Amer. Philos. Soc. (2), xiii., 1867, p. 407.

Barynotus, Günth, t.c., p. 61.

Mouth terminal, inferior or sub-inferior, small or moderately large, more or less protractile, with more or less developed lips; barbels present or absent; dorsal fin with or without ossified ray.

The structure of the scales varies considerably according to the species; we have followed Boulenger's system of grouping in respect to this. In some species the exposed surface of the scale is striated by numerous longitudinal, scarcely radiating, straight or slightly wavy canals, visible to the naked eye or with the aid of a magnifier of low power (except in specimens that have had the scales decalcified by preservation in formol), whilst the centre is more or less finely rugose. In other species with small scales the striations are also numerous, but they radiate fan-like from the centre; whilst in other small species with large scales they are reduced to from two to five, radiating from the centre, the scales appearing smooth but for the fine concentric striation (growth-lines) which is present on the scales of all cyprinids.

Key to Species.

- I.** Exposed surface of scales striated by numerous longitudinal, or even somewhat converging, straight or slightly wavy canals; dorsal fin with 8 to 10 branched rays, the last simple ray if ossified never serrated; two barbels on each side.
- A.** Last simple ray more or less enlarged, ossified, without trace of segmentation—at least in its basal half—forming a strong spine. Anal with 5 branched rays.
 - 1. Ventral fin with its first ray in front of or below anterior rays of dorsal, or dorsal originating slightly in advance of ventrals.

(a) *Dorsal with 8 branched rays.*

Sc. 43 $\frac{7\frac{1}{2}}{9\frac{1}{4}}$, 5, 18; D. iii 8, A. iii 5; posterior barbel

$\frac{2}{3}$ diameter of eye... .. 1. *B. polylepis*. Blgr.

- Sc. 34-43 $\frac{6-7\frac{1}{2}}{6\frac{1}{2}-7\frac{1}{2}}$, $3\frac{1}{2}-4\frac{1}{2}$, 16; D. iv 8, A. iii 5; posterior barbel $\frac{2}{3}$ to $1\frac{1}{2}$ diameter of eye 2. *B. holubi*, Stdr.
- Sc. 40-41 $\frac{7\frac{1}{2}}{7\frac{1}{2}}$, $3\frac{1}{2}-4\frac{1}{2}$, 16-18; D. iii 8, A. iii 5; posterior barbel $1-1\frac{1}{4}$ diameter of eye 3. *B. lineolatus*, n. sp.
- Sc. 38 $\frac{7}{6\frac{1}{2}}$, 3, 16; D. iii 8, A. ii 5; posterior barbel nearly as long as eye 4. *B. zuluensis*, n. sp.
- Sc. 33 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 3, 12; D. iii 8; its spine rather feeble, A. iii 5, reaching caudal; barbels sub-equal, about $1\frac{1}{2}$ diameters of eye 5. *B. marequensis*, A. Smith.

(b) Dorsal with 9 branched rays.

- Sc. 40 $\frac{7}{6}$, 3, 16; D. iv 9, A. iii 5; posterior barbel a little longer than eye 6. *B. kimberleyensis*, n. sp.

2. Base of ventral below anterior rays or middle of dorsal.

(a) Lower lip restricted to the sides, lower jaw with angular edge.

- Sc. 36-38 $\frac{6\frac{1}{2}}{6\frac{1}{2}}$, $3-3\frac{1}{2}$, 16; dorsal with 8 branched rays; posterior barbel as long as or a little longer than eye 7. *B. elephantis*, Blgr.
- Sc. 29-30 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$, 12; dorsal with 9-10 branched rays; posterior barbel $\frac{1}{2}-\frac{2}{3}$ diameter of eye 8. *B. sector*, Blgr.
- Sc. 28 $\frac{5}{4}$, $1\frac{1}{2}$, 14; dorsal with 9 branched rays; posterior barbel nearly as long as eye 9. *B. cooki*, n. sp.

(b) Lower lip continuous across chin, forming a more or less well-developed mental lobe.

- Sc. 38 $\frac{7\frac{1}{2}}{6\frac{1}{2}}$, $3\frac{1}{2}$, 16; dorsal with 8 branched rays; posterior barbel $1\frac{1}{5}$ times diameter of eye 10. *B. mfangosi*, n. sp.
- Sc. 28-29 $\frac{4\frac{1}{2}-5\frac{1}{2}}{4\frac{1}{2}}$, $2-2\frac{1}{2}$, 12; dorsal with 9 branched rays; both lips well developed; posterior barbel $\frac{2}{3}$ to as long as eye 11. *B. brucei*, Blgr.
- Sc. 27 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$, 12; dorsal with 10 branched rays; posterior barbel as long as eye 12. *B. dwaarsensis*, n. sp.

B. Last simple ray of dorsal not enlarged, or segmented down to its basal third anal with 5 branched rays.

1. Ventral fin nearly wholly in advance of dorsal.

Both lips produced into median lobes.

- Sc. 38 $\frac{6\frac{1}{2}}{7\frac{1}{2}}$, 3, 14; dorsal with 8 branched rays, last simple ray segmented; posterior barbel $1\frac{1}{2}$ times diameter of eye 13. *B. mentalis*, n. sp.

2. Ventral below anterior rays of dorsal.

(a) One or both lips produced into median lobes.

- Sc. 42 $\frac{6\frac{1}{2}}{7\frac{1}{2}}$, 4, 14; dorsal with 8 branched rays, last simple ray segmented; both lips produced into triangular lobes; posterior barbel a little longer than eye 14. *B. gilchristi*, Blgr.
- Sc. 33-36 $\frac{5\frac{1}{2}-6\frac{1}{2}}{5}$, 2 $\frac{1}{2}$, 14-16; dorsal with 8-9 branched rays; lower lip continuous across chin, often with a small rounded lobe; posterior barbel as long as or slightly longer than eye. 15. *B. bowkeri*, Blgr.
- Sc. 30 $\frac{6}{5\frac{1}{2}}$, 2 $\frac{1}{2}$, 14; dorsal with 9 branched rays, last simple ray segmented; lower lip with a small mental lobe; posterior barbel slightly longer than eye 16. *B. robinsoni*, n. sp.

(b) Lower lip not extending across chin.

- Sc. 35-37 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 3, 16; dorsal with 8 branched rays; lower jaw with a sharp edge and sometimes with a small mental lobe; posterior barbel as long as or a little shorter than eye 17. *B. aureus*, Cope.

3. Dorsal fin originating in advance of ventrals.

(a) One or both lips produced into median lobes.

- Sc. 32-33 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 2, 14; dorsal with 8 branched rays; ventral originating a little behind origin of dorsal; both lips produced into long pointed median lobes; posterior barbel as long as eye 18. *B. lobochilus*, Blgr.
- Sc. 32-34 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 3, 12; dorsal with 9 branched rays; base of ventral below middle of dorsal; both lips produced into more or less pointed median lobes; posterior barbel as long as eye 19. *B. zambesensis*, Peters.
- Sc. 30-32 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2-2 $\frac{1}{2}$, 12; dorsal with 9-10 branched rays; base of ventral below middle of dorsal; both lips produced into obtusely pointed median lobes; posterior barbel a little shorter than eye 20. *B. chilotes*, Blgr.
- Sc. 28-30 $\frac{5-5\frac{1}{2}}{4\frac{1}{2}}$, 2 $\frac{1}{2}$ -3, 12; dorsal with 9 branched rays, last simple ray segmented; base of ventral below middle or anterior third of dorsal; both lips produced into obtusely pointed median lobes posterior barbel a little shorter than eye 21. *B. gunningi*, n. sp.

Sc. 28-30 $\frac{5}{4\frac{1}{2}}$, 2, 12; dorsal with 9 branched rays, last simple ray segmented; base of ventral below middle of dorsal; lower lip with a small mental lobe, lower jaw rather sharp-edged; posterior barbel $\frac{3}{5}$ to as long as eye 22. *B. swierstra*, n. sp.

(b) Lower lip continuous on chin, without lobe.

Sc. 28 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2, 12; dorsal with 9 branched rays, the anterior rays much elongate; lips thick; posterior barbel $\frac{1}{3}$ diameter of eye 23. *B. altidorsalis*, Blgr.

(c) Lower lip not extending across chin.

* Lower jaw with an angular edge.

Sc. 30-32 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 2 $\frac{1}{2}$ -3, 12; dorsal with 8-9 branched rays; anal ii 5; caudal peduncle $1\frac{1}{5}$ - $1\frac{1}{2}$ times as long as deep 24. *B. rhodesianus*, Blgr.

Sc. 30-31 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 2 $\frac{1}{2}$, 12; dorsal with 8 branched rays; anal iii 5; caudal peduncle not longer than deep 25. *B. victoriæ*, Blgr.

Sc. 30 $\frac{5}{7}$, 3, 12; dorsal with 9 branched rays; snout pointed, prominent; scales large 26. *B. nasutus*, Gilehr. and Thomp.

Sc. 28-30 $\frac{5\frac{1}{2}}{4\frac{1}{2}}$, 2 $\frac{1}{2}$ -3, 12; dorsal with 9 branched rays, last simple ray segmented; anal iii 5 27. *B. sabiensis*, n. sp.

** Lower jaw without angular edge.

Sc. 41-44 $\frac{7\frac{1}{2}}{8\frac{1}{2}}$, 4-5, 16-18; dorsal with 9 branched rays, last simple ray segmented 28. *B. seeberi*, n. sp.

Sc. 35 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 2 $\frac{1}{2}$, 14; dorsal with 8 branched rays, border straight or feebly concave; caudal peduncle $1\frac{1}{5}$ times as long as deep 29. *B. fairbairnii*, Blgr.

Sc. 32 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2, 12; dorsal with 9 branched rays, border concave; caudal peduncle slightly longer than deep 30. *B. codringtonii*, Blgr.

II. Exposed surface of scales with radiating canals which, as a rule, are very numerous in the species with small scales and less numerous, or even restricted to a few, in those with large scales; dorsal fin with 6-8 (rarely 9) branched rays, anal with 5 (rarely 6).

A. Last simple ray of dorsal enlarged, bony, forming a strong spine which is not serrated behind; two barbels on each side.

Sc. 30-34 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 3-4, 14-16; dorsal with 8 (rarely 7) branched rays 31. *B. trimaculatus*, Peters.

B. Last simple ray of dorsal more or less enlarged, bony—at least in the basal third—and serrated behind; two barbels on each side.

(a) Base of ventral fin entirely in advance of dorsal.

- Sc. 42-43 $\frac{7-7\frac{1}{2}}{7}$, 4-5, 20; dorsal with 8 branched rays; mouth terminal. 32. *B. serra*, Peters.
- Sc. 33-36 $\frac{6-7\frac{1}{2}}{5\frac{1}{2}-6\frac{1}{2}}$, 3-4, 16-18; dorsal with 7 branched rays (rarely 8) 33. *B. paludinosus*, Peters.
- Sc. 33 $\frac{5\frac{1}{2}}{4\frac{1}{2}}$, $3\frac{1}{2}$, 14; dorsal with 7 branched rays 34. *B. brookingi*, n. sp.
- Sc. 29-30 $\frac{5\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$, 16; dorsal with 8 branched rays 35. *B. hamiltoni*, n. sp.

(b) Base of ventral entirely or partly below dorsal.

* Anal with 5 branched rays.

- Sc. 35-37 $\frac{6\frac{1}{2}}{5\frac{1}{2}}$, 3, 14; dorsal with 7 branched rays; first ray of ventral slightly in advance of dorsal 36. *B. longicauda*, Blgr.
- Sc. 30-33 $\frac{5\frac{1}{2}-6\frac{1}{2}}{4\frac{1}{2}-5\frac{1}{2}}$, $2\frac{1}{2}$ -3, 14; dorsal with 8 branched rays; ventral below or partly in advance of anterior rays of dorsal; mouth terminal; caudal peduncle $1\frac{2}{3}$ to twice as long as deep 37. *B. rapax*, Sldr.
- Sc. 29-33 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ -3, 12-14; dorsal with 8 branched rays; ventral below anterior rays of dorsal mouth sub-inferior; caudal peduncle $1\frac{1}{3}$ to $1\frac{2}{3}$ times as long as deep 38. *B. argenteus*, Günth.
- Sc. 26 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2, 12; dorsal with 7 branched rays; base of ventral almost entirely in advance of dorsal; pectoral reaching or scarcely reaching caudal; caudal peduncle twice as long as deep 39. *B. kerstenii*, Peters.
- Sc. 24-26 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$, 12; dorsal with 7 branched rays; base of ventral partly in advance of dorsal; pectoral not reaching caudal; caudal peduncle $1\frac{1}{2}$ to $1\frac{5}{7}$ as long as deep 40. *B. eutania*, Blgr.

** Anal with 6 branched rays.

- Sc. 39-40 $\frac{5\frac{1}{2}-6\frac{1}{2}}{6\frac{1}{2}}$, 4, 16; dorsal with 8 branched rays; base of ventral below middle of dorsal. 41. *B. capensis*, A. Smith.

C. Last simple ray of dorsal enlarged, bony, more or less distinctly serrated behind; a single barbel on each side.

- Sc. 33-36 $\frac{5\frac{1}{2}-6\frac{1}{2}}{5\frac{1}{2}-6\frac{1}{2}}$, 3-4, 14; dorsal with 7 branched rays, spine feebly serrated in its upper part only. 42. *B. trevelyani*, Günth.
- Sc. 31 $\frac{5\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$, 16; dorsal with 8 branched rays, its spine strongly serrated in its upper half 43. *B. serrula*, n. sp.

D. Last simple ray of dorsal not enlarged, or but feebly enlarged, not serrated.

1. Two barbels on each side.

(a) *Lateral line complete.*

* Ventral originating wholly or partly in advance of dorsal.

Sc. 32-34 $\frac{5\frac{1}{2}}{5\frac{1}{2}-6\frac{1}{2}}$, $3\frac{1}{2}-4\frac{1}{2}$, 12-14; dorsal with 7 branched rays, border straight; ventral wholly or partly anterior; pectoral not reaching ventral 44. *B. vulneratus*, Cast.

Sc. 32-33 $\frac{5\frac{1}{2}}{6\frac{1}{2}}$, 4-4 $\frac{1}{2}$; dorsal with 7 branched rays, border convex; ventral originating a little in advance of dorsal; pectoral reaching ventral 45. *B. motebensis*, Sdr.

** Ventral originating below anterior rays of dorsal.

Sc. 33-38 $\frac{5\frac{1}{2}-6\frac{1}{2}}{6\frac{1}{2}}$, 4, 12; dorsal with 7 branched rays; pectoral not reaching ventral 46. *B. burchelli*, A. Smith.

Sc. 31-33 $\frac{4\frac{1}{2}}{5\frac{1}{2}}$, 3, 12; dorsal with 7 branched rays; pectoral nearly reaching ventral 47. *B. burgi*, Blgr.

Sc. 31-35 $\frac{5\frac{1}{2}}{3\frac{1}{2}-4\frac{1}{2}}$, $1\frac{1}{2}-2\frac{1}{2}$, 12; dorsal with 7 branched rays; posterior barbel 1 to $1\frac{1}{2}$ diameter of eye 48. *B. gurneyi*, Günth.

Sc. 30 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$, 12; dorsal with 8 branched rays, border feebly concave; caudal peduncle $1\frac{5}{8}$ as long as deep 49. *B. lincomaculatus*, Blgr.

Sc. 29 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$, 12; dorsal with 8 branched rays, border straight; caudal peduncle twice as long as deep; anal with only 2 spines 50. *B. viviparus*, M. Web.

Sc. 27-30 $\frac{4-4\frac{1}{2}}{4-4\frac{1}{2}}$, $2-2\frac{1}{2}$, 12; dorsal with 8 branched rays; posterior barbel as long as or a little longer than eye 51. *B. whiteniatus*, Günth.

Sc. 26-27 $\frac{3\frac{1}{2}}{3\frac{1}{2}}$, 2; dorsal with 8 branched rays; pectoral reaching ventral; posterior barbel a little shorter than eye 52. *B. radiatus*, Peters.

*** Base of ventral wholly below dorsal.

Sc. 35 $\frac{6\frac{1}{2}}{5\frac{1}{2}}$, $3\frac{1}{2}$, 14; dorsal with 8 branched rays; ventral below anterior half of dorsal; upper lip with a median lobe 53. *B. labialis*, n. sp.

Sc. 33-36 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, $3-3\frac{1}{2}$, 14-16; dorsal with 8 branched rays; base of ventral behind anterior rays of dorsal 54. *B. macrurus*, n. sp.

Sc. 29-31 $\frac{4\frac{1}{2}-5\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ -3, 12; dorsal with 8-9 branched rays; posterior barbel $\frac{1}{2}$ - $\frac{2}{3}$ diameter of eye; snout projecting very slightly beyond mouth; ventral below middle of dorsal 55. *B. inermis*, Peters.

(b) Lateral line incomplete.

Sc. 27-29 $\frac{4\frac{1}{2}}{4\frac{1}{2}-5}$, $2\frac{1}{2}$ - $3\frac{1}{2}$, 12; dorsal with 7-8 branched rays; anal with 2 spines; lateral line on 8-15 scales only 56. *B. hemipleurogramma*, Blgr.

2. A single barbel on each side.

(a) Dorsal with 7 (rarely 6) branched rays.

Sc. 37-42 $\frac{8\frac{1}{2}}{8\frac{1}{2}-9\frac{1}{2}}$, 5-6, 18-20; mouth inferior . . . 57. *B. asper*, Blgr.

Sc. 32-38 $\frac{5\frac{1}{2}-7\frac{1}{2}}{5\frac{1}{2}-7\frac{1}{2}}$, $3\frac{1}{2}$ -5, 14-16; mouth sub-inferior . . . 58. *B. anoplus*, M. Web.

Sc. 36 $\frac{6\frac{1}{2}}{8}$, 5, 16; mouth terminal; anal with 2 spines 59. *B. kurkensis*, n. sp.

Sc. 28-31 $\frac{4\frac{1}{2}}{5\frac{1}{2}}$, 3, 12; mouth inferior 60. *B. afer*, Peters.

(b) Dorsal with 8 branched rays; barbel minute, if present.

Sc. 27-28 $\frac{3\frac{1}{2}}{3\frac{1}{2}}$, 2, 12; mouth inferior 61. *B. rogersi*, Blgr.

* 1. BARBUS POLYLEPIS, Blgr.

Bouleng., Proc. Zool. Soc., 1907, p. 308, fig., and Cat. Fresh. Fish. Afr., ii., p. 21, fig. 3 (1911).

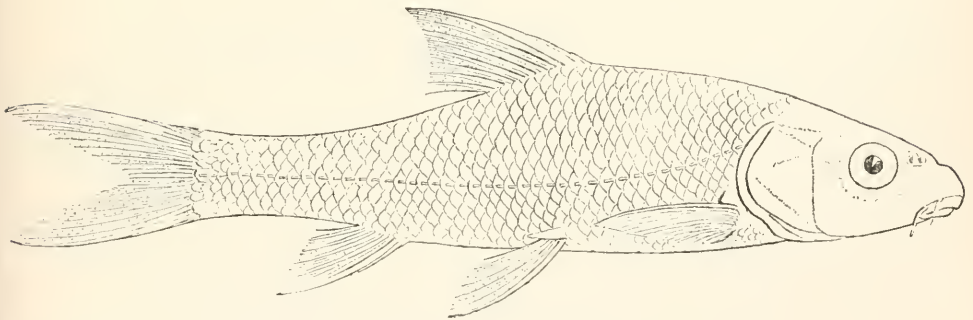


FIG. 34.—*Barbus polylepis*.

“Depth of body $4\frac{1}{5}$ times in total length, length of head $3\frac{1}{3}$ times. Snout rounded-subacuminate, 3 times in length of head, feebly projecting beyond mouth; eye $4\frac{1}{4}$ times in length of head, interorbital

width $3\frac{1}{3}$ times; mouth small, inferior, its width 4 times in length of head; lips well developed, lower continuous across chin; two barbels on each side, sub equal in length, $\frac{2}{3}$ diameter of eye.

Dorsal iii 8; equally distant from eye and from root of caudal, border concave; last simple ray strong, bony, not serrated, its rigid part $\frac{2}{3}$ length of head. Anal iii 5; not reaching root of caudal. Pectoral $\frac{2}{3}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle twice as long as deep. Scales longitudinally striated, $43\frac{7\frac{1}{2}}{9\frac{1}{2}}$, 5 between lateral line and ventral, 18 round caudal peduncle.

Olive-grey above, white beneath.

Total length 120 mm.

Klein Olifant River, Limpopo System."

2. BARBUS HOLUBI, Sldr.

(Geel-visch, Yellow-fish.)

Steind., Sitz. Ak. Wien, ciii., i., 1894, p. 449, pl. iii., fig. 1; M.

Weber, Zool. Jahrb. Syst., x., 1897, p. 151; Bouleng., Ann. and Mag. N.H. (7), x., 1902, p. 424, Proc. Zool. Soc., 1907, p. 309, and Cat. Fresh. Fish. Afr., ii., p. 22, fig. 4 (1911).

Depth of body $3\frac{1}{4}$ to $4\frac{1}{10}$ times in total length excluding caudal, length of head $3\frac{2}{5}$ to $4\frac{1}{10}$ times. Snout rounded, feebly projecting

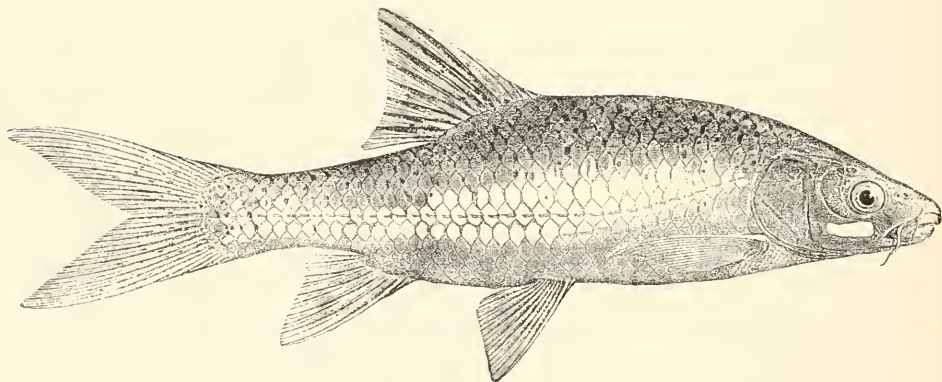


FIG. 35.—*Barbus holubi*. $\frac{1}{3}$.

beyond mouth, $2\frac{2}{3}$ to $3\frac{2}{3}$ times in length of head; eye $3\frac{1}{2}$ (young) to $6\frac{1}{2}$ times in length of head, interorbital width $2\frac{3}{5}$ to 4 times; mouth sub-inferior, its width $2\frac{1}{5}$ to $4\frac{1}{10}$ times in length of head; lips moderately developed, lower continuous across chin, sometimes with

a small median lobe. Two barbels on each side, posterior equal to or generally a little longer than anterior, $\frac{3}{5}$ to $1\frac{1}{2}$ times diameter of eye.

Dorsal iv 8; equally distant from eye or occiput and from root of caudal, or a little nearer latter, border slightly concave; last simple ray strong, bony, not serrated, nearly straight, $\frac{1}{2}$ to $\frac{4}{5}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{5}$ to $\frac{9}{10}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal, the origin of which falls a little behind to slightly in front of 1st ray of ventral. Caudal peduncle $1\frac{2}{5}$ to $2\frac{1}{2}$ times as long as deep. Scales longitudinally striated, 34-43 $\frac{6-7\frac{1}{2}}{6\frac{1}{2}-7\frac{1}{2}}$, $3\frac{1}{2}$ to $4\frac{1}{2}$ between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimens), brown or yellowish brown above, lighter beneath.

Six specimens, ranging from 141-360 mm. in length, from Zak River, Fraserburg, Cape Province (Mr. Jacobs).

One specimen, 151 mm. in length, from Kraai River, Barkly East, Cape Province.

Four specimens, ranging from 148-169 mm. in length, from Kraai River, Aliwal North, Cape Province.

Two specimens, 144 mm., 191 mm. in length respectively, from Durban Museum.

One specimen, 107 mm. in length, from Fish River, German S.W. Africa.

Eight specimens, ranging from 82-133 mm. in length, from Six-mile Spruit, Pretoria, Transvaal.

One specimen, 147 mm. in length, from Dwaars River, Transvaal.

Three specimens, ranging from 117-163 mm. in length, from Mooi River, Potchefstroom, Transvaal (H. Fry).

Seven specimens, ranging from 105-255 mm. in length, from Potchefstroom (river near hatchery), Transvaal.

Four specimens, ranging from 102-157 mm. in length, from Vereeniging, Transvaal.

Three specimens, ranging from 51-73 mm. in length, from Modder River. Cape, Free State.

Two specimens, 166 mm., 181 mm. in length respectively, from Pienaars River, Transvaal (C. J. Swierstra).

3. BARBUS LINEOLATUS, n. sp.

Depth of body $3\frac{1}{3}$ to $3\frac{2}{5}$ times in total length excluding caudal, length of head about $3\frac{1}{2}$ times. Snout rounded, 3 times in length of

head; diameter of eye $5\frac{1}{5}$ to $6\frac{1}{4}$ times in length of head, interorbital width about 3 times; mouth sub-inferior, its width $3\frac{1}{3}$ to $3\frac{2}{5}$ times in length of head; lips moderately developed, lower rather sharp-edged and with a slight median lobe. Two barbels on each side, sub-equal or posterior slightly the longer, 1 to $1\frac{1}{4}$ times diameter of eye.

Dorsal iii 8; equally distant from occiput and from root of caudal, or slightly nearer to occiput, border feebly concave; last simple ray moderately enlarged, bony, not serrated, its rigid part $\frac{1}{2}$ to $\frac{3}{5}$ length of head. Anal iii 5; scarcely reaching caudal. Pectoral $\frac{3}{4}$ to $\frac{4}{5}$

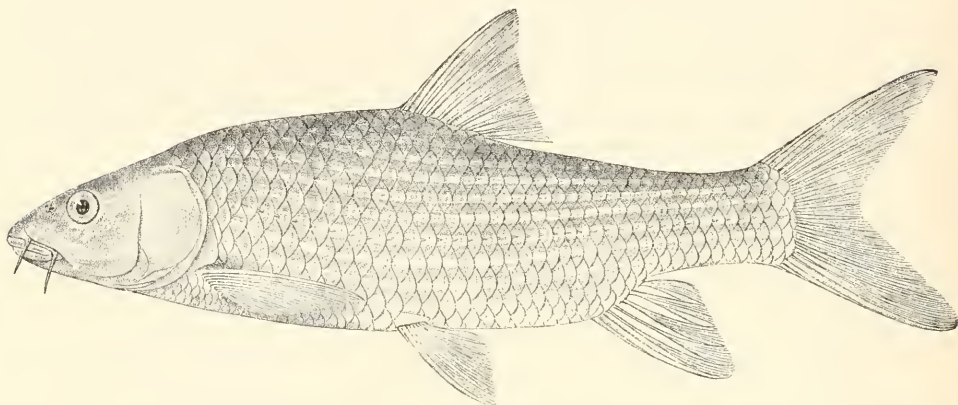


FIG. 36.—*Barbus lineolatus*. $\frac{1}{2}$.

length of head, not reaching ventral; base of latter below or partly in advance of anterior rays of dorsal. Caudal peduncle $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, 40-41 $\frac{7\frac{1}{2}}{7\frac{1}{3}}$, $3\frac{1}{2}$ - $4\frac{1}{2}$ between lateral line and ventral, 16-18 round caudal peduncle.

Colour (of preserved specimens), greenish brown, slightly darker above than below; fins tipped with black; scales with a median light-coloured bar or band, forming together regular longitudinal lines on the body.

Three specimens, 243 mm., 264 mm., 272 mm. in length respectively, from Magalies River, Transvaal (C. J. Swierstra).

4. *BARBUS ZULUENSIS*, n. sp.

Depth of body 4 times in total length excluding caudal, length of head $3\frac{2}{3}$ times. Snout rounded, $2\frac{2}{3}$ times in length of head; eye

$6\frac{3}{4}$ times, interorbital width 3 times; mouth sub-inferior, its width $2\frac{3}{4}$ times in length of head; lips thin. Two barbels on each side, sub-equal and nearly as long as diameter of eye.

Dorsal iii 8; nearer to occiput than to root of caudal, border concave; last simple ray moderately enlarged, bony, not serrated (broken in the specimen). Anal ii 5; scarcely reaching to caudal. Pectoral $\frac{3}{4}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{7}{10}$ times as long as deep. Scales longitudinally striated, $38\frac{7}{62}$, 3 between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimen), dark grey above, whitish below; fins with a blackish tinge.

One specimen, 325 mm. in length, from M'Fongosi, Zululand (W. E. Jones).

* 5. *BARBUS MAREQUENSIS*, A. Smith.

Barbus (*Cheilobarbus*) *marequensis*, A. Smith, Ill. Zool. S. Afr. Fish., pl. x., fig. 2 (1841).

Barbus marequensis, Bouleng., Cat. Fresh. Fish. Afr., ii., p. 36, fig. 16 (1911).

"Depth of body nearly equal to length of head, nearly 4 times in total length. Snout rounded, 3 times in length of head; eye $5\frac{1}{2}$

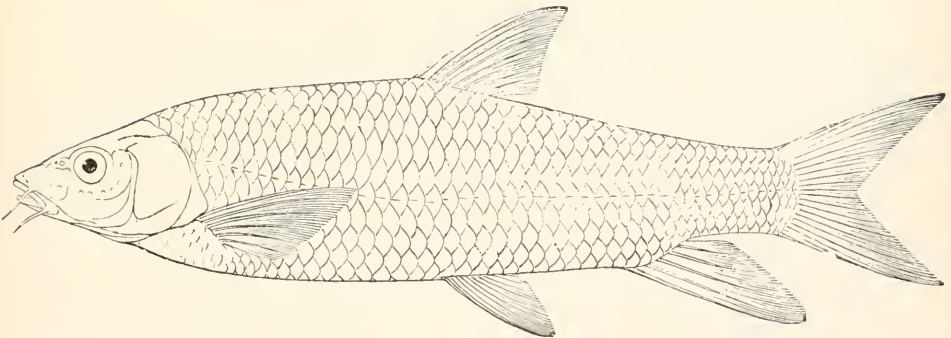


FIG. 37.—*Barbus marequensis*. $\frac{1}{3}$.

times in length of head, interorbital width $2\frac{1}{2}$ times; mouth inferior, its width about $\frac{1}{4}$ length of head; lips well developed, the lower continuous across the chin; two barbels on each side, sub-equal, about $1\frac{1}{2}$ diameters of eye.

Dorsal iii 8; equally distant from occiput and from caudal, border

scarcely emarginate; last simple ray rather feeble, bony, not serrated, nearly $\frac{2}{3}$ length of head. Anal iii 5; reaching root of caudal. Pectoral $\frac{3}{5}$ length of head, not reaching ventral; base of latter slightly behind origin of dorsal. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, $33\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 3 between lateral line and ventral, 12 round caudal peduncle.

Olive-brown above, yellow beneath; lips and barbels dull flesh-colour; fins pale yellow, shaded with dull yellowish brown.

Total length 350 millim.

Interior of South Africa."

6. *BARBUS KIMBERLEYENSIS*, n. sp.

Depth of body $4\frac{1}{7}$ times in total length excluding caudal, length of head $3\frac{1}{2}$ times. Snout 3 times in length of head and $1\frac{7}{10}$ times in postocular portion of head; eye $6\frac{1}{2}$ times in length of head, inter-orbital width 4 times; mouth terminal, its width $2\frac{3}{5}$ times in length of head; lips thick. Two barbels on each side, sub-equal and a little longer than diameter of eye. A row of tubes, with open pores,

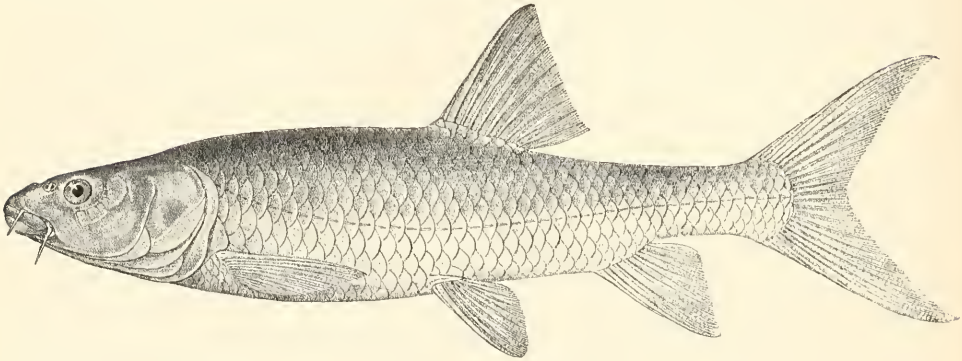


FIG 38.—*Barbus kimberleyensis*. $\frac{1}{14}$.

extending from below nostrils round each orbit to origin of lateral line and joined by a row across occiput.

Dorsal iv 9; its distance from occiput equals $1\frac{1}{2}$ times its distance from root of caudal, border nearly straight; last simple ray strong, bony, not serrated, nearly straight, its rigid part a little more than $\frac{1}{2}$ length of head. Anal iii 5; scarcely reaching to caudal. Pectoral nearly $\frac{7}{10}$ length of head, not reaching to ventral; base of latter partly in front of dorsal. Caudal peduncle nearly twice as long as

deep. Scales longitudinally striated, $40 \frac{7}{6}$, 3 between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimen), greyish brown above, light yellow below.

One specimen, 345 mm. in length, from Kimberley Reservoir, Cape Province.

7. BARBUS ELEPHANTIS, Blgr.

Bouleng., Proc. Zool. Soc., 1907, p. 310, fig., and Cat. Fresh. Fish. Afr., ii., p. 78, fig. 55 (1911).

Depth of body $3 \frac{3}{10}$ to $3 \frac{1}{2}$ times in total length excluding caudal, length of head $3 \frac{1}{5}$ to $4 \frac{1}{3}$ times. Snout rounded, 3 to $3 \frac{3}{10}$ times in length of head; eye $4 \frac{3}{5}$ to 5 times in length of head, interorbital width $2 \frac{9}{10}$ times; mouth inferior, feebly curved, its width $3 \frac{3}{10}$ times

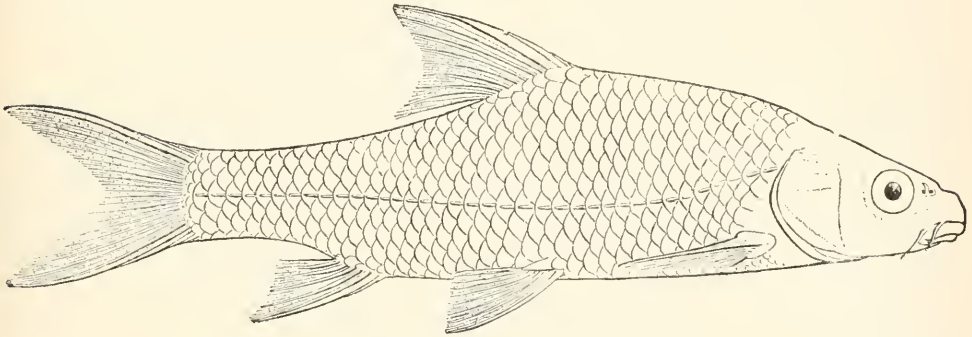


FIG. 39.—*Barbus elephantis*. $\frac{3}{10}$.

in length of head; lower jaw with a sharp edge, lower lip restricted to the sides. Two barbels on each side, anterior $\frac{7}{10}$ to $\frac{1}{3}$ diameter of eye, posterior 1 to $1 \frac{1}{3}$ times.

Dorsal iv 8; equally distant from eye and from root of caudal, border concave; last simple ray strong, bony, not serrated, its rigid part $\frac{3}{4}$ to $\frac{1}{5}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{4}$ to $\frac{1}{5}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1 \frac{1}{3}$ times as long as deep. Scales longitudinally striated, 36-38 $\frac{6 \frac{1}{2}}{6 \frac{1}{2}}$, 3-3 $\frac{1}{2}$ between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimens), silvery, dark above, lighter beneath.

Two specimens, 193 mm. 213 mm. in length respectively, from M'Fongozi, Zululand (W. E. Jones).

It is also reported from the Transvaal.

8. *BARBUS SECTOR*, Blgr.

Bouleng., Proc. Zool. Soc., 1907, p. 309, pl. xviii., fig. 2, and Cat. Fresh. Fish. Afr., ii., p. 78, fig. 56 (1911).

Depth of body $3\frac{1}{2}$ to 4 times in total length excluding caudal, length of head $3\frac{2}{3}$ to 4 times. Snout rounded, projecting, 3 to $3\frac{2}{3}$ times in length of head, eye $3\frac{1}{4}$ to $3\frac{5}{8}$ times, interorbital width $2\frac{3}{5}$ to 3 times; mouth inferior, feebly curved, its width 3 times in length of head; lips thin, lower jaw with a sharp edge, lower lip restricted to the sides. Two barbels on each side, anterior $\frac{1}{4}$ to $\frac{1}{2}$ diameter of eye, posterior $\frac{1}{2}$ to $\frac{2}{3}$.

Dorsal iv 9-10; equally distant from middle of eye and root of caudal, border feebly concave; last simple ray scarcely enlarged,

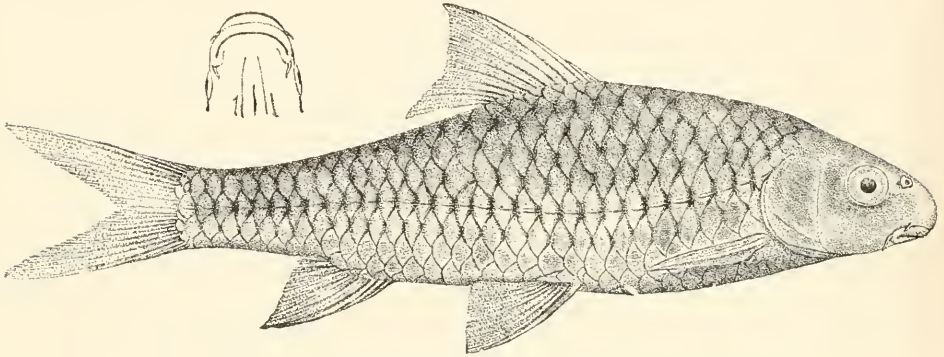


FIG. 40.—*Barbus sector*. $\frac{1}{3}$.

flexible, not serrated, nearly or quite equal to length of head. Anal iii 5; not reaching caudal. Pectoral a little shorter than head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle about $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, $29-30\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimens), silvery grey, darker above; scales dark at the base; dorsal and caudal fins with a dark shade.

One specimen, 139 mm. in length, from Gwelo River, Lomagundi District, Rhodesia (J. Drury).

Two specimens, 117 mm., 51 mm. in length respectively, from Livingstone, Rhodesia (A. Stephenson).

One specimen, 85 mm. in length, from Pienaars River, Transvaal (C. J. Swierstra).

Two specimens, 110 mm., 80 mm. in length respectively, from White River, East Transvaal (A. T. Cooke).

9. *BARBUS COOKEI*, n. sp.

Depth of body 3 times in total length excluding caudal, length of head $4\frac{1}{3}$ times. Snout rounded, feebly projecting beyond mouth, nearly 3 times in length of head; eye $5\frac{2}{3}$ times in length of head, interorbital width $2\frac{1}{10}$ times; mouth sub-inferior, its width $2\frac{1}{3}$ times in length of head; lips thin, lower restricted to the sides; lower jaw with a sharp keel covered with a horny sheath. Two barbels on each side, anterior $\frac{2}{3}$ diameter of eye, posterior nearly as long as eye.

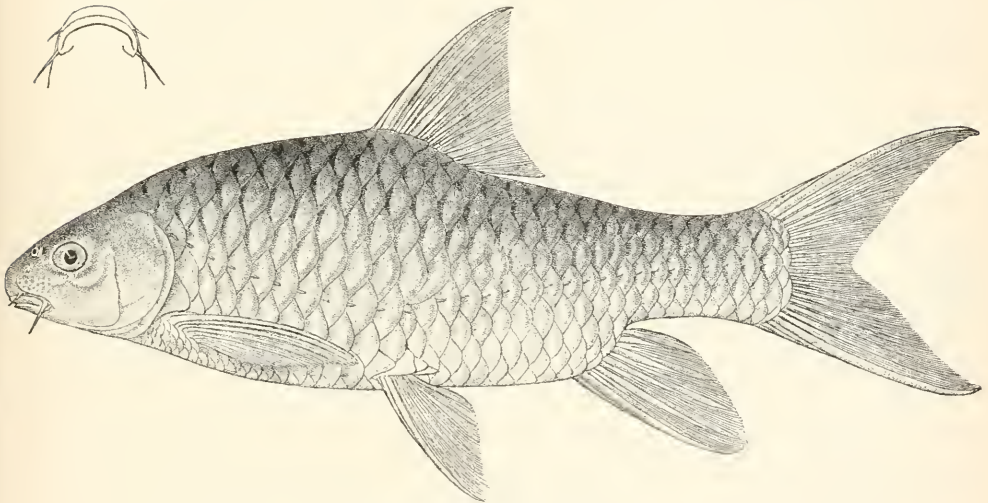


FIG. 41.—*Barbus cookei*. $\frac{3}{8}$.

Dorsal iii 9; equally distant from eye and from root of caudal, border concave; last simple ray slightly enlarged, bony, not serrated, slightly longer than head. Anal ii 5; reaching caudal. Pectoral $1\frac{1}{10}$ times as long as head, falciform, scarcely reaching ventral; base of latter below anterior rays of dorsal. Caudal deeply forked, lobes acutely pointed; caudal peduncle $1\frac{1}{3}$ times as long as deep. Scales longitudinally striated, $28\frac{1}{4}$, $1\frac{1}{2}$ between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimen), greenish, darker above than below; all fins except ventral edged with white; a dark diagonal band on

base of each lobe of caudal; scales on upper part of body edged with black.

One specimen, 328 mm. in length, from Crocodile River, Transvaal (A. T. Cooke).

10. *BARBUS M'FONGOSI*, n. sp.

Depth of body $3\frac{3}{5}$ times in total length excluding caudal, length of head $3\frac{7}{10}$ times. Snout rounded, projecting considerably beyond mouth, $2\frac{1}{2}$ times in length of head; eye $5\frac{3}{5}$ times in length of head, interorbital width 3 times; mouth inferior, its width $3\frac{1}{2}$ times in length of head; lips strongly developed, lower continuous across chin and produced into a rounded mental lobe as long as the eye.

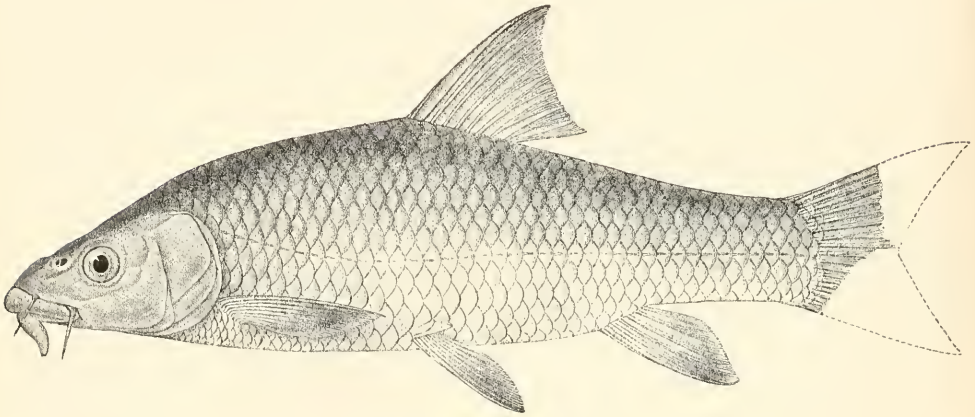


FIG. 42.—*Barbus m'fongosi*. $\frac{5}{9}$.

Two barbels on each side, anterior $\frac{9}{10}$ diameter of eye, posterior $1\frac{1}{5}$ times. Profile from origin of dorsal to snout strongly curved.

Dorsal iv 8; equally distant from eye and root of caudal, border concave; last simple ray very strong, bony, not serrated, straight, the rigid portion a little more than $\frac{2}{3}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{7}{10}$ of head, not reaching ventral; the base of latter falling just behind 1st ray of dorsal. Caudal peduncle $1\frac{1}{3}$ times as long as deep. Scales longitudinally striated, $38\frac{7}{63}$, $3\frac{1}{2}$ between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimen), silvery, darker above than below; fins darkish.

One specimen, 206 mm. in length, from M'Fongosi, Zululand (W. E. Jones).

11. BARBUS BRUCHI, Blgr.

Barbus bruchii, Bouleng., Proc. Zool. Soc., 1907, p. 309, pl. xviii., fig. 1, and Cat. Fresh. Fish. Afr., ii., p. 80, fig. 58 (1911).

Depth of body $3\frac{1}{2}$ to 4 times in total length excluding caudal, length of head $3\frac{3}{4}$ to $4\frac{1}{10}$ times. Snout rounded-sub-acuminate, $2\frac{2}{3}$ to 3 times in length of head, strongly projecting beyond mouth; eye $4\frac{2}{7}$ to $5\frac{2}{3}$ times in length of head, interorbital width 3 to $3\frac{1}{10}$ times; mouth inferior, its width 3 times in length of head; lips well developed, lower lip continuous and forming a short mental lobe, lower jaw sharp-edged. Two barbels on each side, anterior $\frac{3}{5}$ to $\frac{2}{7}$ diameter of eye, posterior $\frac{5}{7}$ to as long as eye.

Dorsal iv 9; equally distant from middle of eye and from root of caudal, border concave; last simple ray enlarged, bony, flexible, not serrated, $\frac{3}{4}$ to $\frac{1}{5}$ length of head. Anal iii 5; not reaching caudal.

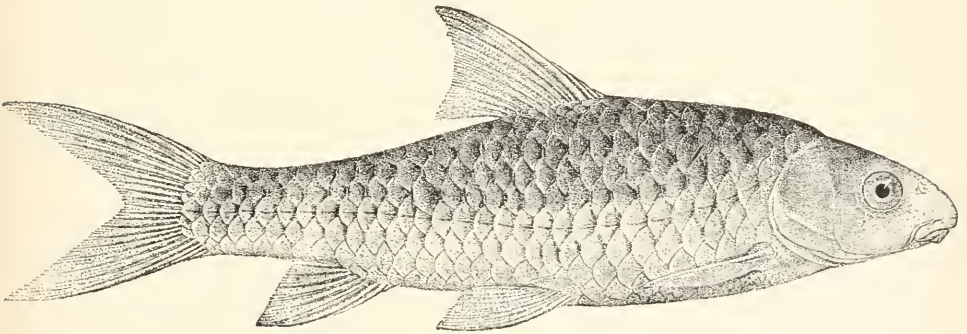


FIG. 43.—*Barbus bruchii*. $\frac{5}{6}$.

Pectoral $\frac{3}{4}$ to $\frac{1}{5}$ length of head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{2}{3}$ to $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, 28–29 $\frac{4\frac{1}{2}-5\frac{1}{2}}{4\frac{1}{2}}$, 2 to $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimens), darkish brown above, lighter below; scales with brown spots on their base.

Three specimens, ranging from 120–180 mm. in length, from White River, Nelspoort, Transvaal (A. T. Cooke).

One specimen, 95 mm. in length, from Pienaars River, Transvaal (C. J. Swierstra).

One specimen, 167 mm. in length, from Dwaars River, Transvaal.

One specimen, 71 mm. in length, from spruit at Pietersburg, Transvaal.

12. *BARBUS DWAARSENSIS*, n. sp.

Depth of body equals length of head and is $3\frac{2}{3}$ times in total length excluding caudal. Snout pointed, projecting beyond mouth, nearly 3 times in length of head; eye $4\frac{2}{3}$ times in length of head, inter-orbital width nearly 3 times; mouth sub-inferior, its width $3\frac{1}{4}$ times in length of head; lips moderately developed, lower with a mental lobe about $\frac{1}{2}$ diameter of eye in depth. Two barbels on each side, anterior $\frac{2}{3}$ diameter of eye, posterior as long as eye.

Dorsal iii 10; equally distant from middle of eye and from root of caudal, border concave; last simple ray moderately enlarged, bony, not serrated, its rigid part $\frac{2}{3}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{4}{5}$ length of head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{1}{3}$ times as long as deep. Scales longitudinally striated (some on the upper part of the body appear to be slightly radiate), $27\frac{4\frac{1}{2}}{1\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimen), brown, darker above than below; about 3 faint longitudinal lines can be made out when the fish is dry; lower part of head and opercles light colour.

One specimen, 106 mm. in length, from Dwaars River, Transvaal.

The species is near *B. brucei*, which, however, has 9 branched rays in the dorsal fin.

13. *BARBUS MENTALIS*, n. sp.

Depth of body nearly 4 times in total length excluding caudal, length of head $3\frac{3}{4}$ times. Snout rounded, about $\frac{1}{3}$ length of head;

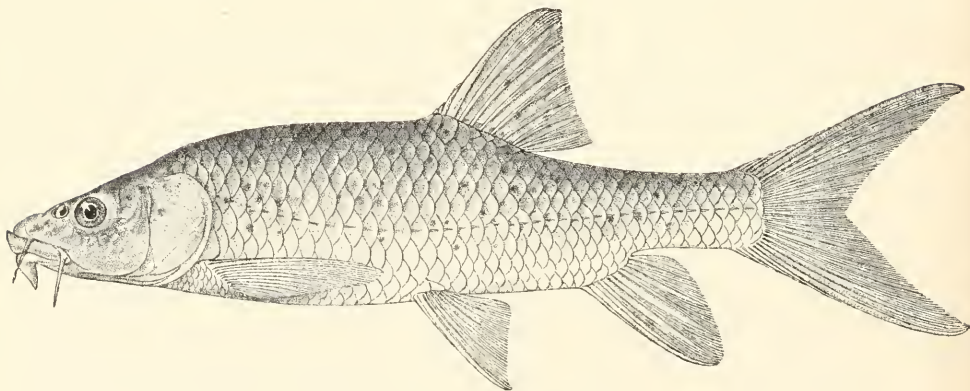


FIG. 44.—*Barbus mentalis*. $\frac{1}{2}$.

eye $5\frac{3}{5}$ times in length of head, interorbital width nearly 3 times; mouth terminal, width $3\frac{1}{10}$ times in length of head; lips very thick, lower extending across chin, both lips produced into median lobes, that on the upper lip triangular and low and the one on lower lip rounded and about $\frac{3}{4}$ diameter of eye. Two barbels on each side, posterior a little longer than anterior and nearly $1\frac{1}{2}$ times diameter of eye.

Dorsal iv 8; a little nearer to occiput than to root of caudal, border almost straight; last simple ray moderately enlarged, bony, slightly curved, segmented down to its lower third, smooth, nearly $\frac{2}{3}$ length of head. Anal iii 5; reaching caudal. Pectoral nearly as long as head, not reaching ventral; base of latter nearly wholly in advance of dorsal. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, $38\frac{6\frac{1}{2}}{7\frac{1}{2}}$, 3 between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimen), brownish on back, flesh-coloured on sides and belly; many of the scales on upper part of the body with a dark patch on base.

One specimen, 262 mm. in length, from Kimberley Reservoir, Cape Province.

* *BARBUS GILCHRISTI*, Blgr.

Bouleng., Cat. Fresh. Fish. Afr., ii., pp. 88, fig. 66 (1911).

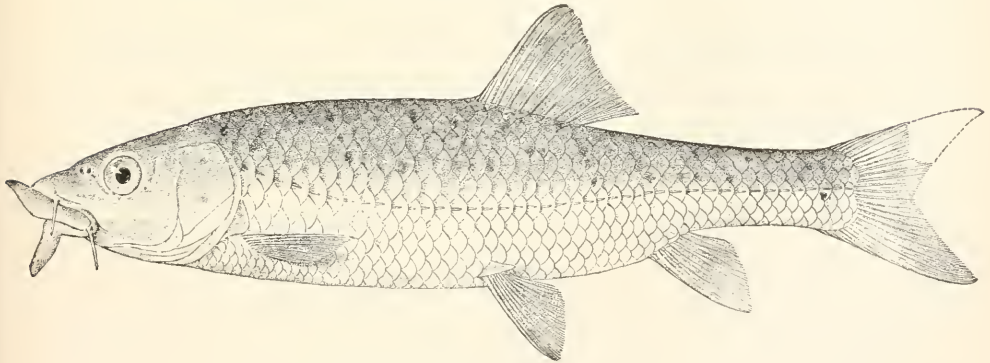


FIG. 45.—*Barbus gilchristi*. $\frac{2}{3}$.

“Depth of body $4\frac{1}{2}$ times in total length, length of head $3\frac{3}{4}$ times. Snout rounded, projecting beyond mouth, $\frac{1}{3}$ length of head; eye $5\frac{1}{2}$ times in length of head, interorbital width $3\frac{1}{3}$ times; width of mouth 3 times in length of head; lips very thick, lower extending across chin, both produced into triangular lobes; two barbels on

each side, posterior a little longer than anterior and slightly longer than eye.

Dorsal iii 8; a little nearer root of caudal than occiput, border slightly concave; last simple ray feebly enlarged, segmented down to its lower third, smooth, about $\frac{3}{8}$ length of head. Anal ii 5; not reaching caudal. Pectoral $\frac{3}{8}$ length of head, not reaching ventral; latter below anterior rays of dorsal. Caudal peduncle nearly twice as long as deep. Scales longitudinally striated, $42\frac{6\frac{1}{2}}{7\frac{1}{2}}$, 4 between lateral line and ventral, 14 round caudal peduncle.

Olive-brown above, with small black spots, whitish beneath.

Total length 165 millim.

Kraai River, Barkly East, Cape Colony."

15. BARBUS BOWKERI, Blgr.

Barbus gurneyi, Günth., Cat. Fish., vii., p. 102 (1868).

Barbus bowkeri, Blgr., Ann. and Mag. N.H. (7), ix., 1902, p. 288, and Cat. Fresh. Fish. Afr., ii., p. 89, fig. 67 (1911).

"Depth of body equal to length of head, $3\frac{3}{4}$ to $4\frac{1}{4}$ times in total length. Snout rounded, feebly projecting beyond mouth, about $\frac{1}{3}$

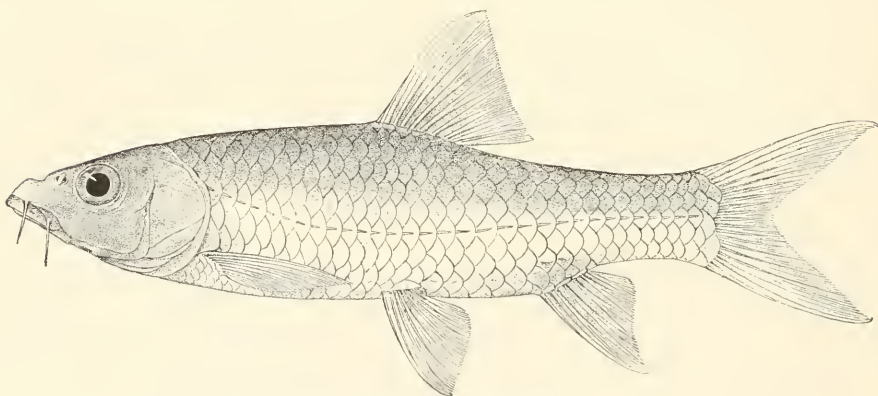


FIG. 46.—*Barbus bowkeri*.

length of head; eye $4\frac{1}{2}$ to $5\frac{1}{2}$ times in length of head, interorbital width $2\frac{3}{4}$ to 3 times; width of mouth $3\frac{1}{2}$ to 4 times in length of head; lips thick, lower extending across the chin, where it may form a small rounded lobe; two barbels on each side, posterior a little longer than anterior and as long as or slightly longer than eye.

Dorsal iii 8-9; equally distant from occiput and from root of

caudal, border slightly concave; last simple ray not enlarged, flexible, smooth, $\frac{3}{5}$ to $\frac{2}{3}$ length of head. Anal ii-iii 5; reaching or nearly reaching caudal. Pectoral $\frac{3}{4}$ to $\frac{5}{8}$ length of head, not reaching ventral; latter below anterior rays of dorsal. Scales longitudinally striated, 33-36 $\frac{5\frac{1}{2}-6\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 14-16 round caudal peduncle. Olive-brown above, silvery beneath.

Total length 255 mm.

Natal."

A specimen, 172 mm. in length, from Mazoe, Mashonaland (J. f.f. Darling), resembles the above.

16. BARBUS ROBINSONI, n. sp.

Depth of body nearly $3\frac{3}{5}$ times in total length excluding caudal, length of head 4 times. Snout rounded, $2\frac{1}{5}$ times in length of head, eye a little more than 4 times, interorbital width $2\frac{1}{2}$ times; mouth sub-inferior, its width $3\frac{3}{4}$ times in length of head; lips moderately developed, lower with a small median lobe. Two barbels on each side, anterior about $\frac{3}{4}$ diameter of eye, posterior slightly longer than eye.

Dorsal iv 9; situated nearer to root of caudal than to eye, border concave; last simple ray slightly enlarged, bony, flexible, segmented down to its basal third, nearly as long as head. Anal iii 5; reaching to caudal. Pectoral nearly as long as head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{4}$ times as long as deep. Scales longitudinally striated $30\frac{6}{5\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimen), silvery, darker above than below; distal extremity of dorsal dark.

One specimen, 173 mm. in length, from Natal (Romer Robinson).

17. BARBUS AUREUS, Cope.

Labeobarbus aureus, Cope, Tr. Amer. Philos. Soc. (2), xiii., 1869, p. 406.

Barbus aureus, Bouleng., Ann. and Mag. N.H. (7), xix., 1907, p. 391, and Cat. Fresh. Fish. Afr., ii., p. 90, fig. 68 (1911).

Depth of body about equal to length of head, which is $3\frac{7}{10}$ to $3\frac{9}{10}$ times in total length excluding caudal. Snout rounded, feebly projecting beyond mouth, $3\frac{1}{4}$ to $3\frac{1}{2}$ times in length of head; eye $4\frac{2}{5}$ to $4\frac{3}{5}$ times in length of head, interorbital width about 3 to $3\frac{1}{2}$ times; mouth curved, its width $3\frac{1}{10}$ to $3\frac{1}{12}$ times in length of head;

lower jaw with a sharp rounded edge; lips thin, lower not extending across chin, sometimes with a small median lobe. Two barbels on each side, equal or posterior the longer, as long as or a little shorter than the eye.

Dorsal iii 8; about equally distant from occiput and root of caudal, border slightly concave; last simple ray not enlarged, flexible, smooth, $\frac{3}{4}$ to $\frac{4}{5}$ length of head. Anal iii 5; scarcely reaching root

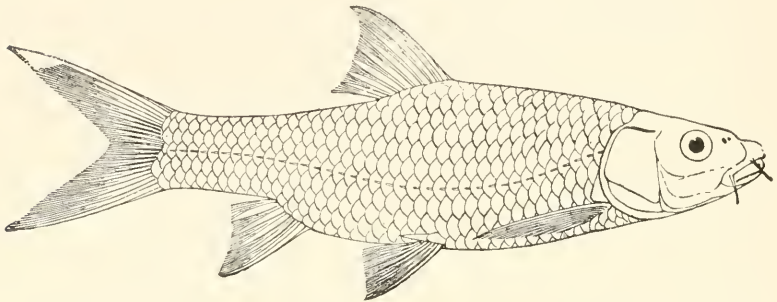


FIG. 47.—*Barbus aurcus*. $\frac{1}{3}$.

of caudal. Pectoral $\frac{3}{4}$ to $\frac{4}{5}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{2}{5}$ to $1\frac{3}{5}$ times as long as deep. Scales longitudinally striated, 35–37 $\frac{5\frac{1}{2}}{5\frac{3}{4}}$, 3 between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimens), yellowish brown, darker above.

Four specimens, ranging from 117–151 mm. in length, from Natal (Durban Museum).

* 18. *BARBUS LOBOCHILUS*, Blgr.

Bouleng., Cat. Fresh. Fish. Afr., ii., p. 92, fig. 71 (1911).

“Depth of body equal to length of head, 4 times in total length. Snout pointed, 3 times in length of head, eye $4\frac{1}{2}$ times in length of head, interorbital width 3 times; mouth inferior, its width 4 times in length of head; both lips much developed, each produced into a long pointed median lobe; two barbels on each side; anterior $\frac{3}{4}$ length of eye, posterior as long as eye.

Dorsal iv 8; equally distant from occiput and from root of caudal, border concave; last simple ray not enlarged, smooth, $\frac{2}{3}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{2}{3}$ length of head.

not reaching ventral; base of latter a little behind origin of dorsal. Caudal peduncle $1\frac{1}{3}$ times as long as deep. Scales longitudinally

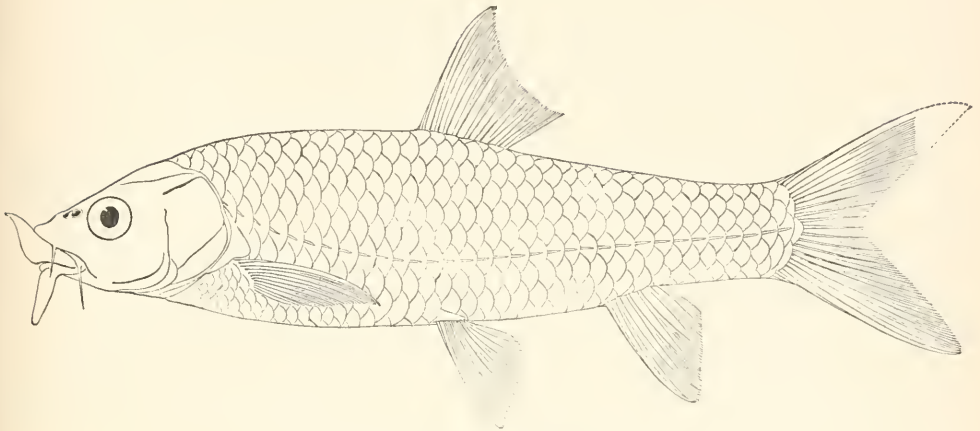


FIG. 48.—*Barbus lobocheilus*. $\frac{2}{3}$.

striated, 32–33 $\frac{5\frac{1}{2}}{5\frac{1}{3}}$, 2 between lateral line and ventral, 14 round caudal peduncle.

Dark olive above, yellowish beneath.

Total length 170 millim.

Natal.”

* 19. *BARBUS ZAMBESENSIS*, Peters.

Labeobarbus zambezensis, Peters, Mon. Berl. Ac., 1852, p. 683, and Reise Mossamb., iv., p. 49, pl. x., fig. 2 (1868).

Barbus zambezensis, Günth., Cat. Fish., vii., p. 105 (1868).

Barbus zambezensis, Bouleng., Cat. Fresh. Fish. Afr., ii., p. 91, fig. 70 (1911).

“Depth of body equal to length of head, 4 times in total length. Snout about $\frac{1}{3}$ length of head; eye 4 times in length of head, equal to interorbital width; mouth inferior; both lips much developed, each more or less produced into a pointed median lobe; two barbels on each side, posterior twice as long as anterior and as long as eye.

Dorsal iv 9; equally distant from eye and from root of caudal, border concave; last simple ray not enlarged, smooth, nearly as long as head. Anal iii 5; not reaching caudal. Pectoral shorter than head, not reaching ventral; latter below middle of dorsal. Caudal peduncle

about $1\frac{1}{3}$ times as long as deep. Scales longitudinally striated, 32-34 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 3 between lateral line and ventral, 12 round caudal peduncle.

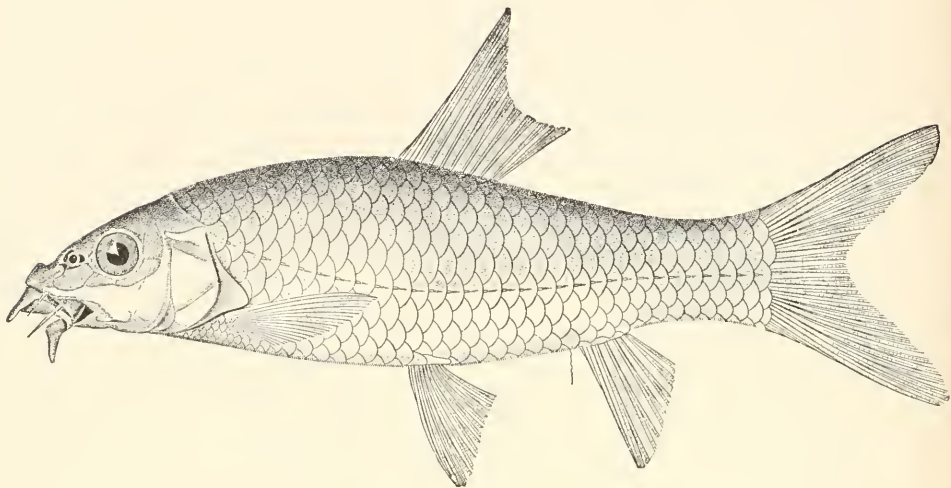


FIG. 49.—*Barbus zambesensis*.

Upper parts and fins green, lower parts silvery tinged with yellow. Total length 130 millim.

Zambezi. Types in Berlin Museum."

* 20. *BARBUS CHILOTES*, Blgr.

Bouleng., Ann. and Mag. N.H. (8), ii., 1908, p. 494, and Cat. Fresh. Fish. Afr., ii., p. 93, fig. 72 (1911).

"Depth of body $3\frac{1}{4}$ times in total length, length of head 4 or $4\frac{1}{4}$ times. Snout rounded, about $\frac{1}{3}$ length of head; eye $3\frac{1}{2}$ (young) to 5 times in length of head; interorbital width $2\frac{1}{2}$ to $2\frac{2}{3}$ times; mouth inferior, its width $3\frac{1}{2}$ to 4 times in length of head; both lips much developed, each more or less produced into an obtusely pointed median lobe; two barbels on each side, posterior nearly twice as long as anterior and a little shorter than eye.

Dorsal iii 9-10; equally distant from eye and from root of caudal, or a little nearer latter, border concave; last simple ray not enlarged, flexible, smooth, $1\frac{1}{2}$ times as long as head. Anal iii 5; reaching or nearly reaching caudal. Pectoral as long as head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle

$1\frac{1}{3}$ times as long as deep. Scales longitudinally striated, $30-32\frac{4\frac{1}{2}}{4\frac{1}{4}}$
 $2-2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

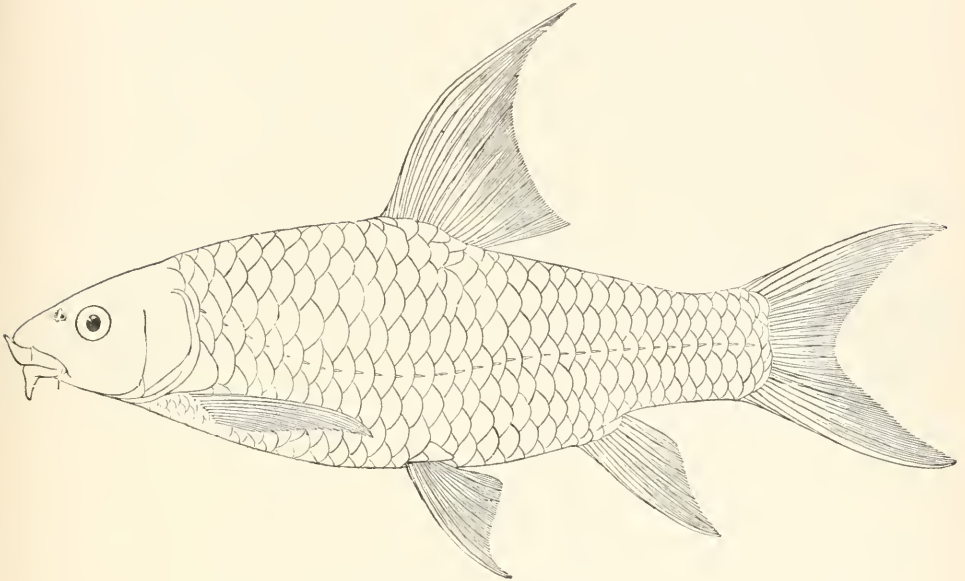


FIG. 50.—*Barbus chilotes*. $\frac{1}{2}$.

Pinkish brown above, the scales edged with blackish, white beneath; fins dark grey.

Total length 235 millim.

Upper Zambezi.”

21. *BARBUS GUNNINGI*, n. sp.

Depth of body $3\frac{1}{5}$ to $3\frac{4}{5}$ times in total length excluding caudal, length of head $3\frac{2}{5}$ to $3\frac{3}{5}$ times. Snout obtusely pointed, not projecting beyond mouth, $2\frac{3}{10}$ to $2\frac{4}{5}$ times in length of head, eye 5 to $5\frac{2}{5}$ times, interorbital width $2\frac{2}{5}$ to 3 times; mouth sub-inferior, its width $2\frac{2}{3}$ to 3 times in length of head; both lips greatly developed, each more or less strongly produced into an obtusely pointed median lobe. Two barbels on each side, anterior $\frac{1}{2}$ to $\frac{2}{5}$ diameter of eye, posterior $\frac{2}{5}$ to $1\frac{1}{5}$ times.

Dorsal iv 9; about equally distant from eye and from root of caudal, or a little nearer to the latter; border concave; last simple ray segmented, moderately enlarged, bony, not serrated, from $\frac{7}{10}$ to

$\frac{9}{10}$ length of head. Anal iii 5; reaching, or almost reaching, root of caudal. Pectoral $\frac{2}{3}$ to $\frac{1}{5}$ length of head, not reaching ventral; base of latter below middle or anterior third of dorsal. Caudal peduncle $1\frac{3}{10}$ to $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, 28-30 $\frac{5-5\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$ -3 between lateral line and root of ventral, 12 round caudal peduncle.

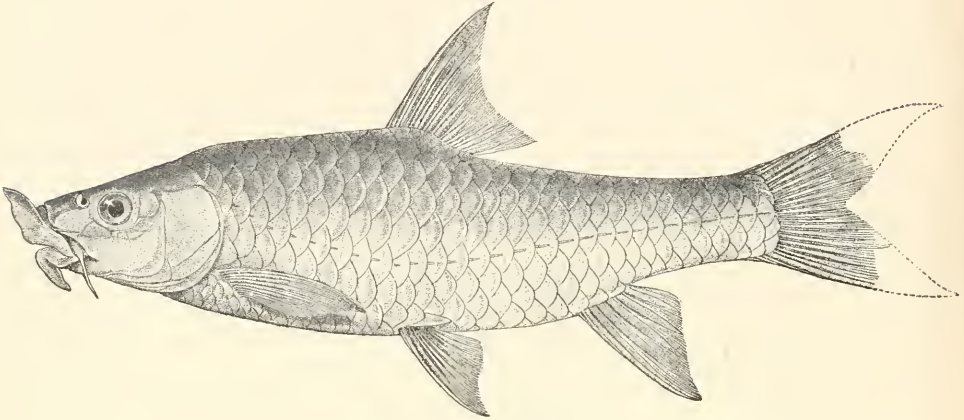


FIG. 51. *Barbus gunningi*. ♂.

Colour (of preserved specimens), dark yellowish brown above, lighter beneath.

One specimen, 238 mm. in length, from Thabina River, Transvaal.

Six specimens, ranging from 142-265 mm. in length, from Pienaars River, Transvaal.

One specimen, 202 mm. in length, from Six-mile Spruit, Pretoria District, Transvaal.

22. BARBUS SWIERSTRÆ, n. sp.

Depth of body $3\frac{2}{5}$ to $3\frac{3}{5}$ times in total length excluding caudal, length of head 4 to $4\frac{3}{10}$ times. Snout blunt, $2\frac{3}{5}$ to 3 times in length of head; eye $5\frac{1}{5}$ to $5\frac{3}{5}$ times in length of head, interorbital width $2\frac{2}{5}$ to $2\frac{3}{4}$ times; mouth inferior, its width $2\frac{2}{5}$ to $2\frac{1}{5}$ times in length of head; lips moderate, lower with a small mental lobe, lower jaw rather sharp-edged. Two barbels on each side, sub-equal or posterior the longer, $\frac{3}{5}$ to about as long as eye. Snout and head covered with minute tubercles.

Dorsal iv 9; equally distant from eye and from root of caudal, border slightly concave; last simple ray slightly enlarged, bony,

segmented down to basal third, nearly as long as head. Anal iii 5; reaching caudal. Pectoral $\frac{4}{5}$ to $\frac{9}{10}$ length of head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, 28-30 $\frac{5}{4\frac{1}{3}}$, 2 between lateral line and ventral, 12 round caudal peduncle.

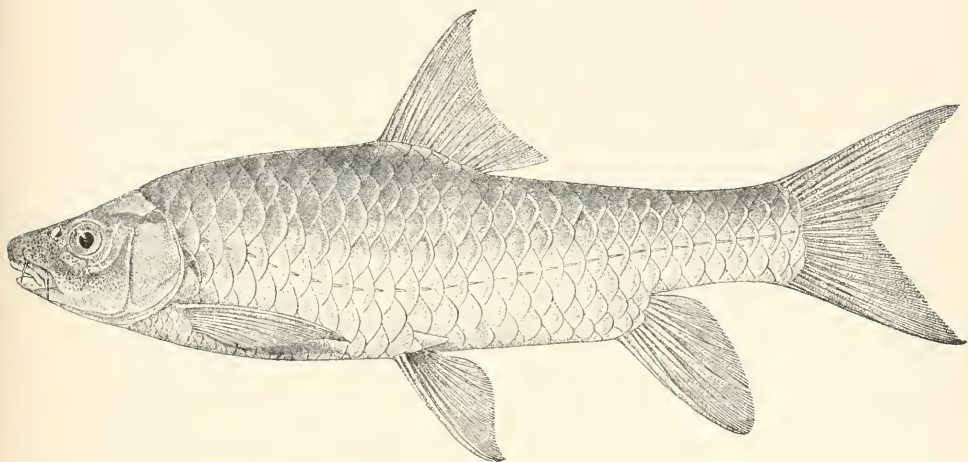


FIG. 52.—*Barbus swierstræ*. $\frac{1}{2}$.

Colour (of preserved specimens), dark brown above, yellowish on sides and belly.

One specimen, 310 mm. in length, from Thabina River, Transvaal;

One specimen, 258 mm. in length, from Dwaars River, Transvaal;

One specimen, 231 mm. in length, from Magalies River, Transvaal;

One specimen, 223 mm. in length, from Pienaars River, Transvaal (C. J. Swierstra).

* 23. *BARBUS ALTIDORSALIS*, Blgr.

Bouleng., Ann. and Mag. N.H. (8), ii., 1903, p. 493, and Cat. Fresh. Fish. Afr., ii., p. 101, fig. 80 (1911).

“Depth of body 3 times in total length, length of head $4\frac{1}{2}$ times. Snout rounded, $3\frac{1}{2}$ times in length of head, with small nuptial tubercles on its sides; eye 5 times in length of head, interorbital width $2\frac{1}{2}$ times; mouth inferior, its width 3 times in length of head; lips thick, lower continuous across chin; two barbels on each side, equal, $\frac{1}{3}$ diameter of eye.

Dorsal iii 9; equally distant from eye and from caudal; border

deeply notched behind third branched ray; last simple ray not enlarged, smooth, anterior branched rays also much elongate, $1\frac{2}{3}$ times length of head. Anal iii 5; reaching beyond root of caudal. Pectoral a little longer than head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{1}{4}$ times as long as

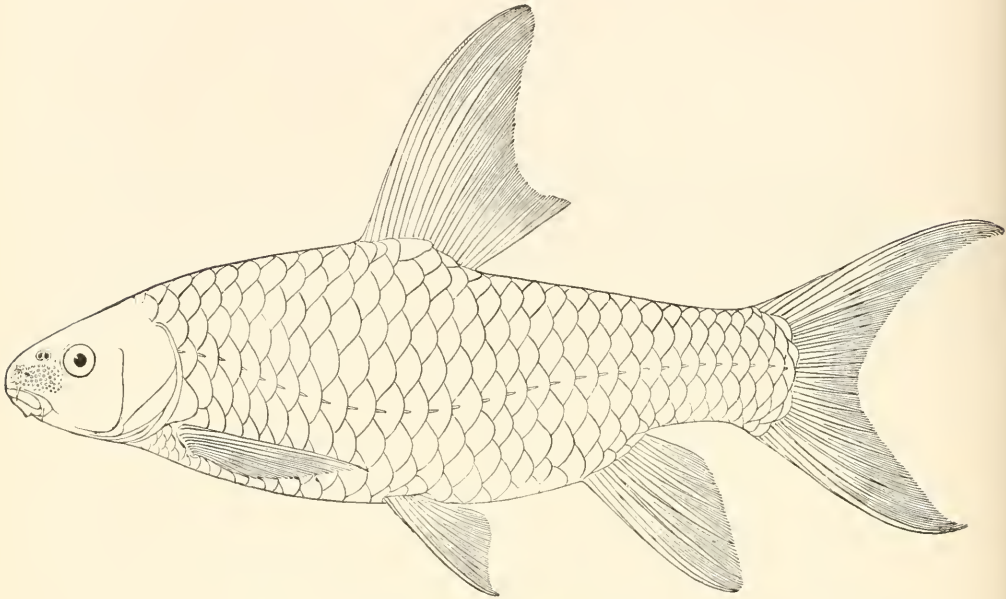


FIG. 53.—*Barbus altidorsalis*. $\frac{1}{3}$.

deep. Scales longitudinally striated, $28\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2 between lateral line and ventral, 12 round caudal peduncle.

Brownish above, the scales darker at the base, pink on the sides, white beneath; fins yellow, blackish towards the edge.

Total length 360 millim.

Upper Zambezi."

24. BARBUS RHODESIANUS, Blgr.

Bouleng., Proc. Zool. Soc., 1902, ii., p. 14, pl. ii., fig. 2, Mem. Manchest. Philos. Soc., li., 1907, No. 12, p. 2, and Cat. Fresh. Fish. Afr., ii., p. 95, fig. 74 (1911).

"Depth of body $3\frac{1}{2}$ to $3\frac{2}{3}$ times in total length, length of head 4 to $4\frac{2}{3}$ times. Snout rounded, $\frac{1}{3}$ length of head; eye $3\frac{2}{3}$ to $4\frac{1}{2}$ times in length of head, interorbital width $2\frac{1}{2}$ times; mouth inferior, its

width $3\frac{1}{2}$ to 4 times in length of head; lower jaw with angular edge; lips thin, lower restricted to the sides; two barbels on each side, sub-equal, about $\frac{1}{2}$ diameter of eye.

Dorsal iii 8-9; equally distant from eye and from root of caudal, border notched; last simple ray not enlarged, flexible, smooth, $\frac{2}{3}$ to $\frac{3}{4}$ length of head. Anal ii 5; nearly reaching caudal. Pectoral a little shorter than head, not reaching ventral, the base of which is

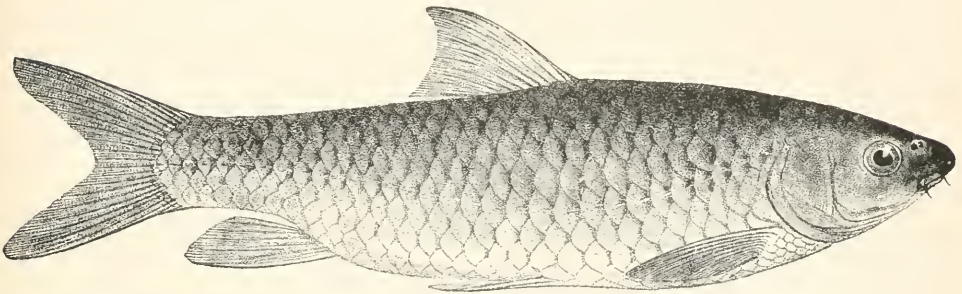


FIG. 54.—*Barbus rhodesianus*. $\frac{1}{2}$.

below middle of dorsal. Caudal peduncle $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, 30-32 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ -3 between lateral line and ventral, 12 round caudal peduncle.

Dark olive-brown above, silvery below; fins dark.

Total length 280 millim.

Mashonaland, N.E. Rhodesia (Zambesi System)."

25. BARBUS VICTORIAE, Blgr.

Bouleng., Ann. and Mag. N.H. (8), ii., 1908, p. 492, and Cat. Fresh. Fish. Afr., ii., p. 96, fig. 75 (1911).

"Depth of body 3 times in total length, length of head $4\frac{1}{2}$ times. Snout rounded, $\frac{1}{3}$ length of head; eye 5 times in length of head, interorbital width $2\frac{1}{3}$ times; mouth inferior, its width 3 times in length of head; lower jaw with a nearly straight sharp edge, covered with a thin horny sheath; lips rather thick, papillose, lower restricted to the sides; two barbels on each side, anterior $\frac{1}{3}$, posterior $\frac{1}{2}$ diameter of eye.

Dorsal iv 8; equally distant from eye and from root of caudal, border concave; last simple ray not enlarged, flexible, smooth, $1\frac{1}{3}$ times length of head. Anal iii 5; nearly reaching caudal. Pectoral as long as head, not reaching ventral, the base of which is below

middle of dorsal. Caudal peduncle as long as deep. Scales longitudinally striated, 30-31 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

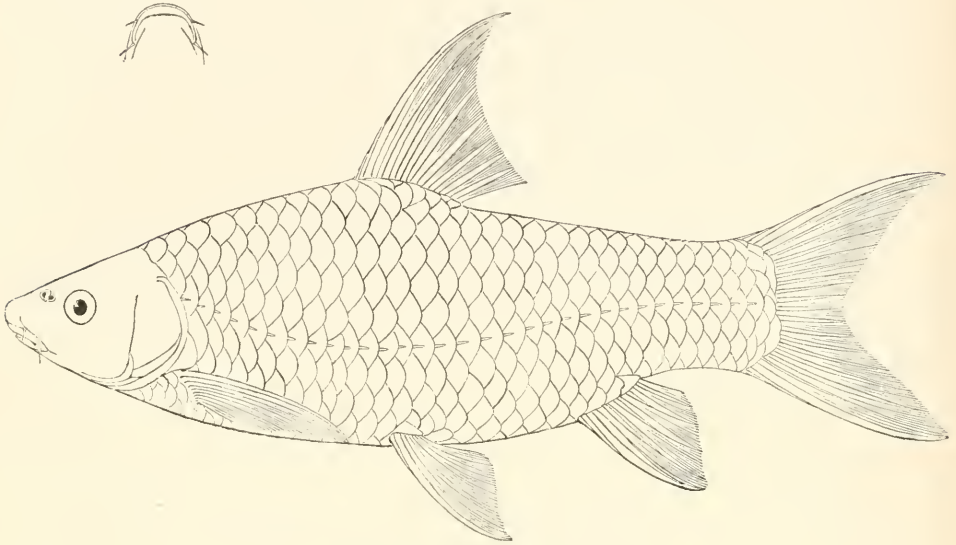


FIG. 55.—*Barbus victor*. $\frac{1}{3}$.

Pinkish brown above, each scale blackish at the base; pinkish white beneath; fins dark grey.

Total length 320 millim.

Upper Zambezi. Gorge below Victoria Falls, Zambezi River (A. Stephenson)."

26. *BARBUS NASUTUS*.

("Morobe".)

Varicorhinus nasutus, Gilchr. and Thomp., Ann. and Mag. N.H., viii., 1911, p. 477.

Depth of body $3\frac{3}{10}$ times in total length excluding caudal, length of head $4\frac{2}{10}$ times. Width of head about $\frac{2}{3}$ its length; snout pointed and prominent, 3 times diameter of eye and a little shorter than postocular portion of head; eye lateral, 7 times in length of head and $3\frac{1}{2}$ times in interorbital width; width of mouth $2\frac{3}{10}$ times in length of head; lips moderately developed, lower restricted to the sides; lower jaw with a sharp edge; rostral flap pointed and overlaps symphysis of upper jaw; a double row of papillæ behind pre-

maxillary. Two barbels on each side, the posterior longer than anterior and $\frac{4}{5}$ diameter of eye.

Dorsal iv 9; border slightly emarginate; last simple ray not enlarged, flexible, smooth, $\frac{9}{10}$ length of head and, as well as the first 2 branched rays, has a skinny flap on each side along the greater part of the posterior edge. Anal iii 5; similar to dorsal, reaches base of caudal. Pectoral a little more than $\frac{1}{5}$ length of head and not reaching to ventral, which is inserted below posterior half or middle of dorsal. Caudal forked; caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales longitudinally striated, $30\frac{2}{3}$, lateral line very indistinct anteriorly and marked on posterior half of body by small round holes; 3 rows of scales between lateral line and ventral,

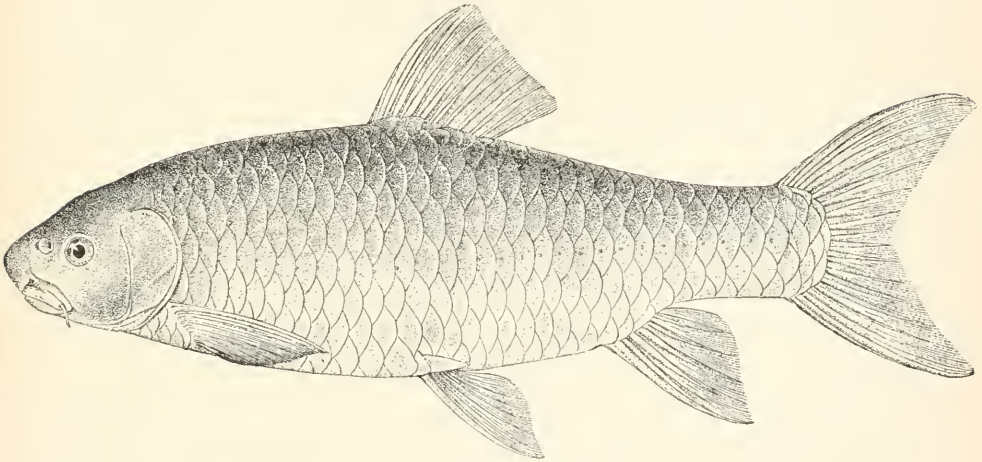


FIG. 56.—*Barbus nasutus*. $\frac{1}{4}$.

12 round caudal peduncle. The scales on the body are very large, those below posterior margin of dorsal being the largest and more than twice diameter of eye; scales on the belly much smaller; head entirely scaleless.

Colour (of preserved specimen), bluish above, flesh-coloured below.

One specimen, 482 mm. in length, from the gorge below Victoria Falls, Zambezi River (F. W. Sykes).

One specimen, 360 mm. in length, from Sabi River, Transvaal (J. S. Hamilton).

27. *BARBUS SABIENSIS*, n. sp.

Depth of body $3\frac{1}{2}$ to $3\frac{1}{2}$ times in total length excluding caudal, length of head 4 to $4\frac{2}{3}$ times. Snout rounded, feebly projecting, $2\frac{2}{3}$

to $2\frac{1}{5}$ times in length of head, eye $4\frac{1}{3}$ to $5\frac{1}{5}$ times, interorbital width $2\frac{1}{6}$ to $2\frac{1}{2}$ times; mouth inferior, its width $2\frac{1}{3}$ to $3\frac{1}{5}$ times in length of head; lips thin, lower restricted to the sides, lower jaw with an angular edge. Two barbels, anterior $\frac{3}{5}$ to $\frac{3}{5}$ diameter of eye, posterior $\frac{7}{10}$ to slightly longer than eye.

Dorsal iv 9; originating in advance of ventrals, equally distant from nostrils or eye and from root of caudal, upper border concave; last simple ray very slightly enlarged, bony, segmented down to its basal third, about as long as head. Anal iii 5; reaching or scarcely reaching caudal. Pectoral $\frac{4}{5}$ to $\frac{9}{10}$ length of head, not reaching ventral, the base of which is below middle of dorsal. Caudal peduncle $1\frac{1}{4}$ to $1\frac{1}{2}$ times as long as deep. Scales large, with slightly wavy longitudinal striations, 28-30 $\frac{5\frac{1}{2}}{4\frac{1}{2}}$ $2\frac{1}{2}$ -3 between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimens), dark or reddish brown above, silvery beneath; dorsal and caudal with a greenish tinge.

Two specimens, 368 mm., 205 mm., in length respectively, from Sabi River, Transvaal (J. S. Hamilton).

One specimen, 218 mm. in length, from Magalies River, Transvaal (C. J. Swierstra).

Two specimens, 148 mm., 128 mm. in length respectively, from Malalane, Transvaal (Rev. F. A. Rogers).

This species closely resembles *B. rhodesianus*.

28. *BARBUS SEEBERI*, n. sp.

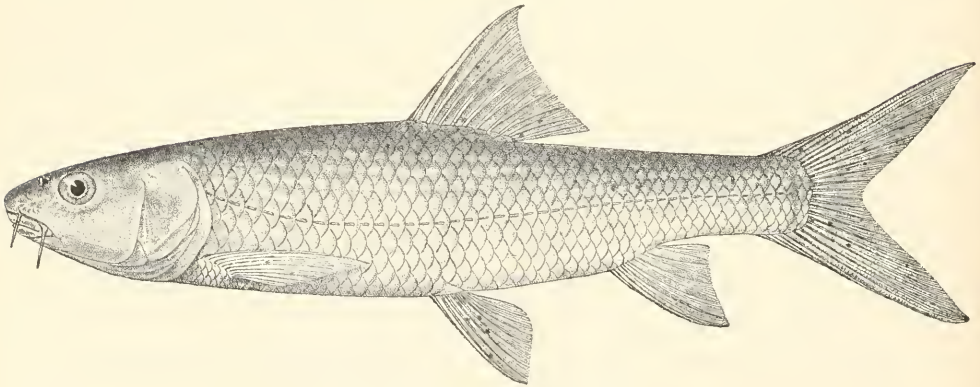


FIG. 57.—*Barbus seeberi*. $\frac{1}{16}$.

Depth of body $3\frac{1}{2}$ to $4\frac{1}{4}$ times in total length excluding caudal, length of head 3 to 4 times. Snout rounded, feebly projecting

beyond mouth, $2\frac{2}{5}$ to $3\frac{1}{2}$ times in length of head; eye supero-lateral, $4\frac{3}{10}$ to 5 times in length of head, interorbital width $3\frac{1}{4}$ to 4 times; lips moderate, lower interrupted on chin. Two barbels on each side, posterior the longer, $\frac{2}{3}$ to as long as eye.

Dorsal iv 9; equally distant from occiput and from root of caudal, border concave; last simple ray not enlarged, flexible, segmented, not serrated, $\frac{2}{3}$ to $\frac{1}{5}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{5}$ to $\frac{4}{5}$ length of head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{2}{3}$ times to nearly twice as long as deep. Scales longitudinally striated, 41-44 $\frac{7\frac{1}{2}}{8\frac{1}{2}}$, 4-5 between lateral line and ventral, 16-18 round caudal peduncle.

Colour (of preserved specimens), silvery grey, darker above than below.

Three specimens, ranging from 95-102 mm. in length, from Olifants River, Cape Province (Dr. Seeber).

29. *BARBUS FAIRBAIRNII*, Blgr.

Bouleng., Ann. and Mag. N.H. (8), ii., 1908, p. 493, and Cat. Fresh. Fish. Afr., ii., p. 97, fig. 76 (1911).

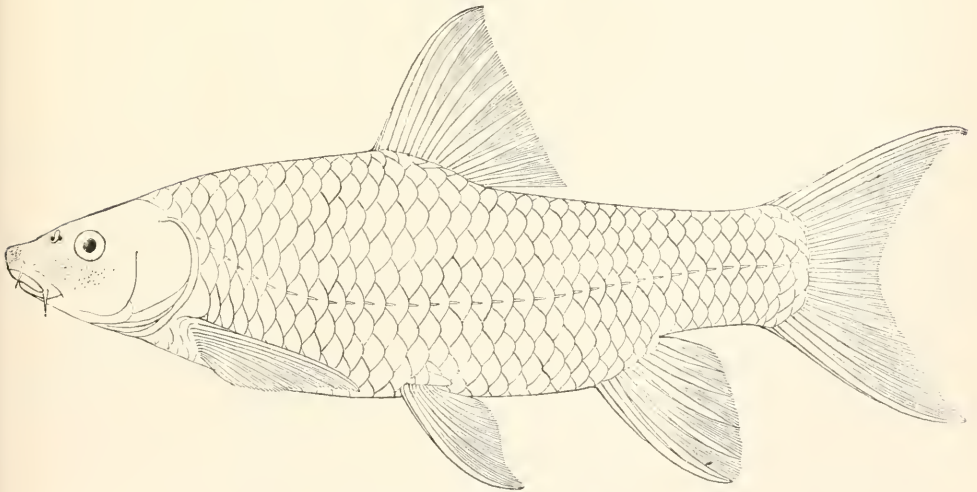


FIG. 58.—*Barbus fairbairnii*. $\frac{1}{3}$.

Depth of body $3\frac{7}{10}$ times in total length excluding caudal, length of head nearly $4\frac{1}{2}$ times. Snout obtusely pointed, covered with horny tubercles on top and sides, $2\frac{1}{2}$ times in length of head; eye $6\frac{1}{4}$ times in length of head, interorbital width $2\frac{1}{10}$ times; mouth

inferior, its width $2\frac{1}{3}$ times in length of head; lips moderate, lower restricted to the sides. Two barbels on each side, sub-equal, posterior $\frac{3}{4}$ diameter of eye.

Dorsal iii 8; equally distant from eye and from root of caudal, border feebly concave; last simple ray not enlarged, smooth, nearly as long as head. Anal iii 5; reaching caudal. Pectoral $\frac{9}{10}$ length of head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{1}{8}$ times as long as deep. Scales longitudinally striated, $33\frac{5\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimen), brown, darker above than below; scales dark at the base.

One specimen, 445 mm. in length, from Zambezi River (A. Stephenson).

* 30. *BARBUS CODRINGTONII*, Blgr.

Bouleng., Ann. and Mag. N.H. (8), ii., 1908, p. 492, and Cat. Fresh. Fish. Afr., ii., p. 98, fig. 77 (1911).

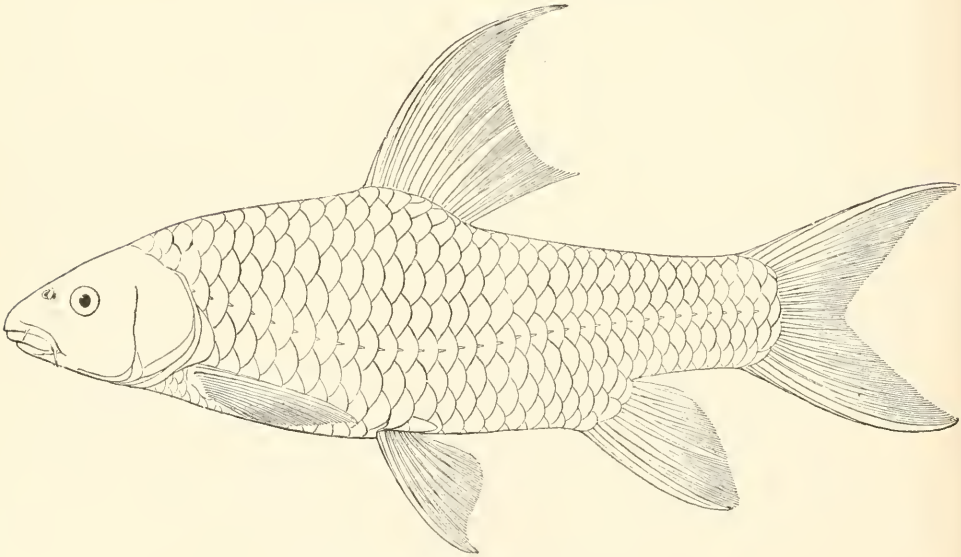


FIG. 59.—*Barbus codringtonii*. $\frac{1}{3}$.

“Depth of body 3 times in total length, length of head 4 times. Snout rounded, $\frac{1}{3}$ length of head; eye 6 times in length of head, interorbital width $2\frac{1}{3}$ times; mouth inferior, its width 3 times in

length of head ; lips moderately developed, lower broadly interrupted on chin ; two barbels on each side, anterior $\frac{1}{2}$, posterior $\frac{2}{3}$ diameter of eye.

Dorsal iii 9 ; equally distant from eye and from root of caudal, border concave ; last simple ray not enlarged, flexible, smooth, $1\frac{1}{2}$ times as long as head. Anal iii 5 ; reaching caudal. Pectoral as long as head, not reaching ventral ; base of latter below middle of dorsal. Caudal peduncle slightly longer than deep. Scales longitudinally striated, $32\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2 between lateral line and ventral, 12 round caudal peduncle.

Brown above, the scales blackish at the base, pink on the sides, white beneath ; dorsals and ventrals yellow.

Total length 390 millim.

Upper Zambezi."

31. BARBUS TRIMACULATUS, Peters.

Barbus trimaculatus, Peters, Berl. Ac., 1852, p. 683, and Reise Mossamb., iv., p. 55, pl. xi., fig. 4 (1868) ; Günth., Cat. Fish., vii., pp. 106 and 483 (1868), and Proc. Zool. Soc., 1893, p. 619 ; Steindr., Sitzb. Ak. Wien, ciii., i., 1894, p. 452 ; M. Weber, Zool. Jahrb. Syst., x., 1897, p. 151 ; Bouleng., Cat. Fresh. Fish. Afr., ii., p. 104, fig. 82 (1911).

Barbus breijeri, M. Weber, t.c., p. 154.

Barbus katangæ, Bouleng., Ann. Mus. Congo Zool., i., p. 132, pl. xlix., fig. 1 (1900), and Poiss., Bass. Congo, p. 224 (1901).

Barbus decipiens, Bouleng., Ann. and Mag. N.H. (7), xix., 1907, p. 492.

Depth of body 3 to 5 times in total length excluding caudal, length of head $3\frac{2}{3}$ to $4\frac{2}{3}$ times. Snout rounded, as long as or a little longer than the eye in adult ; eye $3\frac{1}{4}$ to $4\frac{1}{5}$ times in length of head, interorbital width $2\frac{2}{3}$ to $3\frac{2}{3}$ times ; mouth sub-inferior, with lips feebly developed and interrupted on chin. Two barbels on each side, anterior $\frac{2}{3}$ to $1\frac{1}{5}$ times diameter of eye, posterior $\frac{5}{6}$ to $1\frac{3}{5}$ times.

Dorsal iii 8 (rarely iii 7) ; equally distant from anterior margin or third of eye and from root of caudal, border slightly concave ; last simple ray strong, bony, not serrated, nearly straight or slightly curved, $\frac{3}{4}$ to $1\frac{1}{4}$ times length of head. Anal iii 5 ; not reaching caudal. Pectoral $\frac{2}{3}$ to once length of head, not reaching ventral ; base of latter below or partly in front of anterior rays of dorsal. Caudal peduncle $1\frac{1}{2}$ to $2\frac{1}{2}$ times as long as deep. Scales radiately

striated, 30–34 $\frac{5\frac{1}{2}}{5\frac{3}{4}}$, 3–4 between lateral line and ventral, 14–16 round caudal peduncle.

Colour (of preserved specimens), brown above, yellowish or silvery on sides and belly; the markings are subject to considerable variation. Usually there are 3 more or less distinct roundish or bar-like spots on the body, the first 2 above the lateral line and situated one in front and one behind base of dorsal, the third is at the base of the caudal fin and is traversed by the lateral line. These spots may sometimes be almost or entirely indistinguishable, or may be reduced to 1 at the base of the caudal only; they may all 3 be connected by a dark band, or the last 2 only may thus be joined, sometimes a narrow dark line only traverses the 3 spots.

Forty-two specimens, ranging from 54–107 mm. in length, from Dwaars River, Transvaal.

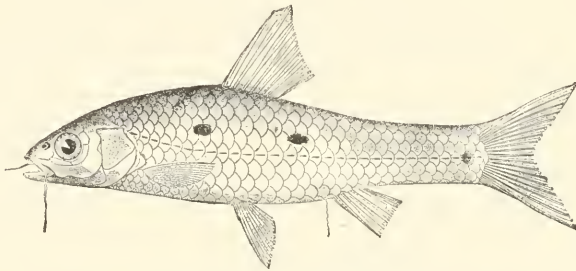


FIG. 60.—*Barbus trimaculatus*.

Three specimens, ranging from 74–85 mm. in length, from spruit at Pietersburg, Transvaal.

Three specimens, ranging from 73–96 mm. in length, from Six-mile Spruit, Transvaal.

Four specimens, ranging from 73–80 mm. in length, from Apjes River, Transvaal.

Two specimens, 64 mm., 87 mm. in length respectively, from Johannesburg, Transvaal.

Five specimens, ranging from 71–86 mm. in length, from Thabeni and Letsetelli Rivers, Zoutpansberg District, Transvaal.

One specimen, 83 mm. in length, from Manzemntonto River, Transvaal (J. S. Hamilton).

Three specimens, ranging from 70–76 mm. in length, from Sabi River, Transvaal (Major Stevenson Hamilton).

Numerous specimens, ranging from 40–126 mm. in length, from Ngwanetzi River, Transvaal (J. S. Hamilton).

Twenty-one specimens, ranging from 72–116 mm. in length, from Pienaars River, Transvaal (C. J. Swierstra).

Four specimens, ranging from 61–80 mm. in length, from Magalies River, Transvaal (C. J. Swierstra).

Three specimens, ranging from 60–74 mm. in length, from White River, Nelspoort, Transvaal (A. T. Cooke).

One specimen, 62 mm. in length, from Olifants River, Lydenburg District, Transvaal.

Four specimens, ranging from 81–96 mm. in length, from Kafue River (tributary of the Zambezi) (J. Drury).

Five specimens, ranging from 44–52 mm. in length, from Umsindusi River, Mbombe District, Zululand. (Pietermaritzburg Museum).

One specimen, 85 mm. in length, locality unknown.

This fish is also reported from Southern Angola.

32. *BARBUS SERRA*, Peters.

(Fresh-water Snoek.)

Peters, Mon. Berl. Ac., 1864, p. 394; Günth., Cat. Fish., vii., p. 94 (1868); Bouleng., Cat. Fresh. Fish. Afr., ii., p. 114, fig. 91 (1911).

Depth of body 4 to $5\frac{1}{10}$ times in total length excluding caudal, length of head $3\frac{1}{8}$ to $3\frac{3}{4}$ times. Snout rounded, $\frac{3}{10}$ to $\frac{2}{5}$ length of

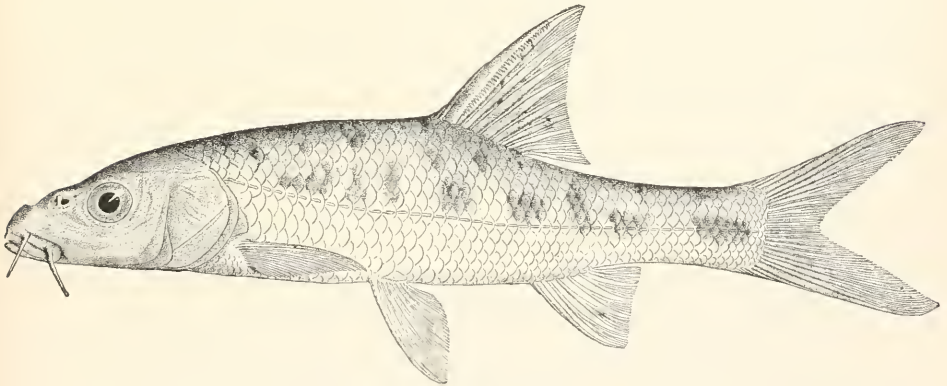


FIG. 61.—*Barbus serra*.

head; eye $3\frac{1}{8}$ to 6 times in length of head, interorbital width 3 to 4 times; mouth terminal, its width $3\frac{3}{8}$ to $4\frac{3}{8}$ times in length of head; lips moderate, interrupted on the chin. Two barbels on each side, equal, 1 to $1\frac{1}{4}$ times diameter of eye.

Dorsal iv 8; equally distant from gill-opening and from root of caudal, border slightly concave; last simple ray very strong, bony, strongly serrated, serrated portion $\frac{2}{3}$ to $\frac{3}{4}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{4}{5}$ length of head, nearly reaching ventral; root of latter entirely in advance of dorsal. Caudal peduncle 2 to $2\frac{1}{5}$ times as long as deep. Scales radiately striated, 42-43 $\frac{7-7\frac{1}{2}}{7}$, 4-5 between lateral line and ventral, 20 round caudal peduncle.

Colour (of preserved specimens), darkish brown above, lighter beneath, or silvery with a dark shade above; some specimens have irregular dark patches or blotches on the body. Dr. Seeber, who supplied the specimens from Olifants River, states that when alive they were of a golden colour with a black stripe on sides; both sexes being of the same colour, but the male easily distinguished by its larger head. They are said to grow to a length of $2\frac{1}{2}$ feet.

Four specimens, ranging from 94 to 162 mm. in length, from Olifants River, Transvaal (Dr. Seeber).

Three specimens, ranging from 50-85 mm. in length, from Olifants River, Clanwilliam, Cape Province (C. J. Leipoldt).

33. BARBUS PALUDINOSUS, Peters.

Barbus paludinosus, Peters, Mon. Berl. Ac., 1852, p. 683, and Reise Mossamb., iv., p. 51, pl. xi., fig. 1 (1868); Günth., Cat. Fish., viii., p. 102 (1868); Bouleng., Cat. Fresh. Fish. Afr., ii., p. 115, fig. 92 (1911); M. Weber, Zool. Jahr. Syst., x., 1897, p. 151.

Barbus welwitschii, Günth., t.c., p. 101.

Barbus vinciguerrai, Pfeiff., Thierw. O-Afr. Fische, p. 62 (1896).

Barbus macropristis, Bouleng., Ann. and Mag. N.H. (7), xiii., 1904, p. 449, and Fish. Nile, p. 241, pl. xlvi, fig. 2 (1907).

Barbus macropristis meruensis, Lönnb., Kilim.-Meru Exped. Fish., p. 3 (1907).

Depth of body $3\frac{1}{2}$ to $4\frac{1}{2}$ times in total length excluding caudal, length of head 3 to 4 times. Snout rounded, about as long as the eye, which is $3\frac{1}{2}$ to $4\frac{1}{2}$ times in length of head; interorbital width $2\frac{1}{2}$ to $3\frac{1}{4}$ times in length of head; mouth terminal or sub-inferior, its width 3 to 4 times in length of head; lips feebly developed. Two barbels on each side, anterior $\frac{1}{4}$ to $\frac{2}{3}$ diameter of eye, posterior $\frac{2}{3}$ to $1\frac{1}{5}$ times.

Dorsal iii 7; equally distant from eye or occiput and from root of caudal, border straight or slightly concave; last simple ray very strong, bony, strongly serrated, $\frac{3}{4}$ to $\frac{9}{10}$ length of head. Anal iii 5;

not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{9}{10}$ length of head, reaching or nearly reaching ventral; base of latter entirely in advance of dorsal. Caudal peduncle $1\frac{3}{4}$ to $2\frac{1}{5}$ times as long as deep. Scales radiately striated, 33-36 $\frac{6-7\frac{1}{2}}{5\frac{1}{2}-6\frac{1}{2}}$, 3-4 between lateral line and ventral, 16-18 round caudal peduncle.

Colour (of preserved specimens), yellowish brown, darker on the back than beneath, or silvery with a dark back; in many specimens there is a more or less distinct dark lateral streak from above origin of lateral line to base of caudal and the upper half of head and opercles is dark.

Five specimens, ranging from 48-76 mm. in length, from Potchefstroom, Transvaal.

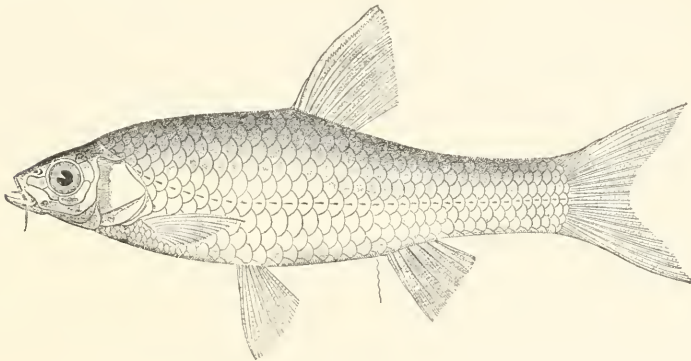


FIG. 62.—*Barbus paludinosus*.

Four specimens, ranging from 48-71 mm. in length, from Little Olifants River, Middelburg, Transvaal.

Five specimens, ranging from 54-64 mm. in length, from Molopo River, Transvaal.

Two specimens, 57 mm., 63 mm. in length respectively, from Pretoria Zoological Gardens, Transvaal.

Three specimens, ranging in length from 54-60 mm., from spruit at Pietersburg, Transvaal.

Numerous specimens from the Sabi, and Ngwanetzi Rivers; also from the Mamzemntonto River, Transvaal (J. S. Hamilton).

Four specimens, ranging from 41-49 mm. in length, from Insiza, Rhodesia (G. French).

It is also reported from East Africa to Angola, Orange River, Natal; and, *teste* Schultze, has been found at Lobatsi, Bechuanaland.

34. *BARBUS BROOKINGI*, n. sp.

Depth of body $3\frac{2}{3}$ times in total length excluding caudal, length of head 4 times. Snout blunt, $3\frac{2}{7}$ times in length of head; eye $4\frac{1}{5}$ times in length of head, interorbital width $3\frac{2}{5}$ times; mouth small, sub-inferior, its width $3\frac{2}{7}$ times in length of head; lips thick, lower cleft in centre and jaw sharp-edged. Two barbels on each side, anterior nearly $\frac{1}{2}$ diameter of eye, posterior $\frac{3}{4}$. A groove across snout in front of nostrils.

Dorsal iii 7; equally distant from eye and from root of caudal, border straight; last simple ray feebly enlarged, feebly serrated at

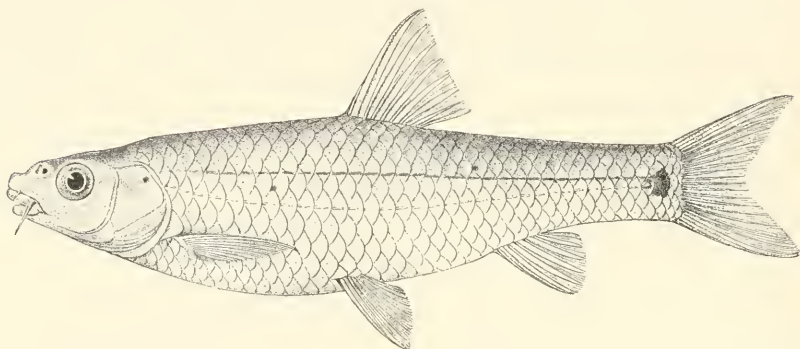


FIG. 63.—*Barbus brookingi*. $\frac{10}{9}$.

distal extremity, curved, nearly $\frac{3}{4}$ length of head. Anal iii 5; not reaching caudal. Pectoral nearly $\frac{2}{3}$ length of head, not reaching ventral; base of latter situated in advance of dorsal. Caudal peduncle $1\frac{2}{3}$ times as long as deep. Scales radiately striated, $33\frac{5\frac{1}{2}}{4\frac{1}{2}}$, $3\frac{1}{2}$ between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimen), light yellowish brown; a dark line from above origin of lateral line to base of caudal, ending in a small dark spot; a dark line on back behind dorsal fin.

One specimen, 92 mm. in length, from East London, Cape Province (H. E. Brooking).

35. *BARBUS HAMILTONI*, n. sp.

Depth of body $3\frac{1}{4}$ to $3\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{3}{5}$ to 4 times. Snout rounded, 3 times in length of head, eye $3\frac{2}{5}$ to 4 times, interorbital width 3 to $3\frac{2}{5}$ times; mouth sub-inferior, its width 3 to $3\frac{2}{5}$ times in length of head; lips moderately

developed, lower continuous across chin. Two barbels on each side, anterior $\frac{2}{3}$ to $\frac{3}{3}$ diameter of eye, posterior $\frac{1}{3}$ to as long as eye.

Dorsal iii 8; equally distant from middle or posterior border of eye and from root of caudal, upper border concave; last simple ray strong, bony, strongly serrated down to basal third, feebly curved, as long as or a little shorter than head. Anal iii 5; not reaching caudal. Pectoral $\frac{7}{10}$ to $\frac{1}{3}$ length of head, not or scarcely reaching to ventral;

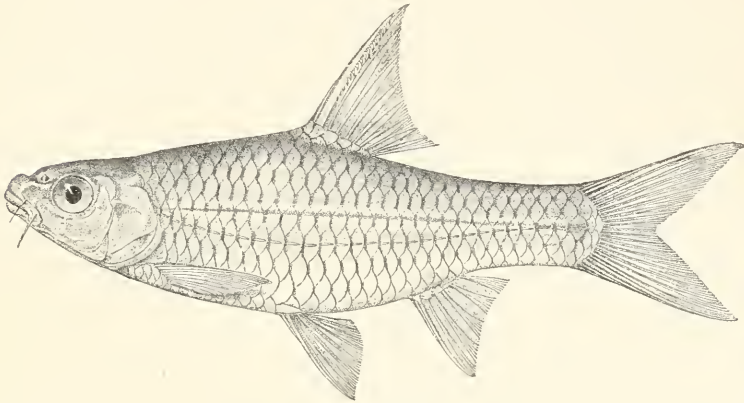


FIG. 64.—*Barbus hamiltoni*. $\frac{3}{2}$.

base of latter slightly in advance of anterior rays of dorsal. Caudal peduncle $1\frac{2}{3}$ to $1\frac{2}{3}$ as long as deep. Scales radiately striated, 29–33 $\frac{5\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimens), silvery, brownish above; a faint dark lateral streak; scales with dark borders.

Three specimens, 67 mm., 68 mm., 72 mm. in length respectively, from Sabi River, Transvaal (J. S. Hamilton).

36. BARBUS LONGICAUDA, Blgr.

Barbus gibbosus (non C. and V.), Peters, Mon. Berl. Ac., 1852, p. 683; Günth., Cat. Fish., vii., p. 101 (1868); Peters, Reise Mos-samb., iv., p. 52, pl. xi., fig. 2 (1868).

Barbus longicauda, Bouleng., Proc. Zool. Soc., 1905, i., p. 63, and Cat. Fresh. Fish. Afr., ii., p. 121, fig. 98 (1911).

Depth of body 4 to $4\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{1}{5}$ to $3\frac{2}{3}$ times. Snout rounded, as long as the eye, which is $3\frac{1}{5}$ to 4 times in length of head, interorbital width 3 times; mouth

terminal; lips moderate. Two barbels on each side, anterior $\frac{1}{3}$ to $\frac{2}{3}$ diameter of eye, posterior about as long as eye.

Dorsal iii 7; equally distant from eye and from root of caudal, border nearly straight; last simple ray strong, bony, serrated, $\frac{2}{3}$ to $\frac{7}{9}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{5}$ to $\frac{3}{4}$ length of head, reaching or scarcely reaching to ventral; first ray of latter slightly in advance of dorsal. Caudal peduncle 2 to $2\frac{1}{3}$ times as long as deep. Scales radiately striated, 35–37 $\frac{6\frac{1}{2}}{5\frac{1}{2}}$, 3 between lateral line and ventral, 14 round caudal peduncle.

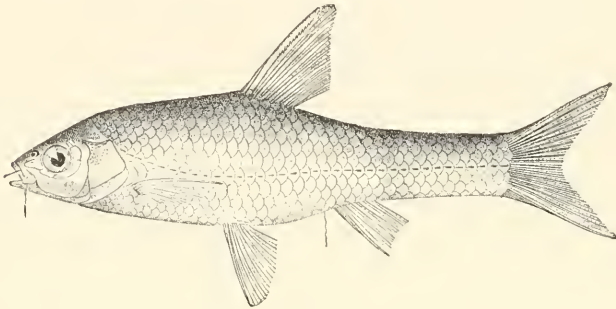


FIG. 65.—*Barbus longicauda*.

Colour (of preserved specimens), pale brown, a little darker above than beneath. In the living state they were markedly paler in colour than specimens of *B. anoplus* found in the stream *outside* this same cave.

Six specimens, ranging from 33–43 mm. in length, from a cave at Wonderfontein, Transvaal.

It is also reported from the Lower Zambezi and Athi River System, East Africa.

37. BARBUS RAPAX, Stdr.

(Silver-fish.)

Steind., Sitzb. Ak. Wien, ciii., i., 1894, p. 451, pl. iv., fig. 2;

Bouleng., Proc. Zool. Soc., 1907, p. 307, and Cat. Fresh.

Fish. Afr., ii., p. 119, fig. 95 (1911).

Depth of body $3\frac{2}{3}$ to 4 times in total length excluding caudal, length of head $3\frac{3}{10}$ to $3\frac{4}{5}$ times. Snout rather pointed, $3\frac{1}{3}$ to $3\frac{2}{3}$ times in length of head, eye $4\frac{3}{10}$ to $6\frac{2}{3}$ times, interorbital width $3\frac{2}{3}$ to $4\frac{1}{2}$ times; top of head depressed; mouth terminal, its width $2\frac{4}{5}$ to 4 times in length of head; chin projecting (specially notable in large specimens); lips moderate, interrupted on chin. Two

barbels on each side, anterior sometimes very feeble and $\frac{1}{5}$ to $\frac{1}{2}$ diameter of eye, posterior $\frac{3}{5}$ to $\frac{7}{10}$ diameter of eye.

Dorsal iv 8; equally distant from centre of eye and from root of caudal, border slightly concave; last simple ray strong, bony, strongly serrated, the serrated part $\frac{2}{5}$ to $\frac{4}{5}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{2}{5}$ to $\frac{4}{5}$ length of head, not reaching ventral; the latter situated below or partly in front of anterior rays of dorsal. Caudal peduncle $1\frac{2}{3}$ to twice as long as deep. Scales

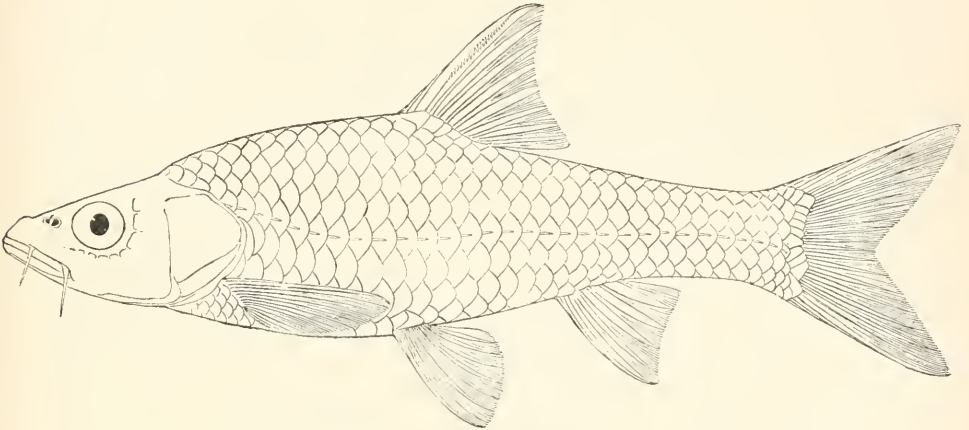


FIG. 66.—*Barbus rapax*.

radiately striated, 30-33 $\frac{5\frac{1}{2}-6\frac{1}{2}}{4\frac{1}{2}-5\frac{1}{2}}$, $2\frac{1}{2}$ to 3 between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimens), brown on back, yellowish on sides and belly.

Nine specimens, ranging from 56-240 mm. in length, from Dwaars River, Transvaal.

Three specimens, 127-226 mm. in length, from Pienaars River, Transvaal (C. J. Swierstra).

It is also reported from Eastern Bechuanaland (Limpopo System).

* 38. BARBUS ARGENTEUS, Günth.

Günth., Cat. Fish., vii., p. 103 (1868); Bouleng., Boll. Mus. Torin., xi., 1896, No. 260, p. 2, and Cat. Fresh. Fish. Afr., ii., p. 136, fig. 113 (1911).

“Depth of body 3 to $3\frac{1}{2}$ times in total length, length of head $3\frac{1}{2}$ to 4 times. Snout obtusely pointed, as long as eye, which is $3\frac{1}{2}$ to 4 times

in length of head ; interorbital width 3 to $3\frac{1}{2}$ times in length of head ; mouth sub-inferior, its width $3\frac{1}{2}$ to 4 times in length of head ; lips feebly developed ; barbels two on each side, posterior 1 to $1\frac{1}{2}$ times as long as eye, anterior a little shorter.

Dorsal iii-iv 8 ; nearly equally distant from end of snout and from root of caudal, or a little nearer latter, border slightly concave ; last simple ray very strong, bony, strongly serrated, the serrated part $\frac{2}{3}$ to $\frac{4}{5}$ length of head. Anal iii 5 ; not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{3}{4}$

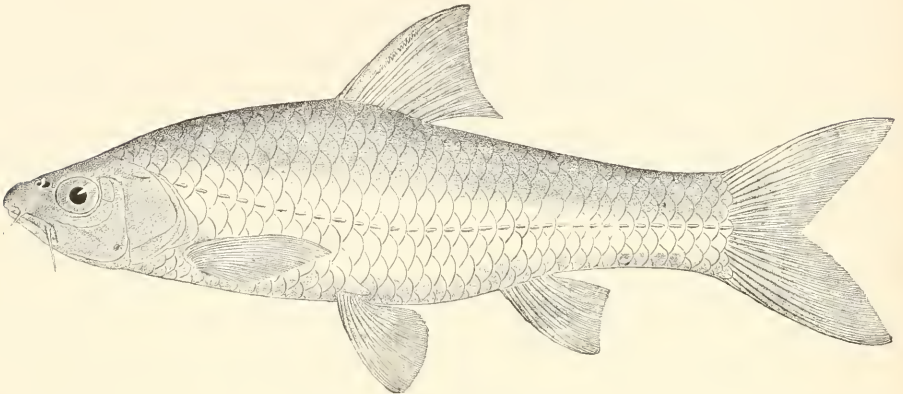


FIG. 67.—*Barbus argenteus*.

length of head, not quite reaching ventral ; latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{2}$ to $1\frac{2}{3}$ times as long as deep. Scales radiately striated, 29-33 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ -3 between lateral line and ventral, 12-14 round caudal peduncle.

Uniform silvery, back brownish.

Total length 110 millim.

Angola ; Upper Zambezi."

39. BARBUS KERSTENII, Peters.

Barbus kerstenii, Peters, Mon. Berl. Ac., 1868, p. 601.

Barbus nigrolinea, Pfeff., Jahrb. Hamb. Wiss. Aust., vi., 2, 1889, p. 19, and x., 2, 1893, p. 36, pl. 1, fig. 3.

Barbus kerstenii, Bouleng., Cat. Fresh. Fish. Afr., ii., p. 130, fig. 107 (1911).

Depth of body $3\frac{2}{10}$ times in total length excluding caudal, length of head $3\frac{1}{5}$ times. Snout rounded, as long as the eye, which is $3\frac{2}{5}$ times in length of head, interorbital width $2\frac{1}{5}$ times ; mouth

terminal, its width $3\frac{3}{5}$ times in length of head; lips thin. Two barbels on each side, anterior $\frac{3}{5}$ diameter of eye, posterior a little longer than eye.

Dorsal iii 7; equally distant from eye and root of caudal, border straight, last simple ray strong, bony, strongly serrated, its rigid part nearly as long as head. Anal iii 5; not reaching caudal. Pectoral $\frac{1}{5}$ length of head, reaching ventral; base of latter almost entirely in advance of dorsal. Caudal peduncle twice as long as

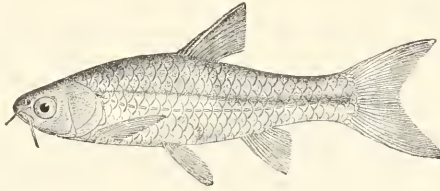


FIG. 68.—*Barbus kerstenii*.

deep. Scales radiately striated, $26\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2 between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimen), reddish brown on back, silvery on belly; a faint lateral streak on body, extending on to head; a faint dark spot at base of dorsal.

One specimen, 45 mm. in length, from Komati Poort, Transvaal.

It is also reported from Kilimanjaro and Masai Districts, German East Africa.

40. BARBUS EUTENIA, Blgr.

Barbus kessleri, Günth., Cat. Fish., vii., p. 107 (1868).

Barbus eutenia, Bouleng., Ann. and Mag. N.H. (7), xiv., 1904, p. 218, and Cat. Fresh. Fish. Afr., ii., p. 131, fig. 108 (1911).

Barbus miolepis, Bouleng., Mem. Manchest. Lit. and Phil. Soc., li., 1907, No. 12, p. 2.

Depth of body $3\frac{1}{5}$ to $3\frac{7}{10}$ times in total length excluding caudal, length of head $3\frac{1}{5}$ to 4 times. Snout rounded, as long as or slightly longer than the eye, which is $3\frac{1}{4}$ to $4\frac{1}{5}$ times in length of head, interorbital width $2\frac{1}{2}$ to $3\frac{1}{4}$ times; mouth terminal, its width $2\frac{2}{3}$ to $3\frac{3}{5}$ times in length of head; lips feebly developed. Two barbels on each side, sub-equal or posterior a little longer than anterior and 1 to $1\frac{1}{5}$ times diameter of eye.

Dorsal iii 7; situated midway between eye or occiput and root of caudal, border straight; last simple ray strong, bony, strongly

serrated, its rigid part $\frac{2}{3}$ to $\frac{5}{7}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{5}{7}$ length of head, not reaching ventral; base of latter partly in advance of dorsal. Caudal peduncle $1\frac{1}{2}$ to $1\frac{5}{7}$ times as long as deep. Scales radiately striated, 24-26 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2-2 $\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimens), light yellowish brown, darker above than below; an indistinct, straight, darkish lateral band

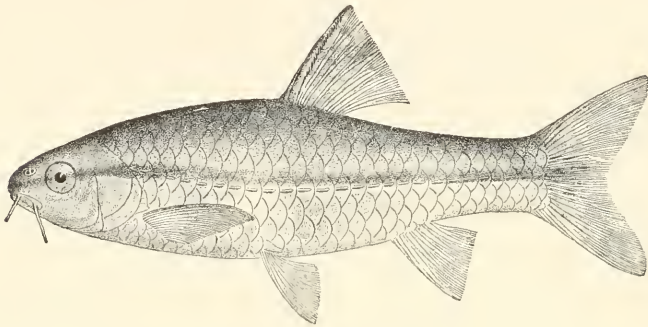


FIG. 69.—*Barbus eutania*.

sometimes extending from end of snout through eye to caudal; a darkish spot at base of dorsal fin.

Four specimens, ranging from 52-66 mm. in length, from White River, Nelspoort, Transvaal (A. T. Cooke).

One specimen, 52 mm. in length, from Olifants River, Pretoria District (Pretoria Museum).

It is also reported from Angola and Rhodesia.

41. BARBUS CAPENSIS, A. Smith.

(Witte-visch, Whitefish, Baardman or Bartman).

Barbus (Cheilobarbus) capensis, A. Smith, Ill. Zool. S. Afr. Fish., pl. x., fig. 1 (1841).

Barbus capensis, Günth., Cat. Fish., vii., p. 98 (1868); Bouleng. Cat. Fresh. Fish. Afr., ii., p. 123, fig. 100 (1911).

Depth of body $3\frac{3}{4}$ to $4\frac{2}{5}$ times in total length excluding caudal, length of head $3\frac{2}{3}$ to $3\frac{3}{4}$ times. Snout rounded, $2\frac{1}{2}$ to $2\frac{3}{5}$ times in length of head, eye 5 to 7 times, interorbital width $3\frac{1}{7}$ to $3\frac{3}{5}$ times; mouth terminal or sub-inferior, its width $3\frac{2}{5}$ to $4\frac{2}{5}$ times in length of

head; lips well developed, interrupted on chin. Two barbels on each side, sub-equal, $1\frac{1}{4}$ to $1\frac{7}{10}$ diameter of eye.

Dorsal iii 8; equally distant from eye and from root of caudal, or a little nearer to the latter, border slightly concave; last simple ray strong, bony, serrated, the serrated portion $\frac{2}{3}$ to $\frac{1}{2}$ length of head. Anal iii 6; not reaching caudal. Pectoral $\frac{3}{5}$ to $\frac{3}{4}$ length of head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{1}{2}$ to $1\frac{2}{5}$ times as long as deep. Scales radiately striated, $39-40\frac{5\frac{1}{2}-6\frac{1}{2}}{6\frac{1}{2}}$, 4 between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimens), dark brown above, lighter beneath.

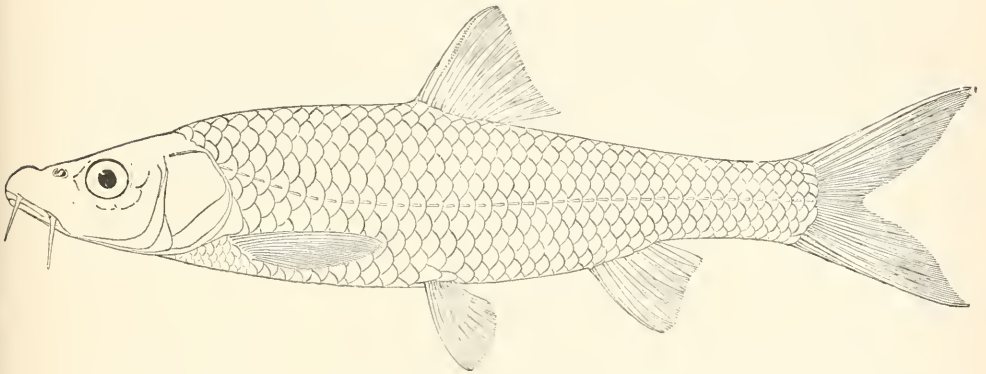


FIG. 70.—*Barbus capensis*. $\frac{5}{7}$.

Four specimens, ranging from 194–270 mm. in length, from Breede River, Goudini Road, Cape Province (D. W. Manning).

Two specimens, 226 mm., 154 mm. in length respectively, from Dwaars River, Ceres, Cape Province (C. A. R. Breet).

One specimen, 96 mm. in length, from Zonder End River, Caledon, Cape Province.

One specimen, 170 mm. in length, from Natal (Durban Museum).

This fish is said to be very plentiful at times in the Breede River, ascending the stream in shoals during the spawning season—the latter part of November—and rising freely to an artificial fly, though worms, grasshoppers, &c., are the usual lure. To the angler it affords good sport, but it is not much esteemed for eating, the flesh being somewhat tasteless and the bones troublesome.

42. BARBUS TREVELYANI, Günth.

Günth., Ann. and Mag. N.H. (4), xix., 1877, p. 313; Bouleng., Cat. Fresh. Fish. Afr., ii., p. 143, fig. 119 (1911).

Depth of body $3\frac{2}{5}$ to $4\frac{1}{10}$ times in total length excluding caudal, length of head $3\frac{3}{4}$ to $4\frac{1}{4}$ times. Snout rounded, 3 to $3\frac{1}{2}$ times in length of head; eye 4 to $4\frac{1}{2}$ times in length of head, interorbital width $2\frac{1}{2}$ to $2\frac{2}{3}$ times; mouth small, inferior; lips moderate. A single barbel on each side, $\frac{1}{2}$ to $\frac{1}{5}$ diameter of eye.

Dorsal iii 7; equally distant from middle of eye and from root of caudal, border straight; last simple ray rather strong, bony, finely

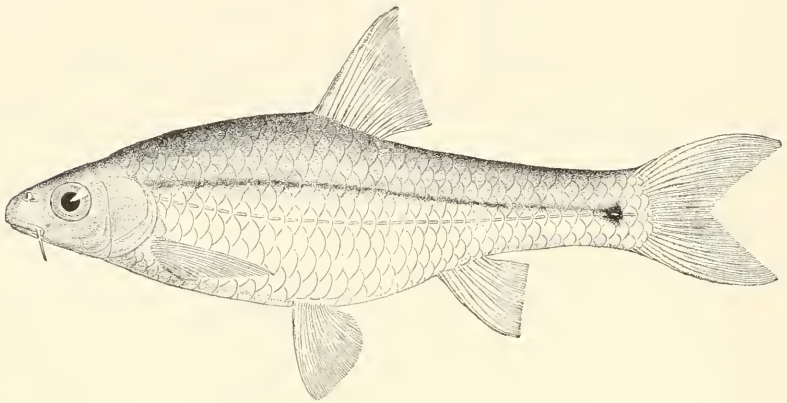


FIG. 71.—*Barbus trevelyani*.

serrated on its upper part only, the rigid portion of ray $\frac{7}{10}$ to $\frac{9}{10}$ length of head. Anal iii 5; not reaching caudal. Pectoral about $\frac{4}{5}$ length of head, not reaching ventral; base of latter partly or almost entirely in front of dorsal. Caudal peduncle $1\frac{2}{3}$ to nearly twice as long as deep. Scales radiately striated, 33–36 $\frac{5\frac{1}{2}-6\frac{1}{2}}{5\frac{1}{2}-6\frac{1}{2}}$, 3–4 between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimens), brown, dark above and lighter beneath; a dark streak on each side from above origin of lateral line to a round dark spot at root of caudal.

Seven specimens, ranging from 68–82 mm. in length, from Buffalo River, King William's Town, Cape Province.

43. BARBUS SERRULA, n. sp.

Depth of body $3\frac{3}{5}$ times in total length excluding caudal; length of head $3\frac{3}{5}$ times. Snout rounded, $3\frac{3}{5}$ times in length of head; eye

$5\frac{1}{7}$ times, interorbital width $4\frac{1}{2}$ times; mouth terminal, its width $3\frac{3}{5}$ times in length of head; lips feebly developed. A single barbel on each side, $\frac{2}{3}$ diameter of eye.

Dorsal iii 8; equally distant from eye and from root of caudal, border slightly concave; last simple ray strong, bony, straight, strongly serrated in its upper half, its rigid part $\frac{3}{4}$ length of head. Anal iii 5; not reaching caudal. Pectoral nearly $\frac{2}{3}$ length of head,

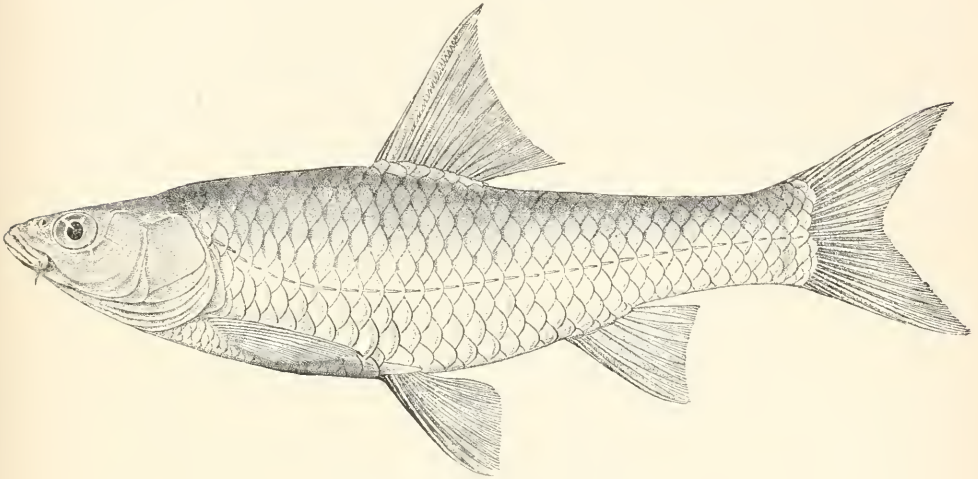


FIG. 72.—*Barbus serrula*. $\frac{1.0}{5}$.

scarcely reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{3}$ times as long as deep. Scales radiately striated, $31\frac{5\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimen), reddish brown above, silvery on sides and belly.

One specimen, 116 mm. in length, from Pienaars River, Transvaal (C. J. Swierstra).

44. BARBUS VULNERATUS, Cast.

? *Barbus gobionoides*, Cuv. and Val., Hist. Poiss., xvi, p. 189 (1842).

Gnathendalia vulnerata, Casteln., Mem. Poiss. Afr. Austr., p. 57 (1861).

Barbus multimaculatus, Steindr., Sitzb. Ak. Wien, lxi, i., 1870, p. 633, pl. iii., fig. 2.

Barbus vulneratus, Bouleng., Ann. and Mag. N.H. (7), xvi., 1905, p. 45, and Cat. Fresh. Fish. Afr., ii., p. 148, fig. 125 (1911).

Depth of body about equals length of head, which is $3\frac{2}{3}$ to 4 times in total length excluding caudal. Snout rounded, 3 to 4 times in length of head; eye $4\frac{1}{3}$ to $5\frac{1}{10}$ times in length of head, interorbital width 3 to $3\frac{2}{3}$ times; mouth small, inferior; lips moderate. Two barbels on each side, posterior longer than anterior, and $\frac{1}{5}$ to $1\frac{1}{5}$ times diameter of eye.

Dorsal iii 7; equally distant from nostrils, eye, or occiput and from root of caudal, border straight; last simple ray not enlarged, not serrated, $\frac{4}{5}$ to $\frac{9}{10}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{4}{5}$ length of head, not reaching ventral; base of latter

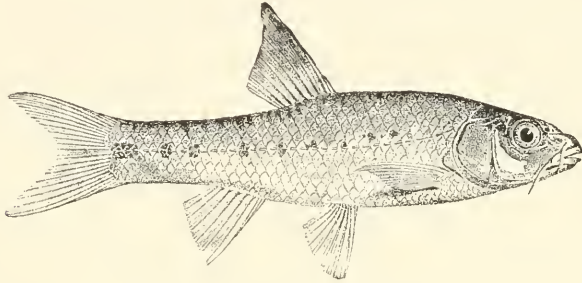


FIG. 73.—*Barbus vulneratus*.

wholly or partly anterior to dorsal. Caudal peduncle $1\frac{3}{5}$ times to twice as long as deep. Scales radiately striated, $32-34\frac{5\frac{1}{2}}{5\frac{1}{2}-6\frac{1}{2}}$, $3\frac{1}{2}-4\frac{1}{2}$ between lateral line and ventral, 12-14 round caudal peduncle.

Colour (of preserved specimens), brown above, lightish beneath; a dark streak or spot through scales forming a longitudinal streak from origin of lateral line to caudal.

Four specimens, ranging from 42 to 67 mm. in length, from Yokeskei River (tributary of the Crocodile River), Transvaal.

Three specimens, ranging from 60-73 mm. in length, from Baakens River, Port Elizabeth, Cape Provinces (Port Elizabeth Museum).

Two specimens, 52 mm., 78 mm. in length respectively, from Zwartkops River, Port Elizabeth, Cape Province.

It is recorded also from Zonder Einde River, Cape Province.

* 45. *BARBUS MOTEBENSIS*, Sldr.

Steind., Sitzb. Ak. Wien, ciii., i., 1894, p. 453, pl. ii., fig. 2, and Bouleng., Cat. Fresh. Fish. Afr., ii., p. 147, fig. 123 (1911).

“Depth of body equal to length of head, about $3\frac{1}{2}$ times in total length. Snout rounded, 3 times in length of head; eye $4\frac{1}{3}$ times in length of head, interorbital width 3 times; mouth small, sub-inferior; two barbels on each side, anterior about $\frac{1}{2}$ as long as posterior, which is a little longer than eye.

Dorsal iii 7; equally distant from eye and from caudal, border convex; last simple ray not enlarged, not serrated, nearly as long as

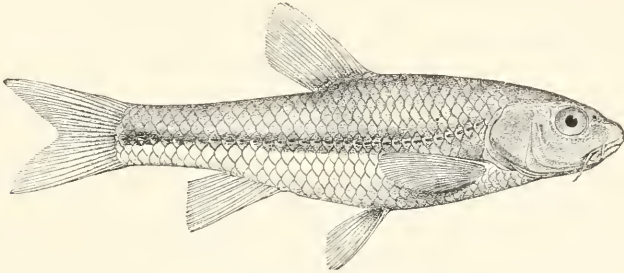


FIG. 74.—*Barbus motebensis*.

head. Anal iii 5; not reaching caudal. Pectoral nearly as long as head, reaching ventral; latter originating a little in advance of dorsal. Caudal peduncle nearly twice as long as deep. Scales radiately striated 32–33 $\frac{5\frac{1}{2}}{6\frac{1}{2}}$, 4–4 $\frac{1}{2}$ between lateral line and ventral.

A dark lateral streak from above lateral line to root of caudal; a dark spot at base of dorsal.

Total length 90 millim.

Motebe River, Upper Notuany River, Marico District, Transvaal.”

46. *BARBUS BURCHELLI*, A. Smith.

Barbus (Pseudobarbus) burchelli, A. Smith, Ill. Zool. S. Afr. Fish., pl. xi., fig. 1 (1840).

Barbus burchelli, M. Weber, Zool. Jahrb. Syst., x., 1897, p. 153; and Bouleng., Cat. Fresh. Fish. Afr., ii., p. 146, fig. 122 (1911).

Depth of body $3\frac{1}{2}$ to $4\frac{1}{6}$ times in total length excluding caudal, length of head $3\frac{1}{3}$ to $4\frac{1}{3}$ times. Snout rounded, $2\frac{2}{3}$ to $3\frac{2}{3}$ times in

length of head, eye 4 to $5\frac{3}{4}$ times, interorbital width $2\frac{2}{3}$ to $3\frac{2}{7}$ times; mouth inferior, lips moderate. Two barbels on each side, anterior $\frac{1}{2}$ to 1 diameter of eye, posterior $\frac{3}{4}$ to $1\frac{2}{5}$. A row of small pores from nostrils round each orbit to origin of lateral line on each side, connected by a row across occiput. In one specimen there are pearl-like tubercles on the head.

Dorsal iii 7; equally distant from eye or occiput and from root of caudal, border straight; last simple ray not enlarged, not serrated, $\frac{2}{3}$ to $\frac{9}{10}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{1}{6}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{2}{3}$ to $2\frac{1}{3}$ times as long as deep. Scales radiately striated, 33-38 $\frac{5\frac{1}{2}-6\frac{1}{2}}{6\frac{1}{2}}$, 4 between lateral line and ventral, 12 round caudal peduncle.

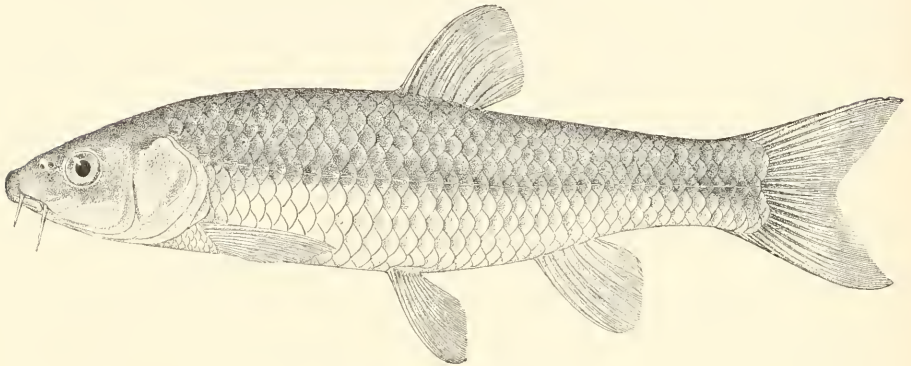


FIG. 75.—*Barbus burchelli*.

Colour (of preserved specimens), brown, dark above and lighter beneath; occasionally some of the scales are darker in the centre.

Seven specimens, ranging from 72-104 mm. in length, from Eerste River, Stellenbosch, Cape Province (L. Péringuey).

Two specimens, 89 mm., 97 mm. in length respectively, from Eerste River, Stellenbosch, Cape Province (Dr. Kruger).

Six specimens, ranging from 56-81 mm. in length, from Berg River, near Paarl, Cape Province (Mr. Brown).

Two specimens, 72 mm., 75 mm. in length respectively, from Robertson, Cape Province (L. Keet).

Three specimens, ranging from 53-80 mm. in length, locality unknown.

47. *BARBUS BURGI*, Blgr.

Bouleng., Cat. Fresh. Fish. Afr., ii., p. 147, fig. 124 (1911).

Depth of body equal to or a little greater than length of head, $3\frac{2}{3}$ to $4\frac{1}{2}$ times in total length excluding caudal. Snout rounded, as long as the eye, which is $3\frac{1}{4}$ to $3\frac{2}{5}$ times in length of head; inter-orbital width 3 to $3\frac{1}{4}$ times in length of head; mouth small, inferior; lips moderate. Two barbels on each side, anterior about $\frac{2}{3}$ length of posterior, which is $\frac{1}{2}$ to $\frac{2}{3}$ diameter of eye.

Dorsal iii 7; equally distant from eye and from root of caudal, border nearly straight; last simple ray not enlarged, not serrated,

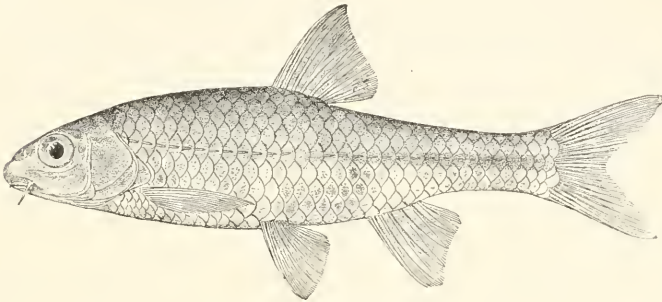


FIG. 76.—*Barbus burgi*.

almost as long as head. Anal iii 5; not reaching caudal. Pectoral $\frac{4}{5}$ length of head, nearly reaching to ventral; base of latter below anterior rays of dorsal. Caudal peduncle $2\frac{1}{5}$ to $2\frac{1}{2}$ times as long as deep. Scales radiately striated, 31–33 $\frac{4\frac{1}{2}}{5\frac{1}{3}}$, 3 between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimens), dark brown above, lighter beneath; an indistinct dark lateral band on posterior half of body.

Three specimens, ranging from 50–55 mm. in length, from Berg River, near Paarl, Cape Province (Mr. Brown).

* 48. *BARBUS GURNEYI*, Günth.

Günth., Cat. Fish., vii., p. 102 (1868), part.; Bouleng., Ann. and Mag. N.H. (7), ix., 1902, p. 288, and Cat. Fresh. Fish. Afr., ii., p. 150, fig. 127 (1911).

“Depth of body equal to or a little less than length of head, $3\frac{2}{5}$ to $3\frac{1}{2}$ times in total length. Snout rounded, $3\frac{1}{3}$ to $3\frac{1}{2}$ times in length of head; eye $3\frac{1}{2}$ (young) to 5 times in length of head, inter-

orbital width 3 to $3\frac{1}{3}$ times; mouth, terminal; lips moderate; two barbels on each side, anterior $\frac{2}{3}$ to $\frac{3}{4}$ diameter of eye, posterior 1 to $1\frac{1}{2}$ diameters.

Dorsal iii 7; equally distant from eye and from caudal, border slightly convex; last simple ray not enlarged, not serrated, $\frac{3}{5}$ to $\frac{2}{3}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{5}$ to $\frac{3}{4}$ length of head, not reaching ventral; base of latter below anterior

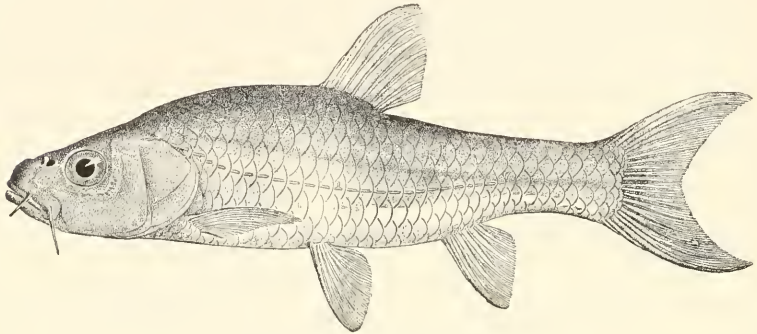


FIG. 77.—*Barbus gurneyi*.

rays of dorsal. Caudal peduncle $1\frac{2}{3}$ to 2 times as long as deep. Scales radiately striated, 31–35 $\frac{5\frac{1}{2}}{3\frac{3}{4}-4\frac{1}{4}}$, $1\frac{1}{2}$ to $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Brownish above, silvery beneath; a rather indistinct dark streak from above origin of lateral line to root of caudal, where it may end in a small black spot.

Total length 100 millim.

Natal and Zululand.”

49. BARBUS LINEOMACULATUS, Blgr.

Bouleng., Ann. and Mag. N.H. (7), xi., 1903, p. 53, pl. v., fig. 3, and Cat. Fresh. Fish., Afr., ii., p. 159, fig. 136 (1911); Hilgend., Zool. Jahrb. Syst., xxii., 1905, p. 415.

Depth of body equals length of head, which is 4 times in total length, excluding caudal. Snout rounded, as long as the eye, which is $4\frac{1}{4}$ times in length of head; interorbital width $2\frac{5}{6}$ times; mouth small, sub-inferior; lips moderately developed. Two barbels on each side, anterior $1\frac{1}{4}$ times diameter of eye, posterior $1\frac{1}{2}$ times.

Dorsal iii 8; equally distant from middle of eye and root of caudal, border feebly concave; last simple ray not enlarged, not serrated,

$\frac{1}{5}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{7}{10}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{2}{3}$ times as long as deep. Scales radiately striated, $30\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimen), brownish, darker on the back; a series of irregular black spots on each side, more or less connected

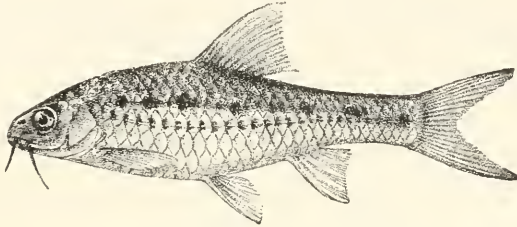


FIG. 78.—*Barbus lineomaculatus*.

by a dark lateral streak, all but the last spot being above the lateral line.

One specimen, 34 mm. in length, from Insiza, Rhodesia (G. French).

It is also reported from Lumi River, east side of Kilimanjaro, flowing into Lake Jipi; and Bubu River, Masailand, East Africa.

50. BARBUS VIVIPARUS, M. Web.

M. Weber, Zool. Jahrb. Syst., x., 1897, p. 153; Bouleng., Cat. Fresh. Fish. Afr., ii., p. 170, fig. 147 (1911).

Depth of body $4\frac{1}{10}$ times in total length excluding caudal, length of head $4\frac{1}{5}$ times. Snout rounded, slightly less than diameter of eye, which is $3\frac{1}{5}$ times in length of head; interorbital width 3 times in length of head; mouth small, sub-inferior; lips thin. Two barbels on each side, anterior $\frac{2}{3}$ diameter of eye, posterior $1\frac{1}{3}$ times.

Dorsal iii 8; equally distant from anterior margin of eye and from root of caudal, border straight; last simple ray not enlarged, but serrated, as long as head. Anal ii 5; not reaching caudal. Pectoral $\frac{1}{5}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle twice as long as deep. Scales radiately striated, $29\frac{4\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimen), light brown above, silvery beneath; a dark streak from snout through eye meeting the lateral line, which is also dark, above the anal; a dark spot on each side at base of anal and two minute dark spots at base of dorsal.

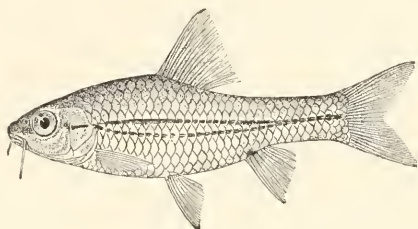


FIG. 79.—*Barbus viriparus*.

One specimen, 38 mm. in length, from Livingstone, Rhodesia (A. Stephenson).

One specimen, 50 mm. in length, from the Sabi River, Transvaal (J. S. Hamilton).

It is also reported from Natal.

51. *BARBUS UNITÆNIATUS*, Günth.

Puntius vittatus (non Day), Steind., Verh. zool.-bot. Ges. Wien, xvi., 1866, p. 767, pl. xvii. fig. 2.

Barbus unitæniatus, Günth., Zool. Rec., 1866, p. 151, and Cat. Fish., vii., p. 103 (1868); M. Weber, Zool. Jahrb., Syst., x., 1897, p. 151. Bouleng., Cat. Fresh. Fish. Afr., ii., p. 158, fig. 135 (1911).

Depth of body $3\frac{7}{10}$ to $4\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{7}{10}$ to 4 times. Snout rounded, as long as or shorter than eye, which is 3 to $3\frac{1}{2}$ times in length of head and equals interorbital width; mouth small, sub-inferior, its width $3\frac{1}{5}$ to $3\frac{3}{5}$ times in length of head; lips moderate. Two barbels on each side, posterior longer than anterior and as long as or a little longer than eye.

Dorsal iii 8; equally distant from middle of eye and from caudal, border straight or slightly concave; last simple ray not enlarged, not serrated, nearly as long as head. Anal iii 5; not reaching caudal. Pectoral a little shorter than head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{3}{4}$ times to twice as long as deep. Scales radiately striated, 27–30 $\frac{4-4\frac{1}{2}}{4-4\frac{1}{2}}$,

2 to $2\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle.

Colour (of preserved specimens), yellowish; a silvery lateral

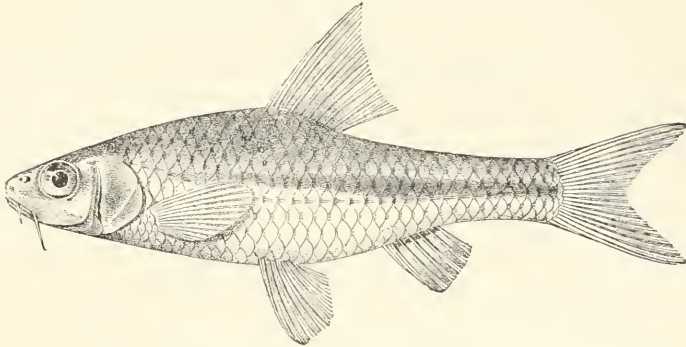


FIG. 80.—*Barbus uniteniatus*.

streak, edged with black, terminating in a black spot on caudal peduncle; the dark edging appears to extend faintly through gill-covers to point of snout, and is sometimes represented on the body by detached dark spots.

Eight specimens, ranging from 33–35 mm. in length, from Sabi River, Transvaal (J. S. Hamilton).

This species is also reported from Angola, Zululand, and Natal.

* 52. *BARBUS RADIATUS*, Peters.

Peters, Mon. Berl. Ac., 1853, p. 783, and Reise Mossamb., iv., p. 56, pl. x., fig. 3 (1868); Bouleng., Fresh. Fish. Afr., ii., p. 155, fig. 132 (1911).

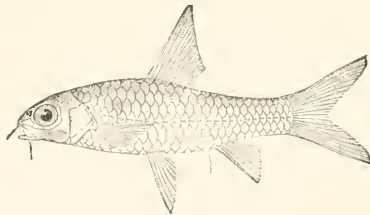


FIG. 81.—*Barbus radiatus*.

“Depth of body equal to length of head, $3\frac{2}{3}$ times in total length. Snout rounded, shorter than eye, which is 3 times in length of head

and equals interorbital width; mouth inferior; two barbels on each side, posterior a little longer than anterior and about $\frac{2}{3}$ diameter of eye.

Dorsal iii 8; equally distant from eye and from caudal, border straight; last simple ray not enlarged, not serrated, as long as head. Anal iii 5; not reaching caudal. Pectoral a little shorter than head, reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle about $1\frac{1}{2}$ times as long as deep. Scales radiately striated, 26–27 $\frac{3\frac{1}{2}}{3\frac{1}{2}}$, 2 between lateral line and ventral.

Silvery, back green.

Total length 48 millim.

Revugo River, Lower Zambesi."

53. BARBUS LABIALIS, n. sp.

Depth of body $3\frac{3}{5}$ times in total length excluding caudal, length of head 4 times. Snout $3\frac{4}{5}$ times in length of head, eye $4\frac{1}{5}$ times, interorbital width $3\frac{1}{2}$ times; mouth sub-inferior, $3\frac{1}{5}$ times in length of head; lips moderate, upper produced into a median lobe about $\frac{1}{2}$ diameter of eye in length. Two barbels on each side, anterior nearly as long as eye, posterior $1\frac{1}{5}$ times diameter of eye.

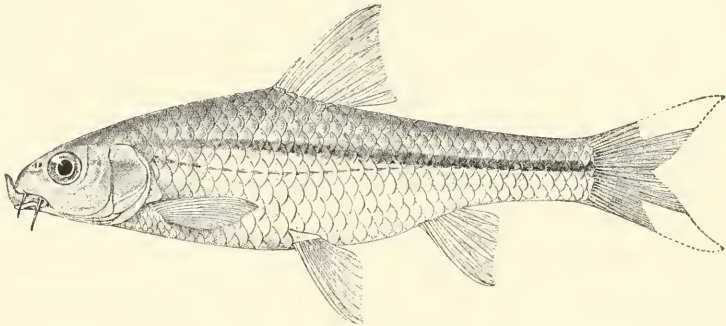


FIG. 82.—*Barbus labialis*. $\frac{2}{7}$.

Dorsal iii 8; equally distant from nostrils and from root of caudal, border feebly concave; last simple ray not enlarged, not serrated, nearly as long as head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{4}$ length of head, not reaching ventral; base of latter below anterior half of dorsal. Caudal peduncle $2\frac{2}{3}$ times as long as deep. Scales radiately striated, 35 $\frac{6\frac{1}{2}}{5\frac{1}{2}}$, $3\frac{1}{2}$ between lateral line and ventral, 14 round caudal peduncle.

Colour (of preserved specimen), yellowish brown, darker above than below; a dark lateral streak from border of preopercle to root of caudal.

One specimen, 77 mm. in length, from Aapjes River, Transvaal.

54. *BARBUS MACRURUS*, n. sp.

Depth of body $3\frac{3}{5}$ to $4\frac{3}{5}$ times in total length excluding caudal, length of head 4 to $4\frac{1}{2}$ times. Snout rounded, as long as eye, which is $3\frac{1}{4}$ to $3\frac{2}{3}$ times in length of head; interorbital width 3 to $3\frac{2}{3}$ times in length of head; mouth sub-inferior, its width 3 to 4 times in length of head; lips moderate. Two barbels on each side, anterior $\frac{2}{3}$ to 1 diameter of eye, posterior 1 to $1\frac{2}{5}$ times.

Dorsal iii 8; equally distant from nostrils or middle of eye and from root of caudal, border slightly concave; last simple ray not enlarged, flexible, 1 to $1\frac{1}{4}$ times length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{7}{10}$ to $\frac{4}{5}$ length of head, not reaching

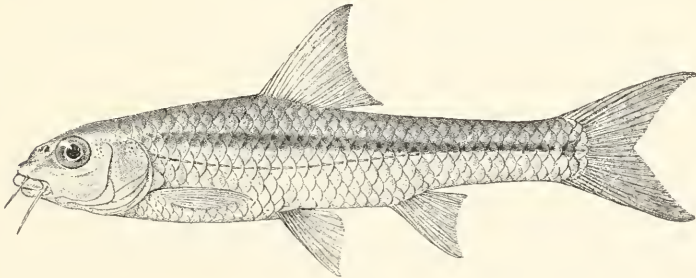


FIG. 83.—*Barbus macrurus*. $\frac{3}{2}$.

ventral; base of latter behind anterior rays of dorsal. Caudal peduncle 2 to $2\frac{1}{2}$ times as long as deep. Scales radiately striated, 33–36 $\frac{5\frac{1}{2}}{5\frac{1}{2}}$, 3– $3\frac{1}{2}$ between lateral-line and ventral, 14–16 round caudal peduncle.

Colour (of preserved specimens), yellowish brown, darker above than below; a dark lateral streak from preopercular border to root of caudal where it ends in a small dark spot; extremity of dorsal fin blackish.

Six specimens, ranging from 60–74 mm. in length, from Dwaars River, Transvaal.

Six specimens, ranging from 47–70 mm. in length, from the Transvaal.

* 55. BARBUS INERMIS, Peters.

Barbus (Dangila) inermis, Peters, Mon. Berl. Ac., 1852, p. 683.

Barbus inermis, Günth., Cat. Fish., vii., p. 103 (1868); Peters, Reise Mossamb., iv., p. 54, pl. xi., fig. 3 (1868); Bouleng., Proc. Zool. Soc., 1907, p. 310, and Cat. Fresh. Fish. Afr., ii., p. 152, fig. 129 (1911).

“Depth of body nearly equal to length of head, $3\frac{1}{2}$ to 4 times in total length. Snout rounded, as long as or a little longer than eye, which is $3\frac{1}{2}$ to $3\frac{2}{3}$ times in length of head; interorbital width $2\frac{2}{3}$ to 3 times in length of head; mouth small, sub-inferior; lips moderate;

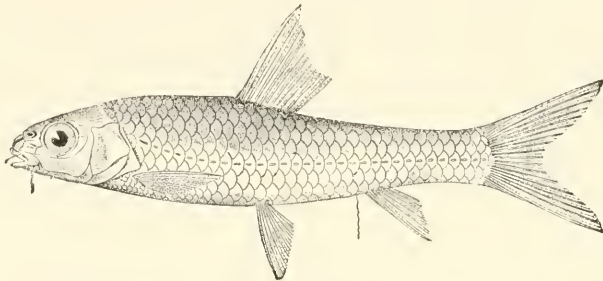


FIG. 84.—*Barbus inermis*.

two barbels on each side, posterior longer than anterior and $\frac{1}{2}$ to $\frac{2}{3}$ diameter of eye.

Dorsal iv 8–9; equally distant from eye or snout and from caudal, border concave; last simple ray not enlarged, not serrated, nearly as long as head. Anal iii 5; not reaching caudal. Pectoral a little shorter than head, not reaching ventral; base of latter below middle of dorsal. Caudal peduncle $1\frac{1}{3}$ to 2 times as long as deep. Scales with numerous feebly radiating striæ; * 29–31 $\frac{4\frac{1}{2}-5\frac{1}{2}}{5\frac{1}{2}}$, $2\frac{1}{2}$ to 3 between lateral line and ventral, 12 round caudal peduncle.

Dark green or olive above, yellowish beneath; fins pale green.

Total length 100 millim.

Lower Zambezi and Limpopo Systems.”

56. BARBUS HEMIPLEUROGRAMMA, Blgr.

Bouleng., Cat. Fresh. Fish. Afr., ii., p. 150, fig. 126 (1911).

Depth of body $3\frac{3}{10}$ to $3\frac{2}{10}$ times in total length excluding caudal, length of head $3\frac{3}{5}$ to $4\frac{3}{10}$ times. Snout rounded, about as long as the

* “In this respect the scales of this species may be said to establish a link between the two divisions of the genus adopted in the present arrangement.”

eye, which is $3\frac{1}{2}$ to $4\frac{1}{4}$ times in length of head; interorbital width $2\frac{1}{2}$ to $3\frac{2}{3}$ times in length of head; mouth small, terminal or sub-inferior; lips moderately developed. Two barbels on each side, anterior $\frac{1}{2}$ to 1 diameter of eye, posterior $\frac{2}{3}$ to $1\frac{1}{2}$ times.

Dorsal iii 7-8; situated midway between eye and root of caudal, border straight; last simple ray not enlarged, flexible and a little shorter than head. Anal ii 5; not reaching caudal. Pectoral $\frac{3}{5}$ to $\frac{3}{4}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{2}$ times to twice as long as deep. Scales radiately striated, 27-29 $\frac{4\frac{1}{2}}{4\frac{1}{2}-5}$, $2\frac{1}{2}$ - $3\frac{1}{2}$ between lateral line and ventral, 12 round caudal peduncle; lateral line incomplete, extending on the anterior 8 to 15 scales only.

Colour (of preserved specimens), brownish, darker above than below; a few round blackish spots forming a more or less regular

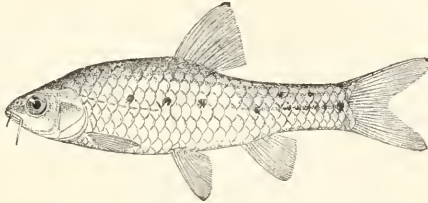


FIG. 85.—*Barbus hemipleurogramma*.

series along each side, a dark patch at base of anal and one or two small dark spots or irregular band on lower side of caudal peduncle.

When alive the colouring is brilliant, dark along the back and a bright reddish coppery colour on sides, white ventrally, with about 6 dark dots along the region of the lateral line.

Six specimens, ranging from 27-41 mm. in length, from Baakens River, Port Elizabeth, Cape Province.

Five specimens, ranging from 32-43 mm. in length, from Potchefstroom, Transvaal.

Two specimens, each 34 mm. in length, from the stream outside the cave at Wonderfontein, Transvaal.

* 57. *BARBUS ASPER*, Blgr.

Bouleng., Cat. Fresh. Fish. Afr., ii., p. 176, fig. 154 (1911).

“Depth of body $3\frac{2}{3}$ to $4\frac{1}{4}$ times in total length, length of head 4 times. Snout rounded, 3 to $3\frac{1}{4}$ times in length of head; eye 4 to $4\frac{1}{2}$ times in length of head, interorbital width 3 times; mouth inferior;

lips moderate; a single barbel on each side, as long as or slightly longer than eye; upper surface of head of breeding male with spine-like tubercles, those on snout very large.

Dorsal iii 7; equally distant from occiput and from caudal, border straight; last simple ray not enlarged, not serrated, $\frac{2}{3}$ to $\frac{3}{4}$ length of head. Anal iii 5; not reaching caudal. Pectoral a little shorter than head, nearly reaching ventral in males, not in females; base of

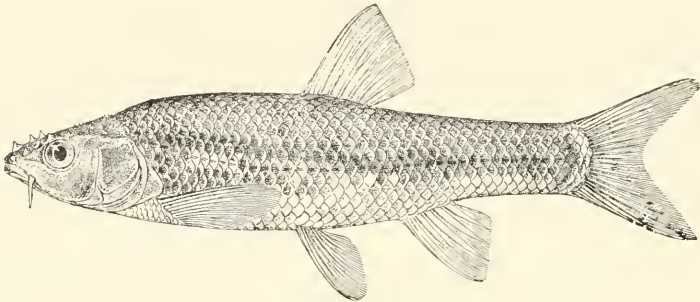


FIG. 86.—*Barbus asper*.

ventral below anterior rays of dorsal. Caudal peduncle $1\frac{2}{3}$ to $1\frac{3}{4}$ times as long as deep. Scales radiately striated, 37–42 $\frac{8\frac{1}{2}}{8\frac{1}{2}-9\frac{1}{2}}$, 5–6 between lateral line and ventral, 18–20 round caudal peduncle; dorsal scales rough, with minute spinose nuptial tubercles.

Brown above, whitish beneath, the scales on the sides darker in the centre; an ill-defined dark lateral band.

Total length 110 millim.

Cape Colony."

58. BARBUS ANOPLUS, M. Web.

(Rooi-vlerk.)

M. Weber, Zool. Jahrb. Syst., x., 1897, p. 151; Bouleng., Cat. Fresh. Fish. Afr., ii., p. 177, fig. 155 (1911).

Depth of body $3\frac{1}{2}$ to $4\frac{1}{2}$ times in total length excluding caudal, length of head 3 to 4 times. Snout rounded, 3 to $4\frac{1}{3}$ times in length of head, diameter of eye $3\frac{1}{4}$ to 5 times, interorbital width $2\frac{7}{10}$ to $3\frac{9}{10}$ times; mouth terminal or sub-inferior; lips moderate. A single barbel on each side, $\frac{1}{2}$ (young) to $1\frac{1}{5}$ times diameter of eye. A row of pores round each orbit and thence to origin of lateral line. In some specimens the head, snout, cheeks, and chin, or the upper part of snout only, are covered with small whitish spine-like tubercles.

Dorsal iii 7; equally distant from eye or occiput and from root of caudal, border straight or feebly concave; last simple ray not enlarged, not serrated, $\frac{2}{3}$ to $\frac{9}{10}$ length of head. Anal iii 5; not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{4}{5}$ length of head, not reaching ventral; base of latter entirely or partly in front of dorsal, or below anterior rays. Caudal peduncle $1\frac{3}{4}$ to $2\frac{1}{5}$ times as long as deep. Scales radiately striated, 32-38 $\frac{5\frac{1}{2}-7\frac{1}{2}}{5\frac{1}{2}-7\frac{1}{2}}$, $3\frac{1}{2}$ to 5 between lateral line and ventral, 14-16 round caudal peduncle. In some specimens the lateral line becomes very indistinct posteriorly.

Colour (of preserved specimens) brownish above, lighter beneath; a more or less distinct dark lateral streak from above origin of lateral line to root of caudal, sometimes ending in an indistinct dark spot. In some specimens, notably those from the Le Roex and

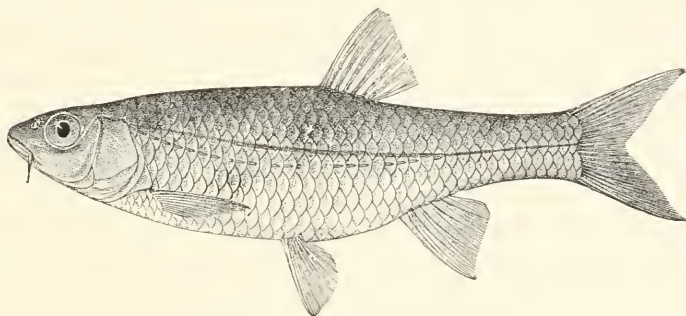


FIG. 87.—*Barbus anoplus*.

Grobelaars Rivers, there is a vivid blood-red spot at the base of the dorsal, anal, pectoral, and ventral fins, or some of them.

Nine specimens, ranging from 21-88 mm. in length, from Le Roex River, Cango, near Oudtshoorn, Cape Province.

Twelve specimens, ranging from 20-62 mm. in length, from Grobelaars River, near Oudtshoorn, Cape Province.

One specimen, 57 mm. in length, from Slaai Kraal, Grahamstown, Cape Province (Albany Museum).

Sixteen specimens, ranging from 20-70 mm. in length, from Jackson's Drift, Klip River, Transvaal.

One specimen, 47 mm. in length, from dam at Modderfontein, Transvaal.

Two specimens, 39 mm., 41 mm. in length respectively, from stream outside cave at Wonderfontein, Transvaal.

Six specimens, ranging from 30-51 mm. in length, from Smithfield, Orange River (D. P. Kannemeyer).

Four specimens, ranging from 40–56 mm. in length, from Natal (J. Saunderson).

59. *BARBUS KARKENSIS*, n. sp.

Depth of body $3\frac{2}{5}$ times in total length excluding caudal, length of head $3\frac{1}{2}$ times. Snout rounded, $3\frac{3}{4}$ times in length of head, eye $4\frac{3}{4}$ times, interorbital width $3\frac{2}{3}$ times; mouth terminal, lips moderately developed; a single barbel on each side, $\frac{1}{5}$ diameter of eye; a row of pores passing round each orbit from nostrils to upper margin of gill-openings and joined by a row across occiput.

Dorsal iii 7; equally distant from eye and from root of caudal, border feebly concave; last simple ray not enlarged, not serrated, $\frac{5}{6}$ length of head. Anal ii 5; not reaching caudal. Pectoral $\frac{7}{10}$ length of head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{5}$ times as long as deep. Scales radiately striated, $36\frac{6\frac{1}{2}}{8}$, 5 between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimen), brown, dark above, lighter below; an indistinct lateral streak on body.

One specimen, 64 mm. in length, from Karkloof, Natal.

* 60. *BARBUS AFER*, Peters.

Barbus (Capoëta) afer, Peters, Mon. Berl. Ac., 1864, p. 395.

Barbus afer, Günth., Cat. Fish., vii., p. 148 (1868), and Bouleng., Cat. Fresh. Fish. Afr., ii., p. 178, fig. 156 (1911).

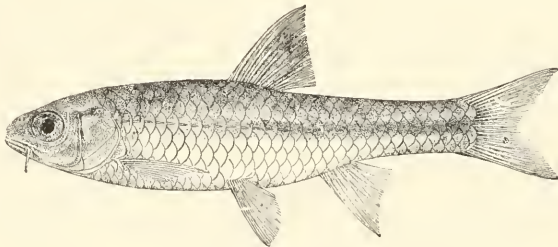


FIG. 88.—*Barbus afer*.

“Depth of body equal to length of head, 4 times in total length. Snout rounded, as long as or a little shorter than eye, which is 3 to $3\frac{1}{2}$ times in length of head; interorbital width 3 times in length of head; mouth small, inferior; lips moderate; a single barbel on each side, $\frac{2}{3}$ to $\frac{3}{4}$ diameter of eye.

Dorsal iii 7; equally distant from eye and from caudal, border

straight; last simple ray not enlarged, not serrated, a little shorter than head. Anal iii 5; not reaching caudal. Pectoral a little shorter than head, sometimes reaching ventral; base of latter originating slightly in advance of dorsal. Caudal peduncle twice as long as deep. Scales radiately striated, $28-31\frac{4\frac{1}{2}}{5\frac{1}{2}}$, 3 between lateral line and ventral, 12 round caudal peduncle.

Brown above, whitish beneath, with a rather indistinct dark lateral band on the posterior half of the body, more distinct on the caudal peduncle; fins whitish.

Total length 70 millim.

Cape Colony."

* 61. *BARBUS ROGERSI*, Blgr.

Bouleng., Cat. Fresh. Fish. Afr., ii, p. 180, fig. 158 (1911).

"Depth of body equal to length of head, $3\frac{1}{2}$ times in total length. Snout rounded, shorter than eye, which is $2\frac{2}{3}$ times in length of head; interorbital width 3 times in length of head; mouth very small, inferior; lips moderate; barbels absent or a single minute one on each side.

Dorsal iii 8; equally distant from anterior border of eye and from caudal, border straight; last simple ray not enlarged, not serrated, as long as head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{4}$ length of

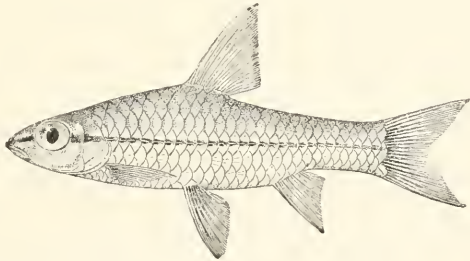


FIG. 89.—*Barbus rogersi*.

head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales radiately striated, $27-28\frac{3\frac{1}{2}}{3\frac{1}{2}}$, 2 between lateral line and ventral, 12 round caudal peduncle.

Silvery, back olive; a blackish streak from the end of the snout, through the eye, and along the lateral line to the root of the caudal; dorsal edged with blackish.

Total length 55 millim.

Que River, Angola; Upper Zambesi."

4. BARILIUS.

Barilius, Ham. Buchan. Fish. Ganges, p. 384 (1822), part.; Günth., Cat. Fish., vii., p. 286 (1868); Bouleng., Poiss. Bass. Congo, p. 231 (1901), Fish. Nile, p. 261 (1907), and Cat. Fresh. Fish. Afr., ii., p. 191 (1911).

Opsaridium, Peters, Mon. Berl. Ac., 1853, p. 783, and Reise n. Mossamb., iv., p. 58 (1868).

Pelotrophus, Günth., Proc. Zool. Soc., 1864, p. 314, and Cat. Fish., t.c., p. 320.

Mouth large, oblique, without lips, with or without barbels. Sub-orbitals large. Dorsal originating behind vertical of ventrals and before that of anal. A scaly process at base of ventrals. Lateral line low down, following ventral line of the body and running along the lower part of caudal peduncle. Belly rounded, with small or moderately large scales.

Key to Species.

At least $\frac{1}{3}$ of base of dorsal fin above anal.

- D. ii 7-8, A. iii 11, Sc. 41-42 $\frac{7\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$; depth of body $3\frac{3}{4}$
to $4\frac{1}{2}$ times in total length 1. *B. peringueyi*, n. sp.
- D. ii 9, A. iii 13, Sc. 42 $\frac{7\frac{1}{2}}{3}$, 3; depth of body $4\frac{1}{5}$ times
in total length 2. *B. nearii*, Blgr.
- D. ii 9, A. iii 13, Sc. 40-41 $\frac{7\frac{1}{2}}{2\frac{1}{2}}$, $2\frac{1}{2}$; depth of body $4\frac{1}{5}$ to
 $4\frac{1}{2}$ times in total length 3. *B. stephensoni*, n. sp.
- D. ii-iii 9-10, A. iii 10-11, Sc. 41-43 $\frac{7\frac{1}{2}}{3\frac{1}{2}}$, 2; depth of
body $4-4\frac{1}{5}$ times in total length 4. *B. zambesensis*, Peters.

1. BARILIUS PERINGUEYI, n. sp.

Depth of body $3\frac{3}{4}$ to $4\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{1}{2}$ to $3\frac{3}{5}$ times. Width of head about $\frac{1}{2}$ its length; snout $3\frac{3}{10}$ to $3\frac{3}{4}$ times in length of head, diameter of eye $3\frac{1}{4}$ to $3\frac{9}{10}$ times, interorbital width 3 to $3\frac{3}{10}$ times; mouth extending to vertical of anterior third or middle of eye; no barbels; sub-orbital bones nearly covering cheeks. Gill-rakers few, rudimentary. In some specimens the lower jaw is covered underneath with more or less distinct scars or rows of conical tubercles and, in the largest specimen, there are about 8 pearl-like tubercles on each side of upper jaw.

Dorsal ii 7-8; originating midway between middle of eye and root of caudal, posterior third above anal; anterior rays longest, $\frac{3}{5}$ to $\frac{4}{5}$

length of head. Anal iii 11; anterior rays slightly longer than those of dorsal, $\frac{7}{10}$ to $\frac{9}{10}$ length of head. Pectoral $\frac{3}{4}$ to $\frac{1}{2}$ length of head, reaching or scarcely reaching ventral. Caudal deeply forked; caudal peduncle $2\frac{2}{3}$ to $2\frac{3}{5}$ times as long as deep. Scales with radiating striae, 41–42 $\frac{7\frac{1}{2}}{4\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and ventral, 14 round caudal peduncle.

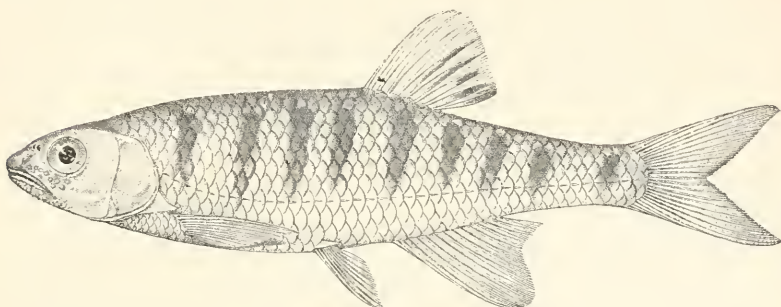


FIG. 90.—*Barilius peringueyi*. $\frac{5}{4}$.

Colour (of preserved specimens) silvery, darker on the back; 8–10 dark vertical bars on the body on each side and a dark patch on base of caudal; membranes between rays of dorsal black and last ray tipped with black.

One specimen, 81 mm. in length, from Nels River, Nelspruit, Transvaal (A. T. Cooke).

Four specimens, ranging from 49–59 mm. in length, from White River, Transvaal (A. T. Cooke).

2. *BARILIUS NEAVII*, Blgr.

Bouleng., Mem. Manchest. Lit. and Phil. Soc., li., 1907, No. 12, p. 3, and Cat. Fresh. Fish. Afr., vol. ii., p. 199, fig. 175 (1911).

Depth of body $4\frac{1}{5}$ times in total length excluding caudal, length of head $2\frac{3}{5}$ times. Head a little more than twice as long as broad; snout obtusely pointed, a little longer than eye, which is $3\frac{7}{10}$ times in length of head; interorbital width $3\frac{7}{10}$ times in length of head; mouth extending to vertical of middle of eye; no barbels; naked space between preoperculum and sub-orbitals as broad as 2nd suborbital. Gill-rakers few, very short or rudimentary.

Dorsal ii 9; originating midway between eye and root of caudal, posterior half above anal; anterior rays longest, $\frac{7}{10}$ length of head. Anal iii 13; with produced anterior lobe, longest ray a little longer

than longest dorsal ray, $\frac{4}{5}$ length of head. Pectoral $\frac{4}{5}$ length of head, not reaching ventral. Caudal forked, lower lobe longer than upper; caudal peduncle $2\frac{1}{2}$ times as long as deep. Scales with radiating striæ, $42\frac{7\frac{1}{2}}{4\frac{1}{2}}$, 3 between lateral line and root of ventral, 14 round caudal peduncle. The specimen has 3 or 4 irregular rows of pores, or scars of tubercles, on each side of lower jaw.

Colour (of preserved specimen), silvery, brownish on back; about

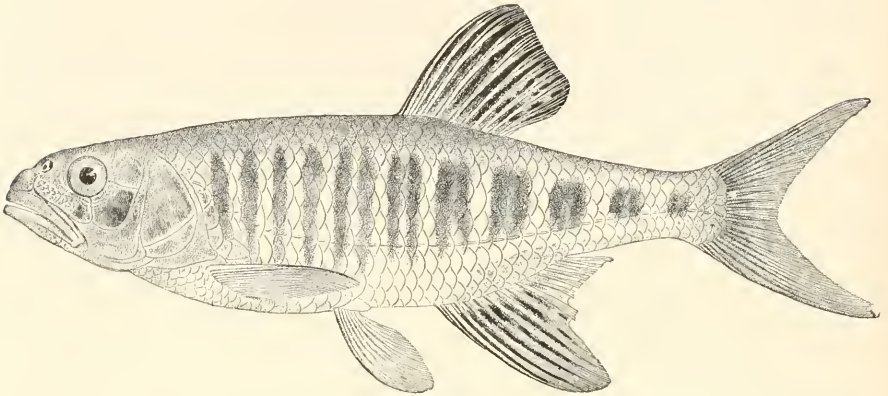


FIG. 91.—*Barilius newii*.

8 irregular pairs of bluish vertical bars on body on each side; dorsal tipped with orange, the membrane between the rays black; membrane between rays of anterior $\frac{2}{3}$ of anal fin black; caudal with a shade of black on rays and a white bar on distal portion of lobes, which are tipped with black.

One specimen, 67 mm. in length, from Livingstone, Rhodesia (A. Stephenson).

3. *BARILIUS STEPHENSONI*, n. sp.

Depth of body $4\frac{1}{5}$ to $4\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{3}{4}$ times. Width of head $\frac{2}{5}$ to $\frac{1}{2}$ its length; snout, interorbital width and eye, of equal length, $3\frac{2}{5}$ to $3\frac{3}{4}$ times in length of head; mouth extending to vertical of anterior third of eye; no barbels; naked space between preoperculum and suborbitals as broad as 2nd suborbital. Gill-rakers few and very small. Lower jaw with a row of open pores, or scars of tubercles, on each side.

Dorsal ii 9; originating midway between middle of eye and root of caudal, posterior third above anal; anterior rays longest, a little more than $\frac{1}{2}$ length of head. Anal iii 13; anterior rays a little longer

than those of dorsal, $\frac{2}{3}$ length of head. Pectoral $\frac{2}{3}$ length of head, not reaching ventral. Caudal forked (damaged in specimens); caudal peduncle $2\frac{1}{2}$ times as long as deep. Scales with radiating striae, 40–41 $\frac{7\frac{1}{2}}{3\frac{1}{2}}$, $2\frac{1}{2}$ between lateral line and base of ventral, 14 round caudal peduncle.

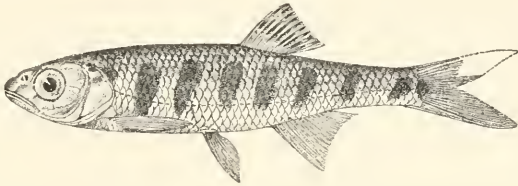


FIG. 92.—*Barilius stephensoni*. $\frac{5}{4}$.

Colour (of preserved specimens), silvery, brownish on back; 7 or 8 vertical bluish bars on body on each side and a dark spot at base of caudal; membranes of dorsal rays and tip of last ray black.

Two specimens, 49 mm., 56 mm. in length respectively, from Livingstone, Rhodesia (A. Stephenson).

* 4. *BARILIUS ZAMBESENSIS*, Peters.

Leuciscus zambezensis, Peters, Mon. Berl. Ac., 1852, p. 682.

Opsaridion zambezense, Peters, op. cit., 1853, p. 783, and Reise Mossamb., iv., p. 58, pl. xi., fig. 5 (1868).

Barilius zambezensis, Günth., Cat. Fish., vii., p. 292 (1868).

Barilius zambezensis, Bouleng., Cat. Fresh. Fish. Afr., ii., p. 198, fig. 173 (1911).

“Depth of body $4-4\frac{1}{3}$ times in total length, length of head $3\frac{2}{3}$ to 4 times. Head twice as long as broad; snout rounded, scarcely

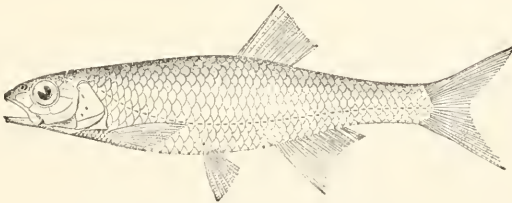


FIG. 93.—*Barilius zambezensis*.

projecting beyond mouth, as long as or shorter than eye, which is $3\frac{1}{3}$ to 4 times in length of head and equals interorbital width; mouth extending to below anterior third or centre of eye; no barbels; sub-

orbitals nearly entirely covering the cheek. Gill-rakers few and very short.

Dorsal ii-iii 9-10; originating midway between eye and caudal, posterior third above anal; anterior rays longest, about $\frac{2}{3}$ length of head. Anal iii 10-11; anterior rays as long as longest dorsals. Pectoral pointed, $\frac{3}{4}$ to $\frac{4}{5}$ length of head, not reaching ventral. Caudal forked. Caudal peduncle twice as long as deep. Scales with radiating striæ, 41-43 $\frac{7\frac{1}{2}}{32}$, 2 between lateral line and ventral, 14 round caudal peduncle.

Silvery white; back green; fins yellowish.

Total length 70 millim.

Zambesi."

5. ENGRAULICYPRIS.

Engraulicypris, Günth., Proc. Zool. Soc., 1893, p. 626; Bouleng., Cat. Fresh. Fish. Afr., ii., p. 209 (1911).

Neobola, Vincig., Ann. Mus. Genova (2), xv., 1895, p. 56; Bouleng., Proc. Zool. Soc., 1903, ii., p. 332, and Fish. Nile, p. 268 (1907).

Body strongly compressed, belly not keeled, covered with moderately large scales. Lateral line low down, following the ventral outline of the body and running along lower part of caudal peduncle. Mouth moderate or large, oblique, without lips. No barbels. Sub-orbitals large, covering cheeks. Gill-membranes narrowly united to isthmus. Dorsal fin without ossified ray, with 9-11 rays, 7 or 8 of which are branched; anal fin with 13-20 rays; a scaly process at base of ventrals.

ENGRAULICYPRIS BREVIANALIS, Blgr.

Neobola brevianalis, Bouleng., Ann. Natal Mus., i., 1908, p. 231, fig.

Engraulicypris brevianalis, Bouleng., Cat. Fresh. Fish. Afr., ii., p. 211, fig. 185 (1911).

Depth of body 4 to 5 times in total length excluding caudal, length of head 4 to $4\frac{3}{4}$ times. Head $2\frac{3}{10}$ to $2\frac{5}{8}$ times as long as broad; snout obtuse, not projecting beyond mouth, about the same length or slightly shorter than the eye, which is 3 to $3\frac{1}{3}$ times in length of head and about equals interorbital width; mouth extending to vertical of anterior third of eye; sub-orbital bones covering greater part of cheek. Under surface of lower jaw entire, or covered with minute tubercles.

Dorsal ii 7; its origin slightly in advance of that of the anal; its distance from end of snout is from 2 to $2\frac{1}{4}$ times its distance from caudal; 1st branched ray longest, $\frac{2}{3}$ to nearly as long as head. Anal ii. 12-13. Pectoral pointed, about as long as head, reaching or scarcely reaching ventral. Caudal deeply forked; caudal peduncle 2 to $2\frac{1}{2}$ times as

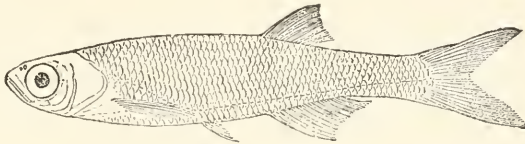


FIG. 94.—*Engraulicypris brevianalis*.

long as deep. Scale $52-55\frac{10\frac{1}{2}}{3\frac{1}{2}}$, 1 between lateral line and ventral, 16 round caudal peduncle.

Colour (of preserved specimens), yellowish, with a silvery lateral band.

Seven specimens, ranging from 38-50 mm. in length, from Dwaars River, Transvaal.

It is also reported from Zululand.

FAMILY SILURIDÆ.

Synopsis of Genera.

1. CLARIINÆ. Dorsal and anal fins very long, without spine; gill-membranes free from isthmus.
 - A. Dorsal fin single, formed entirely of articulated rays.

Sides of head protected by bony shields 1. *Clarias*.
 - B. Dorsal fin divided into two, the posterior portion adipose.

Sides of head protected by bony shields; adipose fin large and supported by bony rays (the produced neural spines) 2. *Heterobranchus*.
2. PLOTOSINÆ. A short dorsal fin in front, with a pungent spine; a second dorsal and a long anal, united with the caudal; gill-membranes free from isthmus 3. *Plotosus*.
3. SILURINÆ. Dorsal fin very short or absent; adipose dorsal fin very small; anal fin much elongate; gill-membranes free from isthmus.
 - Adipose fin present 4. *Eutropius*.
 - Adipose fin absent 5. *Schilbe*.

4. BAGRINE. Dorsal fin short; adipose fin present or transformed into a second rayed dorsal; anal fin short; gill-membranes free, or very narrowly attached to isthmus.
- A. Gill-membranes more or less notched in the middle; nostrils widely separated from each other.
1. Nasal barbel present.
Palate toothless; dorsal with 6-7 branched rays 6. *Gephyroglanis*.
2. Nasal barbel absent.
Dorsal with 7-8 branched rays; gill-membranes feebly notched; eye with free border 7. *Auchenoglanis*.
- B. Gill-membranes not notched, forming a straight transverse fold or a very open angle; nasal barbels absent; dorsal with 6-7 branched rays.
Teeth in pterygoids; nostrils close together 8. *Arius*.
5. DORADINE. Dorsal fin short, a second dorsal fin, adipose or rayed; anal short; gill-membranes more or less grown to isthmus.
Second dorsal fin adipose; mandibular barbels branched; premaxillary teeth conical, not movable; eye with free border 9. *Synodontis*.

1. CLARIAS.

Clarias, Gronov., Zoophyl., p. 100 (1781); Günth., Cat. Fish., v., p. 248 (1864); Bouleng., Poiss. Bass. Congo, p. 248 (1901), Fish. Nile, p. 278 (1907), Proc. Zool. Soc., 1907, p. 1063, Cat. Fresh. Fish. Afr., ii., p. 221 (1911).

Macropteronotus, part., Lacep., Hist. Poiss., v., p. 84 (1803).

Body elongate; with long dorsal and anal fins, composed entirely of soft rays, extending to or nearly to caudal fin. Head much depressed, upper and lateral parts osseous, forming a casque; 4 pairs of barbels—one nasal, one maxillary, two mandibular. Eye small, with free orbital margin. Jaws with a band of villiform teeth, a band of villiform or granular teeth on vomer. Gill-membranes free from isthmus, deeply notched in the middle. Males with a long conical anal papilla.

Key to Species.

- I. Ventral fins midway between end of snout and root of caudal, or a little nearer (less than $\frac{1}{3}$) the former; nasal barbel shorter than head.
- a. Vomerine teeth mostly pointed or granular-subconical, forming a band which is not broader than band of premaxillary teeth; distance between occipital process and dorsal fin $\frac{1}{2}$ to $\frac{3}{4}$ length of head.

- D. 66-72, A. 50-60; 26 gill-rakers (in very young) to 50 on anterior arch; distance between dorsal and caudal $1\frac{1}{5}$ -3 times diameter of eye 1. *C. gariepinus*, Burch.
- b. Vomerine teeth all or mostly granular, forming a crescentic band as broad as the premaxillary band, with or without posterior processes.
D. 62-66, A. 53-60; about 30 gill-rakers on anterior arch; distance between dorsal and caudal fins $1\frac{1}{2}$ times diameter of eye 2. *C. mossambicus*, Peters.
- c. Vomerine teeth granular, forming a crescentic band which, in the middle, is nearly twice as broad as the premaxillary band.
D. 60, A. 50; 15-30 gill-rakers on anterior arch, long; distance between dorsal and caudal fins $\frac{3}{10}$ to $\frac{2}{3}$ length of head 3. *C. ngamensis*, Cast.
- d. Vomerine teeth mostly granular, forming a band which is a little narrower than premaxillary band and interrupted in the middle.
D. 65, A. 52; 55 gill-rakers on anterior arch, distance between dorsal and caudal fins twice diameter of eye 4. *C. capensis*, C. and V.
- II. Ventral fins $1\frac{1}{4}$ to 2 times as distant from root of caudal as from end of snout, or nasal barbel at least as long as head; head smooth or very feebly granulate above; less than 30 gill-rakers on anterior arch.
Dorsal and anal fins embracing or adnate to base of caudal; maxillary barbel $\frac{2}{3}$ to $1\frac{1}{3}$ times length of head.
D. 80-90, A. 67-73; 14 gill-rakers on anterior arch; pectoral spine feebly serrated on the outer side . . 5. *C. theodorae*, M. Web.

1. CLARIAS GARIEPINUS, Burch.

Silurus (Heterobranchus) gariepinus, Burchell, Trav. Int. S. Afr., i., p. 425, fig. (1822).

Clarias capensis (non C. and V.), A. Smith, Ill. Zool. S. Afr. Pisc., pl. xxvii. (1845).

Clarius mossambicus, part., Peters, Mon. Berl. Ac., 1852, p. 682, and Reise Mossamb., iv., p. 32, pl. vi., figs. 1 and 2, and pl. vii., figs. 2 and 3 (1868).

Clarias gariepinus, Günth., Cat. Fish., v., p. 14 (1864); M. Weber, Zool. Jahrb. Syst., x., 1897, p. 149; Bouleng., Poiss. Bass. Congo, p. 254 (1901), Proc. Zool. Soc., 1907, p. 1069, and Cat. Fresh. Fish. Afr., ii., p. 228, fig. 193 (1911).

Depth of body $5\frac{1}{10}$ to $7\frac{3}{5}$ times in total length excluding caudal, length of head 3 to $3\frac{4}{5}$ times. Head $1\frac{3}{10}$ to $1\frac{3}{5}$ times as long as broad, its upper surface more or less distinctly granulate in the adult;

occipital process angular; frontal fontanelle $2\frac{1}{5}$ to $4\frac{1}{5}$ times as long as broad, $3\frac{1}{10}$ to $4\frac{1}{2}$ times in length of head; occipital fontanelle very small, in advance of occipital process; eye very small, 3 to $4\frac{1}{2}$ times in length of snout and $4\frac{2}{3}$ to 7 times in interorbital width; width of mouth about equal to interorbital width, $\frac{2}{5}$ to $\frac{1}{2}$ length of head; band of premaxillary teeth 5 to 7 times as long as broad; vomerine teeth mostly conical, or granular sub-conical, forming a crescentic band which may be slightly interrupted in the middle, where it is nearly as broad as or narrower than the premaxillary band; nasal barbel $\frac{1}{4}$ to $\frac{3}{5}$ length of head; maxillary barbel shorter than head in adult (a

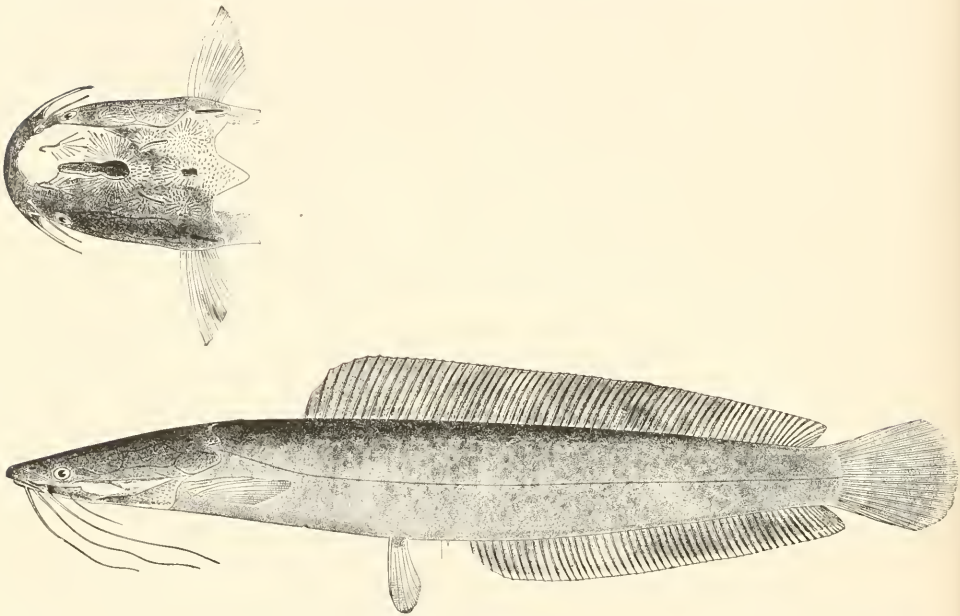


FIG. 95.—*Clarias gariepinus*. $\frac{2}{5}$.

little longer in young), reaching to base or last third of pectoral spine; outer mandibular barbel $1\frac{1}{3}$ to $1\frac{7}{10}$ times as long as inner, which measures $\frac{2}{3}$ to $\frac{3}{5}$ length of head. Gill-rakers on anterior arch fine and closely set, 26–65 in number. Clavicles not exposed.

Dorsal 65–80; its distance from occipital process $\frac{1}{7}$ to $\frac{3}{10}$ length of head, its distance from caudal $1\frac{1}{2}$ to 3 times diameter of eye. Anal 50–60, not reaching caudal. Pectoral $\frac{2}{3}$ to $\frac{1}{2}$ length of head, the spine serrated on the outer border and $\frac{1}{2}$ to $\frac{4}{5}$ the length of the fin. Ventrals nearly equally distant from point of snout and root of caudal or a little nearer to the former. Caudal about $\frac{1}{2}$ length of head.

Colour (of preserved specimens), reddish or dark bluish or greyish brown above, uniform or marbled with dark brown, whitish below ; usually a more or less distinct light vertical bar on base of caudal.

One specimen, 455 mm. in length, from Sabi River, Transvaal (Major Stevenson Hamilton).

Four specimens, ranging from 168-348 mm. in length, from Kuruman, Bechuanaland.

Seven specimens, ranging from 243-365 mm. in length, from Pienaars River, Transvaal (C. J. Swierstra).

One specimen, 311 mm. in length, from Thabina River, Transvaal (C. J. Swierstra).

One specimen, 300 mm. in length, locality unknown.

One specimen, 256 mm. in length, from Mooi River, Potchefstroom, Transvaal.

One specimen, 235 mm. in length, from Transvaal River, Johannesburg (H. Fry).

One specimen, 180 mm. in length, from Potchefstroom, Transvaal (Mr. Stenning).

One specimen, 178 mm. in length, from Pretoria, Transvaal.

One specimen, 174 mm. in length, from dam at Modderfontein, Transvaal.

Two specimens, 170 mm., 181 mm. in length respectively, from Dwaars River, Transvaal.

It is also reported from Natal, Orange River, Rhodesia, Mossambique, Katanga, Angola.

2. CLARIAS MOSSAMBICUS, Peters.

Clarias mossambicus, part., Peters, Mon. Berl. Ac., 1852, p. 682, and Reise Mossamb., iv., p. 32, pl. vi., fig. 3 (1868) ; Fischer, Jahrb. Hamb. Wiss. Aust., i., 1884, p. 28 ; Vincig., Ann. Mus. Genova (2), xv., 1895, p. 31, fig. 1, and xvii., 1896, p. 25 ; Pfeff., Thierw. O-Afr. Fische, p. 27, fig. (1896) ; Pellegr., Mem. Soc. Zool. France, xvii., 1905, p. 176 ; Bouleng., Proc. Zool. Soc., 1907, p. 1071, and Cat. Fresh. Fish. Afr., ii., p. 232, fig. 195 (1911).

Clarias gariepinus, part., Günth and Playf., Fish. Zanzib., p. 113 (1866).

Clarias zobecchui, Vincig., Ann. Mus. Genova (2), xiii., 1893, p. 450, and xv. 1895, p. 30, fig. ; Bouleng., Poiss. Bass. Congo, p. 253 (1901), and Fish. Nile, p. 285, pl. li., fig. 1 (1907).

Clarias lazera (non Cuv. and Val.), Günth., Proc. Zool. Soc., 1894, p. 89 ; Bouleng., Proc. Zool. Soc. 1901, ii. p. 161.

Clarias smithii, Günth., Proc. Zool. Soc., 1896, p. 219, fig.

Clarias microphthalmus, Pfeff., op. cit., p. 28; Hilgendorf, Zool. Jahrb. Syst., xxii., 1905, p. 410.

Clarias güntheri, Pfeff., l.c.

Depth of body 5 to $6\frac{2}{3}$ times in total length excluding caudal, length of head $3\frac{1}{2}$ times. Head $1\frac{1}{2}$ to $1\frac{2}{3}$ times as long as broad, its upper surface closely granulate; occipital process angular; frontal fontanelle sole-shaped or knife-shaped, $3\frac{1}{2}$ to $4\frac{1}{4}$ times as long as broad, 4 to $5\frac{1}{2}$ times in length of head; occipital fontanelle small, in advance of occipital process; eye $3\frac{1}{2}$ to $4\frac{1}{4}$ times in length of snout, $4\frac{1}{3}$ to $6\frac{2}{3}$ times in interorbital width; width of mouth about equal to interorbital width; band of premaxillary teeth $5\frac{1}{2}$ to $8\frac{1}{3}$ times as long as broad; vomerine teeth granular, forming a crescentic band which is as broad as premaxillary band;

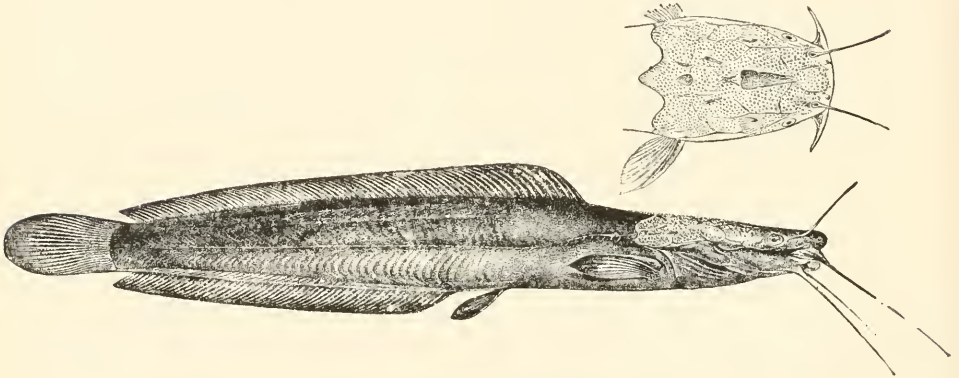


FIG. 96.—*Clarias mossambicus*. $\frac{1}{5}$.

nasal barbel $\frac{1}{4}$ to $\frac{3}{5}$ length of head; maxillary barbels 1 to $1\frac{1}{2}$ times length of head, reaching to end of pectoral fin or a little beyond; outer mandibular barbel $1\frac{1}{2}$ to $1\frac{2}{3}$ times as long as inner, which measures $\frac{1}{3}$ to $\frac{3}{5}$ length of head. Gill-rakers long and closely set, 30 to 60 on anterior arch. Clavicles hidden under the skin.

Dorsal 62-72; its distance from occipital process about $\frac{1}{5}$ length of head, its distance from caudal $1\frac{1}{2}$ to $2\frac{1}{4}$ times diameter of eye. Anal 50-60; separated from caudal by a distinct interspace. Pectoral $\frac{2}{5}$ to $\frac{1}{2}$ length of head, the spine serrated on the outer border and $\frac{3}{5}$ the length of the fin. Ventrals slightly nearer to end of snout than to caudal. Caudal $\frac{2}{5}$ to $\frac{1}{2}$ length of head.

Colour (of preserved specimens) dark mottled brown on back and sides; a dark band on each side of lower surface of head.

Two specimens, 315 mm., 213 mm. in length respectively, from Sabi River, Transvaal (J. S. Hamilton).

Two specimens, 540 mm., 470 mm. in length respectively, from Manzemntonto River, Transvaal (J. S. Hamilton).

Two specimens, 131 mm., 120 mm. in length respectively, from Umbeluzi, Swaziland (Mr. Howard).

It is also reported from East Africa, from Abyssinia and Lake Victoria to Lake Tanganyika and the Zambezi.

3. *CLARIAS NGAMENSIS*, Casteln.

Casteln., Mém. Poiss. Afr. Austr., 1861, p. 63; Bouleng., Trans. Zool. Soc., xviii., v., p. 404, pl. xxxviii., fig. 2 (1911).

Depth of body 6 to $6\frac{3}{4}$ times in total length excluding caudal, length of head $3\frac{2}{5}$ to $3\frac{3}{4}$ times. Head $1\frac{1}{2}$ to $1\frac{3}{5}$ times as long as

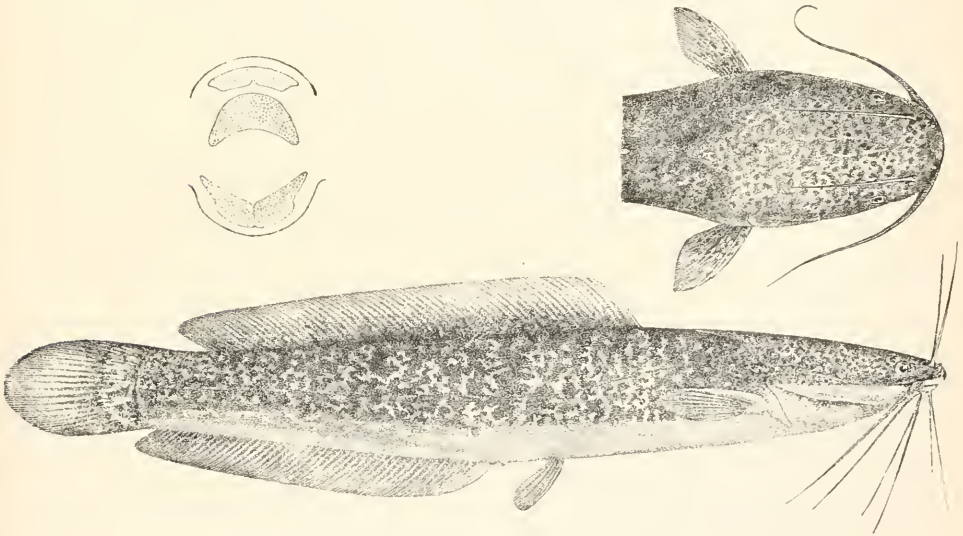


FIG. 97.—*Clarias ngamensis*. $\frac{1}{2}$.

broad, feebly granulated and showing patches of radiating striæ beneath the skin; occipital process angular; frontal fontanelle $2\frac{1}{5}$ to 3 times as long as broad, $\frac{1}{3}$ length of head; occipital fontanelle small, in advance of occipital process; eye 3 to $3\frac{1}{4}$ times in length of snout and $4\frac{1}{10}$ to $4\frac{1}{4}$ times in interorbital width, which equals width of mouth and is $\frac{2}{5}$ length of head; band of premaxillary teeth $3\frac{1}{2}$ to

4 times as long as broad; vomerine teeth granular, forming a crescentic band which, in the middle, is $1\frac{1}{2}$ to $1\frac{2}{3}$ times as broad as the premaxillary band; anterior mandibular teeth pointed, posterior granular. Nasal barbel about $\frac{2}{3}$ length of head, maxillary $\frac{9}{10}$ and reaching posterior half of pectoral spine, outer mandibular barbel $\frac{9}{10}$ length of head, inner $\frac{3}{5}$ to $\frac{7}{10}$. Gill-rakers long, 16 to 20 on lower part of anterior arch. Clavicles striated, more or less distinct under the skin.

Dorsal 60 (*circa*); its distance from occipital process $\frac{1}{6}$ length of head, its distance from caudal fin $\frac{3}{10}$ to $\frac{2}{5}$. Anal 50 (*circa*); narrowly separated from caudal. Pectoral $\frac{2}{3}$ length of head, its spine strongly serrated on the outer border and $\frac{2}{3}$ to $\frac{7}{10}$ length of fin. Ventral equally distant from end of snout and base of caudal or a little nearer to the former. Caudal a little more than $\frac{1}{2}$ length of head.

Colour (of preserved specimens), uniform dark brown above, yellowish beneath, under side of head white.

Two specimens, 108 mm., 101 mm. in length respectively, from N.W. Rhodesia (Rev. F. A. Rogers and E. C. Chubb).

The species is also reported from the Lake Ngami Basin.

4. CLARIAS CAPENSIS, C. and V.

Cuv. and Val., Hist. Poiss., xv., p. 377 (1840); Bouleng., Poiss. Bass. Congo, p. 255 (1901); Proc. Zool. Soc., 1907, p. 1075, Ann. Natal Mus., i., 1908, p. 237, and Cat. Fresh. Fish. Afr. ii, p. 240 (1911).

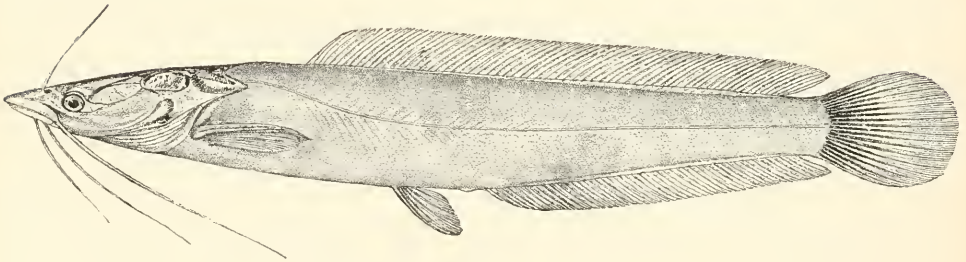


FIG. 98.—*Clarias capensis*. $\frac{3}{4}$.

Depth of body 8 times in total length excluding caudal, length of head $3\frac{3}{5}$ times. Head $1\frac{1}{2}$ times as long as broad, its upper surface coarsely granulate, occipital process angular; frontal fontanelle $3\frac{2}{3}$ times as long as broad, $\frac{1}{3}$ length of head; occipital fontanelle very small, well in advance of occipital process; eye very small, its diameter $3\frac{3}{4}$ times in length of snout, $5\frac{1}{2}$ times in interorbital width,

which equals width of mouth and is $\frac{2}{3}$ length of head; band of premaxillary teeth 6 times as long as broad; band of vomerine teeth a little narrower than premaxillary band, rather widely interrupted in the middle, composed of small, partly pointed, partly granular teeth; nasal barbel $\frac{2}{3}$ length of head; maxillary barbel slightly longer than head, reaching end of pectoral fin; outer mandibular barbel $\frac{1}{3}$ length of head, inner nearly $\frac{2}{3}$. Gill-rakers on first arch long and closely set, 55 in number. Clavicles hidden under the skin.

Dorsal 65; its distance from occipital process nearly $\frac{1}{4}$ length of head, its distance from caudal 2 diameters of eye. Anal 52; narrowly separated from caudal. Pectoral fin $\frac{2}{3}$ length of head, the spine feebly serrated on its outer border, $\frac{3}{4}$ the length of the fin. Ventral nearer to point of snout than to caudal. Caudal $\frac{1}{2}$ length of head.

Colour (of preserved specimen), pale brown on back, flesh-colour beneath; top of head marbled with black; a dark band on base of caudal; fins whitish.

One specimen, 218 mm. in length, from German S.W. Africa.

It is also reported from Natal.

5. CLARIAS THEODORÆ, M. Web.

M. Weber, Zool. Jahrb. Syst., x., 1897, p. 150; Bouleng., Proc.

Zool. Soc., 1907, p. 1089, and Cat. Fresh. Fish. Afr., ii., p. 262, fig. 218 (1911).

Depth of body $8\frac{1}{5}$ times in total length excluding caudal, length of head, $5\frac{2}{3}$ times. Head $1\frac{2}{3}$ times as long as broad, smooth; occipital process angular, broader than long; frontal fontanelle sole-shaped, twice as long as broad, and $\frac{3}{10}$ length of head; occipital fontanelle smaller, in advance of occipital process; eye very small, 3 times in length of snout, $4\frac{1}{2}$ times in interorbital width, which is nearly $\frac{9}{10}$ width of mouth and $\frac{2}{3}$ length of head; band of premaxillary teeth 4 times as long as broad; vomerine teeth conical, forming a curved band, which is as broad as the premaxillary band; nasal barbel $\frac{2}{3}$ length of head, maxillary barbel $\frac{9}{10}$, outer mandibular barbel $\frac{1}{3}$, inner $\frac{1}{2}$ length of head. 14 gill-rakers on anterior arch. Clavicles feebly striated, distinct under the skin.

Dorsal 80-90; its distance from occipital process $\frac{1}{3}$ length of head. Anal 73. Dorsal and anal embracing base of caudal. Pectoral about $\frac{1}{2}$ length of head, its spine feebly serrated on the outer side, strongly on the inner, measuring $\frac{2}{3}$ the length of the fin. Ventrals

$1\frac{2}{3}$ times as distant from caudal as from end of snout. Caudal $\frac{3}{5}$ length of head.

Colour (of preserved specimen), uniform reddish brown.

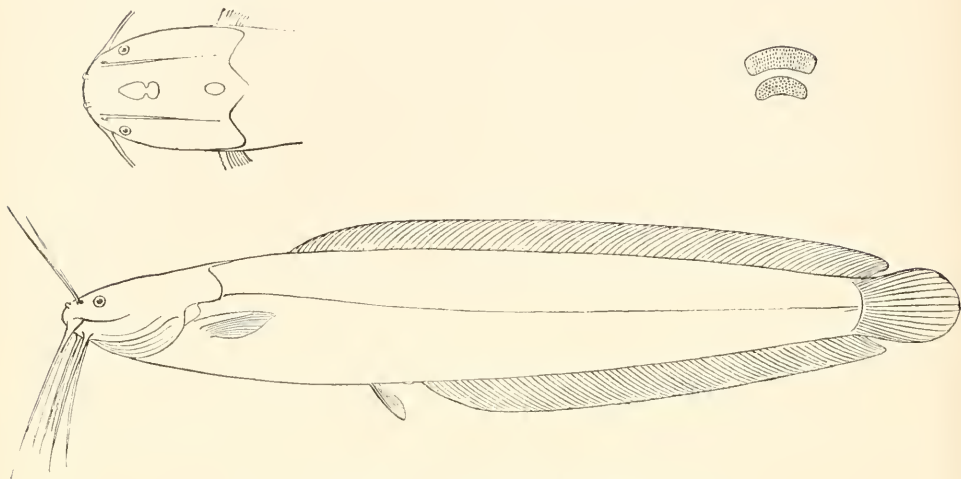


FIG. 99.—*Clarias theodoræ*. $\frac{5}{7}$.

One specimen, 127 mm. in length, from N.W. Rhodesia (Rev. F. A. Rogers and E. C. Chubb. Buluwayo Museum).

This fish is also reported from the Lake Ngami Basin, Natal and Zululand.

2. HETEROBRANCHUS.

Geoff., Deser. Egypte, Poiss. (1809), part.; Günth., Cat. Fish., v., p. 21 (1864); Bouleng., Poiss. Bass. Congo, p. 265 (1901), Fish. Nile, p. 300 (1907), Proc. Zool. Soc., 1907, p. 1094, and Cat. Fresh. Fish. Afr., ii., p. 272 (1911).

Distinguished from *Clarias* by the division of the dorsal fin into two parts, the posterior adipose and supported by the prolongations of the neural spines.

* HETEROBRANCHUS LONGIFILIS, C. and V.

Heterobranchus longifilis, Cuv. and Val., Hist. Poiss., xv., p. 394, pl. cccclxvii. (1840); Günth., Cat. Fish., v., p. 22 (1864), and Petherick's Travels, ii., p. 221 (1869); Bouleng., Fish. Nile, p. 303, pl. liv., fig. 2 (1907), Proc. Zool. Soc., 1907, p. 1095, and Cat. Fresh. Fish. Afr., ii., p. 274, fig. 227 (1911).

Heterobranchus laticeps, Peters, Mon. Berl. Ac., 1852, p. 682, and Reise Mossamb., iv., p. 37, pl. vii., fig. 1 (1868); Bouleng., Poiss. Bass. Congo, p. 265 (1901).

“Depth of body 6–8 times in total length, length of head 3 to $3\frac{2}{3}$ times. Head depressed, $1\frac{1}{2}$ to $1\frac{2}{3}$ times as long as broad, its upper surface coarsely granulate in the adult; occipital process acutely pointed; frontal fontanelle knife-shaped, $2\frac{1}{2}$ to 4 times as long as broad, $3\frac{1}{2}$ to $6\frac{1}{2}$ times in length of head; occipital fontanelle small, in advance of occipital process; eye $2\frac{1}{2}$ (very young) to $4\frac{1}{2}$ times in length of snout, 4 to 9 times in interorbital width; width of mouth a little less than interorbital width; band of præmaxillary teeth 5 to 6 times as long as broad; vomerine teeth also villiform, forming a crescentic band, which is nearly as broad as or a little broader than præmaxillary band; nasal barbel $\frac{1}{2}$ to once length of head; maxillary barbel $1\frac{1}{5}$ to 2 times length of head, extending to end of pectoral or

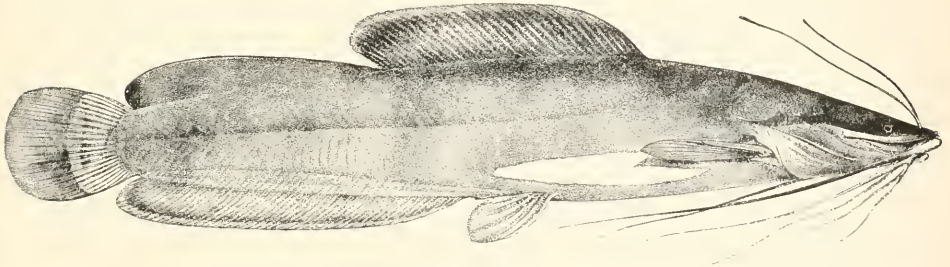


FIG. 100.—*Heterobranchus longifilis*. $\frac{1}{6}$.

between this point and origin of anal; outer mandibular barbel $1\frac{1}{2}$ to $1\frac{3}{4}$ times as long as inner, which measures $\frac{1}{2}$ to nearly once length of head. Gill-rakers rather short, 20 to 30 on anterior arch.

Dorsal 29–34; its distance from occipital process $\frac{1}{7}$ to $\frac{1}{3}$ length of head; adipose dorsal as long as or a little shorter and lower than rayed dorsal, commencing immediately behind or at a short distance from the latter. Anal 44–54; extending, like the adipose dorsal, to the base of the caudal fin. Pectoral $\frac{2}{5}$ to $\frac{1}{2}$ length of head, the spine feebly serrated on the outer border and measuring $\frac{1}{2}$ (young) to $\frac{6}{7}$ the length of the fin. Ventral midway between end of snout and base of caudal, or a little nearer the latter. Caudal $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Olive above, white beneath, sometimes with scattered black blotches; dorsal and anal fins pale olive, darker towards the edge, which may be margined with red; caudal fin yellowish or pale orange at the base, with a more or less distinct blackish crescentic

band, sharply defined in front, shading off to yellow or red behind; adipose dorsal fin often blackish at the end.

Total length 720 millim.

Nile, Omo, Niger, Congo, Zambesi."

3. PLOTOSUS.

Plotosus, Lacep., Hist. Poiss., v., p. 129 (1803); Günth., Cat. Fish., v., p. 23 (1864); Vaill., Bul. Mus. Paris, 1903, p. 119; Bouleng., Cat. Fresh. Fish. Afr., ii., p. 278 (1911).

Platystacus, part., Bloch, Ausl. Fische, viii., p. 52 (1793).

Body elongate, compressed, tapering to a point behind; a short dorsal fin in front, with a pungent spine; a second dorsal and a long anal, united with the caudal; head feebly depressed; 4 pairs of barbels—one nasal, one maxillary, two mandibular. Eye with free orbital margin. Jaws with a band of obtusely conical teeth; a group of large granular teeth on vomer. Gill-membranes free from isthmus, deeply notched in the middle.

Coasts of the Indian Ocean and Western Pacific, sometimes entering fresh waters. One species has been found in fresh waters in East Africa.

PLOTOSUS ANGUILLARIS, Bl.

Silurus, sp. d., Forsk., Descr. Anim., p. xvi (1775).

Platystacus anguillaris, Bloch, Ausl. Fische, viii., p. 60, pl. cccclxxiii., fig. 1 (1793).

Plotosus anguillaris, Lacep., Hist. Poiss., v., p. 129 (1803); Günth., Cat. Fish., v., p. 24 (1864); Bouleng., Cat. Fresh. Fish. Afr., ii., p. 278, fig. 229 (1911).

Plotosus ikapor, Less. Voy. Coquille, Zool., ii., p. 132, pl. xxxi., fig. 3 (1830).

Plotosus marginatus, Bennett, Life of Raffles, p. 691 (1830).

Plotosus lineatus, Cuv. and Val., Hist. Poiss., xv., p. 412 (1840).

Plotosus castaneus, Bleek, Nat. Tijdschr. Ned. Ind., ii., 1851, p. 490.

Plotosus arab, Bleek, Atl. Ichth., ii., p. 98, pl. xcvi., fig. 2 (1862); Day, Fish. Ind., p. 483, pl. cxii., fig. 4 (1878).

Depth of body $5\frac{1}{5}$ to $6\frac{3}{4}$ times in total length excluding caudal, length of head $4\frac{2}{5}$ to 5 times. Snout rounded, feebly projecting beyond mouth, $2\frac{2}{5}$ to $2\frac{3}{5}$ times in length of head, interorbital width $2\frac{2}{3}$ to 3 times; eye supero-lateral, $6\frac{2}{5}$ to $7\frac{2}{5}$ times in length of head; lips papillose; teeth large; nasal barbel $\frac{2}{5}$ length of head; maxillary

and outer mandibular barbels nearly or quite equal, $\frac{2}{5}$ to $\frac{1}{2}$ length of head; inner mandibular barbel $\frac{1}{3}$ to $\frac{2}{5}$ length of head. Gill-rakers rather long, closely set, about 20 on lower part of anterior arch.

Dorsal i 5, 85; spine strong, serrated in front and behind, $\frac{3}{10}$ to $\frac{2}{3}$ length of head. Anal 70. Pectoral $\frac{1}{2}$ to $\frac{3}{5}$ length of head, with a strong but short spine serrated on both sides. Ventral $1\frac{1}{2}$ to $1\frac{7}{10}$ times as distant from caudal as from end of snout.

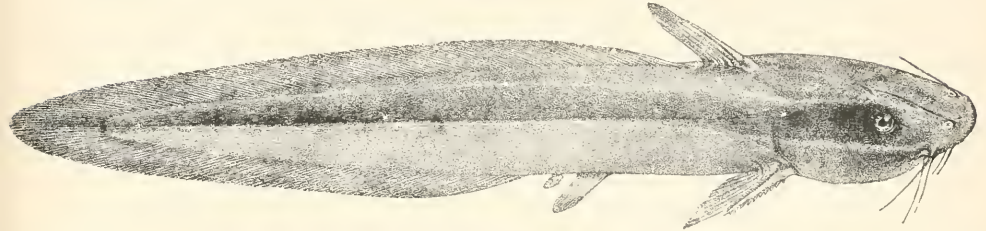


FIG. 101.—*Plotosus anguillaris*. $\frac{1}{2}$.

Colour (of preserved specimens), dark brown above, lighter below; 3 more or less distinct pale bluish longitudinal streaks on body; fins light-coloured; outer edge of dorsal and of posterior half of anal dark.

Four specimens, ranging from 151–164 mm. in length respectively, from Natal (Romer Robinson).

It is also reported from the Indian Ocean and Western Pacific, as far North as Japan.

4. EUTROPIUS.

Müll. and Froesch., Hor. Ichthyol., iii., p. 6 (1849); Günth., Cat. Fish., v., p. 52 (1864); Bouleng., Poiss. Bass. Congo, p. 266 (1901), Fish. Nile p. 306 (1907), Cat. Fresh. Fish. Afr., ii., p. 279 (1911).

Dorsal fin short, adipose dorsal very small, anal much elongate; 4 pairs of barbels—one nasal, one maxillary, two mentals or mandibulars. Nostrils widely separated. Eye large, with a free border. Jaws with a band of villiform teeth; a band of villiform vomeropalatine teeth. Gill-membranes free, deeply notched.

EUTROPIUS DEPRESSIROSTRIS, Peters.

Bagrus depressirostris, Peters, Mon. Berl. Ac., 1852, p. 682.

Eutropius depressirostris, Peters, Arch. f. Nat., 1855, p. 267; Günth., Cat. Fish., v., p. 54 (1864); Bouleng., Cat. Fresh. Fish. Afr., ii., p. 291, fig. 237 (1911).

Eutropius lemairii, Bouleng., Ann. Mus. Congo, Zool., i, p. 138, pl. 1, fig. 3 (1900), and Poiss. Bass. Congo, p. 272 (1901).

Depth of body 4 to $4\frac{2}{5}$ times in total length excluding caudal, length of head $4\frac{1}{3}$ to $4\frac{2}{3}$ times. Head $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as broad; snout broad, lower jaw projecting; eye perfectly lateral, 5 to $6\frac{1}{5}$ times in length of head, $2\frac{1}{2}$ to $3\frac{2}{5}$ times in interorbital width; width of mouth about equal to interorbital width; vomero-palatine teeth forming an uninterrupted band which is narrower than the band of premaxillary teeth; nasal barbel $\frac{3}{10}$ to $\frac{2}{5}$ length of head, maxillary and outer mandibular $\frac{2}{5}$ to $\frac{3}{5}$, inner mandibular $\frac{1}{5}$. Gill-rakers moderately long and thick, widely set, 10-12 on lower part of anterior arch.

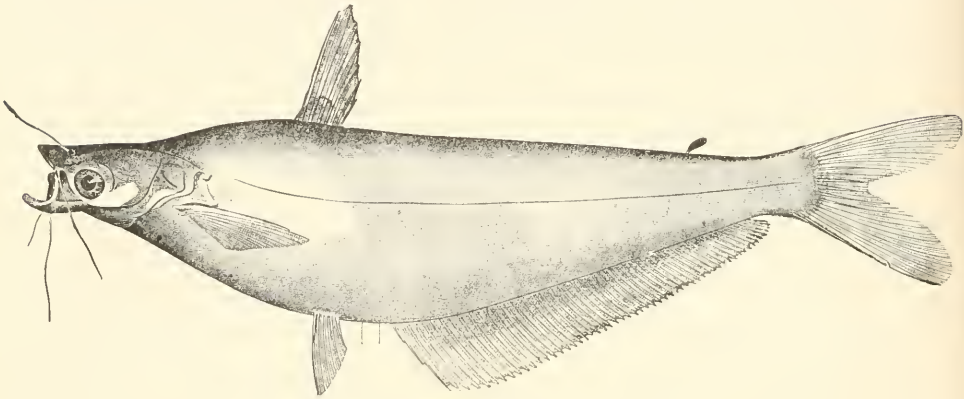


FIG. 102.—*Eutropius depressirostris*. $\frac{2}{5}$.

Dorsal i 6; entirely or nearly entirely in advance of ventrals, $1\frac{1}{5}$ to $1\frac{9}{10}$ times as distant from caudal as from end of snout; its spine slender, feebly serrated behind in its upper half, $\frac{2}{3}$ length of head. Anal 53-56; 3 or 4 anterior rays simple, the following gradually decreasing in length. Pectoral not reaching ventral, its spine feebly serrated on inner side, about as long as and a little stronger than that of dorsal. Caudal deeply forked, with rounded or obtusely pointed lobes; caudal peduncle about 1 to $1\frac{1}{4}$ times as long as deep.

Colour (of preserved specimens), reddish brown above, whitish beneath; sides finely speckled with minute dark dots; an indistinct large dark blotch above the pectoral fin.

One specimen, 275 mm. in length, from Thabina River, Transvaal (C. J. Swierstra).

Two specimens, 140 mm., 154 mm. in length respectively, from Pienaars River, Transvaal (C. J. Swierstra).

One specimen, 195 mm. in length, from Umguazi River, Rhodesia (20 miles N. of Zambezi River).

5. SCHILBE.

Cuv., Règne Anim., ii., p. 202 (1817), part.; Günth., Cat. Fish., v., p. 40 (1864); Bouleng., Poiss. Bass. Congo, p. 273 (1901), Fish. Nile, p. 311 (1907), Cat. Fresh. Fish. Afr., ii., p. 293 (1911).

Differs from *Eutropius* only in the absence of the adipose dorsal fin.

SCHILBE MYSTUS, L.

Silurus mystus, Linn., in Hasselq. Reise Paläst., p. 419 (1762), and Syst. Nat., i., p. 502 (1766).

Schilbe mystus, Rüpp., Beschr. n. Fische Nil, p. 5 (1829); Cuv. and Val., Hist. Poiss., xvi., p. 372 (1839); Günth., Cat. Fish., v., p. 50 (1864); Bouleng., Poiss. Bass. Congo, p. 273 (1901), Fish. Nile, p. 311, pl. lvi. fig. 1 (1907), and Cat. Fresh. Fish. Afr., ii., p. 293, fig. 238 (1911).

Chilbé cherissié, Rifaud, Voy. Egypte, pl. exciii., No. 30 (1830).

Schilbe intermedius, Rüpp., Fortsetz. Beschr. n. Fische, p. 6 (1832).

Schilbe auratus, Joannis, Mag. Zool., 1835, pl. v.

Schilbe senegalus, Cuv. and Val., t.c., p. 378.

Schilbe dispila, Günth., t.c., pp. 51, 223, and Ann. and Mag. N.H. (6), xvii., 1896, p. 276; Bouleng., Poiss. Bass. Congo, p. 274.

Schilbe senegalensis, var. *fasciata*, Steind., Sitzb. Ak. Wien, lx., i., 1872, p. 983, pl. vi., figs. 1 and 2.

? *Schilbe bouvieri*, Rochebr., Bull. Soc. Philom. (7), ix., 1885, p. 95.

Depth of body $4\frac{1}{3}$ to $4\frac{2}{5}$ times in total length excluding caudal, length of head 4 to $4\frac{7}{10}$ times. Head $1\frac{2}{5}$ to $1\frac{3}{5}$ times as long as broad; snout broad, $1\frac{1}{3}$ times to twice as long as eye, lower jaw projecting; eye perfectly lateral, 5 to 7 times in length of head, $2\frac{1}{2}$ to $3\frac{1}{2}$ times in interorbital width; width of mouth about equal to interorbital width. Vomeropalatine teeth forming an uninterrupted crescentic band, which is narrower than the band of the premaxillary teeth. Nasal barbel $\frac{3}{10}$ to $\frac{1}{2}$ length of head; maxillary and outer mandibular barbels about equal and $\frac{2}{5}$ to $\frac{3}{5}$ length of head, inner mandibular barbel $\frac{2}{5}$ to $\frac{1}{2}$ length of outer. Gill-rakers moderately long, widely set, 9-12 on lower part of anterior arch.

Dorsal i 6; entirely in advance of ventrals, $1\frac{2}{3}$ times to nearly twice as distant from caudal as from point of snout; its spine slender, feebly serrated behind, measuring $\frac{1}{2}$ to $\frac{7}{10}$ length of head and produced into a short filament. Anal 60-62; 3 or 4 anterior rays simple, the following gradually decreasing in length. Pectoral not reaching ventral, its spine feebly serrated on the inner side, as long as or a little longer than that of dorsal and also stronger. Caudal deeply forked, with obtusely pointed lobes; caudal peduncle a little deeper than long.

Colour (of preserved specimens), dark brown above, silvery below lateral line; a blackish, ill-defined blotch on each side above the

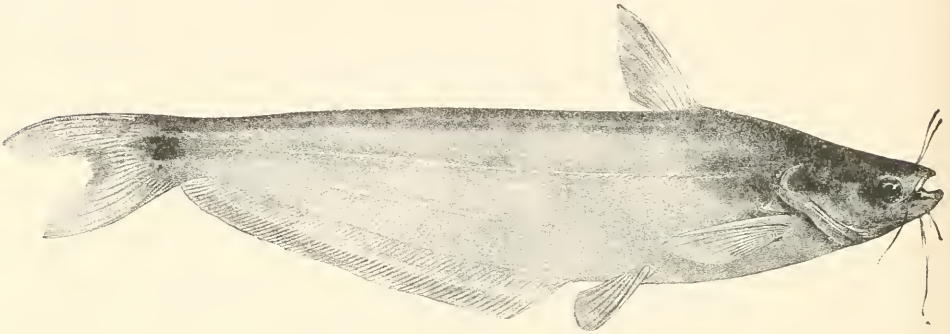


FIG. 103.—*Schilbe mystus*. $\frac{1}{3}$.

pectoral fin; outer border of lobes of caudal and base of inner rays whitish. The smaller specimen has 3 darkish streaks on each side, the upper along the back and continued faintly on upper lobe of caudal fin, the lower extending from below pectoral fin to lower lobe of caudal, the middle from the humeral blotch to root of caudal; a white band along lower third of rays of anal fin.

Two specimens, 130 mm., 295 mm. in length respectively; the smaller from Zambezi (A. Stephenson); the larger from Kafue River, tributary of the Zambezi River (J. Drury).

It is also reported from the Nile and Tropical Africa.

6. GEPHYROGLANIS.

Bouleng., Ann. Mus. Congo, Zool., i., p. 42 (1899), Poiss. Bass. Congo, p. 292 (1901), Cat. Fresh. Fish. Afr., ii., p. 344 (1911).

Dorsal and anal fins short; an adipose dorsal fin; 4 pairs of barbels—one nasal, one maxillary, two mandibular. Nostrils widely separated from each other. Eye supero-lateral, with free border.

Jaws with a band of villiform teeth; no teeth on palate. Gill-membranes free, deeply notched.

GEPHYROGLANIS SCLATERI, Blgr.

Bouleng., Ann. S. Afr. Mus., ii., 1901, p. 228, pl. xiii., and Cat. Fresh. Fish. Afr., ii., p. 347, fig. 269 (1911).

Depth of body $4\frac{1}{2}$ to 6 times in total length excluding caudal, length of head $3\frac{3}{5}$ to 4 times. Head $1\frac{1}{5}$ to $1\frac{1}{2}$ times as broad as deep, $1\frac{1}{5}$ to $1\frac{1}{2}$ times as long as broad, perfectly smooth; occipital process much longer than broad, in contact with the interneural shield; snout obtusely conical, $\frac{2}{5}$ to $\frac{1}{2}$ length of head; eye $5\frac{3}{5}$ to 7 times in length of head, $1\frac{1}{5}$ to $2\frac{1}{3}$ times in interocular width; nasal barbel

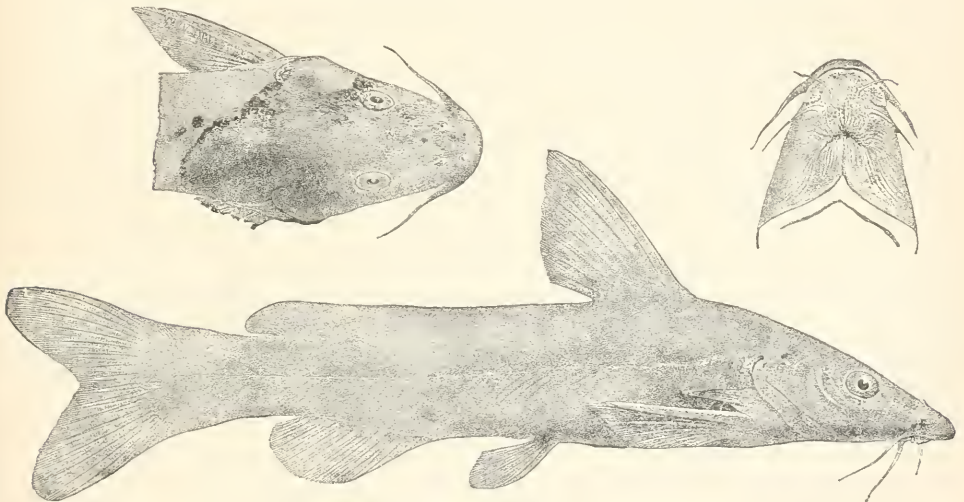


FIG. 104.—*Gephyroglanis sclateri*.

very short, $\frac{3}{10}$ to $\frac{1}{3}$ diameter of eye; maxillary barbel $\frac{3}{10}$ to $\frac{1}{2}$ length of head, outer mandibular $\frac{3}{10}$ to $\frac{2}{5}$, inner $\frac{1}{8}$ to $\frac{1}{4}$. Mouth $\frac{1}{3}$ to $\frac{1}{2}$ width of head; premaxillary band of teeth curved, 3 to 4 times as long as broad.

Dorsal i 7; $1\frac{1}{2}$ times to twice as deep as long, not reaching adipose fin when folded; spine strong, smooth, $\frac{2}{5}$ to $\frac{9}{10}$ length of head; longest soft ray $\frac{7}{10}$ to $\frac{5}{9}$ length of head. Adipose fin $3\frac{1}{4}$ to 4 times as long as deep, its distance from dorsal $1\frac{1}{5}$ to $1\frac{2}{3}$ times its length. Anal 16-17; 11-12 rays branched. Pectoral spine $\frac{3}{4}$ to $1\frac{0}{11}$ length of dorsal spine, strongly serrated on inner border. Caudal forked, with obtuse lobes, $\frac{2}{3}$ to $\frac{3}{4}$ length of head; caudal peduncle $1\frac{3}{5}$ times to twice as long as deep.

Colour (of preserved specimens), uniform dark or reddish brown above, whitish beneath.

One specimen, 165 mm. in length, from Vaal River, Transvaal.

Three specimens, ranging from 104–164 mm. in length, from Mooi River, Transvaal (H. Fry).

One specimen, 146 mm. in length, from Transvaal River, Johannesburg (H. Fry).

One specimen, 130 mm. in length, from Kraai River, Cape Province.

One specimen, 69 mm. in length, from Potchefstroom, Transvaal (Mr. Stenning).

Two specimens, 220 mm. in length, from Kafue River (J. Drury).

7. AUCHENOGLANIS.

Auchenaspis (non Egerton), Bleek., Nederl. Tijdschr. Dierk., i., 1863, p. 101; Günth., Cat. Fish., v., p. 137 (1864).

Auchenoglanis, Günth., Zool. Rec., i., p. 165 (1865); Bouleng., Poiss. Bass. Congo, p. 294 (1901); Fish. Nile, p. 344 (1907), and Cat. Fresh. Fish. Afr., ii., p. 366 (1911).

Oxyglanis, Vincig., Ann. Mus. Genova (2), xix., 1898, p. 249.

“Body moderately elongate, feebly compressed. Dorsal and anal fins short, the former composed of a spine and 7 or 8 branched rays, and followed by a very long adipose fin. Pectoral fin with a spine. Ventral fin with 6 rays, just behind the vertical of the dorsal fin. Three pairs of barbels: maxillary and two mandibulars. Nostrils widely separated from each other, the anterior tubular, on the upper lip, the posterior slit-like. Eye supero-lateral, with free border. Præmaxillaries small; maxillaries, hidden in the lip, comparatively large, bordering the mouth. Jaws with villiform teeth, which may be reduced to small groups; palate toothless. Gill-membranes free, feebly notched. Air-bladder large, free.

Vertebrae 43–48 (18–21 + 25–27). Nine branchiostegal rays. Intestinal canal much elongate and forming numerous convolutions. Nile and Tropical Africa.”

* AUCHENOGLANIS NGAMENSIS, Blgr.

Bouleng., Cat. Fresh. Fish. Afr., ii., p. 371, fig. 287 (1911), and Trans. Zool. Soc., vol. xviii., pt. v., 1911, p. 405.

“Depth of body $5\frac{1}{2}$ times in total length, length of head $3\frac{1}{2}$ times. Head moderately depressed, $1\frac{1}{2}$ times as long as broad, upper surface smooth; operculum with radiating striæ; occipital process

small, longer than broad, in contact with the moderately large inter-neural plate; snout pointed, $\frac{1}{2}$ length of head; eye supero-lateral, 8 times in length of head, twice in interorbital width; mouth small, nearly terminal, with thick papillose lips; præmaxillary teeth in a small patch a little broader than long, with notched posterior border. Maxillary and inner mandibular barbels $\frac{1}{2}$ length of head; outer mandibular slightly shorter than head, reaching base of pectoral fin. Gill-rakers rather long, 8 on lower part of anterior arch. Humeral process short, triangular, feebly striated.

Dorsal i 7; spine moderately strong, smooth, $\frac{1}{2}$ length of head, as

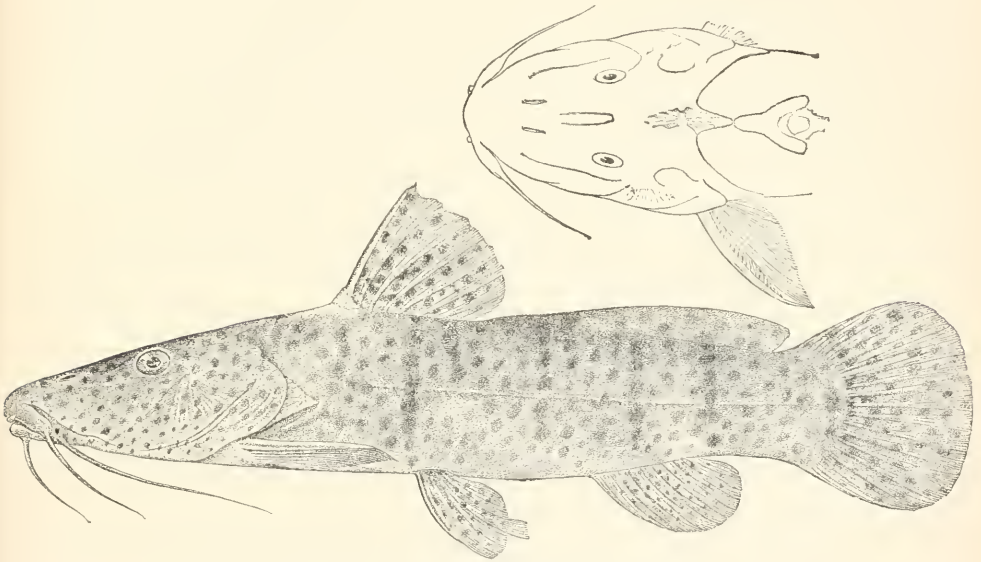


FIG. 105.—*Auchenoglanis ngamensis*. $\frac{5}{8}$.

long as longest soft rays. Adipose dorsal 9 times as long as deep, originating immediately behind rayed dorsal and extending nearly to root of caudal. Anal 13 (8 rays branched). Pectoral not reaching ventral; spine strong; strongly serrated on inner side. Ventral not reaching anal. Caudal rounded.

Olive-brown, with numerous small round black spots, some of which form vertical bars on the sides of the body; belly white.

Total length 220 millim.

Lake Ngami district, Bechuanaland.

A. ngamensis, is closely allied to *A. ballayi*, Sauv., from Cameroon, the Gaboon, and the Congo."

8. ARIUS.

Arius, Cuv. and Val., Hist. Poiss., xv., p. 53 (1840), part. ; Müll. and Trosch., Hor. Ichthyol., iii., p. 6 (1849) ; Bleek., Nederl. Tijdschr. Dierk., i. (1863), p. 91 ; Günth., Cat. Fish., v., p. 138 (1864), part. ; Bouleng., Poiss. Bass. Congo, p. 298 (1901), and Cat. Fresh. Fish. Afr., ii., p. 383 (1911).

Ariodes, Müll. and Trosch., l.c.

Pseudarius, Bleek., l.c.

"Body moderately elongate, not or but feebly compressed. Dorsal and anal fins short, the former consisting of a spine and 6 or 7 branched rays ; a small adipose fin. Pectoral fin with a spine. Ventral fin with 6 rays, inserted behind the vertical of the dorsal fin. Three pairs of barbels ; maxillary and two mandibulars. Nostrils close together. Eyes lateral or supero-lateral, with free border. Maxillary bone rudimentary ; jaws with a band of villiform teeth ; teeth on the pterygoids, none on the vomer. Gill-membranes narrowly attached to isthmus, not notched, forming a continuous transverse fold.

Vertebrae 48-58 (22-29 + 27-33). Branchiostegal rays 5 or 6.

Tropical seas ; a few species in fresh waters, or entering rivers."

* ARIUS KIRKII, Günth.

Günth., Cat. Fish., v., p. 163 (1864) ; Bouleng., Cat. Fresh. Fish. Afr., ii., p. 389 (1911).

"Depth of body about 5 times in total length, length of head $3\frac{1}{2}$ times. Occipital region granulated ; occipital process tectiform, broader than long, in contact with a small interneural shield ; eye $4\frac{1}{2}$ times in length of head and 2 times in interocular width ; premaxillary band of teeth short, about 4 times as long as broad ; palate with two patches of granular teeth on each side, the anterior patch small and rounded, widely separated from its fellow and narrowly from the posterior, which is large, sub-triangular, and longer than broad ; maxillary barbel as long as head. Dorsal i 7 ; spine $\frac{2}{3}$ length of head, very feebly serrated in front and behind. Adipose dorsal small, about $2\frac{1}{2}$ times as distant from rayed dorsal as from caudal. Anal 17 (12 rays branched). Pectoral spine similar to dorsal, but rather more strongly serrated.

Closely allied to the Indian Ocean *A. dussumieri*, C. and V., and imperfectly known from a half-skin of a small specimen, the palate of which is injured.*

Zambezi."

9. SYNODONTIS.

Cuv., Règne Anim., ii., p. 203 (1817); Cuv. and Val., Hist. Poiss., xv., p. 244 (1840); Günth., Cat. Fish., v., p. 210 (1864); Vaill., N. Arch. Mus. (3), vii., 1895, p. 233, and viii., 1896, p. 87; Bouleng., Poiss. Bass. Congo, p. 301 (1901), Fish. Nile, p. 350 (1907), Cat. Fresh. Fish. Afr., ii., p. 391 (1911).

Dorsal fin short, a large or very large adipose dorsal fin; a cephalo-nuchal bony shield, united to clavicular bones; 3 pairs of barbels—one maxillary and two mandibular, all or at least latter branched. Nostrils widely separated, anterior tubular. A band of conical premaxillary teeth; movable teeth implanted in lower lip usually followed by small teeth on lower jaw; palate toothless.

Key to Species.

- Pectoral spine feebly serrated on outer border, not reaching ventral. Adipose dorsal $1\frac{1}{3}$ - $2\frac{1}{2}$ times as long as its distance from rayed dorsal; mandibular barbels with long slender branches without ramifications; humeral process much longer than broad; movable mandibular teeth 35-38 1. *S. zambezensis*, Peters.
- Pectoral spine feebly serrated on outer border. Adipose dorsal as long as its distance from rayed dorsal; mandibular barbels with long slender branches; humeral process slightly longer than broad; movable mandibular teeth 20. Anal rounded 2. *S. woosnami*, Blgr.
- Pectoral spine feebly serrated on outer side; adipose dorsal as long as its distance from rayed dorsal; mandibular barbels with short simple branches, inner row bifid; movable mandibular teeth 18. Humeral process not longer than broad. Anal pointed in front 3. *S. nebulosus*, Peters.
- Pectoral spine strongly serrated on outer side, very strongly on inner; adipose dorsal $1\frac{1}{3}$ times as long as its distance from rayed dorsal; mandibular barbels with short tubercular branches; movable mandibular teeth 20-26. Humeral process a little longer than broad. Anal rounded 4. *S. macrostigma*, Blgr.

* "The figure of the teeth, as given by Günther, is consequently not quite correct."

1. *SYNODONTIS ZAMBEZENSIS*, Peters.

(Batoka name, "Tshigogo"; Barotse name, "Singongi.")

Synodontis zambezensis, Peters, Mon. Berl. Ac., 1852, p. 682; Günth., Cat. Fish., v., p. 214 (1864); Peters, Reise Mossamb., iv., p. 31, pl. v., figs. 2 and 3 (1868); Bouleng., Poiss. Bass. Congo, p. 314 (1901), and Cat. Fresh. Fish. Afr., ii., p. 415, fig. 312 (1911).

Synodontis gambiensis, part., Günth. and Playf., Fish. Zanzib., p. 115, pl. xvii., fig. 1 (1866).

? *Synodontis zanzibaricus*, Peters, Mon. Berl. Ac., 1868, p. 600.

Synodontis punctulatus, Günth., Proc. Zool. Soc., 1889, p. 71, and 1896, p. 223.

Synodontis zambezensis rukwaensis, Hilgend. and Pappenh., Sitzb. Ges. naturf. Fr. Berl., 1903, p. 267.

Synodontis nyassæ, Keilhack, Sitz. Ges. naturf. Fr. Berl., 1908, p. 168.

Depth of body 4 to $4\frac{1}{3}$ times in total length excluding caudal, length of head 4 to $4\frac{1}{6}$ times. Head $1\frac{1}{10}$ to $1\frac{1}{7}$ times as long as

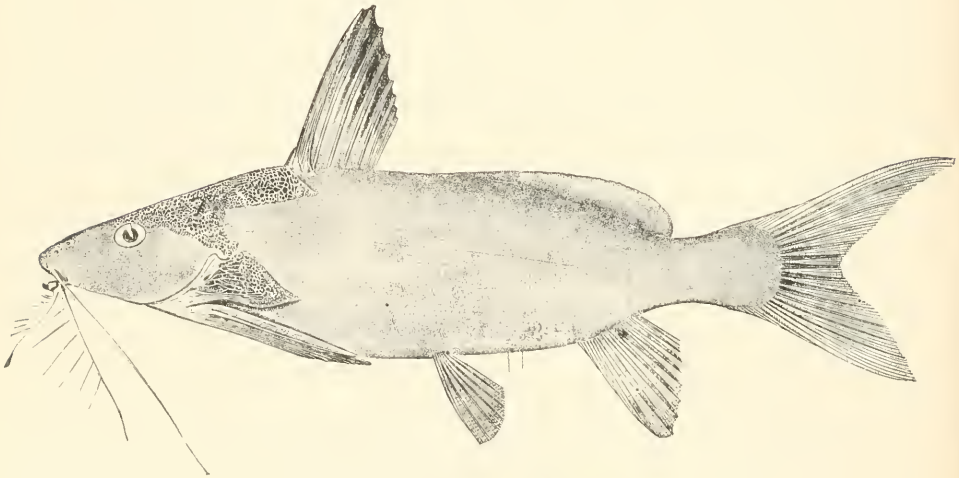


FIG. 106.—*Synodontis zambezensis*. $\frac{1}{2}$.

broad, rugose above behind snout, which is rounded and 1 to $1\frac{1}{5}$ times as long as postocular part of head; eye supero-lateral, $6\frac{1}{4}$ to $6\frac{1}{3}$ times in length of head and $2\frac{7}{5}$ to $2\frac{4}{5}$ times in interorbital width; lips moderately developed; premaxillary teeth forming a short broad band; movable mandibular teeth $\frac{1}{4}$ to $\frac{2}{5}$ diameter of eye in

length, 35-38 in number. Maxillary barbel with a narrow membrane at base, $1\frac{1}{4}$ to $1\frac{2}{5}$ times as long as head, reaching to between anterior or posterior third of pectoral spine; outer mandibular barbel 2 to $2\frac{1}{3}$ times as long as inner and both with long slender branches, the inner barbel sometimes with a few tubercular ramifications. Gill-openings not extending downwards beyond root of pectoral spine. Occipito-nuchal shield rough like the occiput, obtusely tectiform, $1\frac{2}{5}$ to $1\frac{3}{5}$ times as long as broad, with pointed posterior processes. Humeral process much longer than broad, not distinctly keeled, sharply pointed, extending as far or almost as far back as occipito-nuchal process

Dorsal i 7; spine nearly as long as head, feebly curved, striated, sharp-edged in front and rather feebly serrated behind. Adipose dorsal 3 to $3\frac{1}{3}$ times as long as deep, $1\frac{4}{5}$ to $2\frac{1}{2}$ times as long as its distance from rayed dorsal. Anal iv 8; obtusely pointed in front. Pectoral spine nearly as long as head, not reaching ventral, outer border feebly inner strongly serrated. Ventral not reaching anal. Caudal deeply forked, upper lobe the longer; caudal peduncle $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as deep.

Colour (of preserved specimens) uniform brown or bluish brown; tail with a greenish tinge.

Two specimens, 196 mm., 224 mm. in length respectively, from Zambezi River, gorge several miles below the Victoria Falls (F. W. Sykes).

It is also reported from East Africa, from the Webi Shebeli to the Zambezi.

* 2. *SYNODONTIS WOOSNAMI*, Blgr.

Bouleng., *Cat. Fresh. Fish. Afr.*, ii., p. 424, fig. 319 (1911), and *Trans. Zool. Soc.*, xviii., v., 1911, p. 406.

“Depth of body $3\frac{1}{2}$ times in total length, length of head $3\frac{2}{3}$ times. Head a little longer than broad, rugose above from between the eyes; snout as long as postocular part of head; eye supero-lateral, 6 times in length of head, twice in interorbital width; lips moderately developed; præmaxillary teeth forming a short and broad band; movable mandibular teeth $\frac{1}{3}$ diameter of eye, 20 in number. Maxillary barbel not margined, $\frac{4}{5}$ length of head, reaching a little beyond root of pectoral spine; mandibular barbels with long slender branches, outer $1\frac{1}{2}$ times as long as inner. Gill-opening not extending downwards beyond base of pectoral spine. Occipito-nuchal shield rugose like the occiput, a little longer than broad, posterior processes obtusely pointed. Humeral process slightly longer than

broad, obtusely pointed, not extending so far back as occipito-nuchal process.

Dorsal i 7; spine $\frac{5}{6}$ length of head, slightly curved, smooth in front, feebly serrated behind. Adipose dorsal $3\frac{1}{2}$ times as long as deep, as long as its distance from rayed dorsal. Anal iv 8; rounded. Pectoral spine as long as dorsal, rather feebly serrated

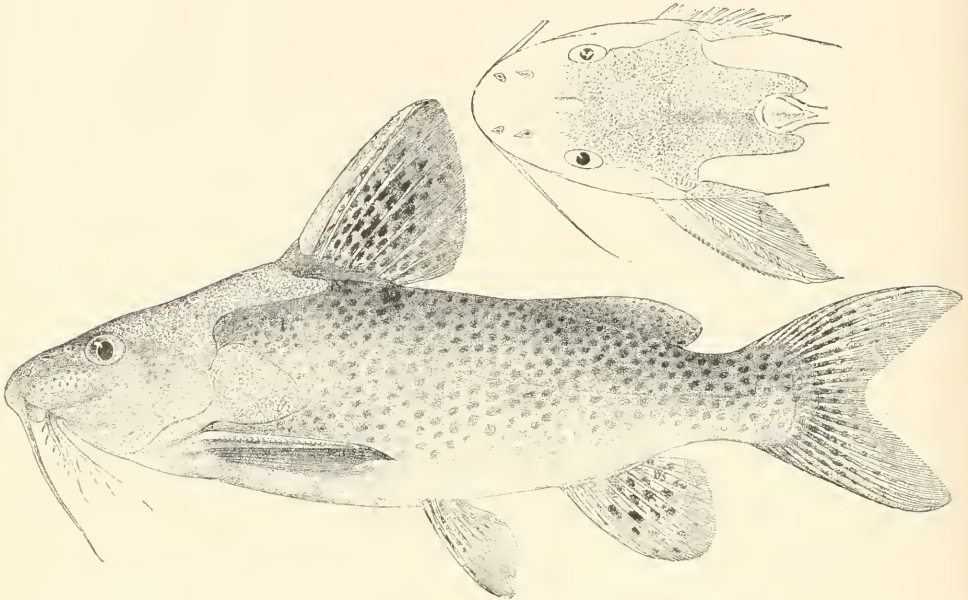


FIG. 107. —*Synodontis woosnami*. $\frac{3}{5}$.

on outer border, strongly on inner. Ventral rounded, not reaching anal. Caudal deeply notched. Caudal peduncle a little longer than deep.

Dark brown above, lighter beneath; back, sides, and fins closely dotted with black.

Total length 150 millim.

Lake Ngami district, Bechuanaland."

* 3. *SYNODONTIS NEBULOSUS*, Peters.

Peters, Mon. Berl. Ac., 1852, p. 682, and Reise Mossamb., iv., p. 28, pl. v., fig. 1 (1868); Bouleng., Cat. Fresh. Fish. Afr., ii., p. 423, fig. 318 (1911).

“Depth of body 5 times in total length, length of head $3\frac{2}{3}$ times. Head a little longer than broad, rugose above from between the eyes; snout as long as postocular part of head; eye supero-lateral, $4\frac{1}{2}$ times in length of head, twice in interorbital width; lips moderately developed; præmaxillary teeth forming a short and broad band, movable mandibular teeth not $\frac{1}{2}$ diameter of eye, 18 in number. Maxillary barbel not margined, a little shorter than head, reaching a little beyond base of pectoral spine; outer mandibular barbels twice as long as inner, with short simple branches, inner with very short, bifid branches. Gill-opening not extending downwards beyond base of pectoral spine. Occipito-nuchal shield rugose like the occiput, as long as broad, posterior processes pointed. Humeral

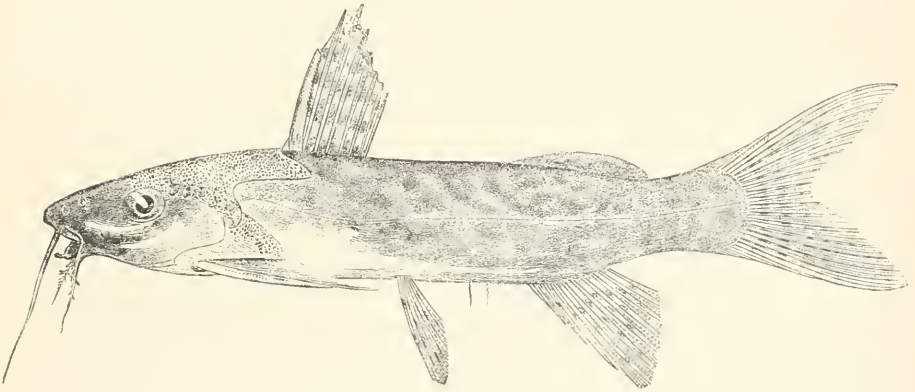


FIG. 108.—*Synodontis nebulosus*.

process not longer than broad, obtusely pointed, not extending so far back as occipito-nuchal process.

Dorsal i 7; spine shorter than head, smooth in front, serrated behind. Adipose dorsal about 5 times as long as deep, as long as its distance from rayed dorsal. Anal iv 8; pointed in front. Pectoral spine shorter than head, feebly serrated on outer border, strongly on inner. Ventral nearly reaching anal. Caudal deeply notched. Caudal peduncle a little longer than deep.

Yellowish green above, with ill-defined, irregular, large blackish spots, yellowish white beneath; fins yellowish green with transverse series of black spots.

Total length 150 millim.

Lower Zambezi.”

5. *SYNODONTIS MACROSTIGMA*, Blgr.

Bouleng., *Cat. Fresh. Fish. Afr.*, ii., p. 432, fig. 325 (1911), and *Trans. Zool. Soc.*, xviii., v., 1911, p. 407.

Depth of body $4\frac{3}{10}$ times in total length excluding caudal, length of head $3\frac{2}{3}$ times. Head $1\frac{3}{10}$ times as long as broad, rugose above; snout rounded and a little longer than postocular portion of head; eye supero-lateral, $4\frac{1}{2}$ times in length of head and $1\frac{2}{3}$ times in inter-orbital width; lips moderately developed; præmaxillary teeth forming a short, broad band; movable mandibular teeth $\frac{3}{10}$ diameter of eye,

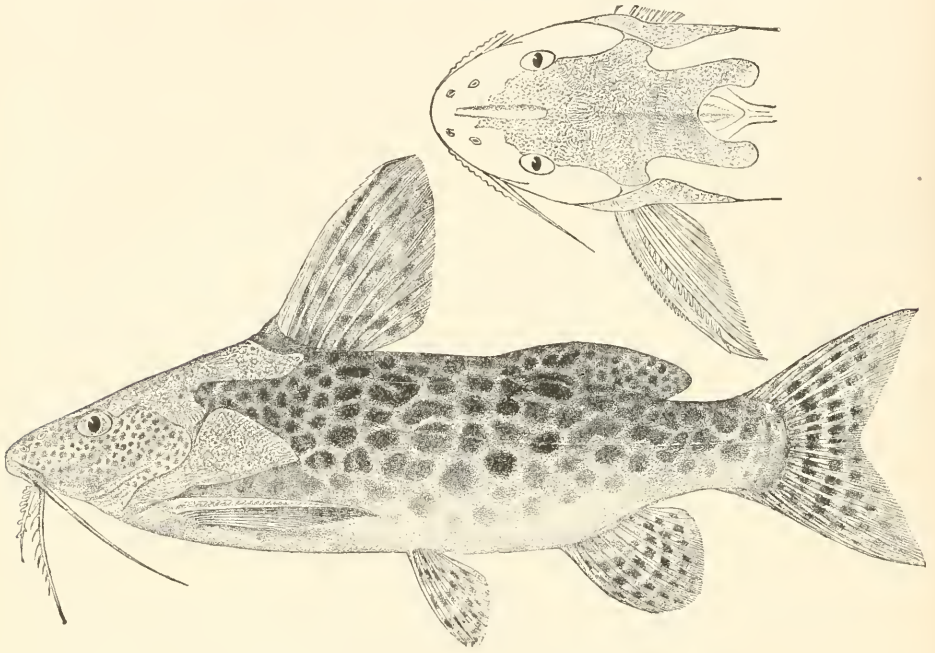


FIG. 109.—*Synodontis macrostigma*. The type. $\frac{1}{2}$.

18 in number. Maxillary barbel with a marginal membrane behind and a series of indistinct round warts in front, $\frac{7}{10}$ length of head and not quite reaching base of pectoral spine; mandibular barbels with short tubercular branches, outer $1\frac{2}{3}$ times as long as inner. Gill-openings not extending downwards beyond root of pectoral spine. Occipito-nuchal shield convex, rough like occiput, as long as broad, posterior processes obtusely pointed. Humeral process $1\frac{1}{2}$ times as long as broad, triangular, granulate, without keel, extending as far back as occipito-nuchal process.

Dorsal i 7 ; bony portion of spine $\frac{2}{3}$ length of head, slightly curved, strong, striated, strongly serrated behind and smooth in front. Adipose dorsal $4\frac{3}{4}$ times as long as deep, $1\frac{1}{3}$ times as long as its distance from rayed dorsal. Anal iv 8 ; rounded. Pectoral spine longer than bony portion of dorsal spine, not reaching ventral, roughly serrated on middle part of outer border and strongly serrated on inner border. Caudal forked ; caudal peduncle $1\frac{1}{2}$ times as long as deep.



FIG. 110.—*Synodontis macrostigma*. Younger specimen from the Kafue River.

Colour (of preserved specimen), brown, darker above than beneath ; back and sides with large, oval, dark spots in irregular lines ; head and fins with small dark spots.

One specimen, 125 mm. in length, from Kafue River, tributary of the Zambezi (J. Drury).

This fish, for the determination of which we are indebted to Mr. Boulenger, closely resembles his *S. macrostigma*, but the eye is much larger proportionately, the spots are fewer and larger, as shown in Fig. 110, and there are other minor differences.

SUB-ORDER APODES.

FAMILY ANGUILLIDÆ.

ANGUILLA.

Shaw, Gen. Zool., iv, p. 15 (1804) ; Günth., Cat. Fish., viii, p. 23 (1870) ; Bouleng., Fish. Nile, p. 401 (1907), and Cat. Freshw. Fish. Afr., iii, p. 3 (1915).

“ Body much elongate, serpentiform, with minute scales imbedded in the skin, arranged in small groups placed obliquely at right angles to one another. Pectoral fins well developed ; dorsal and anal fins very long, united at the end of the tail, the former originating at a great distance from the occiput. Mouth large, with more or less developed lips ; jaws and palate with bands of small pointed teeth ;

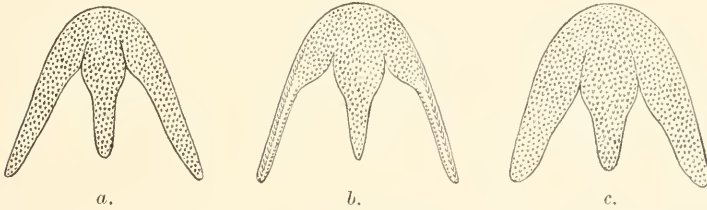


FIG. 111.—Dentition of upper jaw and palate in adult specimens of : (a) *A. mossambica* ; (b) *A. bengalensis* ; (c) *A. australis*. The bands of teeth are narrower in young specimens.

nostrils widely separated from each other, the anterior tubular and at the tip of the snout, the posterior slit-like and close to the eye. Gill-openings small, crescentic, close to the base of the pectoral fins.

Breed in the deep sea, where they undergo very marked metamorphoses (larval forms known as *Leptocephalus*). In Africa, confined to the rivers flowing into the Mediterranean and the North Atlantic and Indian Oceans.” *Blgr.*

Occasional specimens, of a large size, have been reported from the mouth of the Orange River.

Synopsis of the Species.

1. Dorsal originating well in advance of vent.

Mouth extending beyond eye ; teeth on sides of jaw in

3 (young) to 6 series, not separated by a longi-

tudinal groove or interspace *A. mossambica*, Peters.

- Mouth extending to below posterior border of eye or beyond; teeth on sides of jaw in 2 series, separated by a longitudinal groove or interspace (young), or in a single or double series with an inner detached series of minute, sometimes very indistinct teeth . . . *A. bengalensis*, Gray.
2. Dorsal originating above or slightly in advance of vent; teeth on sides of jaw in 4 (young) to 10 series *A. australis*, Rich.

I. ANGUILLA MOSSAMBICA, Peters.

Tribranchus anguillararis, Peters, in J. Müll. Abhand. Ak. Berl., 1844, p. 193.

Muraena (Anguilla) mossambica, Peters, Mon. Berl. Ac., 1852, p. 684.

Anguilla celebesensis, Kaup, Cat. Apod. Fish., p. 42 (1856); M. Web., Zool. Jahrb., Suppl. xv, i, 1912, p. 585, figs.

Anguilla delalandii, Kaup, t.c., p. 50, pl. viii, fig. 41 (1856); Bleek. Visch. v. d. Kaap, p. 56, name only (1860); Günth., Cat. Fish., viii, p. 33 (1870); Sauvage, Hist. Madagascar, Poiss., p. 498, pl. 1, fig. 6 (1891); Gilchr., Cat. Fish. Mar. Inv. S. Afr., i, 1902, p. 154.

Anguilla capensis, Kaup, Abb. Nat. Ver. Hamb., iv, 2, 1859, p. 18, pl. ii, fig. 2; Cast. Mem. Poiss. Afr. Austr., p. 73 (1861).

Anguilla labiata (part.), Playf. and Günth., Fish. Zanzibar, p. 124, fig. (1866).

Anguilla mossambica, Peters, Reise Mossamb., iv, p. 98, pl. xviii, fig. I (1868); Günth., t.c., p. 28 (1870); M. Web., t.c., p. 590 (1912); Bouleng., Freshw. Fish. Afr., iii, p. 6 (1915).

Anguilla aeneitensis, Günth., t.c., p. 34 (1870); M. Web., Fische Aru- und Kei-Ins., p. 22 (1911).

Anguilla virescens (part.), Günth., t.c., p. 35 (1870).

Anguilla megastoma, Kaup, Cat. Apod. Fish., p. 30 (1856); Jord. and Seale, Fish. Samoa, p. 192 (1906).

Teeth in moderately broad bands of four to six series, tapering posteriorly; vomerine teeth in a similar band narrowing posteriorly. Mouth extending to below or a little beyond posterior border of eye; lower jaw projecting. Distance from end of snout to gill-opening $2\frac{2}{3}$ to $2\frac{4}{5}$ times in distance from end of snout to vent. Tail much longer than body. Origin of dorsal much in advance of vent, nearly midway between pectoral and vent or slightly nearer the latter. Pectoral $2\frac{1}{2}$ to $2\frac{3}{4}$ times in its distance from end of snout.

Colour (of preserved specimens) olive green or brown above, yellowish or whitish beneath.

One specimen, 473 mm. in length from M'fongosi, Zululand (W. E. Jones.)

Two specimens, 408 mm., 426 mm. in length respectively, from Manzemtonto River, Transvaal (Major J. Stevenson Hamilton).

Two specimens, 276 mm., 340 mm. in length respectively, from Isipingo, Natal (Freshwater).

The species is also reported from the Indian and South Pacific Oceans, and as entering the rivers of East and South Africa.

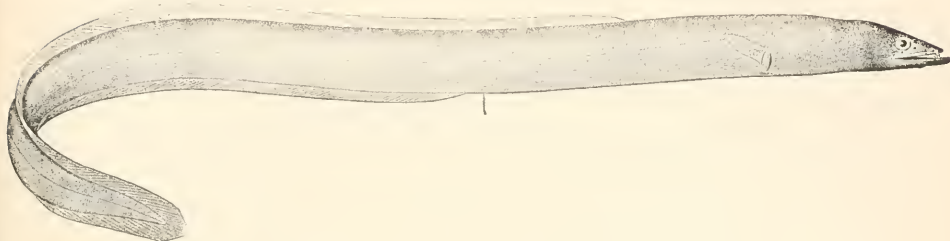


FIG. 112.—*Anguilla mossambica*. Type, after Peters (Reise Mossamb.). $\frac{1}{2}$.

2. ANGUILLA BENGALENSIS, Gray.

Muraena bengalensis, Gray in Hardw. Ill. Indian Zool., pl. —, fig. 5 (1830).

Anguilla mauritiana, Benn., Proc. Comm. Zool. Soc., 1831, p. 128; Günth., Cat. Fish., viii, p. 25 (1870); Shore Fishes, *Challenger*, p. 58 (1880); and Fische Süd-see, p. 389 (1910); Jord and Everm., Fish. Formosa, in Proc. U.S. Nat. Mus., xxv, 1903, p. 325; M. Web., Zool. Jahrb., Supp. xv, i, 1912, p. 582, fig.

Anguilla elphinstonei, Sykes, Trans. Zool. Soc., ii, 1841, p. 337; M. Web., t.c., p. 578.

Muraena (Anguilla) labiata, Peters, Mon. Berl. Ac., 1852, p. 684.

Muraena (Anguilla) macrophthalma, Peters, l.c.

Anguilla johannae, Playf. and Günth., Fish. Zanzibar, p. 124, fig. (1866).

Anguilla labiata (part.), Playf. and Günth., l.c.

Anguilla labiata, Peters, Wieg. Arch., 1855, p. 270, and Reise Mossamb., iv, p. 94, pl. xvii (1868); Günth., Cat. Fish., viii, p. 26 (1870); Vincig. Ann. Mus. Genova (2), xv, 1895, p. 27; Pfeffer, Ost-Afr. Fische, p. 41 (1893), and Thierw. O.-Afr., Fische, p. 71 (1896); Gilchr., Cat. Fish. Mar. Inv. S. Afr., i, 1902, p. 155.

Anguilla macrophthalma, Peters, l.c., p. 99, pl. xix; Günth., t.c., p. 28 (1870).

Anguilla bengalensis, Günth., t.c., p. 27 (1870), and Proc. Zool. Soc., 1904, p. 91; Bouleng., Proc. Zool. Soc., 1902, ii, p. 224, and Freshw. Fish. Afr., iii, p. 7, fig. 5 (1915).

? *Anguilla hildebrandti*, Sauvage, Hist. Madagascar, Poiss., p. 499, pl. xlix a, fig. 1 (1891).

Maxillary and mandibular teeth in bands tapering on the sides to a single or double series on the outer side separated by an interspace

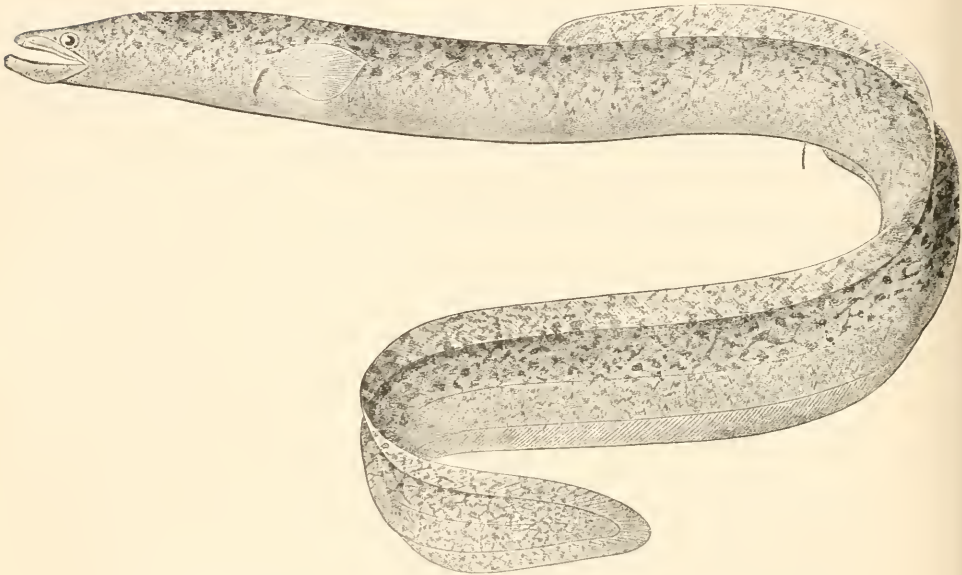


FIG. 113.—*Anguilla bengalensis*. Zambesi (type of *A. labiata*, after Peters (Reise Mossamb.)). $\frac{1}{2}$.

from an inner series of small teeth; vomerine patch of teeth tapering to a narrow band. Mouth extending to beyond posterior border of eye; lower jaw projecting. Distance from end of snout to gill-opening $2\frac{3}{4}$ to $3\frac{1}{2}$ times in distance from end of snout to vent. Tail much longer than body. Origin of dorsal midway between pectoral and vent, or a little nearer to the former. Pectoral $2\frac{1}{2}$ to $3\frac{1}{10}$ times in its distance from end of snout.

Colour (of preserved specimens), reddish brown.

One specimen, 463 mm. in length, from Orange River (Dr. D. R. Kannemeyer).

One specimen, 392 mm. in length, from M'fongosi, Zululand (W. E. Jones).

It is also reported from the Indian and South Pacific Oceans, entering rivers of East and South Africa.

3. **ANGUILLA AUSTRALIS*, Richards.

Anguilla australis, Richards., Proc. Zool. Soc., 1841, p. 22, and Trans. Zool. Soc., iii, 1843, p. 157; M. Weber, Zool. Jahrb., Suppl. xv, i, 1912, p. 593; Bouleng., Freshw. Fish. Africa, iii, p. 9, fig. 6 (1915).

Anguilla bicolor, McClell., Calcutta Journ. N. H., 1845, p. 178, pl. vi, fig. 1; Günth., Cat. Fish., viii, p. 35 (1870).

Muraena macrocephala, Rapp, Jahresh. Ver. Nat. Württemb., iv, 1849, p. 142, pl. ii.

Muraena (Anguilla) virescens, Peters, Mon. Berl. Ac., 1852, p. 684.

Anguilla amblodon, Playf. and Günth., Fish. Zanzibar, p. 125, fig., 1886; Günth., t.c., p. 37.

Anguilla virescens, Peters, Reise Mossamb., iv, p. 101, pl. xxiii, fig. 2 (1868); Pfeffer, Thierw. O.-Afr., Fische, p. 71 (1896); Günth., Fische Süd-see, p. 392 (1910).

Anguilla virescens (part.), Günth., t.c., p. 35.

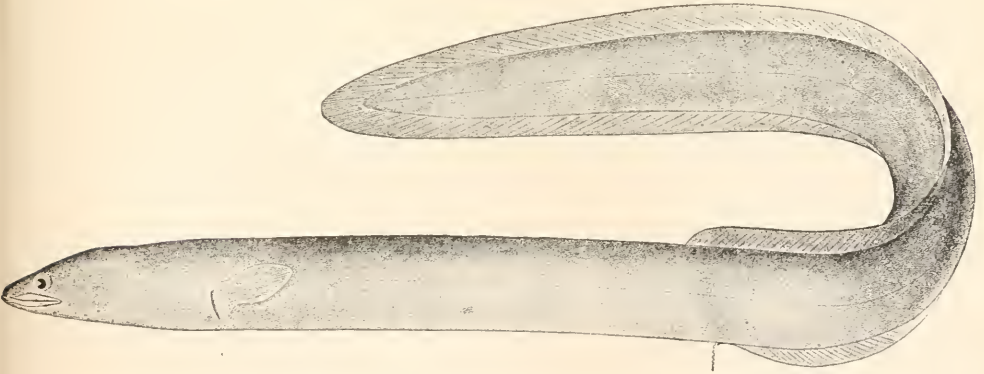


FIG. 114.—*Anguilla australis*. Licuare R. (type of *A. virescens*), after Peters (Reise Mossamb.). $\frac{1}{2}$.

“Teeth forming broad bands, in 4 to 10 series, on the sides of the upper and lower jaws.* Mouth extending to below posterior border of eye or beyond; lower jaw projecting. Distance from end of snout

* In this, as in other species, the bands of teeth are wider in the adult than in the young, the great width of these bands in the type of *A. amblodon* being due to its large size (1070 millim.).

to gill-opening 3 to $3\frac{1}{2}$ times in distance from end of snout to vent. Tail longer than body. Origin of dorsal above or slightly in advance of vent. Pectoral $2\frac{1}{2}$ to 4 times in distance from end of snout. Olive or dark green above, yellowish or white beneath. Vertebrae 105-109.

Total length over 1 metre.

Indian and South Pacific Oceans; entering rivers of East Africa and Natal."

SUB-ORDER HAPLOMI.

FAMILY GALAXIIDAE.

"The *Galaxiidae* present many analogies to the *Salmonidae* of the Northern Hemisphere, both being circumpolar groups of marine origin which are establishing themselves in fresh-water. In both families we meet with non-migratory forms which appear to have finally left the sea, and with others which return to the sea periodically; but whilst the migratory *Salmonidae* are anadromous (ascending rivers to spawn), the migratory *Galaxiidae*, on the contrary, are catadromous (going down to the sea to spawn). . . . The burrowing-habits of a species of *Galaxias* have been recorded by T. S. Hall (Vict. Nat., xviii, 1900, p. 65), who states that, according to the observations of Mr. Russell Ritchie of Launceston, in Tasmania, *Galaxias* have been dug up in moist peaty soil, and swim when placed in water. As many as twelve at a time have been dug up in one place and lived in water in a pickle jar for various periods up to three days." (Regan; Proc. Zool. Soc., 1905, vol. ii, p. 364.)

GALAXIAS.

Galaxias, Cuv., Règne Anim., ii, p. 183 (1817); Cuv. and Val., Hist. Nat. Poiss., xviii, p. 340 (1846); Gunth., Cat. Fish., vi, p. 208 (1866); Regan, Proc. Zool. Soc., 1905, ii, p. 365, and Trans. Roy. Soc. Edinb., xlix, pt. ii (No. 2), 1913, pp. 290, 291; Bouleng., Cat. Freshw. Fish. Afr., iii (1915), p. 12.

Mesites (non Geoff.), Jenyns, Voy. *Beagle*, Fish., p. 118 (1842).

Austrocobitis, Ogilby, Proc. Linn. Soc. N.S. Wales, xxiv, 1899 p. 158.

1. GALAXIAS ZEBRATUS, Cast.

Cobitis zebtratus, Cast., Mém. Poiss. Afr. Austr., p. 56 (1861).

Galaxias capeusis, Steindr., Sitz. Ak. Wien, ciii, i, 1894, p. 460, pl. iii, fig. 2; M. Web., Zool. Jahrb., Syst. x, 1897, p. 154.

Galaxias zebtratus, Bouleng., Ann. and Mag. Nat. Hist. (7), xvi, 1905, p. 51, and Freshw. Fish. Afr., iii, p. 12, fig. 8 (1915); Regan, Proc. Zool. Soc., 1905, ii, p. 367.

Teeth small, subequal. Depth of body $5\frac{1}{6}$ to $6\frac{2}{3}$ times in total length excluding caudal, length of head $3\frac{3}{5}$ to 4 times. Snout rounded, as long as or a little shorter than eye, which is $3\frac{1}{2}$ to 4 times in length of head; jaws about equal in front, chin feebly projecting; mouth extending to below anterior border or anterior fourth of eye. Gill-rakers short, 8 on lower part of anterior arch.

Dorsal iii-iv 7-8; originating at nearly equal distance from occiput and from base of caudal. Pectoral $\frac{1}{2}$ to $\frac{3}{5}$ length of head or distance



FIG. 115.—*Galaxias zebtratus*.

from its base to ventral. Ventral 6-rayed, equally distant from end of snout and from base of caudal. Anal iii-iv 7-8, originating below middle or anterior half of dorsal. Caudal rounded-subtruncate, continued anteriorly on caudal peduncle, which is twice or nearly twice as long as deep.

Colour (of preserved specimens) greyish or brownish, minutely speckled with dark specks, uniform or with numerous faint cross-bars on back and sides.

Several specimens, ranging from 19-31 mm. in length, from Somerset West, Cape Province.

Three specimens, ranging from 20-31 mm. in length, from Willem's River, Calvinia, Cape Province (Revd. C. L. Leipoldt).

Three specimens, ranging from 22-24 mm. in length, from George River (?), Cape Province.

2. GALAXIAS PUNCTIFER, Cast.

Cobitis punctifer, Casteln., Mém. Poiss. Afr. Austr. p. 56, (1861).

Galaxias punctifer, Bouleng., Ann. and Mag. Nat. Hist. (7), xvi, 1905, p. 51, and Freshw. Fish. Afr., iii, p. 13 (1915); Regan, Proc. Zool. Soc., 1905, ii, p. 367, pl. x, fig. 3.

Teeth small, subequal. Depth of body 5 to 6 times in total length excluding caudal, length of head $3\frac{1}{2}$ to $4\frac{1}{2}$ times. Snout rounded, as long as or a little shorter than eye, which is $3\frac{2}{3}$ to 4 times in length of head; interorbital width about 3 to $3\frac{1}{2}$ times in length of head; jaws equal in front, mouth extending to below anterior fourth or anterior third of eye. Gill-rakers short, 8 on lower part of anterior arch.

Dorsal iii-iv 7-8, originating at equal or nearly equal distance, from occiput and from base of caudal. Pectoral $\frac{1}{2}$ to $\frac{3}{5}$ length of head or of the distance from its base to ventral. Ventral 6-rayed, equally distant from snout and from base of caudal. Anal iii-iv 8, commencing below middle or posterior half of dorsal. Caudal truncate, slightly emarginate; continued anteriorly on caudal peduncle, which is $2\frac{1}{2}$ to $2\frac{3}{4}$ times as long as deep.

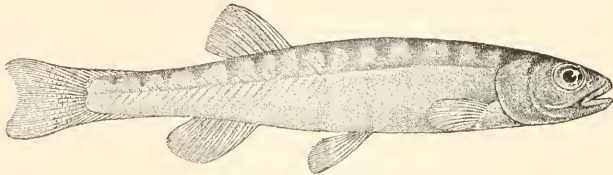


FIG. 116.—*Galaxias punctifer*.

Colour (of preserved specimens) pale brown or yellowish, darker above than below, uniform, or with faint bars on back; body freely speckled with minute dark specks.

Four specimens, ranging from 28-57 mm. in length, from the Flats, Cape Peninsula.

Four specimens, ranging from 23-33 mm. in length, from Diep River, Cape Peninsula.

Many specimens, ranging from 17-24 mm. in length, from Lakeside, Cape Peninsula (B. Power).

Galaxias punctifer is barely distinguishable from the preceding (*G. zebratus*) by "the rather more slender habit, the caudal peduncle being $2\frac{1}{2}$ times as long as deep, and the shape of the caudal fin, which is truncate and slightly emarginate. The dark bars on the body are absent or confined to the back." (Bouleng., Freshw. Fish. Afr., iii, p. 13).

3. GALAXIAS DUBIUS, n. sp.

Teeth rounded, subequal. Depth of body $6\frac{2}{5}$ to 7 times in total length excluding caudal, length of head 4 to 5 times. Snout rounded,

a little shorter than eye, which is $3\frac{2}{3}$ to a little more than 4 times in length of head; interorbital width $2\frac{3}{4}$ to $2\frac{1}{2}$ times in length of head; jaws equal in front; mouth extending to below anterior margin or anterior fourth of eye. Gill-rakers short, 8 on lower part of anterior arch.

Dorsal iii-iv 8-9; originating well behind middle of body, about $1\frac{1}{5}$ to $1\frac{1}{3}$ times as distant from occiput as from base of caudal. Pectoral $\frac{1}{2}$ to $\frac{3}{5}$ length of head or of the distance from its base to ventral. Ventral 6-rayed, about equally distant from end of snout and base of caudal. Anal iv 8-9, originating below anterior third of dorsal. Caudal rounded sub-truncate, continued anteriorly on caudal peduncle, which is nearly twice as long as deep.

Colour (of preserved specimens) brownish, minutely speckled with dark specks and with faint dark bars on back and sides.

Many specimens, ranging from 23-42 mm. in length, from George River, Cape Province.

This little fish closely resembles *G. zebratus*, but the dorsal fin is placed decidedly further back, and the anal rays are more in number. It is not improbable that the three species described may on examination of more extensive collections prove to be merely varieties of one species.

SUB-ORDER SCOMBRESOCES.

FAMILY CYPRINODONTIDAE.

HAPLOCHILUS.

Haplochilus, McClell., *Asiat. Res.*, xix, 1839, pp. 301 and 426; Günth., *Cat. Fish.*, v, p. 310 (1866); Bouleng., *Poiss. Bass. Congo*, p. 344 (1901), *Fish. Nile*, p. 415 (1907), and *Freshw. Fish. Africa*, iii, p. 40 (1915).

Epiplatys, Gill, *Proc. Acad. Philad.*, 1862, p. 136.

Atopocheilichthys, Bleeker, *Nat. Verb. Vet. Haarlem*, xviii, 1863, no. 2, p. 116.

Lycocyprinus, Peters, *Mon. Berl. Ac.*, 1868, p. 146.

Mouth small; teeth conical, in a narrow band, those of the outer series largest. Head usually flat above. Scales moderate. Dorsal fin commencing well behind origin of anal. Ventral fins present, far behind base of the pectorals.

"Fresh and brackish waters of Africa, Southern and Eastern Asia, Central and South America, and the West Indies."

1. * HAPLOCHILUS MYAPOSÆ, Blgr.

Bouleng., Ann. Nat. Mus., i, 1908, pt. 3, p. 232, and Freshw. Fish. Africa, iii, p. 44, fig. 31 (1915).

“Depth of body 4 to $4\frac{1}{2}$ times in total length, length of head $3\frac{2}{3}$ to 4 times. Head flat above; snout short and broad, shorter than eye; mouth directed upwards, lower jaw projecting; eye nearly 3 times in length of head, $1\frac{1}{2}$ times in interorbital width, as long as or a little shorter than postorbital part of head; preorbital hardly $\frac{1}{3}$ diameter of eye.

Dorsal 10, originating twice as far from anterior border of eye as from root of caudal, above anterior third of anal, median rays longest, about $\frac{1}{2}$ length of head. Anal 14-15, rounded like the dorsal. Pectoral $\frac{3}{4}$ length of head, reaching a little beyond base of ventral; latter nearer end of snout than root of caudal. Caudal rounded, as long

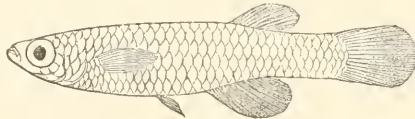


FIG. 117.—*Haplochilus myaposa*. Type (Ann. Natal Mus. 1908).

as head. Caudal peduncle $1\frac{1}{3}$ times as long as deep. 27-28 scales in longitudinal series, 16 round body in front ventrals; no lateral-line pits. Pale olive, with darker edges to the scales; fins greyish.

Total length 28 millim.

Zululand.—Types in Natal Museum, Pietermaritzburg.”

From Myaposa River (Dr. E. Warren).

2. HAPLOCHILUS JOHNSTONII, Günth.

Haplochilus johnstonii, Günth., Proc. Zool. Soc., 1893, p. 627; Bouleng., Ann. Natal Mus., i, 1908, p. 220, and Freshw. Fish. Africa, iii, p. 69, fig. 56 (1915).

Haplochilus atripinna, Pfeff., Thierw. O.-Afr., Fische, p. 46 (1896); Hilgendorf and Pappenheim, Sitzb. Ges. naturf. Fr., 1903, p. 271.

Teeth, outer row enlarged and recurved. Depth of body $4\frac{1}{2}$ to $4\frac{7}{10}$ in total length, excluding caudal, length of head $3\frac{9}{10}$ to $4\frac{1}{8}$ times. Head flat above; snout short and broad, shorter than eye; mouth directed upwards, lower jaw projecting; eye $2\frac{1}{2}$ to $2\frac{2}{5}$ times in length of head, a little shorter than postorbital part of head, $1\frac{1}{10}$ to $1\frac{1}{3}$ times in interorbital width; preorbital nearly $\frac{1}{2}$ diameter of eye.

Dorsal 8, originating twice as far from eye as from root of caudal, above posterior third of anal; last rays longest, $\frac{3}{5}$ length of head. Pectoral $\frac{7}{10}$ length of head, reaching base of ventral; the latter moderately large, reaching anal, and much nearer to end of snout than to root of caudal. Anal 14. Caudal rounded, about as long as or slightly longer than length of head; caudal peduncle about $1\frac{3}{4}$ times as long as deep. 28-30 scales in longitudinal series, 18 round body in front of ventrals; no lateral-line pits.

Colour (of preserved specimens), light brown above, pale yellowish beneath, finely speckled with darker, especially on the borders of the scales; a fine blackish line runs along the sides of the body from the opercular border to the base of caudal; fins greyish.

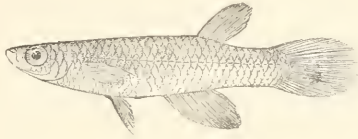


FIG. 118.—*Haplochilus johstonii*. Type.

Two specimens, 29 mm., 33 mm. in length respectively, from Sakania, South Congo (Rev. T. A. Rogers). Bulawayo Museum

The species is also reported from Nyassaland, Lake Rukwa, and Zululand.

SUB-ORDER ACANTHOPTERYGII.

DIVISION PERCIFORMES.

FAMILY CICHLIDAE.

The African Cichlidae are computed by Dr. Boulenger ('Catalogue of the Freshwater Fishes of Africa,' vol. iii, 1915) to number 285 well-established species, grouped under 41 genera; he remarks, however (p. 134), that "the classification of the very numerous African members of this family presents the greatest difficulties . . . the dentition in certain species being subject to variation, according to age, or even of a purely individual nature." Lake Tanganyika has furnished about one-third of these species, and is remarkable for the very numerous generic types with very aberrant dentition which appear to have been evolved out of the more generalised forms occurring in the rivers of Africa.

Some members of this large family, *e.g.* *Tilapia*, *Tropheus*, and

Ectodus, are of considerable interest owing to their mode of spawning and the nursing habits of the parent fish. In the *Tilapia*, for instance, it has been observed that in some species the ova are deposited in a small hollow or nest made in the bed of a pond or stream, and after fertilisation by the male—who is very determined in attacking and driving off any strange fish—are taken into the mouth of the female and carried in the buccal cavity until hatched. Mr. Schoeller, in some observations made at Alexandria (Egypt), noticed that the young fry after hatching took refuge in the mother's mouth immediately any alarm or danger appeared.

Formerly these nursing duties were believed to devolve upon the male, but careful examinations by Dr. Boulenger and others show that it is always the female that undertakes them, and that she apparently goes without food during the ten days or so that elapse whilst the eggs are hatching in her mouth.

Synopsis of the South African Genera described.

Dorsal and anal fins without scaly sheath at the base.

- A.** Outer teeth bi- or tricuspid, rarely conical, without canines in front, not swollen at the base.
 - Teeth forming narrow or moderately broad bands, the outer bicuspid, rarely conical; dorsal with 11-19 spines, anal with 3 or 4. *Tilapia*, A. Smith.
 - Teeth forming very broad bands, all tricuspid; dorsal with 16-20 spines, anal with 3. *Petrochromis*, Blgr.
- B.** Outer teeth bicuspid in some individuals, conical in others (forms connecting *Tilapia* and *Paratilapia*); dorsal with 13-19 spines, anal with 3-6. *Haplochromis*, Pfeff.
- C.** Outer teeth conical in the adult, sometimes bicuspid in the young, with or without curved canines.
 - Anal with 3 spines (exceptionally 4).
 - Outer teeth, if closely set, not strongly incurved.
 - Two lateral lines; ventrals with the outer rays longest.
 - Outer mandibular teeth not pointing outwards.
 - Two or more series of teeth in each jaw; no strong papillose pad in front of the gill-arches; dorsal with 10-18 spines, anal with 6-14 soft rays. *Paratilapia*, Blkr.

- A very strong papillose pad in front of the gill arches; otherwise as in *Paratilapia* . *Pelmatochromis*, Stndr.
Teeth in one or two, very rarely three series, the two median teeth of the outer series enlarged; dorsal with 13-15 spines . . . *Hemichromis*, Peters.

TILAPIA.

Chromis, part., Cuvier, Règne Anim., ii, p. 266 (1817); Günth., Cat. Fish. iv, p. 267 (1862).

Tilapia, A. Smith, Ill. Zool. S. Afr. Fish. (1849); Bouleng., Proc. Zool. Soc., 1899, p. 105, part.; Poiss. Bass. Congo, p. 452 (1901), Fish. Nile, p. 513 (1907), and Freshw. Fish. Africa, iii, p. 138 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 307.

Sarotherodon, Rüpp., Verz. Mus. Senck., iv, p. 21 (1852); Günth., t.c., p. 273.

Coptodon, Gervais, Bull. Soc. Agric. Hérault, 1853, p. 81.

Haligenes, Günth., Proc. Zool. Soc., 1859, p. 471.

Ptychochromis, Steindr., Sitzb. Ak. Wien, lxxvii, i, 1880, p. 248; Pellegr., t.c., p. 346.

Oreochromis, Günth., Proc. Zool. Soc., 1889, p. 70; Pellegr., t.c., p. 354.

Ctenochromis, part., Pfeff., Jahrb. Hamb. Wiss. Aust., x, 1893, p. 149.

Ophthalmotilapia, Pellegr., t.c., p. 345.

“Body short or more or less elongate; scales cycloid or etenoid; two incomplete lateral lines. Teeth in two or more series, the outer bicuspid,* the others tricuspoid; maxillary usually more or less completely hidden under the preorbital when the mouth is closed. Dorsal fin with 11-19 spines, anal with 3 or 4. Parietal and occipital crests strong, extending to between the orbits. Vertebrae 26-34.”

Synopsis of the South African Species described.

I. Scales cycloid (rarely indistinctly etenoid).

A. Gill-rakers 15-27 on lower part of anterior arch.

Anal spines 3 (very rarely 4); pectoral usually as long as or longer than head, often reaching vertical of origin of anal or beyond.

Caudal not densely scaled.

1. Outer teeth small and slender or unicuspid.

* “Occasionally conical or indistinctly bicuspid in a few species which are related to *T. nilotica* (*T. nigra*, *mossambica*, *natalensis*, *linnelli*, *squamipinnis*) See also *Haplochromis*.”

(a) Caudal peduncle as long as deep; 4 series of scales on the cheek; 25 gill-rakers.

D. xvi-xvii 13; A. iii 11; Sc. 31-

33 $\frac{4\frac{1}{2}}{16}$; caudal rounded 1. *T. kafuensis*, Blgr.

(b) Caudal peduncle as long as deep, rarely a little deeper than long; 2 or 3 series of scales on the cheek; 15-23 gill-rakers; pectoral usually not much longer than head.

D. xvi 12-13; A. iii 11; Sc. 31 $\frac{4\frac{1}{2}}{15}$;

mouth moderate, about $\frac{1}{3}$ width of head, extending to behind nostril; caudal truncate

2. *T. intermedia*, n. sp.

D. xv-xvi 10-12; A. iii (iv) 9-10;

Sc. 28-33 $\frac{3\frac{1}{2}-4\frac{1}{2}}{12-15}$; mouth large, at

least about $\frac{3}{4}$ width of head, extending to below eye, or not quite so far; caudal rounded in the adult

3. *T. mossambica*, Peters.

D. xv-xvi 11-13; A. iii 10; Sc.

28-31 $\frac{3\frac{1}{2}}{12}$; mouth large, extend-

ing to anterior border of eye (or nearly so) or a little beyond; caudal truncate

4. *T. vorax*, Pfeff.

D. xv-xviii 10-12; A. iii 9-11;

Sc. 27-31 $\frac{3\frac{1}{2}-4\frac{1}{2}}{13-17}$; mouth $\frac{2}{3}$ to $\frac{3}{4}$

width of head, extending to between nostril and eye; caudal truncate or slightly emarginate (angles sometimes rounded)

5. *T. natalensis*, M. Web.

(c) Caudal peduncle deeper than long; 2 or 3 series of scales on the cheek; 15-25 gill rakers; pectoral often much longer than head in adult.

D. xv-xvi 11-13; A. iii 9-10; Sc.

29-31 $\frac{3-3\frac{1}{2}}{13-15}$; caudal truncate or

slightly emarginate

6. *T. macrochir*, Blgr.

D. xvii 12; A. iii 9; Sc. 28 $\frac{4}{11}$;

caudal truncate or slightly emarginate

7. *T. sheshakensis*, n. sp.

(2) Outer teeth with extremely slender shafts, sometimes almost setiform; 2 or 3 series of scales on the cheek; caudal truncate or slightly emarginate.

(a) Caudal peduncle deeper than long; 18-27 gill-rakers.

D. xv-xvii 12-14; A. iii 10-12;

Sc. 30-34 $\frac{3\frac{1}{2}-4\frac{1}{2}}{14-16}$; mouth extend-

ing to below nostril or slightly

beyond 8. *T. galilaea*, Art.

D. xv-xvii 11-13; A. iii 9-11; Sc.

29-33 $\frac{3-4}{12-16}$; mouth extending

to between nostril and eye 9. *T. andersonii*, Cast.

(b) Caudal densely scaled; 15-22 gill-rakers.

D. xvi 10-11; A. iii 8-9; Sc. 32-

36 $\frac{3\frac{1}{2}}{14-16}$; 2 series of scales on

the cheek; caudal peduncle

longer than deep; caudal

rounded, with a feeble median

notch, or upper angle pointed 10. *T. squamipinnis*, Günth.

B. Gill-rakers 7-15 on lower part of anterior arch.

Outer teeth moderately slender or rather large.

1. 2-5 series of scales on the cheek.

(a) 15 or 16 dorsal spines (rarely 14 or 17); 8-11 (rarely 7) anal rays.

* Depth of body not more than twice (or, rarely, slightly more) in total length; pectoral as long as head, or a little shorter or longer.

D. xiv-xvi 10-14; A. iii 9-11; Sc.

28-32 $\frac{2\frac{1}{2}-3\frac{1}{2}}{11-14}$; 8 to 12 gill-rakers

on lower part of anterior arch. 11. *T. melanopleura*, A. Dum.

D. xv 11; A. 9; Sc. 27 $\frac{1}{11}$; 15 gill-

rakers on lower part of anterior

arch 12. *T. arnoldi*, n. sp.

** Depth of body more than twice in total length. Pectoral longer than head.

D. xvi 12; A. iii 14; Sc. 30 $\frac{3\frac{1}{2}}{12}$;

8 gill-rakers; scales on cheek

in 4 rows 13. *T. swierstrae*, n. sp.

D. xvi 12; A. iii 10; Sc. 29 $\frac{3\frac{1}{2}}{12}$;

9 gill-rakers; scales on cheek

in 4-5 rows 14. *T. mackeani*, n. sp.

D. xvi 11; A. iii 9; Sc. 30 $\frac{3\frac{1}{2}}{12}$;

9 gill-rakers; scales on cheek

in 3 rows 15. *T. sykesii*, n. sp.

- D. xvi 11; A. iii 8; Sc. $28\frac{4}{11}$;
 9 gill-rakers; scales on cheek
 in 3 rows 16. *T. druryi*, n. sp.
- (b) 14 dorsal spines; 6 soft anal rays. Depth of body more than
 3 times in total length. Caudal truncate. Pectoral shorter
 than head.
- D. xiv 10; A. iii 6; Sc. $29\frac{4}{9}$; 10 gill-
 rakers; scales on cheek in
 4 rows 17. *T. runsayi*, n. sp.
- (c) 11-15 dorsal spines; 8-11 soft anal rays. Depth of body 2 to
 3 times in total length. Caudal rounded or rounded-sub-
 truncate.
1. 2 to 4 series of scales on the cheek.
 Breast and belly scaly.
- D. xiii-xv 9-11 (very rarely 12);
 A. iii 8-10; Sc. $27-29\frac{2\frac{1}{2}-3\frac{1}{2}}{9-11}$;
 9-12 gill-rakers; 2 or 3 series
 of scales on cheek; depth of
 body $2-2\frac{3}{4}$ times in total length 18. *T. sparrmani*, A. Smith.
- D. xiii 11; A. 7; Sc. $26\frac{5}{10}$; 9 gill-
 rakers; 3-4 series of scales on
 the cheek; depth of body a
 little more than $2\frac{1}{2}$ times in
 total length 19. *T. ellenbergeri*, n. sp.
- D. xiii-xv 12-13; A. iii 8-9; Sc.
 $27-30\frac{2\frac{1}{2}-3}{10}$; 7 to 9 gill-rakers;
 3 or 4 series of scales on the
 cheek; depth of body $2\frac{2}{3}$ to
 3 times in total length 20. *T. ovalis*, Steindr.
2. 5 to 7 series of scales on the cheek.
 Breast and belly naked.
- D. xv 13; A. iii 9; Sc. $34\frac{3\frac{1}{2}}{10}$;
 12 gill-rakers; depth of body
 $2\frac{3}{4}$ times in total length; caudal
 rounded 21. *T. woosnami*, Blgr.
- D. xv 10; A. iii 8; Sc. $33\frac{3}{8}$; 9 gill-
 rakers; depth of body $2\frac{3}{4}$ times
 in total length; caudal trun-
 cate 22. *T. jallae* Blgr.

II. Scales with more or less denticulate edge.

Caudal rounded or truncate, not at all emarginate.

1. Dorsal with 14 or 15 spines; eye 3 to 4 times in length of head; depth of body $2\frac{3}{4}$ to 3 times in total length; caudal rounded or rounded-subtruncate; 6 series of scales on cheek.

D. xv 14; A. iii 9; Sc. $34\frac{4\frac{1}{2}}{12}$;

pectoral as long as head . . . 23. *T. giardi*, Pellegr.

2. Dorsal with 15-17 spines (rarely 14); eye 4 to $4\frac{1}{2}$ times in length of head in adult; depth of body $2\frac{1}{2}$ to $3\frac{1}{4}$ times in total length; caudal rounded.

D. xiv-xvi 8-10; A. iii 7-8; Sc.

$30-33\frac{3-4}{11-12}$; teeth in 3 to 5

series; snout shorter than post-

ocular part of head . . . 24. *T. calliptera*, Günth.

3. Dorsal with 15-17 spines; eye $3\frac{1}{2}$ to $4\frac{3}{4}$ times in length of head; depth of body $2\frac{1}{2}$ to 3 times in total length; caudal rounded or rounded-subtruncate.

D. xvii 9; A. iii 8; Sc. $33\frac{5-6}{12}$; eye

$3\frac{1}{2}$ times in length of head;

teeth in 6 series, 40 in upper

jaw; caudal rounded . . . 25. *T. livingstonii*, Blgr.

D. xvi 11; A. iii 10; Sc. $30\frac{3\frac{1}{2}}{11}$;

eye $4\frac{7}{10}$ times in length of

head; teeth in 4 series, about

50 in upper jaw; caudal

rounded-subtruncate . . . 26. *T. kirkhami*, n. sp.

1. TILAPIA KAFUENSIS, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (8), x, 1912, p. 138, and Freshw. Fish. Africa, iii, p. 153, fig. 100 (1915).

Teeth in eight series, about 110 in the outer series of upper jaw. Depth of body $2\frac{1}{2}$ times in total length excluding caudal, length of head 3 times. Head $1\frac{3}{4}$ times as long as broad; snout rounded, with feebly concave upper profile, slightly broader than long, a little shorter than postocular part of head; eye $5\frac{3}{4}$ times in length of head, $\frac{2}{3}$ interorbital width, $\frac{3}{4}$ preorbital depth; mouth $\frac{2}{3}$ width of head, extending to between nostril and eye; 4 series of scales on the cheek, width of scaly part a little greater than diameter of eye. Gill-rakers moderate, 25 on lower part of anterior arch.

Dorsal xvi 13; last spine longest, $\frac{2}{3}$ length of head; longest soft ray $\frac{2}{3}$ length of head. Pectoral $1\frac{1}{8}$ times length of head, reaching

vertical of origin of anal. Ventral reaching to vent. Anal iii 11; 3rd spine not quite $\frac{1}{3}$ length of head. Caudal rounded; caudal peduncle as long as deep. Scales cycloid, $31\frac{4\frac{1}{2}}{16}$, lateral lines $\frac{2\frac{2}{6}}$.

Colour (of preserved specimen), dark brownish black above, lightish beneath; a dark opercular spot and 2 or 3 ill-defined black spots on the side below upper lateral line; soft dorsal and anal fins with light and dark spots between their rays.

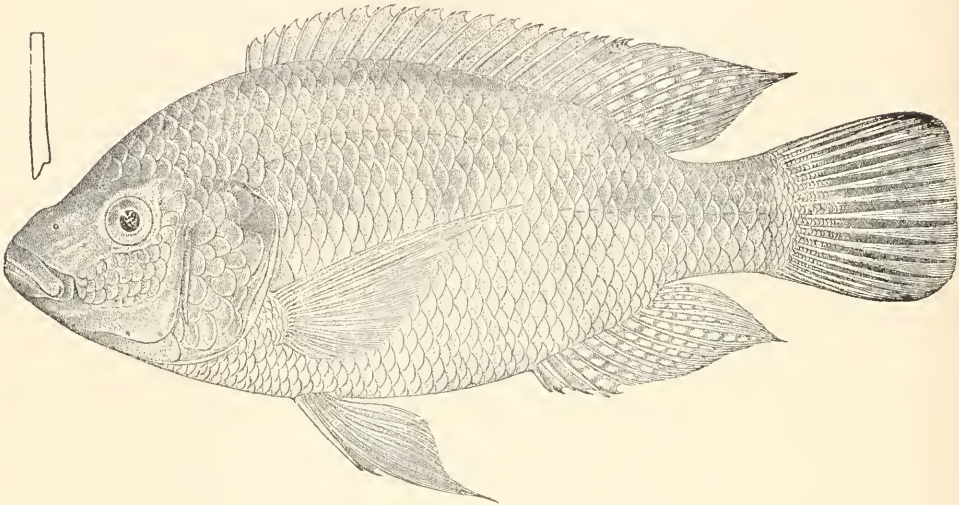


FIG. 119.—*Tilapia kafuensis*. Type. $\frac{1}{3}$.

One specimen, 298 mm. in length, from Bulawayo (Mr. F. D. McKean).

It is also reported from the Kafue River and from the Zambesi.

2. *TILAPIA INTERMEDIA*, n. sp.

Teeth slender, closely set, in 3 series on each jaw, 40–50 in outer series on upper jaw. Depth of body $2\frac{3}{4}$ to $2\frac{3}{4}$ times in total length excluding caudal, length of head $2\frac{3}{4}$ times. Head $1\frac{1}{5}$ to twice as long as broad; snout with straight upper profile, as long as broad, shorter than postocular part of head; eye 4 to $4\frac{1}{10}$ times in length of head, $\frac{2}{3}$ to $\frac{3}{4}$ interorbital width, slightly longer than preorbital depth; width of mouth about $\frac{1}{3}$ width of head, extending to behind nostril; scales on cheek in 2 to 3 series, width of scaly part about equal to or a little less than diameter of eye. Gill-rakers moderate, about 23 on lower part of anterior arch.

Dorsal xvi 12-13; last spine longest, about $\frac{2}{3}$ length of head; longest soft rays a little more than $\frac{1}{2}$ length of head. Pectoral a little shorter than head, reaching to vertical of origin of anal. Ventral extending to vent. Anal iii 11; 3rd spine about $\frac{1}{3}$ length of head. Caudal truncate; caudal peduncle as long as deep or a little deeper than long. Scales cycloid, $31\frac{4}{12}$; lateral lines $\frac{21-22}{13}$.

Colour (of preserved specimens) dark brown above, lighter below; 8 or 9 dark cross-bars on the body and a faint longitudinal streak from opercle to base of caudal; a dark opercular spot; vertical fins with faint dark and light spots forming oblique streaks; a dark spot at base of anterior rays of soft dorsal; snout dark.

Two specimens, 58 mm., 74 mm. in length respectively, from Sawmills, Bulawayo, Rhodesia (F. D. McKean).

This species closely resembles *T. sparrmani*, but the gill-rakers are far more numerous and the scale formula and markings differ slightly.

3. TILAPIA MOSSAMBICA, Peters.

Chromis (Tilapia) mossambicus, Peters, Mon. Berlin. Ac., 1852, p. 681.

Chromis niloticus, part., Peters, Arch. f. Nat., 1855, p. 267; Günth., Cat. Fish., iv, p. 510 (1862); Peters, Reise Mossamb., iv, p. 23, pl. iv, fig. 4 (1868).

Chromis mossambicus, part., Günth., t.c., p. 263.

Chromis dumerilii, Steindr., Verh. zool.-bot. Ges. Wien, xiv, 1864, p. 225, pl. vii, fig. 1.

Chromis niloticus, var. *mossambicus*, M. Web., Zool. Jahrb., Syst. x, 1897, p. 148.

Tilapia mossambica, Bouleng., Trans. Zool. Soc., xv, 1898, p. 4, Proc. Zool. Soc., 1899, p. 111, and Freshw. Fish. Africa, iii, p. 154, fig. 101, (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 309.

Tilapia dumerilii, Bouleng., Proc. Zool. Soc., 1899, p. 116; Pellegr., t.c., p. 317.

Teeth in 4 (young) to 7 series. Depth of body $2\frac{1}{4}$ to 3 times in total length excluding caudal, length of head $2\frac{1}{5}$ to $3\frac{1}{2}$ times. Head $1\frac{7}{10}$ to a little more than twice as long as broad, with concave upper profile; snout rounded, as broad as or a little broader than long, as long as or a little shorter than postocular part of head; eye $4\frac{3}{10}$ (young) to 6 times in length of head, $\frac{2}{3}$ to $\frac{3}{5}$ interorbital width, equal to or a little less than preorbital depth; mouth large, $\frac{7}{10}$ to $\frac{1}{2}$ width of head, extending to below anterior border of eye or not quite so far; 2 to 4 series

of scales on cheek, width of scaly part $\frac{1}{5}$ to a little more than diameter of eye. Gill-rakers short, 16 to 20 on lower part of anterior arch.

Dorsal xv-xvi 10-12; last spine longest, $\frac{1}{3}$ to $\frac{1}{2}$ length of head; longest soft ray $\frac{2}{3}$ to $\frac{9}{10}$ length of head. Pectoral $\frac{9}{10}$ to a little longer than head, reaching vertical of origin of anal or beyond. Ventral reaching vent or origin of anal. Anal iii 9-10; 3rd spine a little shorter than last dorsal spine. Caudal rounded in the adult, truncate in the young; caudal peduncle as long as deep or slightly deeper than long. Scales cycloid, 28-31 $\frac{3\frac{1}{2}-4\frac{1}{2}}{12-15}$, lateral lines $\frac{19-23}{12-6}$.

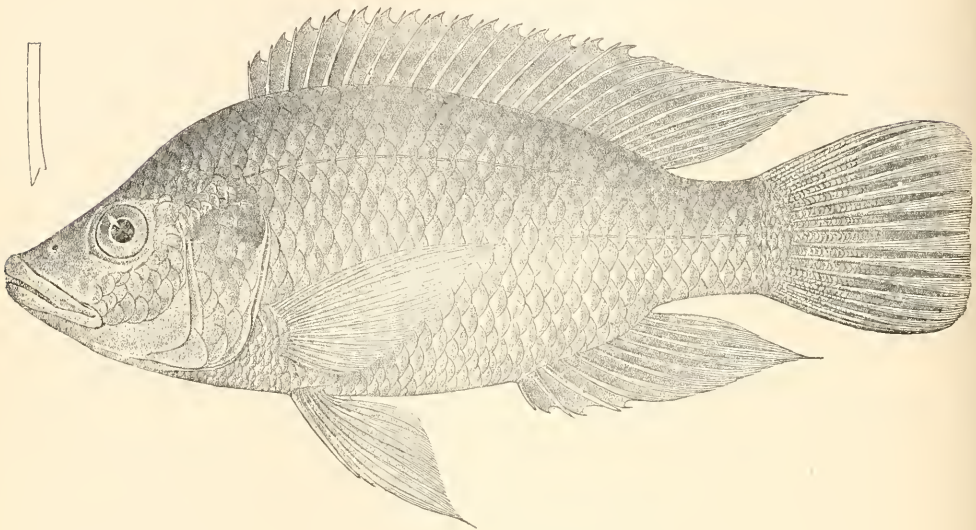


FIG. 120.—*Tilapia mossambica*. $\frac{5}{6}$.

Colour (of preserved specimens) brownish, reddish, or olive brown, usually darker above than below and the scales with dark centre or a band on outer rim; a dark opercular spot; dorsal, anal, and caudal generally dark or with dark spots; dorsal and caudal edged with yellowish white.

Five specimens, ranging from 125-262 mm. in length, from Manzemntonto River, Transvaal (Major J. Stevenson Hamilton).

Four specimens, ranging from 166-249 mm. in length, from Dwaars River, Transvaal.

One specimen, 176 mm. in length, from Lake N'gami (H. F. Kirkham).

Two specimens, 218 mm., 219 mm. in length respectively, from Piensaars River, Transvaal. Pretoria Museum.

The species appears also to range from German East Africa to Natal.

4. *TILAPIA VORAX*, Pfeff.

Chromis vorax, Pfeff, Jahrb. Hamb. Wiss. Anst. x, 1893, p. 151, pl. ii, figs. 9-11, and Thierw. O.-Afr., Fische, p. 12, fig. 8 (1896).

Tilapia vorax, Bouleng., Proc. Zool. Soc., 1899, p. 125, and Freshw. Fish. Afr., iii, p. 156, fig. 102 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 322.

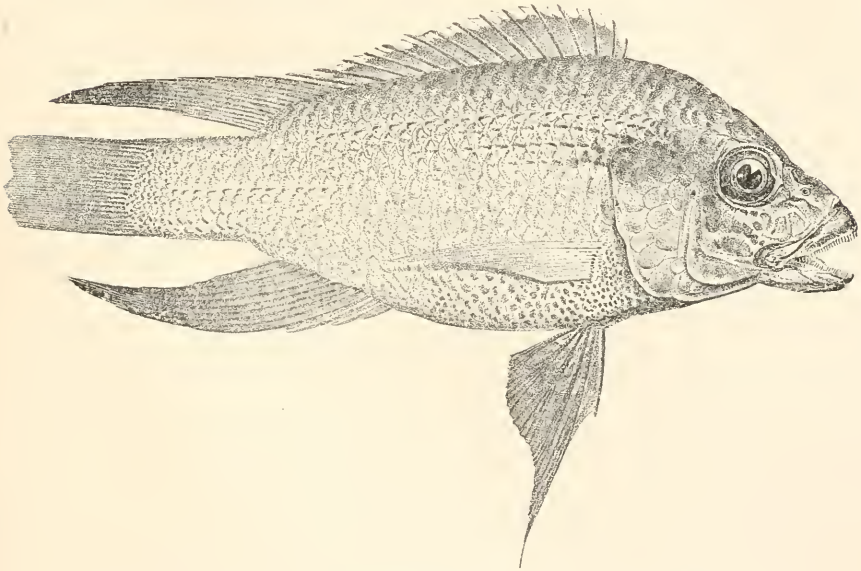


FIG. 121. — *Tilapia vorax*. Type, after Pfeffer (Jahrb. Hamb. Wiss. Anst., 1893). $\frac{3}{4}$.

Teeth small, in 4 rows, about 60 in outer series of upper jaw. Depth of body about equals length of head, $2\frac{2}{3}$ times in total length excluding caudal. Head twice as long as broad; snout with straight upper profile, equal to postocular part of head, about as broad as long, twice diameter of eye, which is 5 times in length of head and nearly twice interorbital width; mouth large, $\frac{4}{5}$ width of head, extending to anterior border of eye; 3 series of scales on the cheek, width of scaly part slightly less than diameter of eye. Gill-rakers short, 18 on lower part of anterior arch.

Dorsal xvi 11; last spine longest, $\frac{2}{5}$ length of head, middle soft rays produced, nearly $\frac{3}{4}$ length of head. Pectoral nearly as long as head, extending a little beyond vertical of origin of anal. Ventral reaching slightly beyond origin of anal. Anal iii 10; 3rd spine a little shorter than last dorsal spine. Caudal truncate, the angles slightly rounded; caudal peduncle as long as deep. Scales cycloid, $30\frac{3}{12}$; lateral lines $\frac{2}{14}$.

Colour (of preserved specimen) uniform dark olive-brown (almost black), belly greyish, cheeks and lower jaw white; a rather indistinct dark opercular spot; vertical fins and ventrals blackish; tip of dorsal and extremity of caudal lobes yellowish white.

One specimen, 161 mm. in length, from Umzemntonto River, Transvaal (Major J. Stevenson Hamilton).

This species is also reported from German East Africa and Mozambique.

The specimen above dealt with differs slightly in some respects from Dr. Boulenger's description of *T. vorax*, but there seems little reason to doubt that it is the same species.

5. *TILAPIA NATALENSIS*, M. Web.

Chromis niloticus, part., Peters, Arch. f. Nat., 1855, p. 267, and Reise Mossamb., iv, p. 23 (1868); Pfeff., Jahrb. Hamb. Wiss. Anst., x, 1893, p. 149, pl. iii, figs. 1-4, and Thierw. O.-Afr., Fische, p. 10, fig. (1896).

Chromis mossambicus, part., Günth., Cat. Fish., iv, p. 268 (1862).

Chromis natalensis, M. Web., Zool. Jahrb., Syst. x, 1897, p. 147.

Tilapia natalensis, Bouleng., Proc. Zool. Soc., 1899, p. 113, Poiss. Bass. Congo, p. 457 (1901), and Freshw. Fish. Afr., iii, p. 157, fig. 103 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 311.

Teeth in 3 (young) to 6 series, 50 (young) to 140 in outer series of upper jaw. Depth of body $2\frac{1}{5}$ to $2\frac{2}{5}$ times in total length excluding caudal, length of head $2\frac{2}{3}$ to $3\frac{1}{5}$ times. Head $1\frac{2}{3}$ to about twice as long as broad; snout rounded, with straight or slightly convex upper profile, as broad as or a little broader than long, $\frac{7}{10}$ to $\frac{9}{10}$ postocular part of head; eye 3 (young) to $5\frac{1}{2}$ times in length of head, $\frac{2}{5}$ to $\frac{3}{4}$ interorbital width, equal to or a little less or a little greater than preorbital depth; mouth moderate, $\frac{2}{3}$ to $\frac{3}{4}$ width of head, extending to between nostril and eye; 2 or 3 series of scales on the cheek, width of scaly part not greater than diameter of eye. Gill-rakers short, 16 to 20 on lower part of anterior arch.

Dorsal xv-xvii 10-12; last spine longest, $\frac{1}{2}$ to a little more than $\frac{1}{2}$ length of head; longest soft rays $\frac{3}{5}$ to $\frac{4}{5}$ length of head. Pectoral equal to or a little longer than head, reaching to vertical of origin of anal or beyond. Ventral reaching vent or scarcely to origin of anal. Anal iii 9-10; 3rd spine a little shorter or equal to last dorsal spine. Caudal truncate or very slightly emarginate, the angles sometimes rounded; caudal peduncle as long as deep or slightly deeper than long. Scales cycloid, 27-32 $\frac{3\frac{1}{2}-4\frac{1}{2}}{13-16}$; lateral lines $\frac{17-21}{11-17}$.

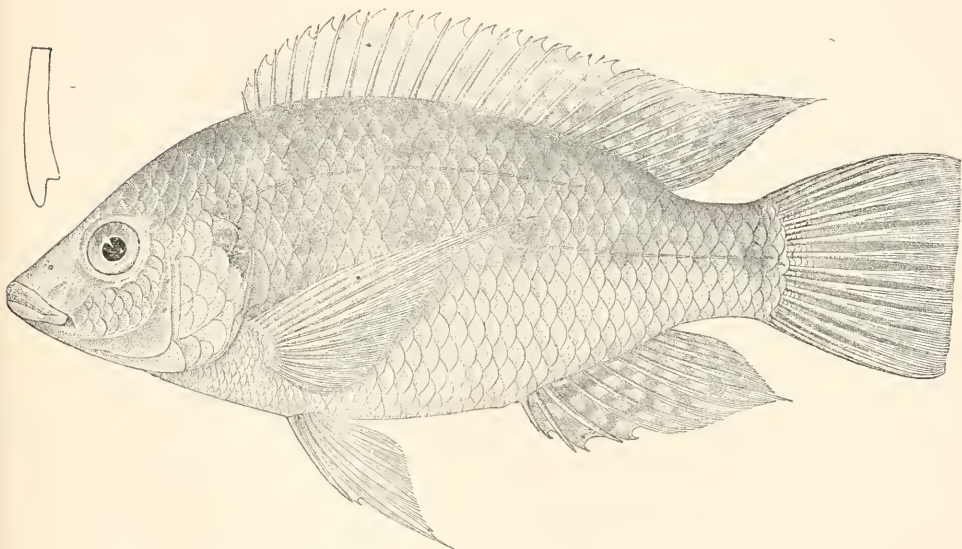


FIG. 122.—*Tilapia natalensis*. $\frac{5}{6}$.

Colour (of preserved specimens), brown or reddish brown above, lighter or whitish beneath; a blackish opercular spot, sometimes followed by a more or less distinct series of similar spots along the side of the body above and below the upper lateral line; young usually with 7 or 8 more or less distinct vertical bars often in addition to the 2 series of blackish spots; vertical fins uniform or with small round blackish spots or light spots separated by a dark network.

Eight specimens, ranging from 55-98 mm. in length, from Lakeside, Cape Peninsula (C. Sullivan).

Two specimens, 73 mm., 131 mm. in length respectively, from Buffalo River, East London (Mr. Wood).

One specimen, 154 mm. in length, from Blind River, Nahoon, East London (brak water) (Mr. Brooking).

Four specimens, ranging from 134–144 mm. in length, from Kanoooga River, East London.

Four specimens, ranging from 77–122 mm. in length, from Umkomas River, Natal (Dr. Gilechrist).

Three specimens, ranging from 60–89 mm. in length, from Umbeluzi, Swaziland (Mr. Howard).

Two specimens, 26 mm., 32 mm. in length respectively, from Komati Poort, Transvaal.

Thirty-five specimens, ranging from 30–83 mm. in length, from Nquametzi River, Transvaal (Major J. Stevenson Hamilton).

Twenty-two specimens, ranging from 34–99 mm. in length, from Sabi River, Transvaal (Major J. Stevenson Hamilton).

One specimen, 142 mm. in length, from Manzemtonto River, Transvaal (Major J. Stevenson Hamilton).

Ten specimens, ranging from 81–128 mm. in length, from Dwaars River, Transvaal.

Six specimens, ranging from 105–167 mm. in length, from Pienaar's River, Transvaal. Pretoria Museum.

Two specimens, 114 mm., 115 mm. in length respectively, from Umniati River, Rhodesia. Bulawayo Museum, collected by Mennell.

One specimen, 147 mm. in length, from Salisbury, Rhodesia (J. folliott Darling).

6. *TILAPIA MACROCHIR*, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (8), x, 1912, p. 139, and Freshw. Fish. Africa, iii, p. 160, fig. 105 (1915).

Teeth in five series, about 80 in outer series of upper jaw. Depth of body twice in total length excluding caudal, length of head $3\frac{1}{7}$ times. Head $1\frac{2}{5}$ times as long as broad, upper profile descending in a strong curve; snout rounded, with concave upper profile, a little broader than long, shorter than postocular part of head; eye $5\frac{1}{2}$ times in length of head, $\frac{2}{3}$ interorbital width, less than preorbital depth; mouth rather small, extending to between nostril and eye; scales on cheek in 2 or 3 series, width of scaly part a little less than diameter of eye. Gill-rakers moderate, 25 on lower part of anterior arch.

Dorsal xvi 11; last spine longest, about $\frac{1}{2}$ length of head; longest soft ray nearly equals length of head. Pectoral $1\frac{1}{4}$ length of head, reaching beyond vertical of origin of anal. Ventral reaching to vent. Anal iii 10; 3rd spine $\frac{1}{3}$ length of head. Caudal slightly emarginate; caudal peduncle deeper than long. Scales cycloid, $30\frac{2\frac{1}{2}}{15}$; lateral lines $\frac{2\frac{1}{2}}{1\frac{1}{2}}$.

Colour (of preserved specimen), blackish, base of scales dark ; a dark opercular spot ; tip of dorsal fin and distal extremity of anal whitish, indistinct dark and light longitudinal streaks on dorsal.

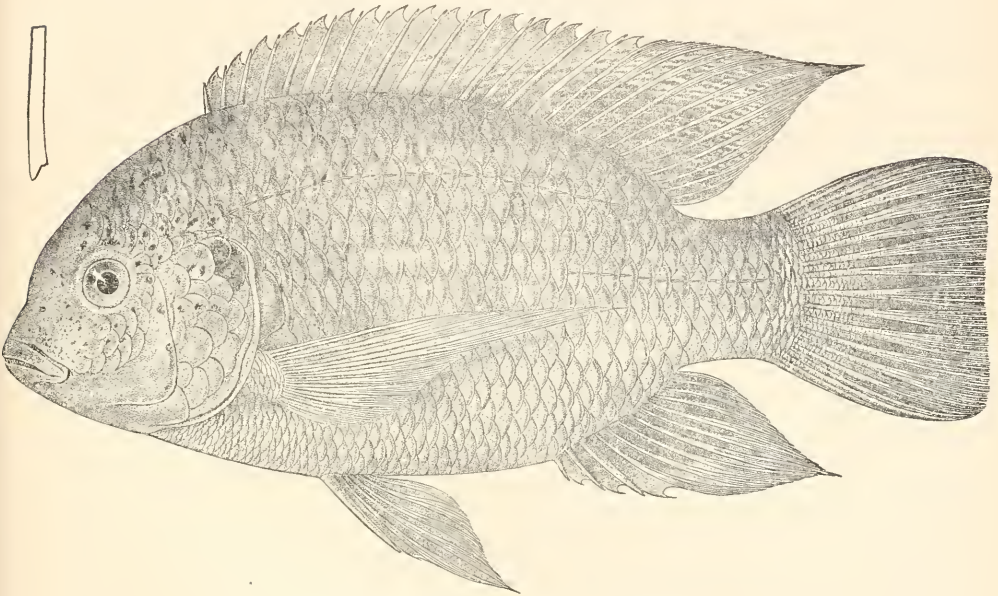


FIG. 123.—*Tilapia macrochir*. Type. $\frac{1}{3}$.

One specimen, 292 mm. in length, from Victoria Falls, Zambesi River (F. Rumsay). Bulawayo Museum.

It is also reported from Lakes Bangwelu and Mweru.

7. *TILAPIA SHESHEKENSIS*, n. sp.

Teeth small, in 3 series, 60 (circa) in outer row on upper jaw. Depth of body $2\frac{1}{5}$ times in total length excluding caudal, length of head $2\frac{1}{5}$ times. Head nearly twice as long as broad, upper profile elevated ; snout $1\frac{1}{5}$ times as broad as long, $\frac{7}{10}$ length of postocular part of head ; eye $3\frac{1}{2}$ times in length of head, $\frac{3}{4}$ interorbital width, $1\frac{2}{5}$ as long as least depth of preorbital ; mouth nearly $\frac{2}{3}$ width of head, extending to between nostril and eye ; 2 series of scales on the cheek, width of scaly part nearly $\frac{3}{5}$ diameter of eye. Gill-rakers short and thick, 24 on lower part of anterior arch.

Dorsal xvii 12 ; spines subequal from the 6th ; longest spines $\frac{2}{5}$ length of head ; longest soft rays $\frac{3}{5}$ length of head $\frac{1}{2}$. Pectoral $1\frac{1}{6}$

times length of head, reaching to about middle of anal. Ventral $\frac{4}{5}$ length of head, reaching scarcely to anal. Anal iii 9, 3rd spine slightly longer than longest dorsal spines. Caudal truncate, slightly emarginate; caudal peduncle $1\frac{1}{6}$ times as deep as long. Scales cycloid, $28\frac{4}{11}$; lateral lines $\frac{2}{12}$.

Colour (of preserved specimen) greyish-brown above, whitish below; scales dark in centre, forming indistinct longitudinal streaks between the series; about 10 more or less distinct dark cross-bars on body—the first extending across the nape, the next starting about the level of the opercular spot crosses in front of the origin of dorsal fin, the 7th below anterior rays of soft dorsal, or extends downwards to just below the median line; a dark opercular spot; dorsal with oblique dark bars enclosing whitish spots, especially on soft portion; anal with dark and light spots.

One specimen, 62 mm. in length, from Shesheke, Southern Rhodesia (Rev. L. Jalla).

This species resembles *T. natalensis* in many respects, but has a greater number of gill-rakers, the diameter of eye is much greater than least depth of preorbital, lateral line has fewer scales transversely, and the colour markings are different.

8. *TILAPIA GALILAEA*, Art.

Sparus galilaeus, Artedi, in Hasselq. Iter Palaest., p. 343 (1757).

Tilapia pleuromelas, A. Dum., Arch. Mus., x, 1859, p. 253.

Tilapia lateralis, A. Dum., l.c.

Tilapia macrocentra, A. Dum., t.c., p. 256.

Chromis ? galilaeus, Günth., Cat. Fish., iv, p. 273 (1862).

Chromis niloticus, part., Günth., t.c., p. 267, Proc. Zool. Soc., 1864, p. 490, and Petherick's Trav., ii, p. 216 (1869); Steindr., Sitzb. Ak. Wien, lx, i, 1870, p. 964, pl. iv, fig. 1.

Chromis pleuromelas, Günth., Cat. Fish., iv, p. 271 (1862).

Chromis lateralis, Günth., t.c., p. 272.

Chromis niloticus, Steindr., Verh. zool.-bot. Ges. Wien, xiv, 1864, p. 226; Tristram, Faun. Palest., pl. xviii, fig. 1 (1884).

Chromis tiberiadis, Lortet, Ann. Mus. Lyon, iii, 1883, p. 135, pl. vi.

Chromis microstomus, Lortet, t.c., p. 139, pl. viii, fig. 1.

Tilapia galilaea, Bouleng., Proc. Zool. Soc., 1899, p. 114, Fish. Nile, p. 531, pl. xc (1907), and Freshw. Fish. Afr., iii, p. 169, fig. 109 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 311.

Teeth in three to four series, 64 (circa) in outer series of upper jaw. Depth of body $2\frac{1}{5}$ times in total length excluding caudal, length of

head $2\frac{9}{10}$ times. Head with elevated profile, slightly more than twice as long as broad; snout rounded, with straight upper profile, as long as broad, nearly $\frac{3}{4}$ postocular part of head; eye $4\frac{1}{3}$ times in length of head, a little more than $1\frac{2}{3}$ times in interorbital width, a little longer than least depth of preorbital; mouth small, slightly more than $\frac{1}{2}$ width of head, reaching to between nostril and eye; scales on cheek in 3 series, width of scaly part $\frac{1}{5}$ diameter of eye. Gill-rakers short, slender, 23 on lower part of anterior arch.

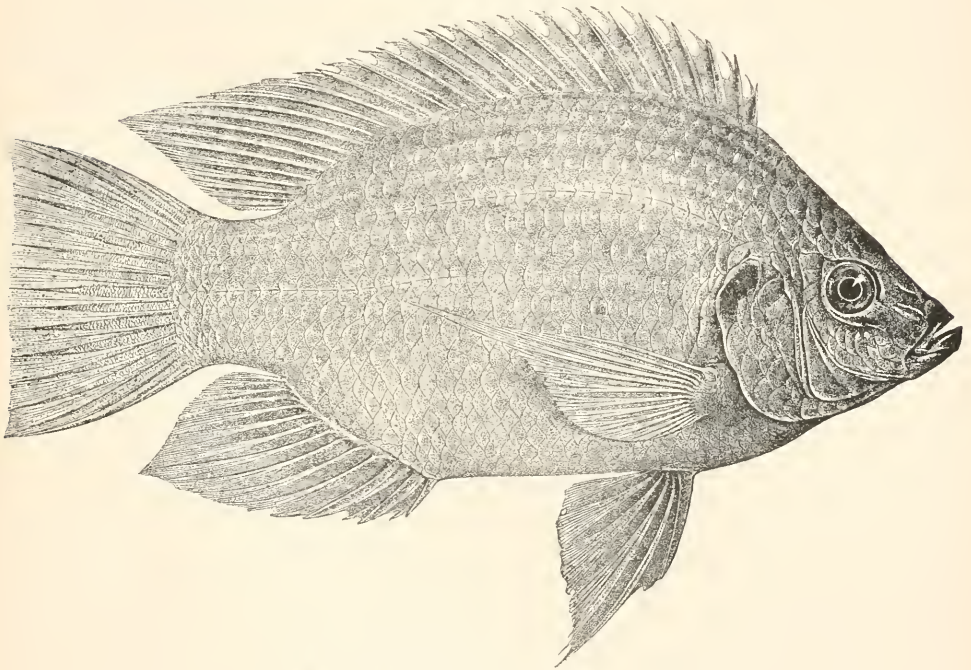


FIG. 124.—*Tilapia galilaea*. Khartum (F.N.). $\frac{1}{2}$.

Dorsal xvii 12; spines strong, last spine longest, nearly $\frac{1}{2}$ length of head; longest soft rays $\frac{2}{3}$ length of head. Pectoral $1\frac{1}{7}$ times length of head, extending to beyond vertical of origin of anal. Ventral reaching to vent. Anal iii 11; 3rd spine a little shorter than longest dorsal spine. Caudal truncate; caudal peduncle $1\frac{1}{7}$ times as deep as long. Scales cycloid, $30\frac{1}{4}$; lateral lines $\frac{2\frac{0}{12}}$.

Colour (of preserved specimen), reddish brown above, whitish below, with indistinct, narrow, dark cross-bands on body; a dark opercular spot; an indistinct dark spot on base of anterior soft rays of dorsal; tip of ventral black.

One specimen, 95 mm. in length, from Victoria Falls, Zambesi River (Mr. J. W. Soper). Bulawayo Museum.

This species is also reported from Lake Galilee and Jordan; Nile system up to Blue Nile and Bahr-el-Gebel; Senegal; Gambia; Portuguese Guinea; Lagos; Niger; ? Banzyville, Ubanghi.

9. *TILAPIA ANDERSONII*, Cast.

Chromys andersonii, Casteln., Mém. Poiss. Afr. Austr., p. 14 (1861).

Chromys chapmani, Casteln, op. cit., p. 15.

? *Chromys sparmanni* (non A. Smith), Casteln., t.c., p. 12.

Melanogenes microcephalus (non Bleek.), Sauvage, Bull. Soc. Zool. France, 1884, p. 196, fig.

Tilapia flavomarginata, Bouleng., Ann. Mus. Congo, Zool., i, p. 123, pl. xlvi (1899), Poiss. Bass. Congo., p. 458 (1901), and Ann. and Mag. Nat. Hist. (8), vi, 1910, p. 560; Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 313, and Bull. Soc. Philom. (9), ix, 1907, p. 37, fig.

Tilapia andersonii, Bouleng., Trans. Zool. Soc., xviii, 1911, p. 415, and Freshw. Fish. Afr., iii, p. 171, fig. 110 (1915).

Teeth in a band of four (young) to eight series. Depth of body $2\frac{3}{10}$ to $2\frac{1}{2}$ times in total length excluding caudal, length of head 3 to $3\frac{1}{4}$ times. Head $1\frac{1}{2}$ to twice as long as broad; snout rounded, with straight or slightly convex upper profile, as broad as or a little broader than long, a little shorter than postocular part of head; eye $4\frac{1}{2}$ to $5\frac{1}{2}$ times in length of head, 2 to $2\frac{1}{5}$ in interorbital width, equal to or a little less than preorbital depth; mouth moderate, $\frac{2}{5}$ to $\frac{3}{4}$ width of head, extending to between nostril and eye; 3 series of scales on the cheek, width of scaly part not greater than diameter of eye. Gill-rakers moderately long, 20 to 24 on lower part of anterior arch.

Dorsal xvi 11-12; last spine longest, $\frac{2}{5}$ to $\frac{3}{5}$ length of head; longest soft rays $\frac{1}{5}$ to 1 length of head. Pectoral 1 to $1\frac{1}{3}$ times length of head, reaching vertical of origin of anal or beyond. Ventral reaching to vent or beyond. Anal iii 10-11; 3rd spine $\frac{1}{3}$ to $\frac{2}{5}$ length of head. Caudal truncate or slightly emarginate; caudal peduncle deeper than long. Scales cycloid, 30-32 $\frac{4}{12-15}$; lateral lines $\frac{20-23}{13-15}$.

Colour (of preserved specimens) blackish brown, or dark uniform brown, lighter beneath; scales edged with whitish; a dark opercular spot; vertical fins dark, with indistinct dark streaks on dorsal; dorsal faintly edged with yellowish white.

One specimen, 268 mm. in length, from Zambesi River, about 3 miles above the Victoria Falls (Mr. F. W. Sykes).

One specimen, 258 mm. in length, from Kafue River, Rhodesia (C. F. Molyneux).

One specimen, 168 mm. in length, from Lake Ngami (H. F. Kirkham).

It is also reported from Angola, Congo, and Gaboon.

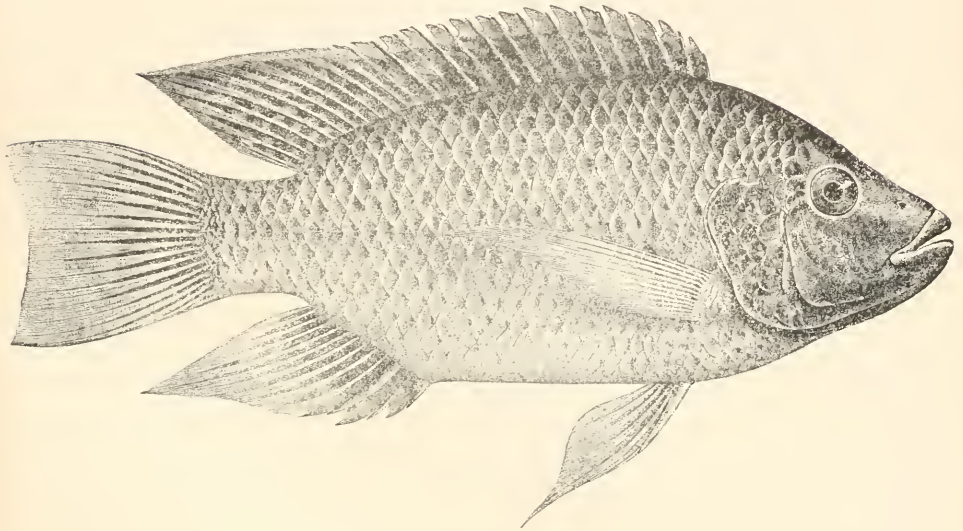


FIG. 125.—*Tilapia andersonii*. ♀.

According to Mr. Sykes the Batoka name of the specimen sent by him is *Tsheri*, the Barotse name *Appapati*. He states that the fish is "much esteemed by Europeans and natives, not having a superfluity of bones and hardly any of the muddy flavour usual with freshwater fish. A favourite dish of Lewanika. Can be caught on hooks baited with locusts and would probably rise to a fly."

10. TILAPIA SQUAMIPINNIS, Günth.

Chronis squamipinnis, Günth., Proc. Zool. Soc., 1864, p. 311, and 1893, p. 621, pl. liii.

Tilapia squamipinnis, Bouleng., Trans. Zool. Soc., xv, 1898, p. 4, and Proc. Zool. Soc., 1899, p. 177; Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 318; Bouleng., Freshw. Fish. Africa, iii, p. 183, fig. 118, (1915).

Depth of body $2\frac{1}{2}$ to $2\frac{2}{3}$ times in total length, length of head $2\frac{2}{3}$ to 3 times. Head $1\frac{3}{4}$ to 2 times as long as broad, snout rounded,

with straight or convex upper profile, about $\frac{2}{3}$ as long as broad, $\frac{3}{4}$ to $\frac{4}{5}$ postocular part of head; eye 3 (young) to $5\frac{1}{2}$ times in length of head, $1\frac{1}{3}$ (young) to $2\frac{2}{3}$ times in interorbital width, equal to prae-orbital depth in adult; mouth moderate, $\frac{1}{2}$ to $\frac{2}{3}$ width of head, extending to between nostril and eye; teeth in 4 (young) to 7 series,* 50 (young) to 110 in outer series of upper jaw; 2 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers moderate, 17 to 21 on lower part of anterior arch.

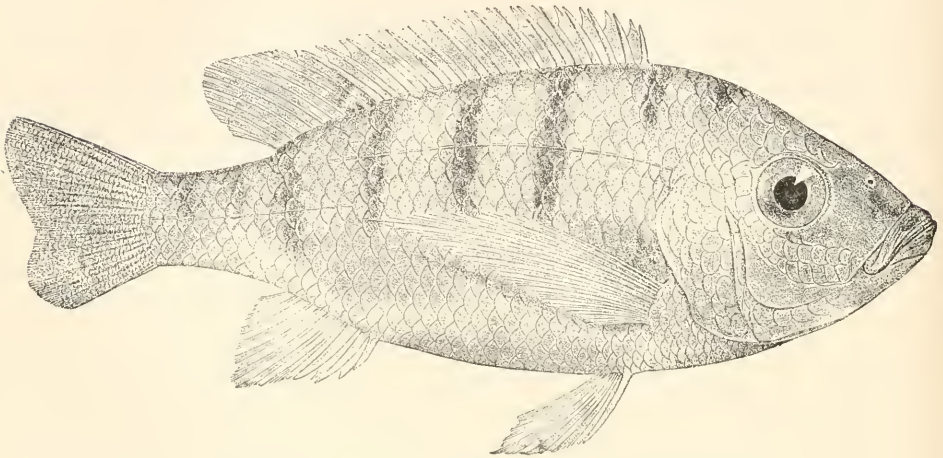


FIG. 126.—*Tilapia squamipinnis*. Type, after Günther (P.Z.S., 1893). $\frac{2}{3}$.

Dorsal xvi 10-11; spines subequal from middle ones, or last longest, $\frac{2}{7}$ to $\frac{1}{2}$ length of head; longest soft rays $\frac{1}{3}$ to $\frac{2}{5}$ length of head. Anal iii 8-9; third spine $\frac{1}{4}$ to $\frac{2}{7}$ length of head. Pectoral as long as or slightly longer than head, reaching origin of anal or a little beyond. Ventral reaching vent or not so far. Caudal densely scaled, rounded with a feeble median notch, or upper angle pointed. Caudal peduncle a little longer than deep. Scales cycloid, 32-36 $\frac{3\frac{1}{2}}{14-16}$; lateral lines $\frac{20-22}{12-18}$.

Pale greyish olive, with or without 8 more or less regular blackish cross-bars, or dark brown to bluish-black; soft dorsal with oblique dark streaks, or fins bluish-black with a yellow or orange edge; the blackish cross-bars constant in the young, which bear a large black spot on the anterior part of the soft dorsal.

* "In one of the specimens received from Capt. Rhoades, all the outer teeth are conical, without secondary cusps."

Total length 300 millim.

Lake Nyassa and Upper Shiré River."

Three specimens, ranging from 74-77 mm. in length, received from Kafue River, Rhodesia (Mr. J. Hotchkiss), appear to belong to this species, but owing to their mutilated condition it is difficult to identify them satisfactorily.

11. *TILAPIA MELANOPLEURA*, A. Dum.

Tilapia melanopleura, A. Duméril, Arch. Mus., x, 1859, p. 252, pl. xxii, fig. 1; Bouleng., Proc. Zool. Soc., 1889, p. 123, Trans. Zool. Soc., xviii, 1911, p. 417, and Freshw. Fish. Afr., iii, p. 190, fig. 123 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 329, and Bull. Soc. Philom. (9), x, 1908, p. 134.

Tilapia affinis, A. Dum., t.c., p. 255; Bouleng., t.c., p. 127; Pellegr., Bull. Mus. Paris, 1900, p. 277.

Tilapia polycentra, A. Dum., t.c., p. 254; Bouleng., t.c., p. 128.

Chromis polycentra, Günth., Cat. Fish., iv, p. 270 (1862).

Chromis latus, Günth., t.c., p. 271; Steindr., Verh. zool.-bot. Ges. Wien, xiv, 1864, p. 227, pl. viii, figs. 1 and 2.

Chromis melanopleura, Günth., t.c., p. 272.

Chromis aureus, Steindr., t.c., p. 229, pl. viii, fig. 5.

Chromis niloticus, part., Steindr., Sitzb. Ak. Wien, lx, 1870, p. 96.

Chromis coeruleomaculatus, Rochebr., Bull. Soc. Philom. (7), iv, 1880, p. 166, and Act. Soc. Linn. Bord. (4), vi, 1883, p. 132, pl. iv, fig. 3.

Chromis faidherbi, Rochebr., tt.c.c., p. 167, and p. 134, pl. v., fig. 5.

Chromis affinis, Rochebr., Act. Soc. Linn. Bord. (4), vi, 1883, p. 131.

Chromis ogowensis, Günth., Ann. and Mag. Nat. Hist. (6), xvii, 1896, p. 271, and Proc. Zool. Soc., 1899, p. 717, and 1902, ii, p. 231.

Chromis rendalli, Bouleng., Proc. Zool. Soc., 1896, p. 915, fig.

Tilapia rendalli, Bouleng., Trans. Zool. Soc., xv, 1898, p. 4, and Proc. Zool. Soc., 1899, p. 126.

Tilapia lata, Bouleng., Proc. Zool. Soc., 1899, p. 125, and Poiss. Bass. Congo, p. 466 (1901); Steindr., Denkschr. Ak. Wien, lxxxix, 1913, p. 60.

Tilapia sezfusciata, Pellegr., Bull. Mus. Paris, 1900, p. 276.

Chromis discolor, Günth., Proc. Zool. Soc., 1902, ii, p. 332.

Tilapia latifrons, Bouleng., Trans. Zool. Soc., xvii, 1906, p. 571, pl. xl.

Teeth in 3 (young) to 5 more or less regular series, the outer largest and separated from the others by a rather wide interspace.

Depth of body 2 to $2\frac{2}{5}$ times in total length excluding caudal; length of head 3 to $3\frac{1}{3}$ times. Head $1\frac{3}{4}$ to 2 times as long as broad; snout with straight or convex, or slightly concave upper profile, as long as broad or a little broader than long, as long as or slightly longer than postocular part of head; eye $3\frac{1}{5}$ (young) to $5\frac{1}{5}$ times in length of head, 1 (young) to $2\frac{1}{4}$ times in interorbital width, less than preorbital depth in adult; mouth moderate, $\frac{1}{2}$ to $\frac{3}{4}$ width of head, extending to between nostril and eye; 3 or 4 series of scales on the cheek, width

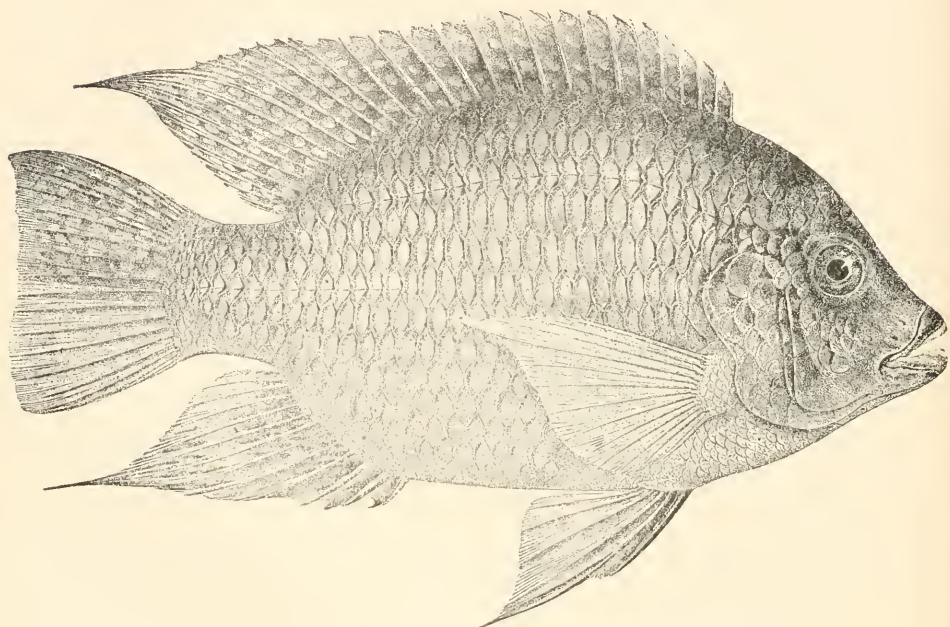


FIG. 127.—*Tilapia melanopleura*. Type of *T. latifrons* (Tr. Z.S., 1906). $\frac{1}{2}$.

of scaly part greater than diameter of eye in adult. Gill-rakers short, 8 to 12 on lower part of anterior arch.

Dorsal xiv-xvi 10-12, last spine longest, $\frac{2}{5}$ to over $\frac{1}{2}$ length of head; middle soft rays slightly produced in adult, usually as long as or a little longer than head. Pectoral 1 to $1\frac{1}{5}$ times as long as head, extending to vent or nearly to vertical of origin of anal. Ventral reaching to vent or beyond. Anal iii 9-10; third spine usually shorter than the longest dorsal spine. Caudal truncate or feebly emarginate; caudal peduncle deeper than long. Scales cycloid or very feebly denticulate, 28-30 $\frac{3\frac{1}{2}}{11-13}$; lateral lines $\frac{20-21}{12-15}$.

Colour (of preserved specimens) brown or dark olive-brown above, sometimes whitish on gular region, with or without 4 to 6 very indistinct darker bars; a dark opercular spot; dorsal fin with oblique dark streaks, with or without round light spots; a more or less indistinct large black spot at the base of anterior part of soft dorsal, sometimes disappearing with age; caudal sometimes with round light spots, or with a dark network.

One specimen, 260 mm. in length from Sabi River, Transvaal (Major J. Stevenson Hamilton).

Thirteen specimens, ranging from 54–95 mm. in length from Sabi River, Transvaal (Major J. Stevenson Hamilton).

One specimen, 232 mm. in length, from Manzembtento River, Transvaal (Major J. Stevenson Hamilton).

One specimen, 228 mm. in length, from Sabi River, Transvaal (Major J. Stevenson Hamilton).

One specimen, 180 mm. in length, from Thabina River, Transvaal. Pretoria Museum.

One specimen, 254 mm. in length, from Kafue River, Rhodesia (J. Hotchkiss).

One specimen, 247 mm. in length, from Victoria Falls, Zambesi River (G. Arnold). Bulawayo Museum.

One specimen, 109 mm. in length, from Lake Ngami (H. F. Kirkham).

A very widely distributed species, originally described from the Senegal (types in the Paris Museum), but now known from West Africa as far south as Angola, from the Congo and Zambesi systems, the Transvaal, Zululand, and Bechuanaland.

The specimens from the Gold Coast have been named *T. discolor*, and those from the Gaboon *T. lata* and *T. ogoensis*, whilst the names *T. latifrons* and *T. reudalli* apply to those from Lake Tanganyika and the Zambesi respectively. Perhaps some of these names may have to be revised when the state of our knowledge permits a division into subspecies, an attempt at which the author of the 'Catalogue of African Freshwater Fishes' has regarded as premature.

12. *TILAPIA ARNOLDI, n. sp.

Teeth in 3 rows; those of outer row larger, slender, close-set, about 50 in upper jaw. Depth of body $2\frac{1}{3}$ times in total length excluding caudal, length of head 3 times. Head $1\frac{1}{3}$ times as long as broad; snout short, with convex upper profile, $1\frac{1}{3}$ times as broad as long.

$\frac{2}{3}$ length of postocular part of head; eye large, $2\frac{2}{3}$ times in length of head, equals interorbital width; least depth of preorbital equals $\frac{1}{2}$ diameter of eye; mouth nearly $\frac{2}{3}$ width of head, reaching to below anterior border of eye; 2 series of scales on the cheek, depth of scaly part $\frac{2}{3}$ diameter of eye. Gill-rakers short, thick, 15 on lower part of anterior arch.

Dorsal xv 11; spines subequal from the 6th, last spine $\frac{2}{3}$ length of head; soft rays a little longer than longest spines. Pectoral nearly as long as head, reaching to vent. Ventral $\frac{2}{3}$ length of head, outer rays slightly produced, reaching to vent. Anal iii 9, 3rd spine a little shorter than longest dorsal spine. Caudal subtruncate; caudal peduncle $1\frac{1}{7}$ as deep as long. Scales cycloid, $27\frac{1}{11}$; lateral lines $1\frac{8}{10}$.

Colour (of preserved specimen) olive brown, light on belly, scales with dark outer edge, indistinct dark cross-bars on body; an indistinct dark opercular spot; a black spot at base of anterior rays of soft dorsal and one or two whitish spots enclosed by dark streaks; anal dark at base with a light outer half; caudal dark at base, light in centre, a black outer ridge.

One specimen, 48 mm. in length, from Mazoe River, Rhodesia (Mr. G. Arnold).

13. *TILAPIA SWIERSTRAE*, n. sp.

Teeth in 5 series, those of the outer row much stronger and separated from the 4 irregular inner rows by a short interspace; 60 teeth in outer series on upper jaw. Depth of body $2\frac{1}{3}$ times in total length excluding caudal, length of head $3\frac{1}{3}$ times. Head elevated, the profile making a bold curve, $1\frac{2}{3}$ times as long as broad; snout obtuse, with convex upper profile, as long as broad and equal to postocular part of head; eye $5\frac{1}{10}$ times in length of head, $\frac{1}{2}$ interorbital width, $\frac{7}{10}$ least depth of preorbital; mouth $\frac{1}{3}$ width of head, reaching scarcely to vertical of anterior margin of eye, lips moderate; 4 series of scales on cheek, width of scaly part $1\frac{1}{3}$ times diameter of eye. Gill-rakers short, some of them bifid, 8 on lower part of anterior arch.

Dorsal xvi 12; last spine longest, a little more than $\frac{1}{2}$ length of head; longest soft rays produced, a little longer than head. Pectoral $1\frac{1}{6}$ times length of head, reaching to vent. Ventral reaching to vent. Anal iii 10; 3rd spine a little shorter than longest dorsal spine. Caudal truncate; caudal peduncle $1\frac{1}{4}$ times as deep as long. Scales cycloid, $30\frac{3}{12}$, lateral lines $2\frac{2}{14}$.

Colour (of preserved specimen) reddish brown, lighter beneath,

scales dark at the base; a dark opercular spot; soft dorsal with dark streaks enclosing white spots; caudal with dark spots, more plainly visible on upper lobe.

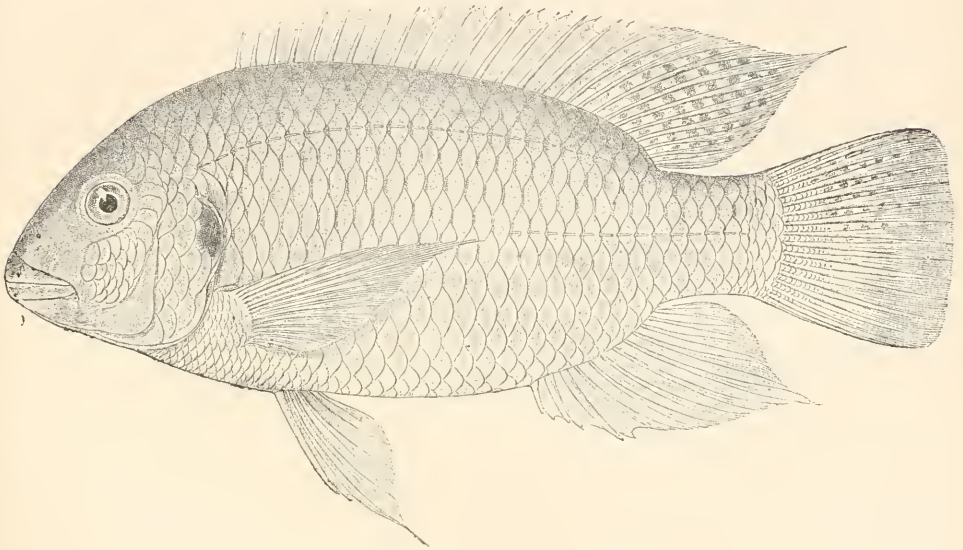


FIG. 128.—*Tilapia swierstrae*. Type.

One specimen, 222 mm. in length, from Thabina River, Transvaal (Mr. C. J. Swierstra).

14. *TILAPIA MACKEANI*, n. sp.

Teeth in 4 series, those of the outer row larger; 60 in outer series on upper jaw. Depth of body $2\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{2}{3}$ times. Head with elevated and rounded profile, $1\frac{1}{3}$ times as long as broad; snout with slightly concave upper profile, as long as broad and equal to postocular portion of head; eye $4\frac{4}{5}$ times in length of head, $\frac{1}{2}$ interorbital width, $\frac{3}{4}$ least depth of preorbital; mouth $\frac{2}{3}$ width of head, extending to between nostril and eye; four to five series of scales on the cheek, width of scaly part $1\frac{1}{3}$ times diameter of eye. Gill-rakers, 9 on lower part of anterior arch.

Dorsal xvi 12; spines increasing in length to the last, which is nearly $\frac{1}{2}$ length of head; longest soft rays $\frac{9}{10}$ length of head. Pectoral $1\frac{1}{3}$ times length of head, reaching to vent. Ventral not reaching vent. Anal iii 10; 3rd spine a little more than $\frac{1}{4}$ length of head. Caudal

rounded; caudal peduncle nearly $1\frac{1}{4}$ times as deep as long. Scales cycloid, $29\frac{3\frac{1}{2}}{12}$; lateral lines $\frac{21}{12}$.

Colour (of preserved specimen) dark greyish above, whitish below, scales dark at the base; a dark opercular spot; 4 or 5 indistinct dark cross-bars on body; indistinct dark bar across nape from opercle to opercle and a faint one from eye to angle of mouth; dorsal with dark streaks and light spots; caudal with dark spots on upper lobe.

One specimen, 270 mm. in length, from Sawmills, Bulawayo, Rhodesia (Mr. F. D. McKean).

15. *TILAPIA SYKESI*, n. sp.

Teeth in six series, those of the outer row enlarged and separated from the inner rows by a narrow interspace; about 50 teeth in outer series on upper jaw. Depth of body $2\frac{2}{3}$ times in total length excluding caudal, length of head $3\frac{1}{5}$ times. Head $1\frac{2}{3}$ times as long as broad, upper profile convex; snout with straight upper profile, $1\frac{2}{5}$ times as long as broad, a little longer than postocular part of head; eye $5\frac{1}{3}$ times in length of head, a little more than $\frac{1}{2}$ interorbital width, $\frac{5}{8}$ least depth of preorbital; mouth $\frac{3}{4}$ width of head, reaching to between nostril and eye; three series of scales on cheek, depth of scaly part $1\frac{1}{4}$ times diameter of eye. Gill-rakers short, 9 on lower part of anterior arch.

Dorsal xvi 11; last spine longest, nearly $\frac{1}{2}$ length of head; middle soft rays longest, as long as head. Pectoral a little longer than head, reaching to vent. Ventral reaching to vent or slightly beyond. Anal iii 9; 3rd spine $\frac{3}{10}$ length of head. Caudal truncate; caudal peduncle $1\frac{1}{3}$ times as deep as long. Scales cycloid, $30\frac{3\frac{1}{2}}{12}$, lateral lines $\frac{20}{12}$.

Colour (of preserved specimen) brown above, light yellow below, scales dark at base; a large dark opercular spot; dorsal and caudal fins with dark spots or streaks.

One specimen, 254 mm. in length, from Zambesi River, 3 miles above Victoria Falls. From Mr. F. W. Sykes, who gives the native name as *Apapati*, which appears also to be the native name of a somewhat similar species, *T. andersoni*.

16. *TILAPIA DRURYI*, n. sp.

Teeth, an outer row of small bicuspoid teeth, separated by a slight interspace from 6 inner rows of smaller tricuspoid teeth; about 70 teeth in outer series on upper jaw. Depth of body $2\frac{1}{2}$ times in total length

excluding caudal, length of head $3\frac{1}{5}$ times. Head $1\frac{7}{10}$ times as long as broad, upper profile descending in a bold curve; snout with concave upper profile, $1\frac{1}{6}$ times as long as broad, $1\frac{1}{6}$ times as long as postocular part of head; eye $4\frac{2}{3}$ times in length of head, a little more than $\frac{1}{2}$ interorbital width, nearly $\frac{3}{4}$ least depth of preorbital; mouth $\frac{7}{10}$ width of head, reaching to below nostril; scales on cheek in 3 rows, width of scaly part $1\frac{1}{4}$ times diameter of eye. Gill-rakers short, anvil-shaped, 9 on lower part of anterior arch.

Dorsal xvi 11; last spine longest, $\frac{2}{3}$ length of head; soft rays $\frac{2}{3}$ length of head. Pectoral a little longer than head, scarcely reaching vertical of origin of anal. Ventral not reaching vent. Anal iii 8; 3rd spine $\frac{1}{3}$ length of head. Caudal truncate, slightly emarginate; caudal peduncle $1\frac{1}{4}$ times as deep as long. Scales cycloid, $28\frac{1}{11}$; lateral lines $\frac{2}{12}$.

Colour (of preserved specimen) dark brown above, whitish beneath, scales dark at base; a dark opercular spot; dorsal with dark spots or streaks forming longitudinal lines; caudal with dark spots on upper lobe.

One specimen, 245 mm. in length, from Kafue River, Rhodesia (Mr. J. Drury).

17. *TILAPIA RUMSAYI*, n. sp.

Teeth in 3 rows, an outer series of large teeth followed by 2 inner rows of minute ones. Depth of body $3\frac{2}{5}$ times in total length excluding caudal, length of head $2\frac{1}{2}$ times. Head $2\frac{1}{5}$ times as long as broad;

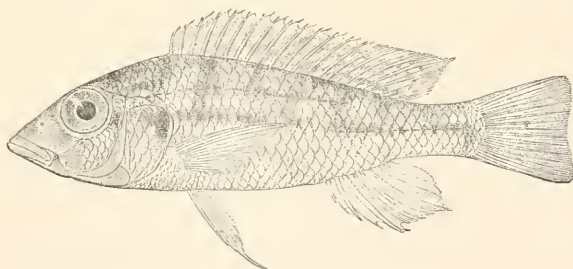


FIG. 129.—*Tilapia rumsayi*.

snout with straight upper profile, $1\frac{1}{4}$ times as long as broad, a little less than postocular part of head; eye $3\frac{1}{3}$ times in length of head; $1\frac{1}{2}$ times interorbital width, $1\frac{2}{3}$ times least depth of preorbital; mouth a little more than $\frac{1}{2}$ width of head, extending to between nostril and eye, lower jaw slightly projecting beyond upper; scales on cheek in 4 rows, width

of scaly part $\frac{3}{4}$ diameter of eye. Gill-rakers short, 10 on lower part of anterior arch.

Dorsal xiv 10; spines subequal from 6th; longest spine $\frac{2}{5}$ length of head; longest soft rays $\frac{1}{2}$ length of head. Pectoral $\frac{3}{4}$ length of head, reaching to vent. Ventral reaching to vent. Anal iii 6; 3rd spine $1\frac{1}{6}$ times as long as longest dorsal spine. Caudal truncate; caudal peduncle $1\frac{2}{3}$ times as long as deep. Scales cycloid, $29\frac{1}{2}$; lateral lines $\frac{2}{12}$.

Colour (of preserved specimen) light brown, darker above than below, faint cross-bars on body; an interrupted dark lateral band from eye to root of caudal; a shorter dark streak along upper lateral line to below posterior end of soft dorsal; a dark opercular spot; a faint dark bar from eye to angle of mouth and to chin; dorsal and caudal fins with dark and light spots.

One specimen, 61 mm. in length, from Victoria Falls, Zambesi River (F. Rumsay). Bulawayo Museum.

18. *TILAPIA SPARRMANI*, A. Smith.

Tilapia sparrmani, A. Smith, Ill. Zool. S. Afr., Pisces, pl. v (1849); Bouleng., Proc. Zool. Soc., 1899, p. 119, Pois. Bass. Congo., p. 462 (1901), Trans. Zool. Soc., xviii, 1911, p. 417, and Freshw. Fish. Africa, iii, p. 206, fig. 132 (1915); Pellegr. Mém. Soc. Zool. France, xvi, 1904, p. 319.

Chromis sparrmani, Günth., Cat. Fish., iv, p. 269 (1862).

Chromis niloticus, part., Peters, Reise Mossamb., iv, p. 23 (1868).

Tilapia fouloni, Bouleng., Ann. and Mag. Nat. Hist. (7), xvi, 1905, p. 647.

Teeth small, in 3 to 6 series, 40 (young) to 80 in outer series of upper jaw. Depth of body $2\frac{1}{4}$ to $2\frac{2}{3}$ times in total length excluding caudal, length of head 3 to $3\frac{1}{2}$ times. Head $1\frac{1}{3}$ to nearly twice as long as broad; snout with straight or slightly concave upper profile, a little broader than long, as long as or a little longer than eye, $\frac{3}{4}$ to $\frac{5}{8}$ postocular part of head; eye $3\frac{2}{5}$ to $4\frac{3}{10}$ times in length of head, $\frac{7}{10}$ to $\frac{9}{10}$ interorbital width, equal to or a little more than depth of preorbital; mouth moderate, $\frac{1}{2}$ to $\frac{2}{3}$ length of head, extending to between nostril and eye; 2 or 3 series of scales on the cheek, depth of scaly part $\frac{2}{3}$ to $\frac{5}{8}$ diameter of eye. Gill-rakers short, 9 to 12 on lower part of anterior arch.

Dorsal xiii-xv 9-11; last spine longest, $\frac{1}{2}$ to $\frac{3}{5}$ length of head; longest soft rays $\frac{2}{3}$ to $\frac{5}{8}$ length of head. Pectoral $\frac{3}{4}$ to nearly equal to length of head, not reaching anal. Ventral reaching to vent or to

origin of anal. Anal iii 8-10; 3rd spine a little shorter but stronger than last dorsal spine. Caudal rounded or subtruncate; caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 27-29 $\frac{2\frac{1}{2}-3\frac{1}{2}}{9-11}$; lateral lines $\frac{16-19}{9-12}$.

Colour (of preserved specimens) light or reddish brown to dark olive brown, the scales sometimes with greenish-yellow margins; young with 7 to 9 dark cross-bars, which may persist, though feebly marked, in the adult; a blue-black opercular spot; dorsal, anal and caudal fins with dark spots or oblique dark and light stripes; a large blackish

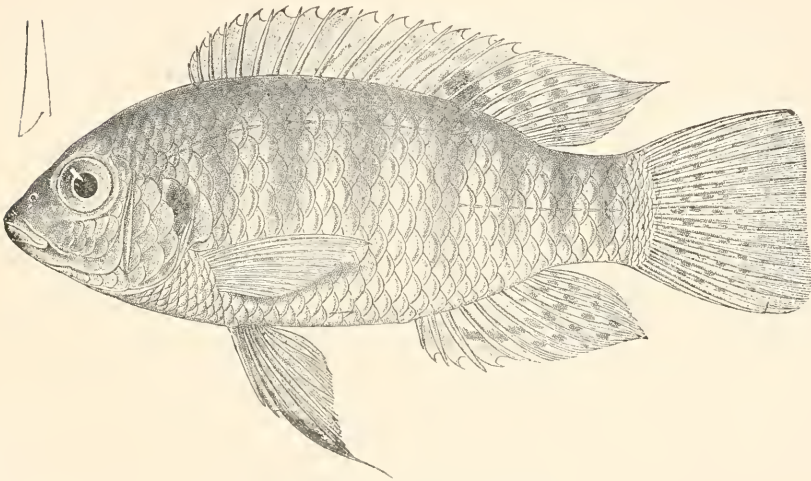


FIG. 130.—*Tilapia sparrmani*.

spot at base of soft dorsal between anterior rays; caudal sometimes with dark spots between the rays; outer ventral rays often darkish.

Two specimens, 98 mm., 108 mm. respectively, from Griqualand West (T. H. Orpen).

One specimen, 103 mm. in length, from a pool in Bulawayo, Rhodesia. Bulawayo Museum.

One specimen, 103 mm. in length, from Kafue River, Rhodesia.

One specimen, 38 mm. in length, from Dry Hartz River, Vryburg, Bechuanaland.

One specimen, 103 mm. in length, from Kuruman, Bechuanaland (R. Moffat).

Six specimens, ranging from 74-92 mm. in length, from Wondergat, near Mafeking.

Two specimens, 68 mm., 70 mm. in length respectively, from Nqametse River, Transvaal (Major J. Stevenson Hamilton).

One specimen, 48 mm. in length, from farm De Kroon, Limpopo or Crocodile River, Transvaal (H. Fry).

Five specimens, ranging from 57–81 mm. in length, from Klip River, Transvaal.

Two specimens, 67 mm., 78 mm. in length respectively, from Vereeniging, Transvaal (Mr. Leslie).

Two specimens, 85 mm., 98 mm. in length respectively, from Potchefstroom, Transvaal.

One specimen, 125 mm. in length, from Potchefstroom, Transvaal (Mr. Stenning).

Three specimens, ranging from 55–68 mm. in length, from Lydenberg District, Transvaal. Pretoria Museum.

Two specimens, 76 mm., 121 mm. in length respectively, from Six-miles Spruit, Pretoria District. Pretoria Museum.

One specimen, 86 mm. in length, from Aapjes River, Pretoria. Pretoria Museum.

Eleven specimens, ranging from 67–103 mm. in length, from Thabina and Letsikela Rivers, Transvaal. Pretoria Museum.

Thirteen specimens, ranging from 69–99 mm. in length, from Magalies River, Transvaal. Pretoria Museum.

One specimen, 112 mm. in length, from Pienaar's River, Transvaal. Pretoria Museum.

This species is also reported from Angola, Katanga, Lakes Mweru and Bangwelu, and Zambesi to Orange River and Natal.

19. *TILAPIA ELLENBERGERI*, n. sp.

Teeth in 2 series on upper jaw, about 60 in outer row, in 3 series on lower jaw. Depth of body a little more than $2\frac{1}{2}$ times in total length excluding caudal, length of head $2\frac{7}{10}$ times. Head nearly twice as long as broad; snout with convex upper profile, a little longer than broad, $\frac{5}{6}$ as long as postocular part of head; eye $4\frac{1}{4}$ times in length of head, a little less than interorbital width, equal to least depth of preorbital; mouth $\frac{3}{5}$ width of head, reaching to below nostril; scales on cheek in 3 or 4 rows, depth of scaly part $1\frac{1}{4}$ times diameter of eye. Gill-rakers short, broad, 9 on lower part of anterior arch.

Dorsal xiii 11; spines increasing in length to the last, which is $\frac{1}{3}$ length of head; longest soft rays $\frac{1}{2}$ length of head; posterior margin of both dorsal and anal fins rounded. Pectoral $\frac{3}{5}$ length of

head, scarcely reaching to vent. Ventral nearly $\frac{3}{5}$ length of head, reaching to vent. Anal iii 7; 3rd spine a little longer than longest dorsal spine. Caudal rounded; caudal peduncle as long as deep. Scales cycloid, $26\frac{5}{10}$; lateral lines $1\frac{9}{9}$.

Colour (of preserved specimen) dark brown above, yellowish beneath, with indistinct dark cross-bars on the body and an interrupted dark lateral band from eye to base of caudal, where it ends in a dark spot; soft dorsal covered with light spots in rows and with a narrow yellowish band or streak just within its outer edge running from its rounded posterior margin forward on to the posterior dorsal spines; anal with a row of 4 large, ocellar, whitish spots; caudal with small light and dark spots in transverse rows; a dark opercular spot, with a dark blotch below it; an indistinct dark bar from eye to angle of mouth.

One specimen, 74 mm. in length, from Lialui, Upper Zambesi (Rev. Ellenberger).

20. **TILAPIA OVALIS*, Steindr.

Chromis ovalis, Steindr., Verh. Zool.-bot. Ges. Wien., xvi, 1866, p. 761.

Tilapia ovalis, Bouleng., Proc. Zool. Soc., 1899, p. 119, Poiss. Bass. Congo., p. 461 (1901), and Freshw. Fish. Africa, iii, p. 208, fig. 133 (1915); Pellegr. Mém. Soc. Zool. France, xvi, 1904, p. 319.

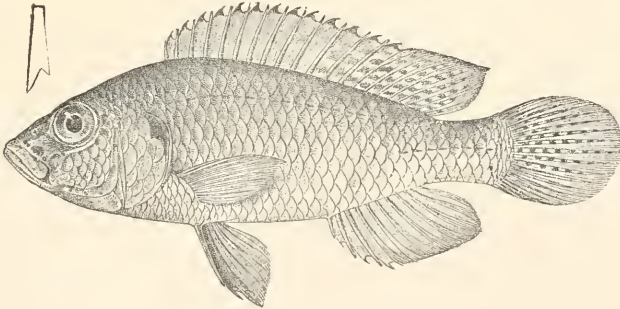


FIG. 131.—*Tilapia ovalis*.

“Depth of body equal to length of head, $2\frac{2}{3}$ to 3 times in total length. Head twice as long as broad, upper profile straight or curved; snout as long as broad, a little longer than eye, which is $3\frac{1}{2}$ (young) to 4 times in length of head, and slightly exceeds interorbital width or preorbital depth; mouth about $\frac{1}{2}$ width of head, extending to below anterior border of eye; teeth small, in 3 series, 40 to 50 in outer series

of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part nearly equal to diameter of eye. Gill-rakers short, 7 to 9 on lower part of anterior arch.

Dorsal xiii-xv 9-11; last spine longest, $\frac{2}{5}$ to $\frac{1}{2}$ length of head; longest soft rays $\frac{1}{2}$ to $\frac{3}{5}$. Anal iii 8-9; 3rd spine as long as last dorsal. Pectoral shorter than head, not extending to vertical of origin of anal. Ventral reaching vent or anal. Caudal rounded. Caudal peduncle as long as deep. Scales cycloid or very finely denticulate, 27-30 $\frac{2\frac{1}{2}-3}{10}$; lateral lines $\frac{13-19}{1(\overline{2})-10}$.

Olive-brown, with or without faint darker vertical bars; a black opercular spot; dorsal and anal edged with black, and with dark and light spots, or with black streaks; outer ventral rays black or blackish.

Total length 100 millim.

Angola, Bechuanaland, Rhodesia, Katanga, Lake Bangweu."

21. **TILAPIA WOOSNAMI*, Blgr.

Bouleng., Trans. Zool. Soc., xviii, 1911, p. 417, pl. xliii, fig. 2; and Freshw. Fish. Africa, iii, p. 212, fig. 137 (1915).

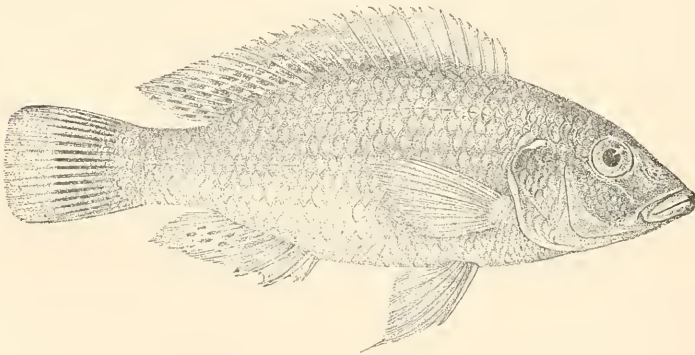


FIG. 132.—*Tilapia woosnami*. Type. $\frac{5}{6}$.

"Depth of body $2\frac{3}{4}$ times in total length, length of head 3 times. Head twice as long as broad; snout obtusely pointed, as long as postorbital part of head, as long as broad, with slightly convex upper profile; eye $4\frac{1}{2}$ times in length of head, equal to width of interorbital region or depth of preorbital; mouth moderate, $\frac{3}{5}$ width of head extending to between nostril and eye; teeth in outer row rather large,

36 in upper jaw, with an inner row of very minute teeth; 6 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers very short, 12 on lower part of anterior arch.

Dorsal xv 13; spines equal in length from the seventh, which is $\frac{2}{5}$ length of head; longest soft rays $\frac{1}{2}$ length of head. Anal iii 9; 3rd spine nearly as long as longest dorsal. Pectoral $\frac{2}{3}$ length of head, not reaching vertical of origin of anal. Ventral barely reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales with feebly denticulated border, $34\frac{3\frac{1}{2}}{10}$; lateral lines $\frac{2}{16}$.

Brownish above, yellowish beneath; dorsal with round black spots between the soft rays.

Total length 110 millim."

From Lake Ngami Basin (Okovango River). (R. B. Woosnam).

22. *TILAPIA JALLAE, Blgr.

Chromis jallae, Bouleng., Boll. Mus. Torin., xi, 1896, p. 260.

Tilapia jallae, Bouleng., Proc. Zool. Soc., 1899, p. 123, and Freshw. Fish. Africa, iii, p. 213 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 329.

"Depth of body $3\frac{1}{2}$ times in total length, length of head $3\frac{1}{4}$ times. Snout a little longer than eye, which is $3\frac{1}{2}$ times in length of head and $1\frac{1}{2}$ times interorbital width; mouth not extending to below anterior border of eye; teeth small; 6 or 7 series of scales on the cheek. Gill-rakers short, 9 on lower part of anterior arch.

Dorsal xv 10; spines subequal from the fifth, which measures $\frac{1}{2}$ length of head; last soft rays prolonged into filaments. Anal iii 8; third spine as long as longest dorsal. Pectoral $\frac{2}{3}$ length of head. Caudal truncate. Caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales cycloid, $33\frac{3}{8}$, lateral lines $\frac{2}{13}$.

Olive-brown, with traces of five darker bars.

Total length 75 millim.

Upper Zambesi (district of the Victoria Falls)."

23. *TILAPIA GIARDI, Pellegr.

Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 341, pl. v, fig. 2

Bouleng., Freshw. Fish. Africa, iii, p. 221, fig. 144 (1915).

"Depth of body equal to length of head, $2\frac{2}{3}$ times in total length. Upper profile of head curved; snout shorter than postocular part of head; eye $3\frac{1}{2}$ times in length of head; mouth $\frac{2}{5}$ width of head, extend-

ing nearly to below anterior border of eye; teeth in 3 series; 6 series of scales on the cheek. Gill-rakers short, 12 on lower part of anterior arch.

Dorsal xv 14; spines subequal from the fifth, a little less than $\frac{1}{2}$ length of head. Anal iii 9. Pectoral shorter (?) than head, not reaching anal. Caudal rounded (?). Caudal peduncle as long as deep. Scales feebly denticulate, $34\frac{13}{12}$, lateral lines $\frac{22}{13}$.

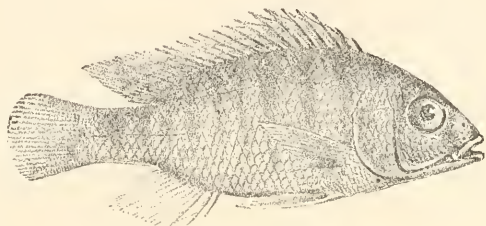


FIG. 133.—*Tilapia giardi*. Type.

Olive above, golden beneath; about 10 dark transverse bands; a dark opercular spot; soft dorsal with brownish dots.

Total length 78 millim.

Zambesi."

24. TILAPIA CALLIPTERA, Günth.

Chromis callipterus, Günth. Proc. Zool. Soc., 1893, p. 623, pl. Iv, fig. B; Bouleng., *op. cit.*, 1896, p. 916.

Chromis subocularis, part., Günth., l.c. p. 621.

Otenochromis callipterus, Pfeff., Thierw. O.-Afr., Fische, p. 19 (1896).

Tilapia calliptera, Bouleng., Trans. Zool. Soc., xv, 1898, p. 4, Proc. Zool. Soc., 1899, p. 132, and Freshw. Fish. Africa, iii, p. 222, fig. 145 (1915); Pellegr., Mém. Soc. Zool. France, xv, 1904, p. 336.

Teeth in 3 or 4 series, outer larger, 40–60 in upper jaw; lateral teeth conical but passing generally into the bicuspid teeth. Depth of body $2\frac{2}{3}$ to $2\frac{3}{4}$ times in total length excluding caudal, length of head $2\frac{7}{10}$ to $2\frac{1}{2}$ times. Head twice as long as broad; snout rounded, with straight upper profile, as long as broad, shorter than postocular part of head; eye shorter than snout, 4 times in length of head, equal to or a little less than interorbital width, a little greater than least preorbital depth; width of mouth $\frac{2}{5}$ to $\frac{3}{5}$ width of head, extending to below anterior margin of eye, lower jaw projecting; 3 or 4 series

of scales on the cheek, width of scaly part equals diameter of eye. Gill-rakers short, 8 to 10 on lower part of anterior arch.

Dorsal xiv 9-10; last spine longest, $\frac{2}{3}$ length of head; longest soft rays $\frac{1}{2}$ to $\frac{3}{4}$ length of head. Pectoral $\frac{2}{3}$ to $\frac{3}{4}$ length of head, not reaching vertical of origin of anal. Ventral reaching to vent or nearly to origin of anal. Anal iii 7-8; 3rd spine as long as or a little shorter than last dorsal spine. Caudal rounded; caudal peduncle as long as deep. Scales finely denticulate, 27-33 $\frac{3-4}{11-12}$; lateral lines $\frac{19-20}{10-11}$.

Colour (of preserved specimens), brown or reddish-brown, with more or less distinct dark and light spots on dorsal and caudal fins; anal with a few large round white spots; a more or less distinct dark band from below the eye to the angle of the mouth; a dark opercular spot.

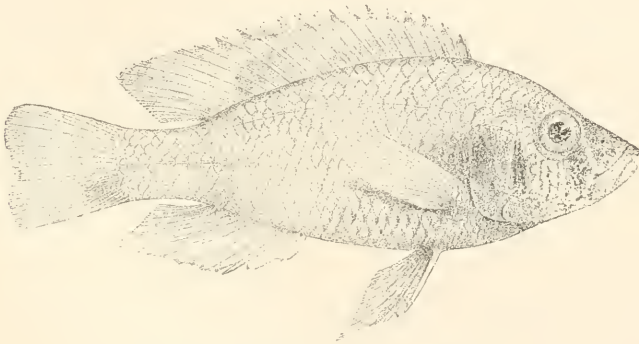


FIG. 134.—*Tilapia calliptera*. Type.

One specimen, 57 mm. in length, from Umgeni River, Natal.

One specimen, 63 mm. in length, from Kuruman, Bechuanaland (R. Moffat).

* 25. *TILAPIA LIVINGSTONII*, Blgr.

Bouleng., Proc. Zool. Soc., 1899, p. 134, pl. xi, fig. 2, and Freshw. Fish. Africa, iii, p. 243, fig. 162 (1915); Pellegr. Mém. Soc. Zool. France, xvi, 1904, p. 341.

“Depth of body scarcely greater than length of head, 3 times in total length. Head twice as long as broad, upper profile forming a strong curve; snout broader than long, shorter than postocular part of head, as long as eye, which is $3\frac{1}{2}$ times in length of head and slightly exceeds interorbital width or least depth of praeorbital;

mouth moderately large, $\frac{3}{4}$ width of head, extending to below anterior border of eye; teeth in 6 series, outer moderately large, 40 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 8 on lower part of anterior arch.

Dorsal xvii 9; last spine longest, not quite $\frac{1}{2}$ length of head, $\frac{2}{3}$ longest soft rays. Anal iii 8; 3rd spine a little shorter than last dorsal. Pectoral $\frac{3}{4}$ length of head, not extending to origin of anal. Ventral reaching origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales strongly denticulate, 33 $\frac{5-6}{12}$; lateral lines $\frac{22-23}{11-12}$.

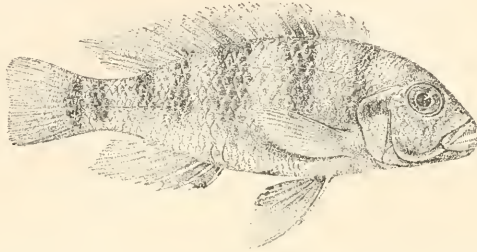


FIG. 135.—*Tilapia livingstoni*. Type (P.Z.S., 1899).

Brownish above, with 7 dark bars, the first on the nape, the penultimate on the caudal peduncle, the last at the root of the caudal fin; two round white spots on the anal fin.

Total length 73 millim.

Zambesi (?)."

26. *TILAPIA KIRKHAMI*, n. sp.

Teeth in 4 series, an outer of larger bicuspid teeth, about 50 in number on upper jaw, separated by a narrow interspace from 3 rows of tricuspid teeth. Depth of body $2\frac{1}{2}$ times in total length excluding caudal, length of head $3\frac{1}{10}$ times. Head with an obtusely rounded profile, $1\frac{2}{3}$ times as long as broad; snout with straight upper profile, $1\frac{1}{3}$ times as long as broad, a little longer than postocular part of head; eye $4\frac{7}{10}$ times in length of head, $\frac{3}{5}$ interorbital width, $\frac{4}{5}$ least depth of preorbital; mouth $\frac{4}{5}$ width of head, reaching scarcely to vertical of anterior border of eye; 3 to 4 series of scales on cheek, width of scaly part $1\frac{1}{5}$ times diameter of eye. Gill-rakers short, 8 on lower part of anterior arch.

Dorsal xvi 11; spines weak, increasing in length to the last, which is nearly $\frac{1}{2}$ length of head; soft rays slightly produced, $\frac{9}{10}$ length of head. Pectoral $\frac{9}{10}$ length of head, not reaching anal. Ventral reaching scarcely to vent. Anal iii 10; 3rd spine $\frac{3}{10}$ length of head; soft rays produced as long as head. Caudal rounded-subtruncate; caudal peduncle $1\frac{1}{4}$ times as deep as long. Scales rugose, feebly pectinate, $30\frac{3}{11}$; lateral lines $\frac{21}{14}$.

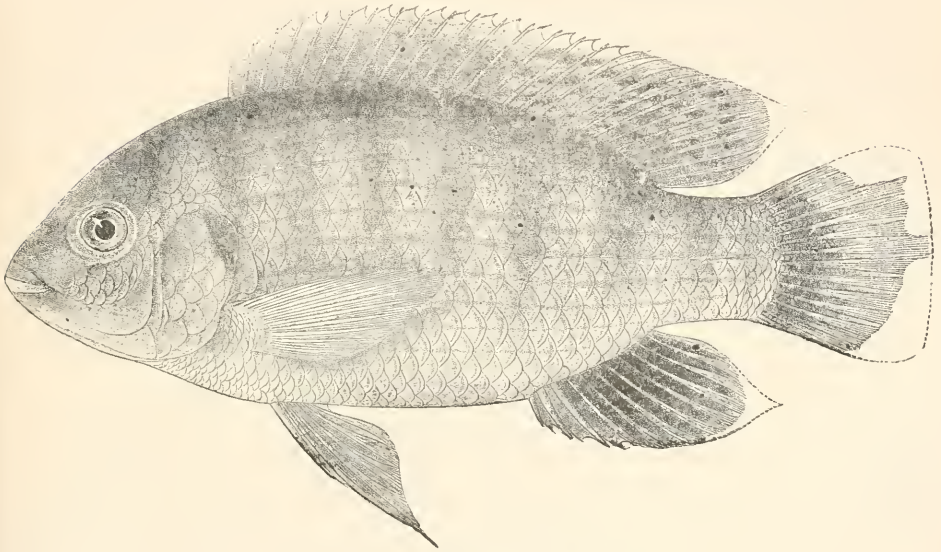


FIG. 136.—*Tetapia kirkhami*. ♀.

Colour (of preserved specimen), dark brown above, a little lighter on the belly, scales with a dark curved bar on outer half and a white outer margin; opercular spot very indistinct; indistinct dark cross-bars on body; faint dark spots or bars on soft dorsal, with a very indistinct dark spot at base of anterior rays and a faint light tip to the rays; gill-membranes blackish.

One specimen, 181 mm. in length, from Lake Ngami (Mr. H. F. Kirkham).

PETROCHROMIS.

Bouleng., Trans. Zool. Soc., xv, 1898, p. 20, Poiss., Bass. Congo, p. 479 (1901), Fish. Nile, p. 535 (1907), and Freshw. Fish. Africa, iii, p. 267 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 350.

“Barely separable from *Tilapia*, differing only in the broader bands of teeth in the jaws, showing when the mouth is closed, the teeth being all very slender with expanded tricuspid crowns bent inwards and disposed very regularly.” (In a footnote Dr. Boulenger points out that “as in *Tilapia*, the teeth are much more numerous and form broader bands in the adults than in the young. Thus, in *P. tanganyicæ* the transverse series vary with age from 5 to 12, the outer series containing 58–100 teeth.”) Vertebrae 31–32.

Great Lakes of Africa.

PETROCHROMIS ANDERSONII, Blgr.

Bouleng., Ann. & Mag. Nat. Hist. (7), viii, 1901, p. 13, Fish Nile, p. 535, pl. xvi (1907), and Freshw. Fish. Africa, iii, p. 269, fig. 183 (1915); Pellegr. Mém. Soc. Zool. France, xvi, 1904, p. 351.

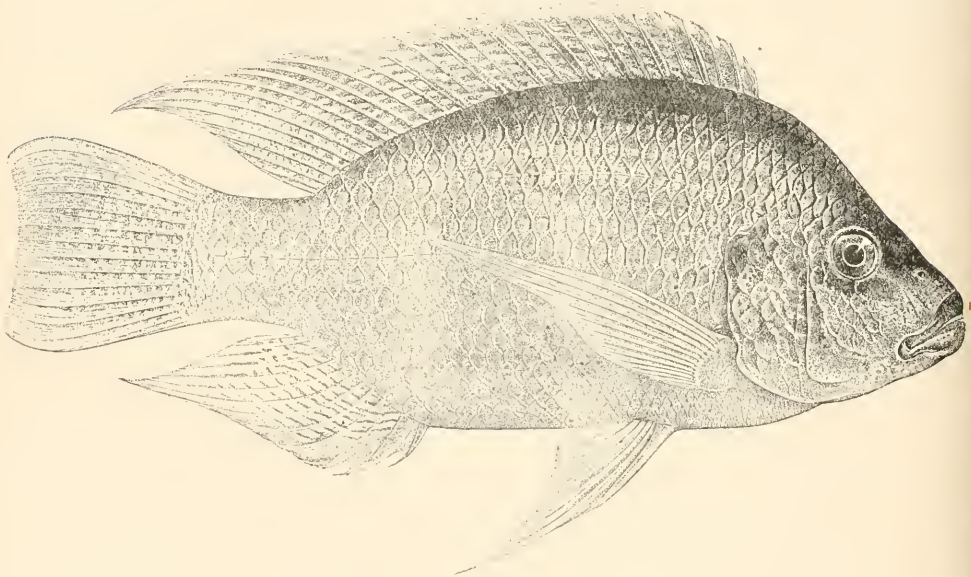


FIG. 137.—*Petrochromis andersonii*. Type. $\frac{2}{7}$.

Teeth in a broad band anteriorly, diminishing in width as it passes backwards on the jaws. Depth of body $2\frac{1}{6}$ times in total length excluding caudal, length of head nearly 3 times. Head not quite twice as long as broad; snout as long as broad, $2\frac{3}{8}$ times as long as eye, which is six times in length of head and $2\frac{1}{4}$ times in interorbital

width; mouth with thick lips, extending to between nostril and eye; scales on cheek in 2 series, width of scaly part equals diameter of eye. Gill-rakers short, 25 on lower part of anterior arch.

Dorsal xvi 13; spines strong, increasing in length to the last, which is $\frac{2}{5}$ length of head; longest soft rays a little shorter than head. Pectoral longer than head, reaching slightly beyond origin of anal. Ventral reaching anal. Anal iii 11; 3rd spine a little shorter than last dorsal spine. Caudal truncate? (broken in specimen), caudal peduncle $1\frac{2}{5}$ as deep as long. Scales not denticulate, $33\frac{4}{5}$; lateral lines $\frac{2}{1}\frac{1}{5}$.

Colour (of preserved specimen), dark olive brown above, yellowish below, scales with dark centre; a black opercular spot; dorsal and anal with dark spots or streaks, outer $\frac{3}{5}$ of soft dorsal light-coloured; outer rays of ventral blackish; gular and pectoral regions blackish.

One specimen, 279 mm. in length, from Bulawayo Museum.

The above specimen does not quite agree with Dr. Boulenger's description of *P. andersonii*, as there are only 2 series of scales on the cheek, the snout appears to be proportionately shorter and the eye smaller.

HAPLOCHROMIS.

Haplochromis, Pfeff., Sitzb. Ges. naturf. Fr. Berlin, 1888, p. 76; Bouleng., Fishes Nile, p. 495 (1907), and Freshw. Fish. Afr., iii, p. 284 (1915).

Ctenochromis, part., Pfeff., Jahrb. Hamb. Wiss. Anst., z, 1893, p. 149, and Thierw. O.-Afr., Fische, p. 14 (1896).

Paratilapia, part., Bouleng., Proc. Zool. Soc., 1898, p. 137, and Poiss. Bass. Congo, p. 412 (1901).

Tilapia, part., Bouleng. Proc. Zool. Soc., 1899, p. 105, and Poiss. Bass. Congo, p. 452.

Astatotilapia, Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 299.

Astatoreochromis, Pellegr., t.c., p. 384.

"Body short or moderately elongate; scales ctenoid; two incomplete lateral lines. Teeth in two or more series, the outer conical or bicuspid, the inner usually tricuspid; maxillary bone exposed at the end when the mouth is closed. Dorsal fin with 13 to 19 spines, anal with 3 to 6. Vertebrae 28-32.

Africa and Syria.

Under this genus are grouped a number of allied species which vary to such an extent in their dentition that some specimens might be referred to *Tilapia* and others to *Paratilapia*."

HAPLOCHROMIS MOFFATI, Cast.

Chronys moffati, Cast., Mém. Poiss. Afr. Austr., p. 16 (1861).

Chronis (Ctenochromis) philander, M. Weber, Zool. Jahrb. Syst., x, 1897, p. 148.

Paratilapia moffati, Bouleng., Proc. Zool. Soc., 1898, p. 140; Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 259.

Tilapia philander, Bouleng., Proc. Zool. Soc., 1899, p. 136; Peliegr., t.c., p. 340.

Haplochromis moffati, Bouleng., Fish. Nile, 504 (1907), Trans. Zool. Soc., xviii, 1911, p. 415, and Freshw. Fish. Africa, iii, p. 300, fig. 204 (1915); Schreitmüller, Bl. Aq. Terr. K., xxiii, 1912, p. 724, fig.

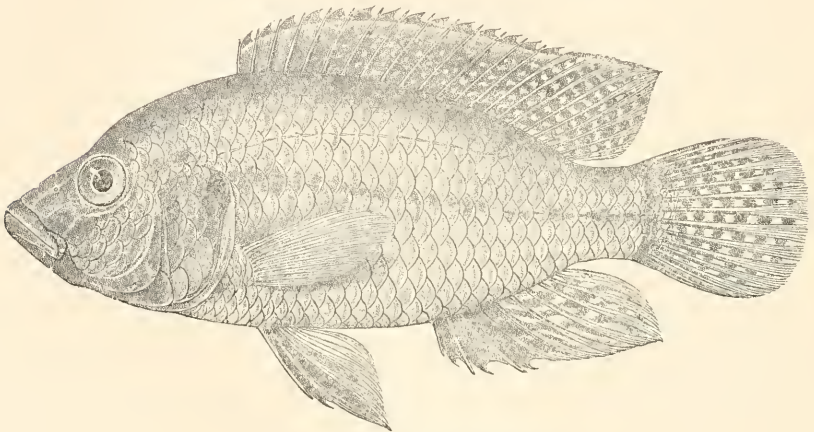


FIG. 138.—*Haplochromis moffati*.

Teeth in three or four series, outer larger and conical or more or less distinctly bicuspid, inner usually tricuspid, sometimes conical. Depth of body equal to or a little less than length of head, which is $2\frac{1}{2}$ to 3 times in total length excluding caudal. Snout with straight or slightly convex upper profile, longer than eye, which is $3\frac{1}{2}$ to $4\frac{1}{2}$ times in length of head and equals or is slightly greater than interorbital width; maxillary extending to below nostril or between nostril and eye; 3 or 4 series of scales on the cheek, depth of scaly part equal to or a little less or a little more than diameter of eye. Gill-rakers short, 8 to 10 on lower part of anterior arch.

Dorsal xiii-xiv (rarely xv) 9-11; spines subequal or increasing in length posteriorly, the last $\frac{1}{3}$ to $\frac{2}{5}$ length of head; longest soft rays $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Pectoral $\frac{3}{5}$ to $\frac{3}{4}$ length of head, not reaching

vertical of origin of anal. Ventral reaching vent or origin of anal. Anal iii 8-9; 3rd spine as long as or a little shorter than longest dorsal spine. Caudal rounded; caudal peduncle as long as or slightly longer than deep. Scales denticulate, 26-30 $\frac{3-4}{10-11}$; lateral lines $\frac{15-19}{6-11}$.

Colour (of preserved specimens), olive or brownish, darker above than below, with or without ill-defined darker cross-bars, and with or without an interrupted indistinct dark lateral band; a dark opercular spot; sometimes a dark bar below the eye; spinous dorsal black-edged at least anteriorly; soft dorsal, anal and caudal with small light and dark spots.

One specimen, 85 mm. in length, from Umkomas River, Natal (Dr. Gilchrist).

Three specimens, ranging from 25-42 mm. in length, from Dry Hartz River, Vryburg (Mr. J. W. Jones).

Four specimens, ranging from 53-66 mm. in length, from Kuruman, Bechuanaland.

Five specimens, ranging from 55-71 mm. in length, from Wondergat, near Mafeking.

Two specimens, 46 mm., 53 mm. in length respectively, from Pretoria.

Twenty-nine specimens, ranging from 32-75 mm. in length, from Zoological Gardens, Pretoria.

Three specimens, ranging from 49-62 mm. in length, from Subi River, Transvaal (Major J. Stevenson Hamilton).

Three specimens, ranging from 47-57 mm. in length, from Potchefstrom, Transvaal.

One specimen, 40 mm. in length, from Molopo River, Transvaal.

This species is also reported from the upper tributaries of the Congo (Katanga), Zululand, Lake Ngami, Rhodesia, and Mozambique.

HAPLOCHROMIS DESFONTAINESII, Lacep.

Labrus desfontainesii, Lacep., Hist. Nat. Poiss., iv, pp. 54, 160 (1802).

Sparus? desfontainesii, Gerv., Zool. Pal. Gén., p. 208, pl. xlv, fig. 4 (1869).

Chromis desfontainesii, Sauv., Bull. Soc. Philom. (7), i, 1877, p. 160; Vincig., Ann. Mus. Genova, xx, 1884, p. 429; Rolland, Rev. Scientif. (4), ii, 1894, p. 418, fig.

Hemichromis bloyeti, Sauv., Bull. Soc. Philom. (7), viii, 1883, p. 159.

Chromis flavii-josephi, Lortet, Arch. Mus. Lyon, iii, 1883, p. 141, pl. viii, fig. 2.

Hemichromis giglioli, Pfeff., Thierw. O.-Afr., Fische, p. 24 (1896).

Paratilapia blozeti, Bouleng., Proc. Zool. Soc., 1898, p. 143, and Poiss. Bass. Congo, p. 418 (1901).

Tilapia desfontainesii, Bouleng., Proc. Zool. Soc., 1899, p. 135, pl. xi, fig. 3.

Tilapia flavii-josephi, Bouleng., l.c.

Paratilapia wingatii, Bouleng., Ann. and Mag. Nat. Hist. (7), x, 1902, p. 264.

Astatotilapia desfontainesii, Pellegr. Mém. Soc. Zool. France, xvi, 1904, p. 300, and xxii, 1910, p. 291.

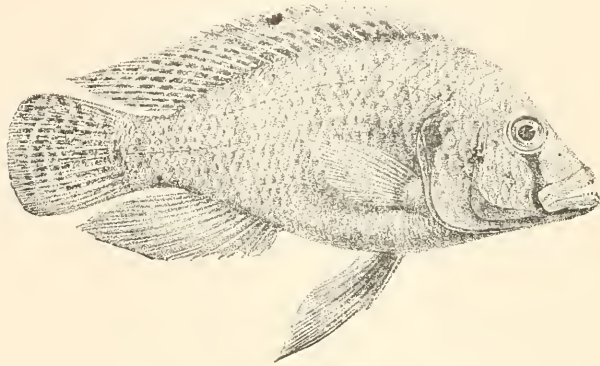


FIG. 139.—*Haplochromis desfontainesii*.

Tilapia (Ctenochromis) sparsidens, Hilgendorf, Zool. Jahrb., Syst., xxii, 1905, p. 408.

Haplochromis desfontainesii, Bouleng., Fish. Nile, p. 501, pl. xc, fig. 3 (1907), and Ann. Mus. Genova (3), v, 1911, p. 71, and Freshw. Fish. Africa, iii, p. 302, fig. 205 (1915).

Teeth, outer large, conical or more or less distinctly bicuspid in the adult, usually bicuspid in the young, 30-60 in upper jaw, followed by two or three series of small tricuspid teeth. Depth of body $2\frac{1}{2}$ to $3\frac{1}{4}$ times in total length excluding caudal, length of head $2\frac{2}{3}$ to 3 times. Head $1\frac{1}{3}$ to twice as long as broad; snout with straight or slightly concave upper profile, 1 to $1\frac{1}{2}$ times diameter of eye, which is 3 to $4\frac{1}{2}$ times in length of head and equals or slightly exceeds interorbital width; least depth of preorbital $\frac{2}{3}$ to once diameter of eye; jaws

equal in front or lower slightly projecting; maxillary extending to below anterior border of eye; 3 to 5 series of scales on the cheek, width of scaly part nearly equal to or slightly greater than diameter of eye. Gill-rakers very short, 8 to 10 on lower part of anterior arch.

Dorsal xiv-xvi (rarely xiii) 9-10 (rarely 8, 11, or 12); spines subequal from 10th or increasing in length to the last, which is $\frac{2}{5}$ to $\frac{3}{5}$ length of head; longest soft rays $\frac{1}{3}$ to over $\frac{2}{3}$ length of head. Pectoral $\frac{3}{5}$ to $\frac{1}{5}$ length of head, not reaching vertical of origin of anal. Ventral reaching vent, sometimes to origin of anal or beyond. Anal iii-iv 7-10; 3rd spine as long as or a little shorter than last dorsal spine. Caudal rounded; caudal peduncle as long as or a little longer than deep. Scales strongly denticulate, 27-33 $\frac{3-4}{10-12}$; lateral lines $\frac{17-22}{7-13}$.

Colour (of preserved specimens), brownish or olive, with or without indistinct dark cross-bars, with an interrupted dark lateral band from eye to root of caudal fin and in some a narrower band on upper lateral line; a more or less distinct dark bar from eye to angle of mouth; vertical fins with or without more or less distinct dark and light spots, anal often with light ocelli and dorsal often black-edged. Some specimens entirely dark brown.

Three specimens, ranging 47-70 mm. in length, from Livingstone, Rhodesia (A. Stevenson).

One specimen, 56 mm. in length, from Little Olifants River, Middleburg, Transvaal.

Seven specimens, ranging from 36-51 mm. in length, from Potchefstroom, Transvaal.

This species is also reported from the Northern border of the Sahara and Syria to Lakes Victoria and Tanganyika, and German East Africa.

PARATILAPIA, Bleek.

Paratilapia, Bleeker, Verh. Ak. Amsterd., ii, 1868, p. 307; Bouleng., Proc. Zool. Soc., 1898, p. 137 (part.), Poiss. Bass. Congo, p. 412 (1901), Fish. Nile, p. 466 (1907), and Freshw. Fish. Africa, iii, p. 308 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 256.

Paracara, Bleek., Versl. Ak. Amsterd., xii, 1878, p. 193.

Haplotilapia, Hilgendl., Sitzb. Ges. nat. Fr. Berl., 1888, p. 77.

Hemichromis, part., Pfeff., Thierw. O.-Afr., Fische, p. 19 (1896).

Boulengerochromis, Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 304.

“Body short or more or less elongate; scales cycloid or ctenoid; two lateral lines both incomplete, or the upper nearly complete. Two or more series of teeth, the outer conical and sometimes canine-like in the adult, sometimes bicuspid in the young, the others unicuspid or tricuspid; maxillary usually exposed when the mouth is closed. Dorsal with 10 to 18 spines, anal with 3. Parietal and occipital crests strong, extending to between the orbits. Vertebrae 27-37.

Africa and Syria.”

Synopsis of the South African Species described.

7 to 14 gill-rakers on lower part of anterior arch; less than 50 scales in longitudinal series on the body.

A. Premaxillary process very long, extending to between the orbits; caudal rounded or truncate.

1. Width of head not more than $2\frac{1}{3}$ times in its length.

(a) Pectoral at least nearly as long as head.

D. xv 13; A. iii, 9-10; Sc. 34-37 $\frac{4-11}{11}$; 5 or

6 series of scales on the cheek 1. *P. longimanus*, Blgr.

D. xiv 11; A. iii 7; Sc. 31 $\frac{31}{9}$; 5 series of

scales on the cheek; pectoral $\frac{1}{5}$ length of head 2. *P. arnoldi*, n. sp.

(b) Pectoral much shorter than head.

D. xv 14; A. iii 9-10; Sc. 33-35 $\frac{7}{11-12}$; 8-9

series of scales on the cheek; pectoral $\frac{2}{3}$ length of head 3. *P. ellenbergeri*, n. sp.

D. xvi 14; A. iii 10; Sc. 36 $\frac{6\frac{1}{2}}{13}$; 8 series of

scales on the cheek; pectoral $\frac{3}{5}$ length of head 4. *P. zambesensis*, n. sp.

2. Width of head $2\frac{1}{3}$ to 3 times in its length; pectoral shorter than head.

D. xiv-xvi 14-16; A. iii 10-13; Sc. 36-39

$\frac{5-7}{12-18}$; lower jaw projecting; 7-10 series of scales on the cheek; caudal peduncle as long as or a little longer than deep 5. *P. angusticeps*, Blgr.

B. Premaxillary processes not extending to between the orbits; caudal rounded, truncate, or slightly emarginate, not scaly.

1. Pharyngeal teeth all slender.

Snout considerably longer than the eye in the adult; depth of body $2\frac{2}{3}$ to $4\frac{1}{2}$ times in total length.

Caudal peduncle as long as deep, or slightly longer than deep; head 2 to $2\frac{1}{2}$ times as long as broad.

6 to 9 series of scales on the cheek.

- D. xv-xviii 13-16; A. iii 10-12; Sc. 35-41
 $\frac{4\frac{1}{2}-5\frac{1}{2}}{12-15}$; 7 to 9 series of scales on the
 cheek 6. *P. thumbergii*, Cast.
2. Some of the pharyngeal teeth with spherical crowns; depth of body
 2 to $2\frac{2}{3}$ times in total length; caudal rounded or subtruncate.
- (a) Snout shorter than postocular part of head; 4 or 5 series of scales
 on the cheek.
- D. xiv-xv 14-15; A. iii 10; Sc. 35-36 $\frac{4}{12}$.
 cycloid; pectoral shorter than head;
 caudal peduncle much deeper than
 long 7. *P. codringtoni*, Blgr.
- D. xv 12-13; A. iii 9-10; Sc. 33-34 $\frac{4}{11}$, finely
 denticulate; pectoral shorter than
 head; caudal peduncle as long as deep
 or slightly deeper than long 8. *P. carlotthae*, Blgr.
- D. xiv-xv 12-13; A. iii 10; Sc. 30-33 $\frac{3\frac{1}{2}-4}{10-11}$.
 cycloid; pectoral as long as head;
 caudal peduncle as long as deep or a
 little deeper than long 9. *P. gibbiceps*, Blgr.
- D. xvi 13; A. iii 9-10; Sc. 33-35 $\frac{6}{12}$.
 pectoral shorter than head; caudal
 peduncle deeper than long 10. *P. marginata*, n. sp.
- (b) Snout at least as long as postocular part of head; pectoral shorter
 than head; caudal peduncle as long as deep or a little deeper
 than long.
- D. xv 13-14; A. iii 8-9; Sc. 32-34 $\frac{3\frac{3}{4}}{11}$; eye
 5 to $5\frac{1}{2}$ times in head; 50 to 60 teeth in
 outer series of upper jaw 11. *P. frederici*, Cast.
- D. xiv-xv 12-13; A. iii 8-9; Sc. 33-34 $\frac{3\frac{1}{2}}{10-11}$;
 eye 4 to $4\frac{1}{2}$ times in length of head;
 52 to 64 teeth in outer series of upper
 jaw 12. *P. smithii*, Cast.
- D. xv-xvi 12-14; A. iii 8-10; Sc. 32-37
 $\frac{3\frac{1}{2}-4\frac{1}{2}}{11-13}$; eye $3\frac{1}{2}$ to $4\frac{1}{2}$ times in length of
 head; 36-50 teeth in outer series of
 upper jaw 13. *P. mellandi*, Blgr.

1. PARATILAPIA LONGIMANUS, Blgr.

Bouleng., Trans. Zool. Soc., xviii, 1911, p. 411, pl. xl, and Freshw.
 Fish. Africa, iii, p. 319, fig. 212 (1915).

Teeth small, in 2 or 3 series, 52-60 in outer series of upper

jaw. Depth of body $2\frac{2}{3}$ times in total length excluding caudal, length of head $2\frac{2}{3}$ times. Head $2\frac{1}{3}$ times as long as broad, upper profile slightly concave; lower jaw slightly projecting beyond upper; snout obtusely pointed, slightly longer than broad, shorter than postocular part of head; eye $4\frac{1}{2}$ times in length of head, equal to interorbital width or preorbital depth; mouth very protractile, extending to below anterior border of eye; premaxillary processes very long, extending to between the eyes; 6 series of scales on the cheek, width of scaly part a little greater than diameter of eye. Gill-rakers short, posterior T-shaped, 11 on lower part of anterior arch.

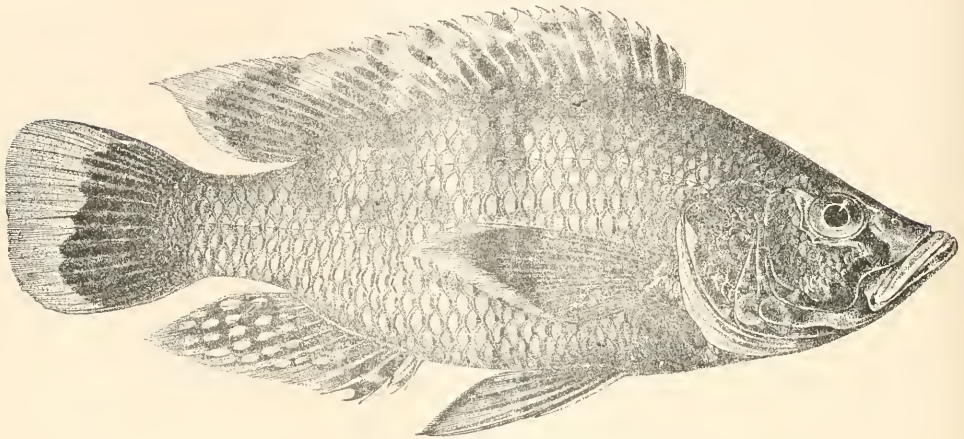


FIG. 140.—*Paratilapia longimanus*. Type. $\frac{1}{2}$.

Dorsal xv 13; spines increasing in length to the last, which is $\frac{2}{5}$ length of head; longest soft rays $\frac{3}{5}$ length of head. Pectoral nearly as long as head, reaching beyond vertical of origin of anal. Ventral scarcely reaching anal. Anal iii 10; 3rd spine $\frac{1}{3}$ length of head. Caudal rounded; caudal peduncle as long as deep. Scales not or but very indistinctly denticulate, $34\frac{5}{17}$; lateral lines $\frac{2\frac{2}{3}}$.

Colour (of preserved specimen), olive-brown, yellowish beneath, with ill-defined or irregular darker cross-bands; vertical fins brown, with round darker spots; pectorals dark olive; a dark opercular spot.

One specimen, 143 mm. in length, from Victoria Falls, Zambesi River (G. Arnold). Bulawayo Museum.

One specimen, 245 mm. in length, from the same locality, received from Mr. F. W. Sykes, apparently belongs to this species, but the condition of the fish is too unsatisfactory for determination.

2. *PARATILAPIA ARNOLDI*, n. sp.

Teeth, an outer row of sharp conical teeth, 60 on upper jaw, followed by 2 rows of small teeth. Depth of body equals length of head and is about 3 times in total length excluding caudal. Head a little more than twice as long as broad; snout with straight upper profile, a little longer than broad, a little shorter than postocular part of head; eye 4 times in length of head, $1\frac{1}{7}$ times interorbital width, about equal to least depth of preorbital; premaxillary processes long, extending to between the eyes; lips thick; mouth about $\frac{2}{3}$ width of head, reaching to between nostril and eye; 5 series of scales on the cheek, depth of scaly part $1\frac{1}{8}$ times diameter of eye. Gill-rakers short, stout, 10 on lower part of anterior arch.

Dorsal xiv 11; last spine longest, a little more than $\frac{2}{5}$ length of head; longest soft rays $\frac{7}{10}$ length of head. Pectoral $\frac{4}{5}$ length of head, reaching to vent. Ventral $\frac{7}{10}$ length of head, reaching to vent. Anal iii 7; 3rd spine slightly shorter than longest dorsal spine. Caudal truncate; caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales cycloid, $31\frac{33}{9}$; lateral lines $\frac{20}{14}$.

Colour (of preserved specimen) brown, dark above, yellowish beneath, about 7 indistinct cross-bars; a dark opercular spot; soft dorsal and caudal with light and dark spots in rows; outer rays of ventral dark; a dark brown bar from lower anterior angle of eye to angle of mouth and continued beneath; chin black, a dark blotch on occiput above upper posterior angle of each eye.

One specimen, 95 mm. in length, from Mazoe River, Rhodesia (Mr. G. Arnold).

3. *PARATILAPIA ELLENBERGERI*, n. sp.

Teeth in 2 rows, about 60 in outer series on upper jaw. Depth of body $2\frac{3}{4}$ to 3 times in total length excluding caudal, length of head $2\frac{2}{3}$ to 3 times. Head twice as long as broad, with straight or slightly concave upper profile; snout as long as broad, pointed, $\frac{2}{3}$ to $\frac{3}{4}$ length of postocular part of head; eye $4\frac{3}{4}$ to $5\frac{1}{10}$ times in length of head, equal to or a little less than interorbital width, a little greater than preorbital depth; mouth $\frac{3}{4}$ to $\frac{4}{5}$ width of head, extending to anterior margin of eye, very protractile; lower jaw projecting; premaxillary processes long, extending to between the eyes; 8 to 9 series of scales on the cheek, depth of scaly part $1\frac{1}{3}$ to $1\frac{2}{3}$ diameter of eye. Gill-rakers short, 11 to 12 on lower part of anterior arch.

Dorsal xv 14; last spine longest, nearly $\frac{2}{3}$ length of head; longest soft rays $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Pectoral $\frac{3}{5}$ to $\frac{7}{10}$ length of head, reaching or nearly reaching vent. Ventral $\frac{3}{5}$ length of head, reaching to vent. Anal iii 9-10, 3rd spine a little shorter than longest dorsal spine. Caudal rounded; caudal peduncle $1\frac{1}{6}$ to $1\frac{3}{10}$ times as long as deep. Scales cycloid, 33-33 $\frac{7}{11-12}$; lateral lines $\frac{23}{14}$ - $\frac{25}{16}$.

Colour (of preserved specimens) olive-brown above, yellowish below; dark cross-bars on body and a dark lateral band; a dark opercular spot; dorsal with light spots; anal with dark oval spots between the rays; caudal with light spots; ventrals dark.

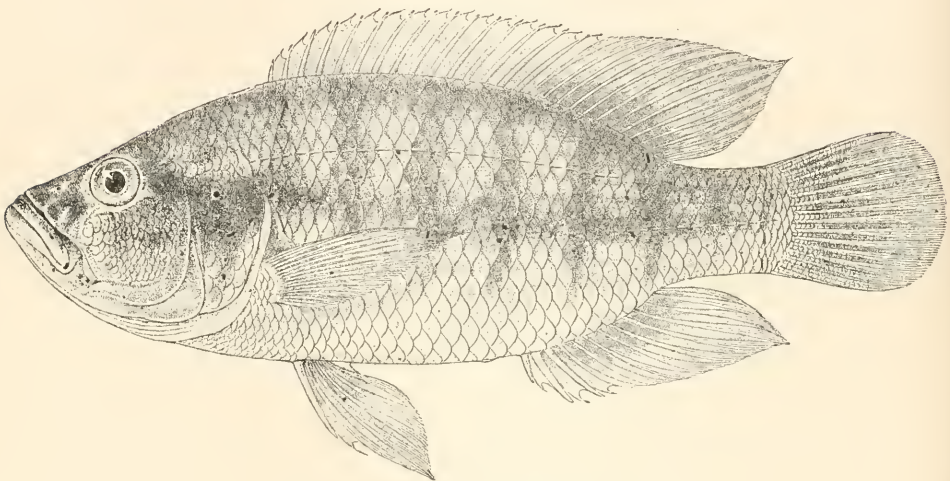


FIG. 141.—*Paratilapia ellenbergeri*.

Two specimens, 106 mm. and 130 mm. in length respectively, from Lialui, Upper Zambesi (Rev. Ellenberger).

One specimen, 213 mm. in length, from Shesheke, Southern Rhodesia (Rev. L. Jalla).

This species closely resembles *P. angusticeps* and seems to be intermediate between it and *P. longimanus*.

4. PARATILAPIA ZAMBESENSIS, n. sp.

Teeth small, in 3 series, 50 (circa) in outer row on the upper jaw, followed by 2 short irregular rows of slightly smaller teeth. Depth of body $2\frac{2}{5}$ times in total length excluding caudal, length of head $2\frac{1}{5}$ times. Head twice as long as] broad, upper profile convex, with a depression

before the eyes; snout rounded, $1\frac{1}{5}$ times as long as broad, a little more than $\frac{3}{4}$ length of postocular part of head; eye $6\frac{3}{10}$ times in length of head, $1\frac{4}{5}$ times in interorbital width, $\frac{2}{3}$ preorbital depth; mouth protractile, reaching to a little beyond vertical of anterior border of eye, lower lip projecting; premaxillary processes long, reaching to between the eyes; 8 series of scales on the cheek, depth of scaly part $2\frac{1}{3}$ times diameter of eye. Gill-rakers short and thick, bifid and trifid near angle, 12 on lower part of anterior arch.

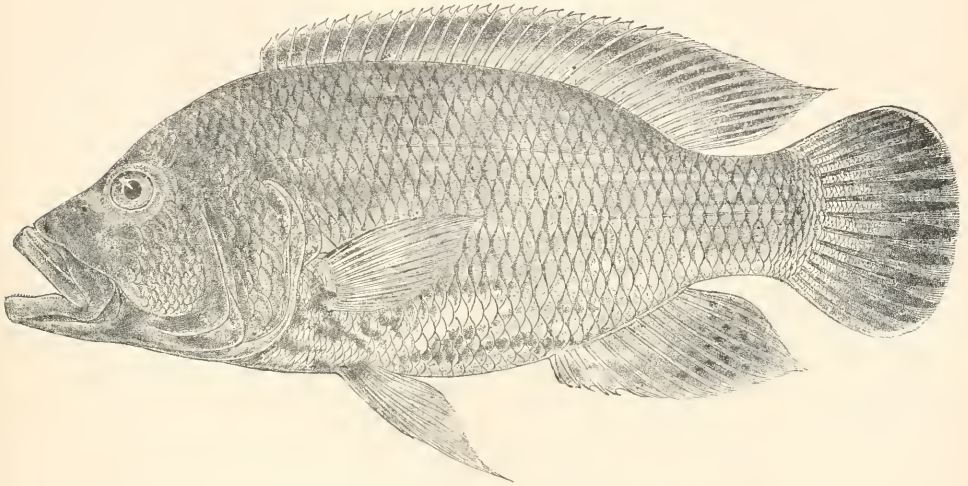


FIG. 142.—*Paratilapia zambesensis*. $\frac{5}{13}$.

Dorsal xvi 14; spines strong and increasing in length to the last, which is about $\frac{3}{10}$ length of head; longest soft rays $\frac{3}{5}$ length of head. Pectoral $\frac{3}{5}$ length of head, reaching to vent. Ventral nearly $\frac{4}{5}$ length of head, reaching to origin of anal. Anal iii 10; 3rd spine $\frac{3}{4}$ length of longest dorsal spine. Caudal rounded, caudal peduncle $1\frac{1}{4}$ times as deep as long. Scales cycloid, $36\frac{6}{13}$; lateral lines $\frac{2}{5}$.

Colour (of preserved specimen) dark olive-brown, scales dark at the base; a dark blotch on body before origin of anal; an indistinct dark opercular spot; soft dorsal with light spots; anal with dark ocellated spots; dorsal fin and lobes of caudal tipped with orange.

One specimen, 325 mm. in length, from Zambesi River. Bulawayo Museum.

5. PARATILAPIA ANGUSTICEPS, Blgr.

? *Chromys levaillantii*, Casteln., Mém. Poiss. Afr. Austr., p. 16, (1861).

Paratilapia angusticeps, Bouleng., Ann. and Mag. Nat. Hist. (7), xx, 1907, p. 108, Trans. Zool. Soc., xviii, 1911, p. 414, pl. xlii, and Freshw. Fish. Africa, iii, p. 320, figs. 213 and 214 (1915).

Paratilapia kafuensis, Bouleng., Ann. and Mag. Nat. Hist. (8), ii, 1908, p. 494.

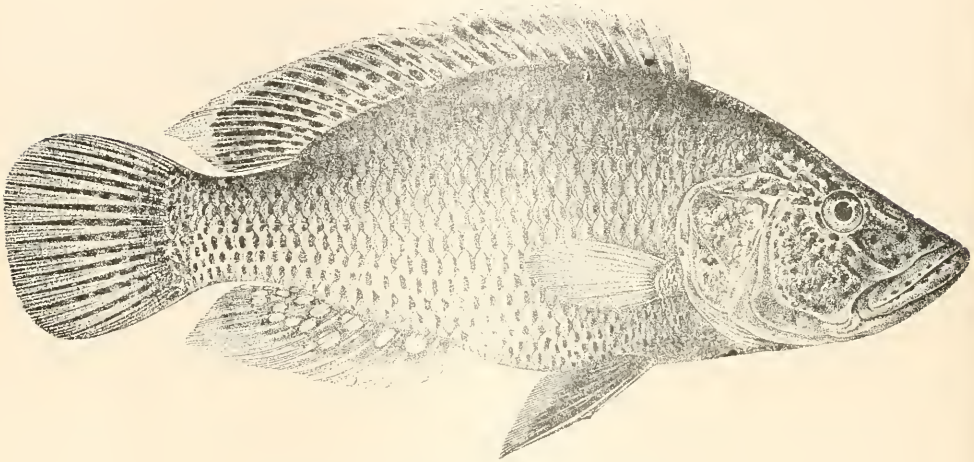


FIG. 142.—*Paratilapia angusticeps*, male. $\frac{1}{2}$.

Teeth small, in 3 or 4 series, 60 to 80 in outer series of upper jaw. Depth of body $2\frac{2}{5}$ to $3\frac{1}{10}$ times in total length excluding caudal, length of head $2\frac{1}{2}$ to 3 times. Head strongly compressed, $2\frac{1}{5}$ (young) to $2\frac{4}{5}$ times as long as broad, with concave upper profile; lower jaw projecting; snout pointed, $1\frac{1}{3}$ to $1\frac{1}{2}$ as long as broad, shorter than postocular part of head; eye $4\frac{1}{2}$ to 7 times in length of head, equal to or a little less than interorbital width or least depth of preorbital; mouth very protractile, extending to below anterior border of eye; premaxillary processes long, extending to between the eyes; 7 to 10 series of scales on the cheek, width of scaly part once to nearly twice diameter of eye. Gill-rakers rather short, occasionally some of the posterior ones bifid, 11 to 12 on lower part of anterior arch.

Dorsal xiv-xvi 14-16; spines increasing in length to the last, which measures $\frac{1}{3}$ to $\frac{2}{5}$ length of head; longest soft rays a little more or a

little less than $\frac{1}{2}$ length of head. Pectoral $\frac{1}{2}$ to a little more than $\frac{3}{5}$ length of head, not extending to vertical of origin of anal. Ventral reaching vent or anal. Anal iii 10-13; 3rd spine as long as or a little shorter than last dorsal spine. Caudal rounded; caudal peduncle as long as or a little longer than deep. Scales feebly denticulate in the young, sometimes perfectly cycloid in the adult, 35-39 $\frac{6-7}{12-18}$; lateral lines $\frac{20-24}{13-18}$.

Colour (of preserved specimens): Females and young brownish above, yellowish beneath, with dark brown spots and dots or marblings,

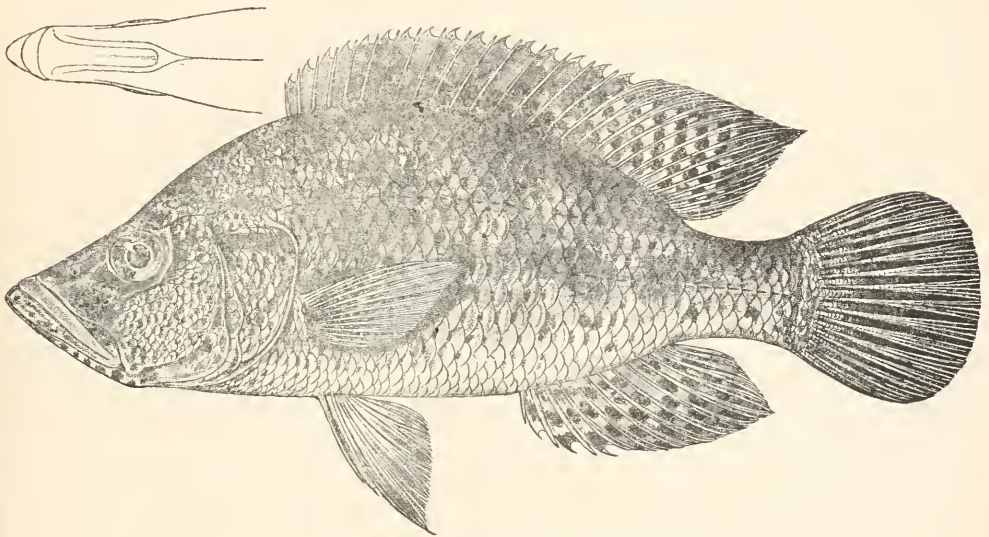


FIG. 144. — *Paratilapia angusticeps*, female. $\frac{1}{2}$.

or with 7 or 8 indistinct dark bars on the body, sometimes with a more or less distinct dark lateral stripe; a blackish opercular spot; dorsal, anal and caudal fins with round or oval brown or blackish spots. Males yellowish olive above, yellow beneath, each scale with a dark brown bar or spot; dorsal and anal sometimes edged with yellow; anal with light ocellar spots.

Two specimens, 293 mm., 173 mm. in length respectively, from Kafue River, Rhodesia.

Two specimens, 74 mm., 69 mm. in length respectively, from Sawmills, Bulawayo, Rhodesia (F. D. McKean).

One specimen, 229 mm. in length, from Victoria Falls, Zambesi River (G. Arnold). Bulawayo Museum.

6. PARATILAPIA THUMBERGII, Cast.

Chromis thumbergi, Casteln., Mém. Poiss. Afr. Austr., p. 13 (1861).

Chromis ngameensis, Casteln., l.c.

? *Chromis livingstonii*, Casteln., l.c.

Hemichromis robustus, Günth., Proc. Zool. Soc., 1864, p. 312.

Hemichromis jallae, Bouleng., Boll. Mus. Torin, xi, 1896, no. 260.

Paratilapia robusta, Bouleng., Proc. Zool. Soc., 1898, p. 141, and Poiss. Bass. Congo, p. 414 (1901); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 266.

Paratilapia thumbergii, Bouleng., Proc. Zool. Soc., 1898, p. 146, Trans. Zool. Soc., xviii, 1911, p. 412, pl. xli, and Freshw. Fish. Africa, iii, p. 328, fig. 220 (1915); Pellegr., t.c., p. 268.

? *Pelmatochromis gruisquamulatus*, Pellegr., Bull. Soc. Zool. France, xxxix, 1914, p. 27; Bouleng., Freshw. Fish. Africa, iv, p. 330 (1916).

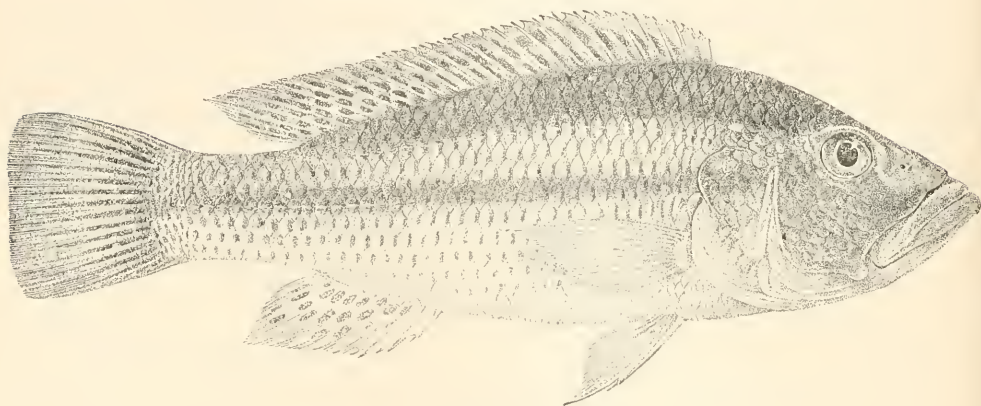


FIG. 145.—*Paratilapia thumbergii*, $\frac{2}{3}$.

Teeth moderate, in two to four series. Depth of body $2\frac{3}{4}$ to $3\frac{1}{5}$ times in total length excluding caudal, length of head $2\frac{2}{3}$ to 3 times. Head 2 to $2\frac{1}{4}$ times as long as broad, upper profile straight, or slightly convex or slightly concave; lower jaw projecting; snout obtusely pointed, as long as or slightly longer than broad, shorter than post-ocular part of head; eye $4\frac{2}{3}$ (young) to 6 in length of head, nearly equal to or less than interorbital width or preorbital depth; mouth extending to below anterior border of eye or a little beyond; 7 to 9 series of scales on the cheek, width of scaly part $1\frac{2}{3}$ to $2\frac{1}{5}$ diameters of eye. Gill-rakers moderately long, some of the posterior usually bifid or trifid, 10 to 12 on lower part of anterior arch.

Dorsal xv-xvi 13-14; spines increasing in length to the last, which is about $\frac{1}{3}$ length of head; longest soft rays $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Pectoral $\frac{2}{5}$ to $\frac{2}{3}$ length of head, not reaching origin of anal. Ventral usually not reaching vent. Anal iii 10-12; 3rd spine $\frac{1}{4}$ to $\frac{1}{3}$ length of head. Caudal rounded or rounded-subtruncate; caudal peduncle as long as or a little longer than deep. Scales feebly denticulate, sometimes cycloid, 35-38 $\frac{4\frac{1}{2}-5\frac{1}{2}}{12-15}$; lateral lines $\frac{23}{16-17}$.

Colour (of preserved specimens), dark olive or reddish-brown above, yellowish beneath, often with 2 blackish longitudinal bands, the upper above the upper lateral line, the lower from the gill-cover to the base of the caudal fin; dorsal and caudal fins greyish or dark olive, with round blackish or reddish-brown spots; ventrals dark; an indistinct dark opercular spot.

One specimen, 267 mm. in length, from Zambesi River, above Victoria Falls (Mr. F. W. Sykes). The eye is very small in this specimen in comparison with length of snout or interorbital width. Mr. Sykes gives the local designation of the fish as: Batoka name, *Mbofu*; Barotse name, *Simaromo*.

One specimen, 127 mm. in length, from Kafue River (Mr. J. Hotchkiss).

Three specimens, 64 mm., 69 mm., 74 mm. in length respectively, from Sawmills, Bulawayo (Mr. F. D. McKean).

7. PARATILAPIA CODRINGTONI, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (8), ii, 1908, p. 495, and Freshw. Fish. Africa, iii, p. 352, fig. 238 (1915).

Teeth small, in three series, 50 to 60 in outer series of upper jaw. Depth of body twice in total length excluding caudal, length of head 3 times. Head about twice as long as broad, with steep, slightly concave upper profile; snout rounded, slightly longer than broad, shorter than postocular part of head; eye $5\frac{1}{2}$ times in length of head, $\frac{2}{3}$ interorbital width and a little less than preorbital depth; mouth not reaching vertical of anterior margin of eye, maxillary slipping nearly entirely under preorbital; scales on cheek in 5 series, width of scaly part much greater than diameter of eye. Gill-rakers short, 11 on lower part of anterior arch.

Dorsal xiv 14; spines increasing in length to the last, which measures a little more than $\frac{2}{5}$ length of head; longest soft rays $\frac{3}{4}$ length of head. Pectoral $\frac{1}{3}$ length of head, not reaching origin of anal. Ventral reaching to vent. Anal iii 10; 3rd spine shorter than

last dorsal spine. Caudal sub-truncate, slightly emarginate; caudal peduncle deeper than long. Scales cycloid, $35\frac{4}{12}$; lateral lines $\frac{22}{15}$.

Colour (of preserved specimen), brownish, darker on the back, the scales lighter in the centre; a black opercular spot; dorsal almost black, feebly edged with whitish; ventrals dark; anal gray, edged with faint yellow; caudal grayish.

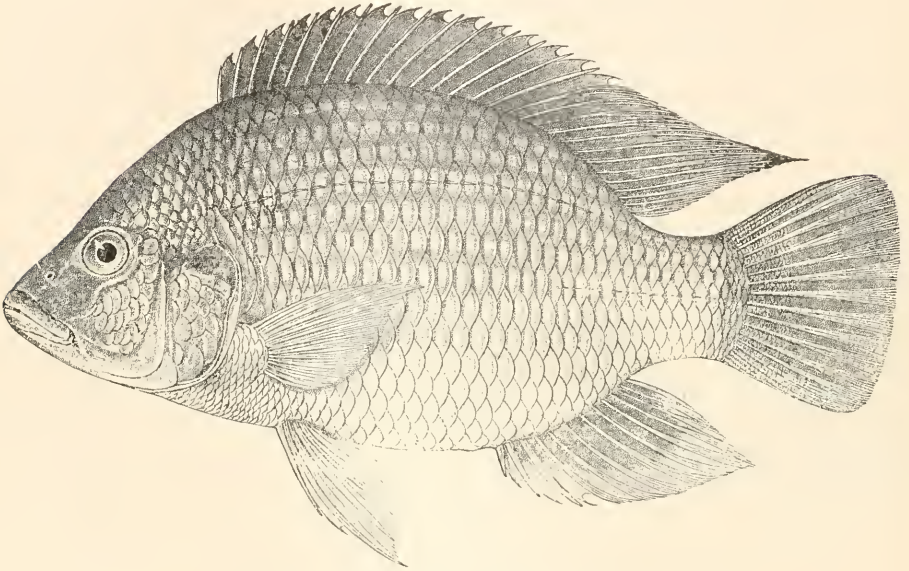


FIG. 146.—*Paratilapia codringtoni*. Type. $\frac{1}{2}$.

One specimen, 202 mm. in length, from Victoria Falls, Zambesi River (G. Arnold). Bulawayo Museum.

One specimen, 233 mm. in length, from Zambesi River. Bulawayo Museum.

8. *PARATILAPIA CARLOTTAE*, Blgr.

Bouleng., *Ann. S. Afr. Mus.*, iii, 1905, p. 301, pl. xiv, and *Freshw. Fish. Africa*, iii, p. 353, fig. 239 (1915).

Teeth small, in four series on each jaw, those of the outer row largest. Depth of body $2\frac{1}{5}$ times in total length excluding caudal, length of head $3\frac{1}{10}$ times. Head twice as long as broad; snout rounded, with slightly concave upper profile, as long as broad, shorter

than postocular part of head, and $1\frac{2}{5}$ times as long as eye, which is $4\frac{1}{5}$ times in length of head and $1\frac{1}{4}$ times in interorbital width; mouth oblique, $\frac{1}{5}$ width of head, lips well developed, maxillary reaching vertical of anterior margin of eye; 4 series of scales on cheek, width of scaly part greater than diameter of eye. Gill-rakers short, the largest T-shaped, 12 on lower part of anterior arch.

Dorsal xv 12; spines increasing in length to the last, which measures about $\frac{2}{5}$ length of head and a little more than $\frac{2}{5}$ longest soft rays.

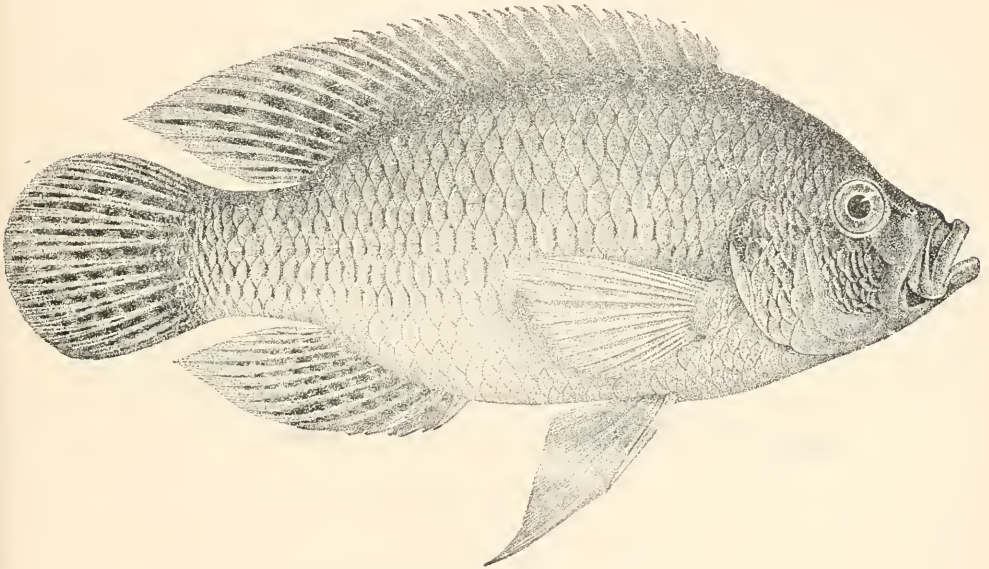


FIG. 147.—*Paratilapia carlottae*. Type. $\frac{1}{2}$.

Pectoral a little shorter than head, not extending to vertical of origin of anal. Ventral reaching to branched rays of anal. Anal iii 10; 3rd spine a little shorter than last dorsal spine. Caudal rounded; caudal peduncle slightly deeper than long. Scales finely denticulate, $33\frac{4}{11}$; lateral lines $\frac{23}{14}$.

Colour (of preserved specimen), light brown, darker above than below; an indistinct dark opercular spot; dorsal, anal and caudal with dark spots in irregular rows.

One specimen, 195 mm. in length, from Zambesi River.

Type in South African Museum.

9. *PARATILAPIA GIBBICEPS*, Blgr.

Bouleng., *Trans. Zool. Soc.*, xviii, 1911, p. 411, pl. xliii, fig. 1, and *Freshw. Fish. Africa*, iii, p. 354, fig. 240 (1915).

Teeth, an outer row of small conical teeth, a little separate from two irregular series of minute teeth. Depth of body $2\frac{1}{4}$ times in total length excluding caudal, length of head $2\frac{4}{5}$ times. Head $1\frac{4}{5}$ times as long as broad, upper profile very convex above the eye; snout rounded,

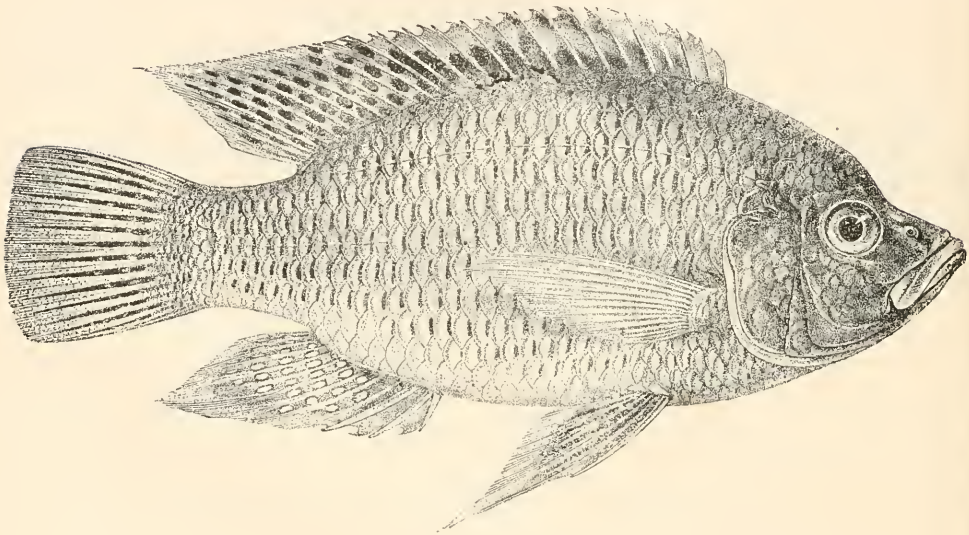


FIG. 148.—*Paratilapia gibbiceps*. Type. $\frac{5}{8}$.

a little broader than long, shorter than postocular part of head; eye $4\frac{3}{10}$ times in length of head, $1\frac{1}{4}$ times in interorbital width, equal to preorbital depth; mouth extending to below anterior border of eye; 4 series of scales on the cheek, width of scaly part a little greater than diameter of eye. Gill-rakers short, posterior T-shaped, 11 on lower part of anterior arch.

Dorsal xiv 13; spines increasing in length to the last, which is $\frac{1}{2}$ length of head; longest soft rays $\frac{2}{5}$ length of head. Pectoral about as long as head, reaching vertical of origin of anal. Ventral reaching beyond origin of anal. Anal iii 10; 3rd spine $\frac{2}{5}$ length of head.

Caudal rounded-subtruncate; caudal peduncle as long as deep. Scales cycloid, $30\frac{4}{10}$; lateral lines $2\frac{2}{3}$.

Colour (of preserved specimen), dark olive brown above, lighter beneath, with a dark bar at the base of the scales; dorsal edged with whitish, the soft portion of fin with regular series of round or oval dark spots; anal with similar spots lighter in shade; ventrals blackish.

One specimen, 119 mm. in length, from Lake Ngami (H. F. Kirkham).

10. *PARATILAPIA MARGINATA*, n. sp.

Teeth, an outer row of short conical teeth, about 40 to 60 on upper jaw, followed by 2 or 3 series of minute teeth on anterior part of jaws. Depth of body 2 to $2\frac{2}{5}$ times in total length excluding caudal, length of head $2\frac{4}{5}$ to nearly 3 times. Head $1\frac{4}{5}$ times to nearly twice as long as broad, upper profile curved, with a depression before the eye; snout with straight or slightly convex upper profile, a little longer than broad, about $\frac{3}{4}$ length of postocular part of head; eye $4\frac{1}{3}$ times in length of head, $\frac{3}{4}$ interorbital width, a little greater than preorbital depth; mouth $\frac{2}{3}$ width of head, reaching to between nostril and eye; 4 to 5 series of scales on cheek, depth of scaly part $1\frac{1}{4}$ to $1\frac{1}{2}$ times diameter of eye. Gill-rakers short, thick, 11 to 12 on lower part of anterior arch.

Dorsal xvi 13; spines increasing in length to the last, which is nearly $\frac{1}{2}$ length of head; longest soft rays $\frac{3}{5}$ to $\frac{4}{5}$ length of head. Pectoral a little more than $\frac{7}{10}$ length of head, reaching to vent. Ventral as long as pectoral, reaching to or slightly beyond vent. Anal iii 9-10, 3rd spine a little shorter than longest dorsal spine. Caudal truncate, feebly emarginate and with slightly rounded corners; caudal peduncle $1\frac{3}{10}$ as deep as long. Scales cycloid, 33-36 $\frac{6}{12}$; lateral lines $\frac{22-24}{14-16}$.

Colour (of preserved specimen) olive green, dark above, light beneath, scales with a light marginal band; a dark opercular spot; spinous dorsal edged with yellowish, soft dorsal with dark and a few light spots and with the outer half of the fin yellowish; anal with a few indistinct light spots and with a broad yellowish margin; outer half of caudal yellowish; ventrals dark, tipped with yellowish; pectoral pale yellowish.

One specimen, 95 mm. in length, from Lialui, Upper Zambesi (Rev. Ellenberger).

One specimen, 232 mm. in length, from Bulawayo Museum.

* 11. PARATILAPIA FREDERICI, Cast.

Chromys frederici, Casteln., Mém. Poiss. Afr. Austr., p. 15 (1861).

Chromidotilapia (?) *frederici*, Bouleng., Proc. Zool. Soc., xviii, 1911, p. 409, pl. xxxix, fig. 1.

Paratilapia frederici, Bouleng., Trans. Zool. Soc., xviii, 1911, p. 409, pl. xxxix, fig. 1, and Freshw. Fish. Africa, iii, p. 355, fig. 241 (1915).

Depth of body $2\frac{1}{2}$ times in total length, length of head 3 times. Head twice, or a little over twice, as long as broad, upper profile slightly concave in front of the eyes; snout rounded, as long as broad, as long as or slightly longer than postocular part of head; eye 5 to $5\frac{1}{3}$ times in length of head, $1\frac{1}{5}$ to $1\frac{1}{4}$ times in interorbital width, less

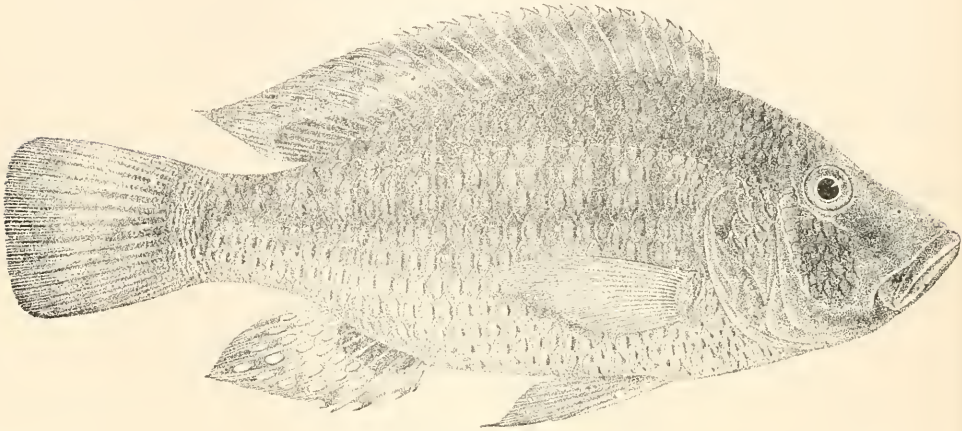


FIG. 149.—*Paratilapia frederici*. $\frac{2}{3}$.

than preorbital depth; mouth not extending to below anterior border of eye; teeth in outer series rather small, 50 to 60 in upper jaw, followed by one or two irregular series of minute teeth confined to the anterior part of the jaws; 3 to 5 series of scales on the cheek, width of scaly part greater than diameter of eye. Lower pharyngeal teeth with spherical crowns. Gill-rakers short, knob-like or anvil-shaped, 11 or 12 on lower part of anterior arch.

Dorsal xv 13-14; spines increasing in length to the last, which is about $\frac{2}{5}$ length of head; longest soft rays $\frac{3}{5}$ to $\frac{3}{4}$ length of head. Anal iii 8-9; 3rd spine $\frac{1}{3}$ length of head. Pectoral $\frac{3}{4}$ to $\frac{4}{5}$ length of head, not reaching vertical of origin of anal. Ventral reaching vent. Caudal rounded; caudal peduncle as long as deep. Scales cycloid, 32-34 $\frac{31}{11}$; lateral lines $\frac{21-23}{14-15}$.

Olive above, paler beneath, with or without a vertical brown bar at the base of each scale; sometimes with a blackish lateral band, which may be traversed by 8 blackish vertical bars; dorsal green or olive, sometimes edged with red, with round yellowish-brown spots on the soft part; anal green or pink, with numerous round pinkish-white spots; pectorals lake-red; ventrals olive-green.

Total length 210 millim.

Lake Ngami Basin."

* 12. PARATILAPIA SMITHII, Cast.

? *Chromys smithii*, Casteln., Mém. Poiss. Afr. Austr., p. 16 (1861).

Paratilapia smithii, Bouleng., Trans. Zool. Soc., xviii, 1911, p. 410, pl. xxxix, fig. 2, and Freshw. Fish. Africa, iii, p. 357, fig. 242 (1915).

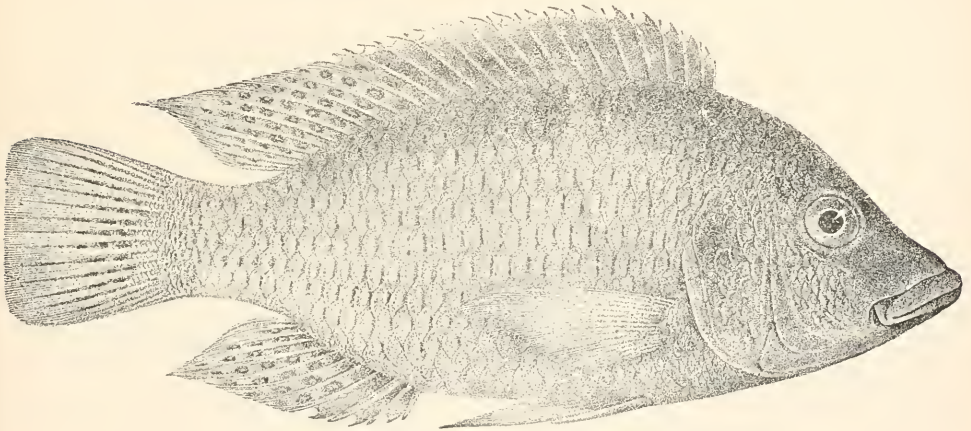


FIG. 150.—*Paratilapia smithii*. ♀.

"Depth of body $2\frac{1}{3}$ to $2\frac{1}{2}$ times in total length, length of head 3 times. Head twice as broad, upper profile slightly concave in front of eyes; snout rounded, as long as broad, as long as postocular part of head; eye 4 to $4\frac{1}{2}$ times in length of head, $1\frac{1}{3}$ to $1\frac{1}{4}$ times in interorbital width, equal to preorbital depth; mouth not extending to below anterior border of eye; teeth in outer series rather small, 52 to 64 in upper jaw, followed by one or two series of minute teeth; 5 series of scales on the cheek, width of scaly part greater than diameter of eye. Lower pharyngeal teeth with spherical crowns. Gill-rakers short, knob-like, 9 to 12 on lower part of anterior arch.

Dorsal xiv-xv 12-13; spines increasing in length to the last, which is about $\frac{2}{5}$ length of head; longest soft rays $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Anal iii 8-9; 3rd spine about $\frac{1}{3}$ length of head. Pectoral $\frac{3}{4}$ to $\frac{4}{5}$ length of head, not extending to vertical of origin of anal. Ventral reaching vent or anal, or not so far. Caudal rounded-subtruncate. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid or indistinctly denticulate, 33-34 $\frac{3\frac{1}{2}}{10-11}$; lateral lines $\frac{21-23}{13-15}$.

Brown to blackish above, yellowish or dark grey beneath; vertical fins olive-grey or dark brown, with round dark or ocellar spots forming single series between the rays; pectorals greyish olive or blackish.

Total length 220 millim.

Lake Ngami Basin. Type lost."

13. *PARATILAPIA MELLANDI*, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (7), xvi, 1905, p. 646, and Freshw. Fish. Africa, iii, p. 358, fig. 243 (1915).

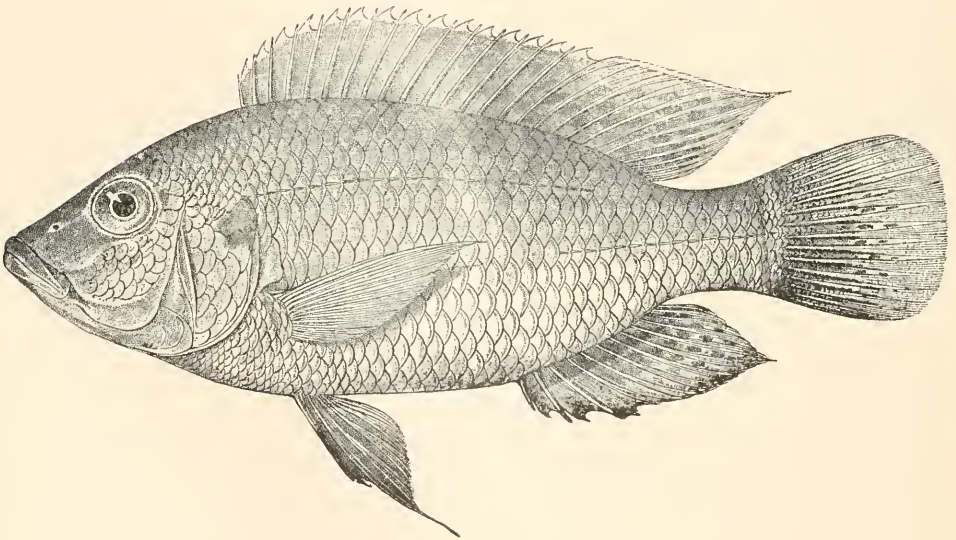


FIG. 151.—*Paratilapia mellandi*. Type. $\frac{5}{6}$.

Teeth in three or four series, outer largest, 36-50 in upper jaw. Depth of body $2\frac{1}{2}$ to 3 times in total length excluding caudal, length of head $2\frac{4}{5}$ to 3 times. Head a little more than twice as long as broad; snout obtusely pointed, with straight upper profile, as long as broad, as long as or slightly less than postocular part of head, $1\frac{1}{3}$ to $1\frac{3}{5}$ times

as long as eye, which is $3\frac{2}{5}$ to 4 in length of head, and equals or slightly exceeds interorbital width, equals preorbital depth; mouth moderate, $\frac{1}{2}$ to $\frac{2}{3}$ width of head, extending to between nostril and eye; 4 series of scales on the cheek, width of scaly part equal to or slightly greater than diameter of eye. Gill-rakers short, 10 to 12 on lower part of anterior arch.

Dorsal xv-xvi 12-13; spines increasing in length to the last, which measures $\frac{2}{5}$ to $\frac{1}{3}$ length of head; longest soft rays $\frac{2}{5}$ to $\frac{7}{10}$ length of head. Pectoral a little shorter than head, reaching to vent or a little beyond. Ventral reaching to vent or to origin of anal. Anal iii 8-9; 3rd spine $\frac{1}{3}$ to $\frac{1}{2}$ length of head. Caudal rounded-subtruncate; caudal peduncle as long as deep. Scales cycloid, 32-34 $\frac{4-4\frac{1}{2}}{11}$; lateral lines $\frac{21-23}{13-15}$.

Colour (of preserved specimens) light brown, darker above than below, with rather indistinct dark cross-bars; dorsal, anal and caudal with numerous round or ocellar dark spots; pectorals greyish; ventrals blackish; a dark opercular spot.

Four specimens, ranging from 86-147 mm. in length, from Kafue River, Rhodesia (J. Drury.)

One specimen, 118 mm. in length, from Kafue River, collected by Rogers and Chubb. Bulawayo Museum.

PELMATOCHROMIS.

Pelmatochromis, Steindr., Notes Leyd. Mus., xvi, 1894, p. 40; Bouleng., Proc. Zool. Soc., 1898, p. 147, Poiss. Bass. Congo, p. 433 (1901); Fish. Nile, p. 484 (1907), and Freshw. Fish. Africa, iii, p. 377 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 275.

Chromidotilapia, Bouleng., Proc. Zool. Soc., 1898, p. 151.

“Barely distinguishable from *Paratilapia* by the greater development of a papillose pad on each side of the pharynx, close to the upper part of the branchial arches, and appearing as a strong prominence in front of the latter when the gill-cover is lifted up.”

I. *PELMATOCHROMIS DARLINGI, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (8), vii, 1911, p. 377; and Freshw. Fish. Africa, iii, p. 410, fig. 280 (1915).

“Depth of body equal to length of head, $2\frac{1}{5}$ times in total length. Head $2\frac{1}{3}$ times as long as broad; snout as long as broad, with slightly convex upper profile, a little longer than eye, which is $3\frac{2}{3}$ times in length of head and slightly exceeds interorbital width or preorbital

depth; mouth moderate, extending to below anterior border of eye; 3 series of teeth, outer rather large, 50 in upper jaw; 4 series of scales on the cheek, width of scaly part slightly less than diameter of eye. Gill-rakers very short, 9 on lower part of anterior arch.

Dorsal xv 11; spines increasing in length to the last, which measures $\frac{1}{2}$ length of head; longest soft ray $\frac{2}{3}$ length of head. Anal iii 8; 3rd spine stronger but a little shorter than last dorsal. Pectoral a little shorter than head, reaching vertical of origin of anal. Ventral extending a little beyond origin of anal. Caudal rounded (obliquely

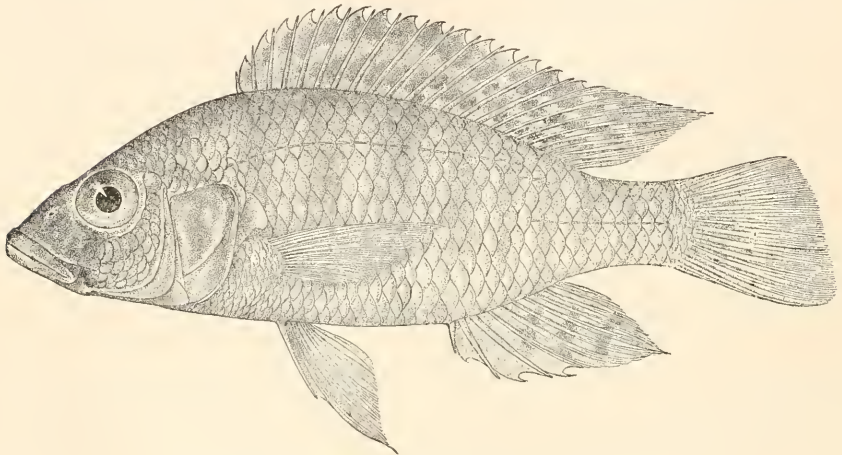


FIG. 152.—*Pelmatochromis darlingi*. Type.

subtruncate). Caudal peduncle a little longer than deep. Scales feebly denticulate, $32\frac{3}{10}$; lateral lines $\frac{22}{10}$.

Brownish above, whitish beneath, with seven very indistinct darker cross-bars; a dark bar below anterior third of eye; dorsal and anal fins with round brown spots.

Total length 110 millim.

Makabusi River, Zambesi System."

2 PELMATOCHROMIS SPEKII, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (7), xvii, 1906, p. 440, Fish.

Nile, p. 486, pl. lxxxviii, fig. 2 (1907), Ann. Mus. Genova (3), v, 1911, p. 69, and Freshw. Fish. Africa, iii, p. 416, fig. 285, (1915).

Teeth conical, in three rows, outer larger and slightly curved, about

60 in upper jaw. Depth of body $3\frac{1}{5}$ to $3\frac{1}{10}$ times in total length excluding caudal, length of head $2\frac{7}{10}$ to $2\frac{1}{5}$ times. Head large, $2\frac{3}{10}$ to $2\frac{1}{2}$ times as long as broad, with straight or slightly concave upper profile; snout a little longer than broad, $1\frac{1}{5}$ to $1\frac{1}{4}$ times as long as eye (in young), which is $3\frac{2}{10}$ to $4\frac{2}{10}$ times in length of head, $1\frac{1}{3}$ to $1\frac{2}{5}$ times in interorbital width, and exceeds least depth of preorbital; mouth large, oblique, extending to below anterior border of eye or not quite so far, lower jaw slightly projecting; 4 to 5 series of scales on the cheek, width of scaly part equal to diameter of eye (in young). Gill-rakers short, 10 on lower part of anterior arch.

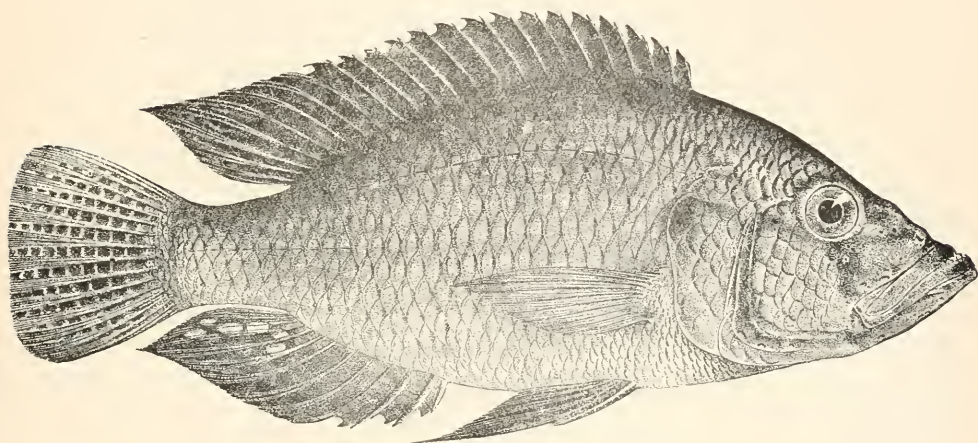


FIG. 153.—*Pelmatochromis spekii*. Type. $\frac{1}{2}$.

Dorsal xv-xvi 8-11; spines increasing in length to the last, which is $\frac{1}{3}$ to $\frac{2}{5}$ length of head; longest soft rays $\frac{2}{5}$ to $\frac{1}{2}$ length of head. Pectoral $\frac{2}{3}$ to $\frac{7}{10}$ length of head, not reaching anal. Ventral reaching to vent or a little beyond. Anal iii 8; 3rd spine $\frac{1}{3}$ length of head, stronger than dorsal spines. Caudal rounded-subtruncate; caudal peduncle $1\frac{1}{2}$ times as long as deep. Scales cycloid or feebly denticulate, 29-33 $\frac{4\frac{1}{2}-5\frac{1}{2}}{11-12}$; lateral lines $\frac{22-21}{14-17}$.

Colour (of preserved specimens) light reddish brown, darker above than below, with faint dark cross-bars on the back; 2 more or less distinct dark lateral stripes, and an indistinct dark vertical bar below the eye; a dark opercular spot; soft dorsal and caudal with faint dark spots.

Six specimens, ranging from 60 to 83 mm. in length, from Magalies River, Transvaal. Pretoria Museum.

These specimens are small in comparison with the type from which the species is described, but they appear to belong to this species.

P. spekii is also reported from Lake Victoria and the Victoria Nile, and Lake Albert Edward.

3. PELMATOCHROMIS ROBUSTUS, n. sp.

Teeth, an outer row of short, conical teeth on each jaw, about 50 on upper jaw, followed by a similar row of smaller ones, with a few detached teeth behind them. Depth of body $2\frac{3}{5}$ times in total length

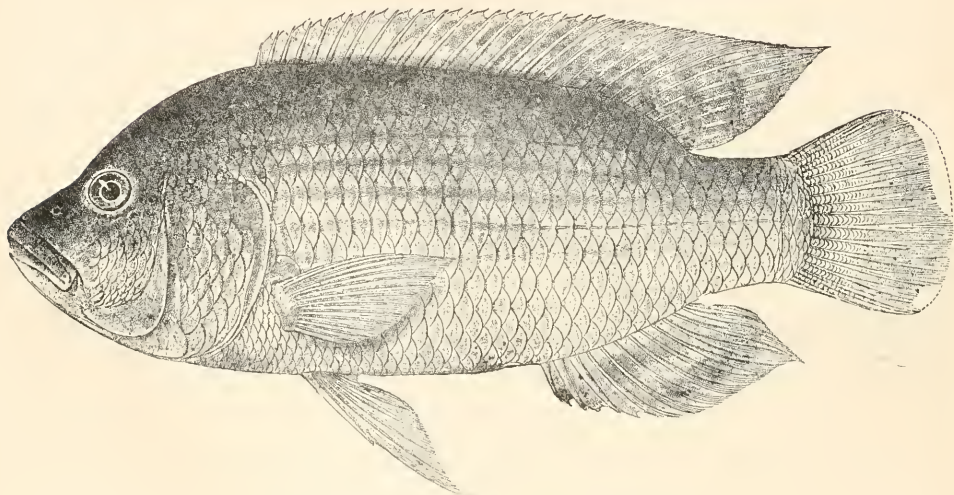


FIG. 154.—*Pelmatochromis robustus*. Type. $\frac{1}{2}$.

excluding caudal, length of head 3 times. Head $1\frac{7}{10}$ times as long as broad, with a rounded profile, concave before the eyes; snout rounded, with slightly concave upper profile, as long as broad, $\frac{3}{4}$ length of postocular part of head; eye 6 times in length of head, nearly twice in interorbital width, a little less than least depth of preorbital; mouth oblique, $\frac{2}{3}$ width of head, extending nearly to vertical of anterior border of eye; 6 series of scales on cheek, depth of scaly part $1\frac{3}{4}$ times diameter of eye. Gill-rakers short, thick, anvil-shaped at the angle, 11 on lower part of anterior arch.

Dorsal xvi 13; spines increasing in length to the last, which is $\frac{1}{3}$ length of head; longest soft rays nearly $\frac{3}{4}$ length of head. Pectoral $\frac{7}{10}$ length of head, reaching to vent. Ventral reaching to vent. Anal iii 10; 3rd spine $\frac{4}{5}$ length of longest dorsal spine, Caudal (broken in

specimen, truncate apparently); caudal peduncle $1\frac{1}{5}$ times as deep as long. Scales cycloid or feebly denticulate, $34\frac{4}{11}$; lateral lines $\frac{2\frac{4}{5}}$.

Colour (of preserved specimen) dark brown above, lighter beneath; scales lighter in the centre, forming indistinct longitudinal streaks following the series of scales; faint, very indistinct dark patches or cross-bars on body; a dark opercular spot; dorsal with indistinct dark and light streaks; anal light in centre with some indistinct orange markings near outer border.

One specimen, 277 mm. in length, from Sawmills, Bulawayo, Rhodesia (Mr. F. D. McKean).

4. PELMATOCHROMIS NGAMENSIS, n. sp.

Teeth, an outer row of small conical teeth with swollen bases, about 40 on upper jaw, with an inner series of small, irregularly placed teeth

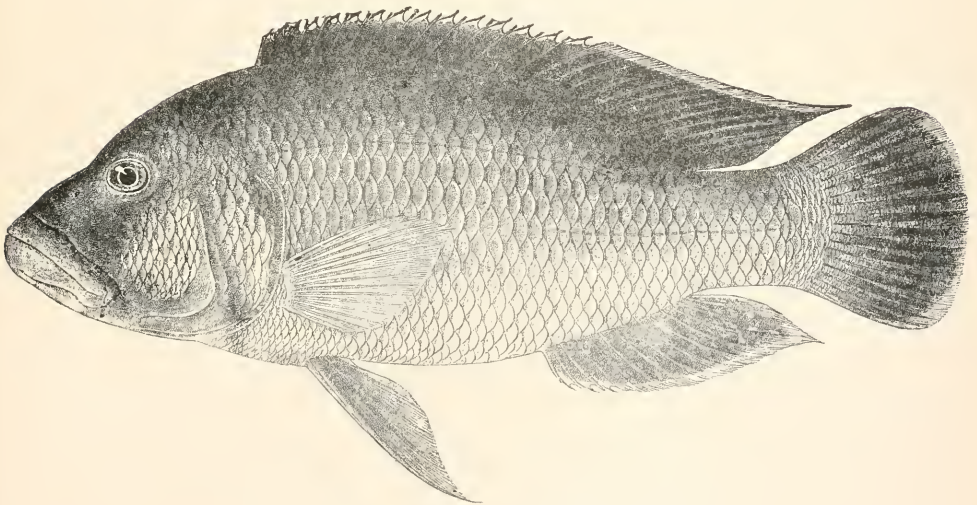


FIG. 155.—*Pelmatochromis ngamensis*. Type. $\frac{1}{3}$.

some distance behind them. Depth of body $2\frac{2}{3}$ times in length of head excluding caudal, length of head 3 times. Head $1\frac{7}{10}$ times as long as broad, upper profile rounded, concave before the eyes; snout rounded, with straight upper profile, as long as broad, shorter than postocular part of head; eye $6\frac{7}{10}$ times in length of head, $1\frac{4}{5}$ times in interorbital width, nearly $\frac{2}{3}$ least depth of preorbital; width of mouth a little more than $\frac{1}{5}$ width of head, maxillary reaching to below middle or anterior third of eye; 7 or 8 series of scales on the cheek,

width of scaly part $2\frac{2}{3}$ times diameter of eye. Gill-rakers short, T-shaped near the angle, 11 to 12 on lower part of anterior arch.

Dorsal xv 15; spines weak, increasing in length to the last, which measures $\frac{1}{4}$ length of head; longest soft rays $\frac{2}{3}$ length of head. Pectoral nearly $\frac{2}{3}$ length of head, not reaching vent. Ventral reaches to anal. Anal iii 11; 3rd spine nearly as long as longest dorsal spine. Caudal truncate; caudal peduncle as long as deep. Scales feebly denticulate, $35\frac{5}{14}$; lateral lines $\frac{2.5}{16}$.

Colour (of preserved specimen) dark olive-brown above, lighter beneath; scales on the body—especially those below the median line—with a light rim on outer edge and all scales with a dark bar at base; dorsal fin dark-coloured, almost black, with a white outer edge especially on the soft rays; anal dark, with dark and light spots and with a greenish-yellow margin; caudal dark, with light tips to the somewhat rounded lobes; pectorals pale brown with a light margin; ventral dark with a light tip.

One specimen, 350 mm. in length, from Lake Ngami District (Mr. H. F. Kirkham).

HEMICHROMIS.

Hemichromis, Peters, Mon. Berl. Ac., 1857, p. 403; Günth., Cat. Fish., iv, p. 274, part. (1862); Bouleng., Proc. Zool. Soc., 1898, p. 134, Poiss. Bass. Congo, p. 409 (1901), Fish. Nile, p. 467 (1907), and Freshw. Fish. Africa, iii, p. 427 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 252.

Chromichthys, Guichen., in A. Dum. Arch. Mus., x, 1859, p. 257.

“Body short or moderately elongate; scales cycloid or very feebly denticulate; two incomplete lateral lines. Teeth conical, in one series, or with one, very rarely two, series of a few very small teeth behind the outer; the two median teeth of the outer series usually larger than the others. Maxillary bone narrow and curved behind, concealed when the mouth is closed. Dorsal with 13 to 15 spines, anal with 3. Occipital and parietal crests strong, extending to between the orbits; premaxillary processes extending to between the orbits. Vertebrae 26–28.

Africa.”

HEMICHROMIS FASCIATUS, Peters.

Hemichromis fasciatus, Peters, Mon. Berl. Ac., 1857, p. 403; Günth., Cat. Fish., iv, p. 274 (1862); Bleek., Nat. Verh. Vet. Haarlem, xviii,

No. 2, 1863, p. 38, pl. v, fig. 1; Steindr., Sitzb. Ak. Wien, lx, i, 1870, p. 970, and Notes Leyd. Mus., xvi, 1894, p. 47; Sauv., N. Arch. Mus. (2), iii, 1880, p. 35; Bouleng., Proc. Zool. Soc., 1898, p. 135, Poiss. Bass. Congo, p. 409 (1901), and Freshw. Fish. Africa, iii, p. 428, fig. 293 (1915); Pellegr., Mém. Soc. Zool. France, xvi, 1904, p. 253.

Chromichthys elongatus, Guichen. in A. Dum., Arch. Mus., x, 1859, p. 257, pl. xxii, fig. 3.

Hemichromis auritus, Gill, Proc. Ac. Philad., 1862, p. 135; Günth., t.c., p. 275.

Hemichromis leiguardii, Capello, Jorn. Sc. Lisb., iv, 1872, p. 85.

Hemichromis desquezi, Rochebr., Bull. Soc. Philom. (7), iv, 1880, p. 168, and Act. Soc. Linn. Bord., vi, 1882, p. 113, pl. v, fig. 6.

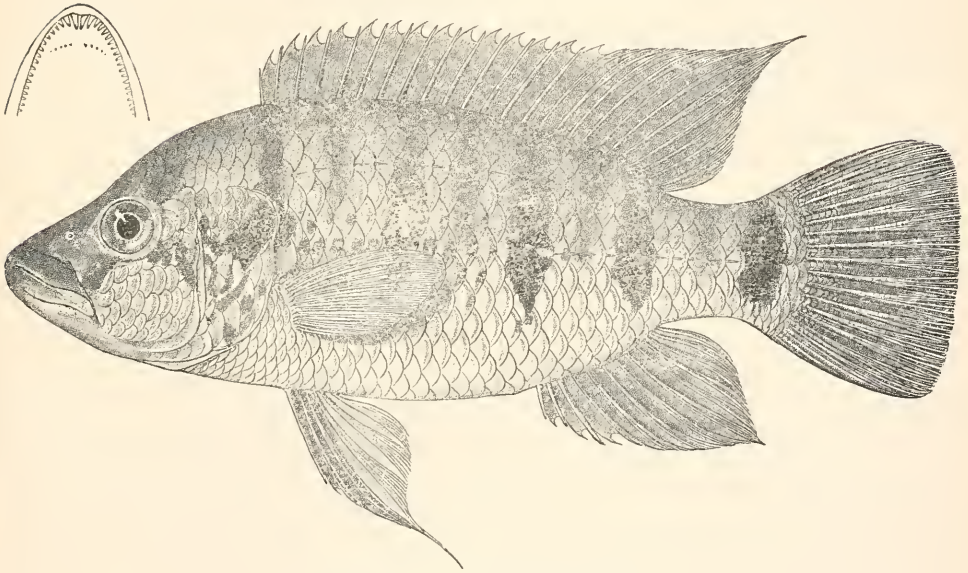


FIG. 156.—*Hemichromis fasciatus*.

Teeth, middle outer ones enlarged and canine-like, with an inner series of small teeth on upper jaw widely separated from the outer ones. Depth of body about the same as length of head and $2\frac{2}{5}$ times in total length excluding caudal. Head twice as long as broad; snout with straight upper profile, $1\frac{3}{5}$ times diameter of eye, which is $4\frac{2}{5}$ times in length of head and $1\frac{1}{4}$ times in interorbital width; lower jaw projecting; mouth not extending to below anterior border of eye; 5 series of scales on the cheek, width of scaly part $1\frac{1}{2}$ times diameter

of eye. Gill-rakers short, the largest anvil-shaped, 9 on lower part of anterior arch.

Dorsal xiv 12; spines increasing in length to the last, which measures $\frac{1}{3}$ length of head and $\frac{1}{2}$ that of longest soft rays. Pectoral nearly $\frac{2}{3}$ length of head, not extending to vertical of origin of anal. Ventral produced into a filament, reaching to vent. Anal iii 10; 3rd spine slightly shorter than last dorsal spine. Caudal subtruncate; caudal peduncle a little deeper than long. Scales cycloid or feebly denticulate, 29 $\frac{3\frac{1}{2}}{10}$; lateral lines $\frac{17}{4}$.

Colour (of preserved specimen) yellowish-brown above, pale yellowish beneath; 5 more or less distinct black blotches or bars on each side, the last situated at the base of the caudal, with faint bars uniting them with base of dorsal and one or two narrower faint bars between them; a large blackish opercular spot; a faint diagonal streak from angle of mouth through eye to nape; anal and ventral fins blackish; pectoral pale yellowish; caudal blackish on lower half, light above.

One specimen, 103 mm. in length, from Victoria Falls, Zambesi River (J. W. Soper). Bulawayo Museum.

This species is also reported from Senegambia to Angola and Lake Ngami.

DIVISION LABYRINTHICI.

FAMILY ANABANTIDAE.

As a group the Labyrinthici are "remarkable for the time they can live out of water and for their habit of migrating overland from one pond or stream to another" (Regan, P. Z. S., 1909, pt. iv, p. 769). This is due to their possession of a superbranchial respiratory organ composed of thin bony laminae, which are more or less folded and covered with a mucous membrane and situated in a cavity above the gills. One of the family, *Anabas scandens*, is the so-called Climbing Perch—a common Indian species, not found in South Africa.

ANABAS.

Anabas, Cuv., Règne Anim., ii, p. 339 (1817); Günth., Cat. Fish., iii, p. 374 (1861); Bouleng., Poiss. Bass. Congo, p. 371 (1901), Fish. Nile, p. 441 (1907), and Freshw. Fish. Africa, iv, p. 48 (1916).

Spirobranchus, Cuv. and Val., Hist. Nat. Poiss. vii, p. 392 (1831); Günth., t.e., p. 373.

Oteuopoma, Peters, Mon. Berl. Ac., 1844, p. 34; Günth., t.c., p. 373; Peters, Reise Mossamb., iv, p. 14 (1868).

Sandelia, Casteln., Mém. Poiss. Afr. Austr., p. 36 (1861).

“Body short or moderately elongate, more or less compressed, covered with large, hard, ctenoid scales; lateral line interrupted. Head convex, covered with scales; mouth moderately large, with small conical teeth; teeth on the vomer and on the parasphenoid; palatine teeth present or absent. Anterior nostril in a short tube. Spinous part of the dorsal and anal fins longer than the soft; 12 to 20 dorsal and 6 to 11 anal spines. Vertebrae 25 to 31.

South-eastern Asia and Tropical and South Africa.”

Synopsis of the Species.

Caudal peduncle very distinct, measuring at least the diameter of the eye; depth of body more than $2\frac{1}{2}$ times in total length.

Ventral fin not reaching anal; maxillary extending to below anterior third of eye, or beyond; teeth on palatine bones.

(a) 12 to 17 dorsal spines; suboperculum not denticulate; scales partly cycloid partly ctenoid.

D. xii-xiv 7-10; A. vi-viii 8-11; Sc.

26-30 $\frac{3-4}{9-10}$ 1. *A. capensis*, Cuv. & Val.

D. xiii-xv 8-9; A. viii-ix 8-9; Sc.

27-29 $\frac{3-4}{10-11}$ 2. *A. vicinus*, Blgr.

D. xv-xvii 9-10; A. vii-viii 9-10; Sc.

31-35 $\frac{6-7}{13-15}$ 3. *A. bainsii*, Casteln.

(b) 17-20 dorsal spines; suboperculum denticulate; scales all ctenoid.

D. xvi-xix 8-9; A. vii-x 8-10; Sc.

30-35 $\frac{2-3}{8-9}$ 4. *A. multispinis*, Peters.

D. xviii 10; A. ix 9; Sc. 31 $\frac{3}{5}$ 5. *A. rhodesianus*, n. sp.

I. ANABAS CAPENSIS, Cuv. and Val.

Spirobranchus capensis, Cuv. and Val., Hist. Nat. Poiss., vii, p. 392, pl. cc (1831); Val. in Cuv., Règne Anim. Ill., Poiss., pl. lxxv, fig. 1 (1836); Casteln., Mém. Poiss. Afr. Austr., p. 36 (1861); Günth., Cat. Fish., iii, p. 373 (1861).

Anabas capensis, Bouleng., Ann. and Mag. Nat. Hist. (7), xvi, 1905, p. 53, and Freshw. Fish. Africa, iv, p. 50, fig. 27 (1916).

Teeth in a villiform band on each jaw, those of the outer row larger; in a narrow band on vomer and palatines. Depth of body $2\frac{3}{5}$ to $3\frac{1}{10}$ times in total length excluding caudal, length of head

$2\frac{1}{2}$ to 3 times. Snout $3\frac{1}{2}$ to 5 times in length of head, eye 3 (young) to $7\frac{1}{3}$ times, interorbital width $3\frac{1}{2}$ to $4\frac{1}{2}$ times (in the smaller specimens, up to about 60 mm. in length, the snout, eye and interorbital width appear to be equal to each other); maxillary extends to below anterior margin or middle of eye; preoperculum entire; opercle terminates in a semicircular notch, which has a moderately strong flat spine at each corner and is filled with a membrane usually of a blackish colour; chin prominent. Scales on head and cheeks, snout naked; 6 series of scales between orbit and angle of preoperculum, 4 transverse series on operculum, 1 series along sub- and interoperculum.

Dorsal xii-xiv 7-10; last spine longest, $\frac{1}{5}$ to $\frac{1}{3}$ length of head; soft portion of fin higher than spinous, about $\frac{1}{2}$ length of head. Pectoral

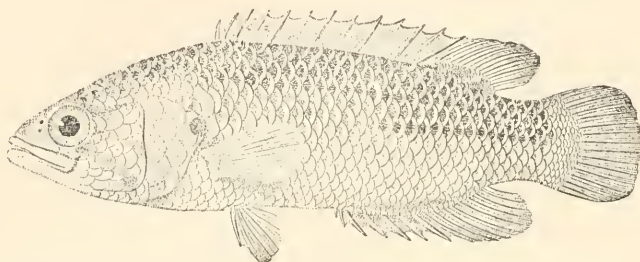


FIG. 157.—*Aulabts capensis*. Type, after Cuvier and Valenciennes.

$\frac{1}{2}$ to $\frac{2}{3}$ length of head. Ventral $\frac{2}{5}$ to $\frac{1}{2}$ length of head. Anal vi-viii 8-10; longest spine equal to or a little less than longest dorsal spine. Caudal rounded-subtruncate; caudal peduncle much deeper than long. Scales ctenoid, 26-28 $\frac{3-3\frac{1}{2}}{9-10}$; lateral lines $\frac{15-18}{9-14}$.

Colour (of preserved specimens), reddish or olive-brown, darker above than beneath; scales with a dark centre; 3 oblique dark streaks radiating from orbit to preopercle.

Five specimens, ranging from 58-177 mm., from Princess Vlei, Cape Peninsula.

Fifteen specimens, ranging from 38-152 mm., from the Cape Flats, Cape Peninsula.

Five specimens, ranging from 81-96 mm., from the vlei at Lakeside, Cape Peninsula.

One specimen, 101 mm. in length, from Woodville, George, Cape Province.

Four specimens, ranging from 63-91 mm. in length, from George River, near George, Cape Province.

One specimen, 97 mm. in length, from Le Roux River, Oudtshoorn, Cape Province.

Five specimens, ranging from 25–37 mm. in length, from Grobelaars River, near Oudtshoorn, Cape Province.

Two specimens, 60 mm., 70 mm. in length respectively, from Baakens River, Port Elizabeth, Cape Province.

* 2. *ANABAS VICINUS*, Blgr.

Bouleng., Freshw. Fish. Africa, iv, p. 51, fig. 28 (1916).

“Depth of body $2\frac{2}{3}$ to 3 times in total length, length of head $2\frac{3}{4}$ to 3 times. Snout rounded, as long as or a little shorter than eye, which is 4 to 5 times in length of head and 1 to $1\frac{1}{2}$ times in inter-

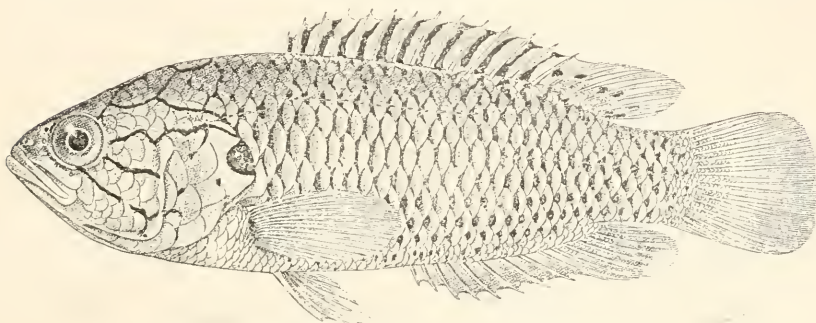


FIG. 158.—*Anabas vicinus*. Type.

orbital width; maxillary to below anterior third or centre of eye; palatine teeth present; none of the bones of the head serrated; operculum with a notch, between two more or less obtuse spines, 9 to 11 short gill-rakers on lower part of anterior arch. Dorsal xiii–xv 8–9; spines increasing in length to the eighth or ninth, which measures about $\frac{1}{4}$ length of head; longest soft rays $\frac{2}{5}$ to $\frac{1}{2}$ length of head. Anal viii–ix 8–9, similar to dorsal. Pectoral $\frac{2}{5}$ to $\frac{2}{3}$ length of head. Ventral not reaching anal. Caudal rounded. Caudal peduncle $1\frac{2}{3}$ to 2 times as deep as long, the distance between dorsal and caudal about $\frac{1}{4}$ length of head. Scales rugose, partly cycloid, partly ctenoid, 27–29 $\frac{3-4}{10-11}$; lateral lines $\frac{15-18}{+11}$. Brown above, lighter beneath, often spotted all over with black; blackish lines radiating from the eye; spinous dorsal with black markings; lobe between opercular spines black.

Total length 120 milli .

Port Elizabeth, Cape Colony.”

3. ANABAS BAINSI, Cast.

Sandelia bainsii, Casteln., Mém. Poiss. Afr. Austr., p. 37 (1861); Bouleng., Ann. and Mag. Nat. Hist. (7), iii, 1899, p. 243.

Ctenopoma microlepidotum, Günth., Cat. Fish., iii, p. 565 (1861).

Spirobranchus bainsii, Günth., Ann. and Mag. Nat. Hist. (4), xviii, 1876, p. 67.

Anabas bainsii, Bouleng., Ann. and Mag. Nat. Hist. (7), xvi, 1905, p. 53, and Freshw. Fish. Africa, iv, p. 52, fig. 29 (1916).

Teeth in a villiform band on jaws, those of the outer row enlarged; in a narrow band on vomer and palatines. Depth of body $2\frac{1}{5}$ times in total length excluding caudal, length of head $2\frac{3}{5}$ times. Snout obtusely conical, 4 times in length of head and equals interorbital space, which is flat; eye $4\frac{1}{5}$ times in length of head; preopercular margin entire, angle rounded; operculum terminates in 2 processes,

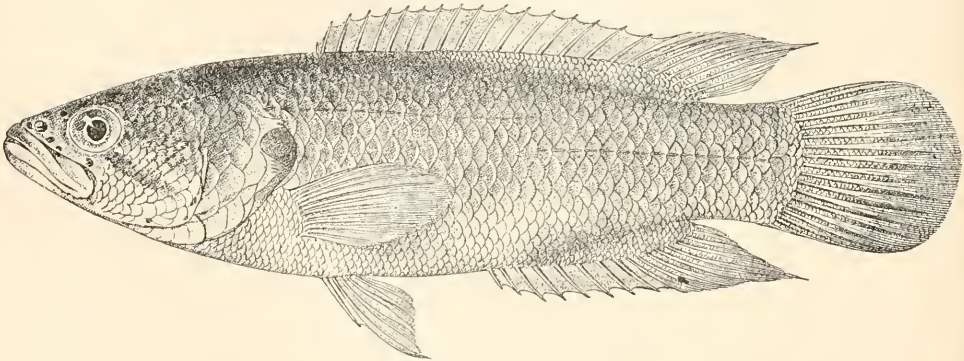


FIG. 159.—*Anabas bainsii*. $\frac{2}{3}$.

each of which is provided with 2 or more teeth, and which have a semicircular notch between them filled with a blackish membrane; serrature of suboperculum very indistinct, interopercle smooth; portion of gill-membranes covering isthmus scaly. Head covered with scales except on snout; scales on upper surface irregular, those on cheeks small, 8 series between orbit and margin of preoperculum; large open pores on head.

Dorsal xv 10; spines low, increasing in length to the last, which is nearly $\frac{1}{4}$ length of head; middle rays of soft dorsal and anal slightly produced and reaching beyond base of caudal. Pectoral rounded, a little more than $\frac{2}{5}$ length of head. Ventral $\frac{1}{2}$ length of head. Anal viii 9; spines increasing in length to the last, which

equals the longest spine of the dorsal. Caudal subtruncate, the angles rounded, rays slightly produced beyond the connecting membrane. Scales ciliated, those on the back smaller than those on the sides, $31\frac{7}{5}$; lateral lines $\frac{1}{5}$.

Colour (of preserved specimens), uniform dark brown, slightly darker above than below; one, or more, dark streaks from the eye towards the preopercular border.

One specimen, 94 mm. in length, from King Williams Town, Cape Province.

4. ANABAS MULTISPINIS, Peters.

Ctenopoma multispinis, Peters, Mon. Berl. Ac., 1844, p. 34, Müller's Arch. f. Anat. u. Phys., 1846, p. 481, pl. x, figs. 10-15, and Reise Mossamb., iv, p. 16, pl. ii, fig. 3 (1868).

? *Anabas scandens*, (non Daldorf), Bianconi, Spec. Zool. Mossamb., p. 270 (1858).

Spirobranchus smithii, Bianconi, op. cit., p. 279, pl. x (1859).

Ctenopoma multispine, Günth., Cat. Fish., iii, p. 373 (1861).

Anabas multispinis, Bouleng., Ann. and Mag. Nat. Hist. (7), xvi, 1905, pp. 53, 646, Trans. Zool. Soc., xviii, 1911, p. 408, and Freshw. Fish. Africa, p. 53, fig. 30 (1916).

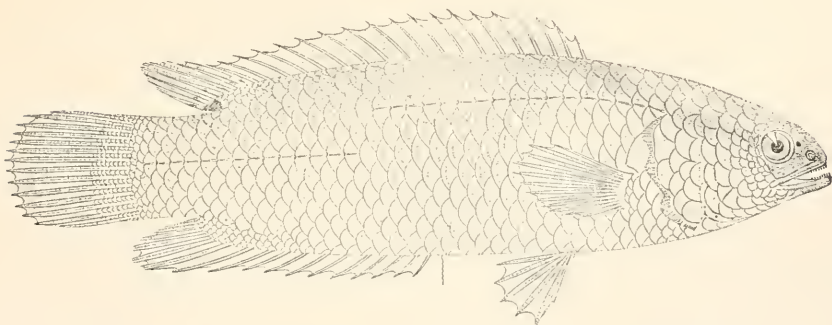


FIG. 160.--*Anabas multispinis*. Type, after Peters (Reise Mossamb.).

Teeth in a villiform band on jaws, those of the outer row slightly enlarged and curved; in a narrow band on vomer and palatines. Depth of body 3 to $3\frac{3}{4}$ times in total length excluding caudal, length of head 3 to a little more than 3 times. Snout obtusely conical, equals diameter of eye, which is $4\frac{1}{5}$ to $4\frac{2}{5}$ times in length of head; interorbital width 4 times in length of head; maxillary reaches to

below middle of eye, lower jaw prominent; preoperculum entire, angle rounded; operculum terminating in a semicircular notch posteriorly, with strong teeth on each corner, the denticulations decreasing in size as they approach the upper and lower margin of the opercle; sub- and inter-operculum strongly denticulated; 6 series of scales between orbit and preopercular angle. (In two of the specimens 2 rows of postorbital scales are strongly denticulated).

Dorsal xvi-xix 8-9; spines low, increasing in length to the last, which is $3\frac{3}{10}$ to $\frac{3}{5}$ length of head; middle soft rays of dorsal and anal slightly produced, $\frac{1}{2}$ to $\frac{3}{5}$ length of head, reaching beyond base of caudal. Pectoral $\frac{1}{2}$ to $\frac{3}{5}$ length of head, longer than ventral. Anal viii-ix 8-10, similar to dorsal. Caudal subtruncate; caudal peduncle much deeper than long. Scales strongly pectinate, 30-31 $\frac{2\frac{1}{2}-3}{8\frac{1}{2}-9}$; lateral lines $\frac{16-18}{13-15}$.

Colour (of preserved specimens), dark brown above, yellowish beneath; indistinct dark spots on body.

Three specimens, ranging from 63-71 mm. in length, from Umsifu River, Broken Hill, Rhodesia (collected by Rogers and Chubb). Bulawayo Museum.

Three specimens, ranging from 53-64 mm. in length, from Sawmills, Bulawayo, Rhodesia (Mr. F. D. McKean).

5. ANABAS RHODESIANUS, n. sp.

Teeth in a band on each jaw, those of the outer series fewer in number, stronger, conical; in a narrow band on vomer and palatines. Depth of body 4 times in total length excluding caudal, length of head $3\frac{1}{2}$ times. Body compressed and comparatively slender; snout obtusely conical, nearly 6 times in length of head, eye $5\frac{2}{3}$ times, inter-orbital width $3\frac{1}{5}$ times; lower jaw projecting beyond upper, chin prominent; maxillary extends to below posterior margin of eye; preoperculum entire, angle rounded; operculum strongly denticulated, terminating in a semicircular notch, which has the teeth at each corner stronger and longer than the others, which become smaller as they approach the upper and lower borders of the opercle; sub- and inter-operculum strongly denticulated; 6 series of scales between the orbit and the preopercular angle. Head and cheeks scaly. Gill-membranes covering isthmus scaly.

Dorsal xviii 10; spines subequal from the 6th, which is $\frac{1}{4}$ length of head; middle soft rays a little produced, nearly $\frac{3}{5}$ length of head. pectoral $\frac{7}{10}$ length of head. Anal ix 9; longest spine slightly longer

than longest dorsal spine, soft portion of fin similar to soft dorsal. Caudal rounded; caudal peduncle $1\frac{1}{2}$ times as deep as long. Scales etenoid, $31\frac{3}{9}$; lateral lines $\frac{1}{3}$.

Colour (of preserved specimen), dark uniform brown, scales on upper two-thirds of body and head blackish in the centre.

One specimen, 126 mm. in length, from Livingstone, Rhodesia (Mr. A. Stephenson).

SUB-ORDER OPISTHOMI.

FAMILY MASTACEMBELIDAE.

MASTACEMBELUS.

Gronov., Zoophyl., p. 133 (1781), part.; Günth., Cat. Fish., iii, p. 540 (1861); Bouleng., Poiss. Bass. Congo, p. 490 (1901), Fish. Nile, p. 540 (1907), Journ. Ac. Philad. (2), xv, 1912, p. 197, and Freshw. Fish. Africa, iv, p. 112 (1916).

“Rostral appendage not striated inferiorly. Dorsal with 7 to 39 spines, anal with 1 to 3.

South-eastern Asia, China, Euphrates, Oxus, and Tropical Africa.

In all the African species the caudal fin is confluent with the dorsal and anal.”

MASTACEMBELUS MELLANDI, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (8), iv, 1914, p. 386, and Freshw. Fish. Africa, iv, p. 135, fig. 89 (1916).

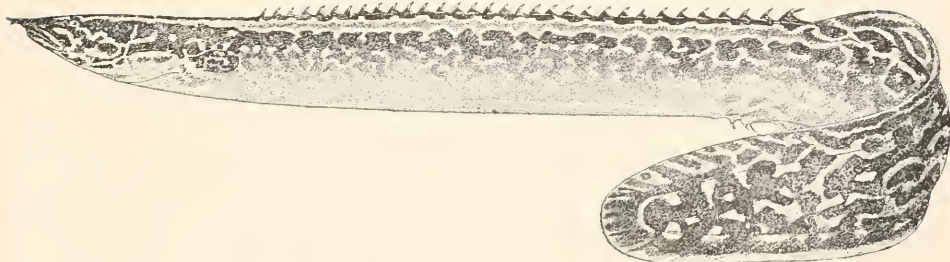


FIG. 161.—*Mastacembelus mellandi*. Type. $\frac{1}{2}$.

Depth of body 12 times in total length, length of head 8 times. Vent nearly equally distant from head and from caudal, its distance

from former $3\frac{1}{2}$ times its length. Snout 4 times as long as eye, ending in an appendage which is $1\frac{1}{2}$ times as long as eye; mouth extending to below anterior border of eye; no preorbital or preopercular spines.

Dorsal xxxii 70; last spine twice as long as eye; distance between first spine and head $\frac{1}{2}$ length of latter. Anal ii 75; first spine short, second as long as last dorsal. Caudal rounded. Pectoral $\frac{1}{3}$ length of head. Scales very small, 15 between origin of soft dorsal and lateral line.

Yellowish-brown with blackish-brown marblings, and a broad festooned, blackish-brown lateral band in front; a vertebral series of large blackish-brown spots narrowly separated from each other; a pair of yellowish streaks, confluent in front, on each side of the back between the dark bands; caudal region blackish brown with a network of yellow lines; lower edge of anal yellow.

One specimen, 240 mm. in length, from Sipapoma, South Rhodesia (Rev. Ellenberger). Bulawayo Museum.

It is also reported from Northern Rhodesia.

ADDENDA.

Page 331. After *Gnathonemus macrolepidotus* insert:

*GNATHONEMUS ANGOLENSIS, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (7). xv, 1905, p. 458, and Freshw.

Fish. Africa, i, p. 109, fig. 89 (1909), and iv, p. 165 (1915);

Pellegr., Bull. Soc. Zool. France, xxxix, 1914, p. 24.

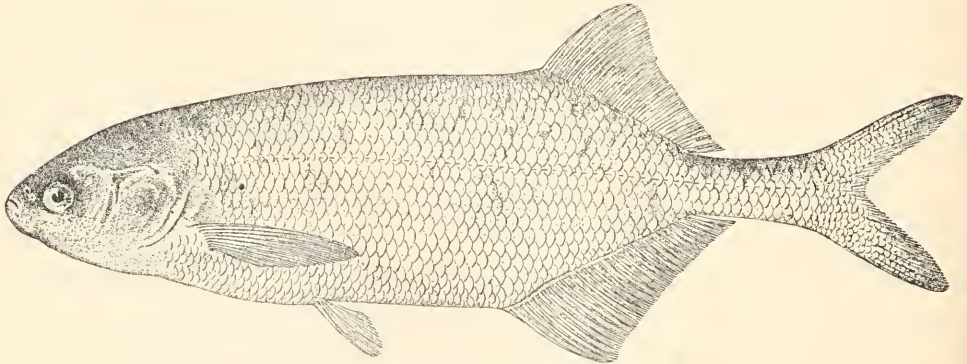


FIG. 162.—*Gnathonemus angolensis*. Type.

“Depth of body $3\frac{1}{4}$ to $3\frac{1}{2}$ times in total length, length of head $4\frac{1}{3}$ to 5 times. Head as long as deep, with curved upper profile; snout

$\frac{1}{2}$ length of head; teeth conical, 5 in upper jaw, 6 in lower; a feeble mental swelling; eye moderate, a little shorter than snout, $\frac{2}{3}$ interorbital width. Dorsal 24–26, originating above 6th to 8th ray of anal, its length $2\frac{1}{3}$ to $2\frac{1}{2}$ times in its distance from head. Anal 29–33, nearer base of caudal than base of ventral. Pectoral pointed, a little shorter than head, twice as long as ventral, extending a little beyond base of latter. Caudal scaled in its basal two-thirds, with pointed lobes. Caudal peduncle $2\frac{1}{2}$ times as long as deep, $\frac{3}{4}$ length of head. 56–60 scales in lateral line, $\frac{10}{16}$ – $\frac{12}{18}$ in transverse series on body, $\frac{8-10}{8-13}$ in transverse series between dorsal and anal, 12 round caudal peduncle. Brown above, silvery white beneath; a few irregular dark brown blotches may be present on the body; fins dark brown.

Total length 135 mm.

Angola. Recorded from Upper Zambesi by Pellegrin."

Page 332. After *Mormyrus anchietae*, Guim., insert:

*MORMYRUS ELLENBERGERI, Pellegr.

Pellegr., Bull. Zool. Soc. France, xxxix, 1914, p. 24; Bouleng., Freshw. Fish. Africa, iv, p. 167 (1916).

"Depth of body $4\frac{1}{4}$ to $4\frac{1}{3}$ times in total length, length of head 4 times. Head $1\frac{1}{2}$ times as long as deep, with curved upper profile; snout scarcely bent downwards, its length little more than $\frac{1}{2}$ postocular part of head; chin slightly swollen. Teeth notched, 7 or 8 in upper jaw, 11 in lower; eye moderate, its diameter $2\frac{1}{4}$ times in length of snout, twice in interorbital width. Dorsal 62–68, originating well in advance of ventral, $4\frac{1}{4}$ to $4\frac{1}{2}$ times as long as deep. Anal 18–19, originating nearer base of caudal than base of pectoral. Pectoral rounded, a little more than $\frac{1}{2}$ length of head, 3 times length of ventral. Caudal scaled at the base, with obtusely pointed lobes. Caudal peduncle $1\frac{1}{2}$ times as long as deep. 90–92 scales in lateral line, $\frac{15}{20}$ – $\frac{22}{22}$ in transverse series on body, $\frac{1}{1}$ – $\frac{3}{3}$ in transverse series between dorsal and anal, 18 round caudal peduncle.

Brownish with silvery sheen; fins dark.

Total length 153 millim.

Upper Zambesi—types in Paris Museum.

Distinguished from *M. anchietae* by the less bent snout, more scales in the lateral line, and fewer round the caudal peduncle."

MORMYRUS LONGIROSTRIS, Peters.

Mormyrus longirostris, Peters, Mon. Berl. Ac., 1852, p. 275, and Reise Mossamb., iv, p. 83, pl. xvi, fig. 2 (1868); Günth., Cat. Fish., vi, p. 216 (1866); Bouleng., Trans. Zool. Soc., xvii, 1906, p. 546, and Freshw. Fish. Africa, i, p. 139, fig. 115 (1909); Pappenh. Mitth. Zool. Mus. Berl. iii, 1907, p. 362.

Mormyrus mucupe, Peters, tt. cc., pp. 275, 87, pl. xvi, fig. 1; Günth. t. c., p. 215.

Mormyrus longirostris, part., Bouleng., Proc. Zool. Soc., 1908, p. 817, and Poiss. Bass. Congo, p. 112 (1901).

Teeth notched (mouth damaged in specimen: about 5 to 7 teeth on upper jaw, 8 to 12 on lower). Depth of body $3\frac{2}{3}$ times in total length excluding caudal, length of head $3\frac{2}{3}$ times. Head $1\frac{2}{3}$ times as long as deep, with slightly curved upper profile; snout produced, as long as postocular part of head, its length $2\frac{3}{5}$ times its least depth; mouth very small, lower jaw feebly projecting; eye moderate, its diameter $2\frac{1}{3}$ times in interorbital width, 12 times in length of head.

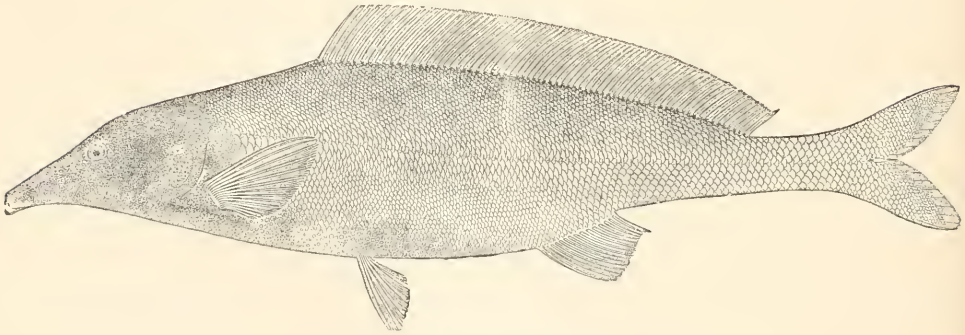


FIG. 163.—*Mormyrus longirostris*.

Dorsal 65, originating in advance of ventral, $4\frac{3}{5}$ times as long as anal, $1\frac{1}{5}$ times as long as its distance from end of snout. Pectoral obtusely pointed, nearly $\frac{2}{3}$ length of head. Ventral $\frac{2}{5}$ length of head. Anal 17, originating a little nearer to base of caudal than to base of pectoral. Caudal densely scaled, with rounded lobes; caudal peduncle $1\frac{1}{2}$ times as long as deep. About 95 scales in lateral line, $\frac{2}{3}\frac{2}{3}$ in transverse series on body, 40 in transverse series between dorsal and anal, 22 round caudal peduncle.

Colour (of preserved specimen) pale reddish yellow, lighter below throat.

One specimen, 268 mm. in length, from Umgusa River, Southern Rhodesia (Mr. C. Baker). Bulawayo Museum.

This species is also reported from the Zambesi and Lakes Nyassa, Mweru and Tanganyika.

Page 348. After *L. seeberi*, Gilchr. and Thomp., insert :

LABEO HAMILTONI, n. sp.

Body compressed, its depth $3\frac{2}{5}$ to $3\frac{1}{5}$ times in total length excluding caudal, length of head 4 to $4\frac{2}{3}$ times. Head $1\frac{2}{5}$ to $1\frac{2}{3}$ times as long as broad, depressed; snout prominent, with a deep transverse groove, about equal to or slightly longer than postocular portion of head and $2\frac{1}{2}$ to $2\frac{2}{3}$ times in length of head; eye lateral, in middle of head, $3\frac{2}{3}$ to $4\frac{1}{2}$ times in length of head, $1\frac{1}{2}$ to 2 times in interorbital width; width of mouth, with lips, about $\frac{1}{2}$ width of head; lips moderately developed, fringed with long conical papillae, with a band of small plicae on inner surface and with a smooth, cutting inner edge; rostral flap entire; snout covered with strong tubercles or their pits or scars. A small barbel on each side, $\frac{1}{4}$ to nearly $\frac{1}{2}$ diameter of eye in length.

Dorsal iii 11; about equidistant between middle of eye and base of caudal, upper edge concave, longest rays $1\frac{1}{10}$ to $1\frac{1}{7}$ times length of head. Pectoral $\frac{4}{5}$ length of head, not reaching ventral, which is inserted below anterior half of dorsal. Anal ii 5, not reaching caudal, which is deeply forked, crescentic, and $1\frac{1}{4}$ to $1\frac{2}{5}$ times in length of head. Caudal peduncle $1\frac{1}{5}$ to $1\frac{3}{10}$ times as long as deep. Scales 38-40 $\frac{6\frac{1}{2}}{6\frac{1}{2}}$, $4\frac{1}{2}$ between lateral line and base of ventral, 20 round caudal peduncle.

Colour (of preserved specimens) golden brown, darker above, silvery below; scales dark on outer edges, forming longitudinal lines between the several series; vertical fins greyish, covered with minute dark specks.

Three specimens, 98 mm., 124 mm., 132 mm. in length respectively, from Sabi River Game Reserve, Transvaal (Major J. Stevenson Hamilton).

This species closely resembles *L. cyclorhynchus*.

Page 421. After *Barbus lineomaculatus*, Blgr., insert :

**BARBUS BARILIOIDES*, Blgr.

Bouleng., Ann. and Mag. Nat. Hist. (8), xiv, 1914, p. 386, and Freshw. Fish. Africa, iv, p. 266, fig. 164 (1916).

“Depth of body equal to length of head, $3\frac{2}{3}$ times in total length. Snout rounded, shorter than eye, which is 3 times in length of head and equals interorbital width; mouth small, terminal; lips feebly developed; two barbels on each side, anterior as long as eye, posterior $1\frac{1}{2}$ diameters of eye.

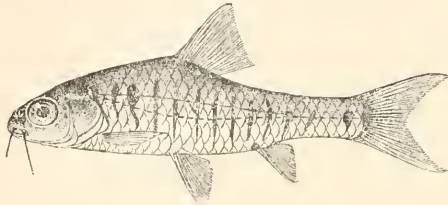


FIG. 164.—*Barbus barilioides*. Type.

Dorsal iii 8; equally distant from centre of eye and from caudal, border straight; last simple ray not enlarged, not serrated, nearly as long as head. Anal iii 5; not reaching caudal. Pectoral $\frac{3}{4}$ length of head, not quite reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle twice as long as deep. Scales radiately striated, 28–30 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 2 between lateral line and ventral.

Yellowish brown, darker on the back, with 12 to 16 narrow vertical bars on the sides, the second or third and the last expanding into a spot; belly white; basal half of vertical fins orange; eye red.

Total length 53 millim.

Solwezi River, tributary of Chifulowa River; Zambesi.”

From Northern Rhodesia. “Distinguished from *B. fasciolatus* by smaller scales.”

Page 421. Before *B. viviparus*, M. Web., insert :

BARBUS ANNECTENS, n. sp.

Depth of body $3\frac{3}{4}$ times in total length excluding caudal, length of head 4 times. Snout rounded, longer than eye, which is $3\frac{1}{3}$ times in length of head; interorbital width 3 times in length of head; mouth terminal, its width $3\frac{1}{7}$ times in length of head, lips moderate. Two barbels on each side, anterior a little longer than eye, posterior $\frac{3}{4}$ eye.

Dorsal iii 7; border feebly concave, equally distant from anterior

border of eye and from root of caudal; last simple ray flexible, not enlarged, not serrated, slightly longer than head. Anal iii 5; not reaching caudal. Pectoral $\frac{7}{10}$ length of head, not reaching ventral; base of later inserted below anterior rays of dorsal. Caudal (broken in specimen); caudal peduncle $1\frac{2}{3}$ times as long as deep. Scales radiately striated, $28\frac{31}{3}$; 2 between lateral line and base of ventral; 12 round caudal peduncle.

Colour (of preserved specimen) pale brown, silvery below; scales on back and upper part of body with minute dark specks; 5 more or less distinct dark spots on the side, the first 4, rather small and indistinct, situated between the verticals of the axil of pectoral fin and posterior margin of dorsal, the last spot situated on base of caudal; a dark lateral band traverses all these spots, fainter and above the lateral line on the fore part of the body, but on the lateral line at the 1st and 2 last spots.

One specimen, 45 mm. in length, from Sabi River, Transvaal (Major J. Stevenson Hamilton).

This species closely resembles *B. lineomaculatus* and *B. weneri*.

Page 431. After *Barbus rogersi*, Blgr., insert:

* BARBUS TOPPINI, Blgr.

Bouleng., Freshw. Fish. Africa, iv, p. 274 (1916).

“Depth of body equal to or a little greater than length of head, $3\frac{1}{2}$ to $3\frac{3}{4}$ times in total length. Snout rounded, shorter than eye, which is $3\frac{1}{3}$ to $3\frac{1}{2}$ times in length of head and equals interorbital width; mouth small, terminal; lips feebly developed; no barbels.

Dorsal iii 8; equally distant from eye and from caudal, border feebly concave; last simple ray not enlarged, not serrated, nearly as long as head. Anal iii 5; not reaching caudal. Pectoral a little shorter than head, not reaching ventral; base of latter below anterior rays of dorsal. Caudal peduncle twice as long as deep. Scales radiately striated, 27–28 $\frac{4\frac{1}{2}-5\frac{1}{2}}{2\frac{1}{2}-3\frac{1}{2}}$, $1\frac{1}{2}$ between lateral line series and ventral; lateral line reduced to 3 to 7 anterior tubules.

Yellowish, with a black lateral line expanding into a small spot at the base of the caudal fin.

Total length 30 millim.

Zululand. Types in Durban Museum.

. . . Msundusi R., Ubombo district . . .

Distinguished from the species without barbels and with incomplete lateral line by the more numerous scales.”

Page 437. In synopsis of genera, family *Siluridae*, insert after *Heterobranchus* :

Sides of head naked, only the postorbital shield being present ; adipose dorsal, fin small *Dinotopterus*.

Page 448. After *Heterobranchus longifilis* insert :

DINOPTERUS.

Bouleng. Trans. Zool. Soc., xvii, 1906, p. 550 ; Proc. Zool. Soc., 1907, p. 1097 ; and Freshw. Fish. Africa, ii, p. 276 (1911).

“As in the preceding, but sides of head naked, only the postorbital shield being present, and dorsal fin small, not supported by bony rays.” *Blyr.*

DINOPTERUS JALLAE, n. sp.

Teeth minute, in a narrow band on upper jaw ; in a broader crescentic band, wide in the centre and narrowing to a point on each side

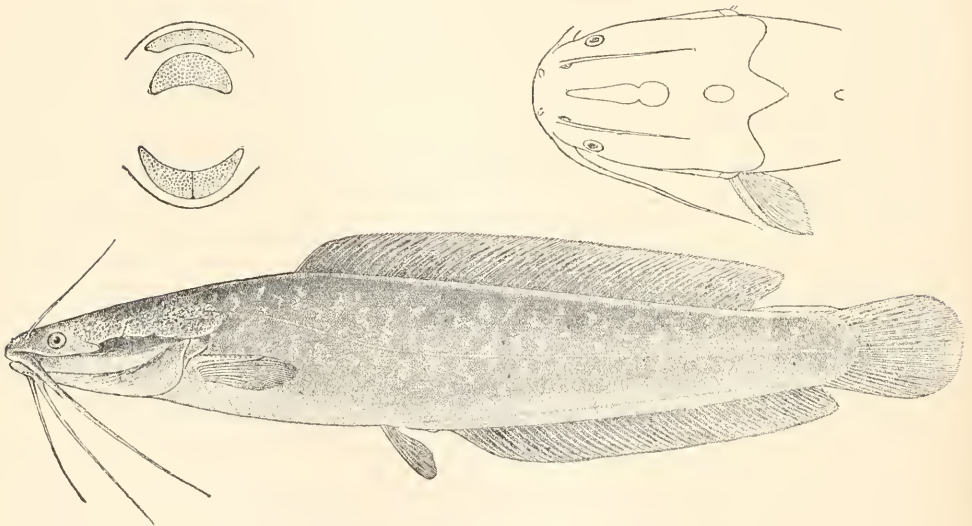


FIG. 165.—*Dinotopterus jallae*. Type.

on lower jaw ; in a broad curved band on vomer. Depth of body $5\frac{2}{3}$ times in total length excluding caudal, length of head $3\frac{1}{3}$ times. Head flattened, $1\frac{1}{3}$ times as long as broad, its upper surface covered

with a thin skin and feebly rugose; frontal fontinelle large, 4 times as long as broad, nearly $\frac{2}{3}$ length of head, sole-shaped; occipital fontinelle small; occipital process angular, broader than long; snout broad, truncate, not projecting beyond mouth; eye small, $3\frac{3}{5}$ times in length of snout, 5 times in interorbital width; nasal barbel a little more than $\frac{1}{2}$ length of head; maxillary barbel $\frac{9}{10}$ length of head, reaching to posterior third of pectoral; outer mandibular barbels $1\frac{2}{5}$ times as long as inner, $\frac{3}{4}$ length of head. Gill-rakers long, slender, closely set, and very numerous.

Dorsal 58, its distance from occipital process $\frac{1}{5}$ length of head, posterior margin rounded; adipose dorsal minute, very low, short, and in contact with caudal. Pectoral $\frac{2}{3}$ length of head; spine strong, serrated, $\frac{2}{3}$ length of soft rays. Ventral a little nearer to snout than to base of caudal. Anal 53, separated from caudal by a space equal to diameter of eye. Caudal rounded.

Colour (of preserved specimen) dark olive-brown, marbled with whitish markings above, white beneath; or more or less distinct dark streak on lower surface of head.

One specimen, 220 mm. in length, from Shesheke. Southern Rhodesia (Rev. L. Jalla).

Page 454 After *Gephyroglanis sclateri*, Blgr., insert:

AMPHILIUS.

Pimelodus, part., Günth., Cat. Fish., v, p. 114 (1864).

Amphilius, Günth., t.c., p. 115; Poche, Zool. Anz., 1902, pp. 121 and 212; Bouleng., Freshw. Fish. Africa, ii, p. 353 (1911), and iv, p. 306 (1916).

Anoplopterus, Pfeff. Jahrb. Hamb. Wiss. Anst., vi, 2, 1889, p. 15. and Thierw. O.-Afr., Fische, p. 33 (1896); Bouleng., Ann. and Mag. Nat. Hist. (7), i, 1898, p. 255, and Ann. Mus. Congo. Zool., ii, p. 41 (1902).

Chimarrhoglanis, Vaill., Bull. Mus. Paris, 1897, p. 81.

"Body more or less elongate, more or less depressed anteriorly. Dorsal and anal fins short, the former consisting of a soft simple ray and 5 to 7 branched rays; an adipose dorsal fin. Pectoral fin expanded horizontally, the outer ray more or less thickened but not ossified, formed of very numerous angularly bent articles, bearing an outer series or fringe of hair-like rays. Ventral fin with 6 rays, the outer of which is similar to the outer pectoral. Three pairs of barbels; maxillary and two mandibulars. Nostrils widely separated from each other. Eye superior, without free border. Maxillary bone rather

large, hidden in the lip but bordering the mouth; jaws with a band of villiform teeth; no teeth on the palate. Gill-membranes free, deeply notched. Air-bladder absent.

Vertebrae 41 (19 — 20 × 20 — 21). Eight or 9 branchiostegal rays. A more or less distinct foramen above the axil.

Tropical Africa."

AMPHILIUS LONGIROSTRIS, Blgr.

Anoplopterus longirostris, Bouleng., Ann. and Mag. Nat. Hist. (7), viii, 1901, p. 447.

Amphilius longirostris, Bouleng., Proc. Zool. Soc., 1903, i, p. 25, pl. i, fig. 3, and 1905, i, p. 64, and Freshw. Fish. Africa, ii, p. 359, fig. 279 (1911), and iv, p. 308 (1916).

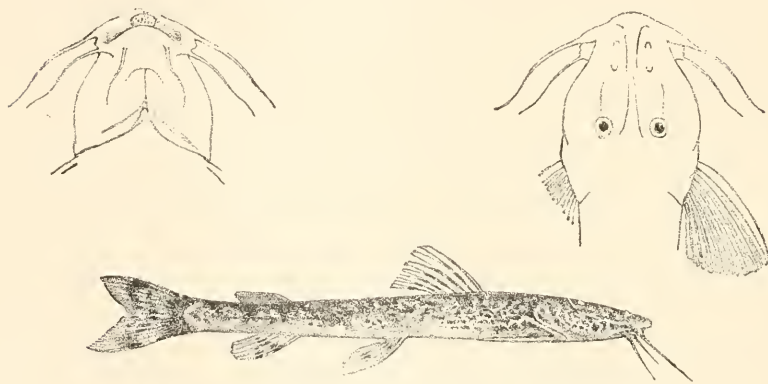


FIG. 166.—*Amphilius longirostris*. Type (P.Z.S., 1903).

Teeth in a villiform band. Depth of body $6\frac{3}{7}$ to 9 times in total length excluding caudal, length of head 4 to $4\frac{1}{2}$ times. Head much depressed, $1\frac{1}{10}$ to $1\frac{3}{10}$ times as long as broad; snout obtusely pointed, about $\frac{1}{2}$ length of head; eye very small, in second half of head, $6\frac{1}{5}$ to 8 times in length of head, 2 to $2\frac{1}{2}$ times in interocular width; posterior nostril midway between eye and end of snout; maxillary barbel $\frac{2}{3}$ to nearly the same length as head, reaching root of pectoral or beyond; outer mandibular barbel $\frac{2}{3}$ to $\frac{7}{10}$ length of head, inner about $\frac{2}{5}$. Gill-rakers moderate, 5 or 6 on lower part of anterior arch.

Dorsal i 6; much nearer to end of snout than to root of caudal; adipose dorsal low, $1\frac{1}{2}$ times to twice as long as rayed dorsal, and $\frac{1}{2}$ to as long as its distance from the latter. Pectoral $\frac{7}{10}$ to as long as head. Ventral a little shorter than pectoral, well behind base of dorsal.

Anal ii 7; caudal emarginate; caudal peduncle a little longer than deep.

Colour (of preserved specimens) dark olive-brown above, with darker spots and marblings, pale yellowish beneath, sometimes with more or less distinct large transverse yellowish spots on back; fins light, with dark transverse streaks or spots; caudal black at the base, with a large blackish blotch on each lobe.

Three specimens, 25 mm., 45 mm., 80 mm. in length respectively, from Zululand (Mr. H. W. Bell-Marley).

Our specimens differ in some minor respects from the species described as *A. longirostris* by Boulenger, but this is probably owing to their small size.

The species has been described from South Cameroon.

[Since this was in type we have learned that Boulenger has received specimens from Krantzklouf, Natal, representing a new species which he calls *Amphilius natalensis*. It is doubtful that these specimens should prove to be specifically identical with those we describe under the name of *Amphilius longirostris*, the differences being very considerable.]

Page 463. After *Synodontis macrostigma*, Blgr., insert :

**SYNODONTIS LEOPARDINUS*, Pellegr.

Pellegr., Bull. Soc. Zool. France, xxxix, 1914, p. 25; Bouleng., Freshw. Fish. Africa, iv, p. 320 (1916).

Depth of body $3\frac{3}{4}$ times in total length, length of head a little more than 3 times. Head $1\frac{1}{3}$ times as long as broad, granulate above; snout rounded, considerably longer than postocular part of head; eye supero-lateral, $7\frac{1}{2}$ times in length of head, $2\frac{1}{2}$ times in interorbital width; lips moderately developed; premaxillary teeth forming a rather broad band, in six transverse series; movable mandibular teeth $\frac{2}{5}$ diameter of eye, 21 in number. Maxillary barbel feebly margined at base, $\frac{2}{3}$ length of head, not reaching base of pectoral; mandibular barbels strongly branched, outer $1\frac{1}{2}$ times as long as inner. Gill-opening not extending downwards beyond base of pectoral spine. Occipito-nuchal shield granulate like the occiput, scarcely longer than broad, posterior processes pointed. Humeral process granulate, a little longer than broad, obtusely pointed, extending nearly as far back as occipito-nuchal process. Dorsal i 7; spine a little longer than head, not striated, smooth in front, feebly serrated behind. Adipose dorsal $3\frac{2}{3}$ times as long as deep, as long as its distance from rayed

dorsal. Anal iv 8; rounded. Pectoral spine $\frac{3}{4}$ length of dorsal, finely denticulated on outer border, strongly serrated on inner. Ventral not reaching anal. Caudal forked, upper lobe the longer. Caudal peduncle $1\frac{1}{2}$ times as long as deep.

Yellowish, with numerous round black spots, the largest, on the side of the body, hardly as large as the eye; all the fins also spotted with black.

Total length 160 millim.

Upper Zambesi, Northern Rhodesia. Type in Paris Museum."

SYNODONTIS MELANOSTICTUS, Blgr.

Synodontis melanostictus, Bouleng., Trans. Zool. Soc., xvii, 1906, p. 553, pl. xxxiv, and Freshw. Fish. Africa, ii, p. 418, fig. 314 (1911), and iv, p. 316 (1916).

Synodontis melanostictus, var. *iturii*, Steindr. Anz. Ak. Wien, 1911, p. 316.

Premaxillary teeth forming a short broad band, movable mandibular teeth about $\frac{1}{2}$ diameter of eye in length, about 30 in number. Depth of body about 4 to $4\frac{2}{3}$ times in total length excluding caudal, length of head $3\frac{7}{10}$ to 4 times. Head a little longer than broad, rugose above. Snout rounded, a little more than twice in head, $1\frac{1}{5}$ to $1\frac{1}{2}$ times in postocular part of head; eye $5\frac{3}{4}$ to $6\frac{1}{4}$ times in length of head, $2\frac{1}{3}$ to $2\frac{3}{8}$ times in interorbital width; width of mouth about $\frac{1}{2}$ length of head; maxillary barbel $1\frac{1}{7}$ to $1\frac{1}{5}$ times length of head, with a narrow membrane at base, and reaching to about middle of pectoral spine; outer mandibular barbel $\frac{1}{5}$ length of head, inner $\frac{1}{2}$ to $\frac{3}{5}$ as long as outer, both with long slender branches without ramifications; lips moderately developed. Gill-opening not extending downwards beyond root of pectoral spine. Occipito-nuchal shield rough like occiput, obtusely tectiform, $1\frac{1}{5}$ as long as broad, with rounded or truncate posterior processes; humeral process $1\frac{7}{10}$ to nearly twice as long as broad, indistinctly keeled, sharp pointed, extending as far as or not quite so far back as occipito-nuchal process.

Dorsal i 7; spine as long as head, striated, curved, front edge sharp, feebly serrated behind. Adipose dorsal 4 to $4\frac{1}{5}$ times as long as deep, $1\frac{3}{5}$ to twice as long as its distance from rayed dorsal. Pectoral spine $\frac{9}{10}$ to slightly longer than head, not reaching ventral, strongly serrated on both sides. Ventral not reaching to anal. Anal iv 7-8, obtusely pointed in front. Caudal deeply forked, upper lobe longer than lower; caudal peduncle as long as deep.

Colour (of preserved specimens) dark brown; body and fins covered with small round black spots, those on throat and anterior part of belly slightly smaller than the rest.

One specimen, 183 mm. in length, from Lialui, Barotseland, Upper Zambesi.

One specimen, 166 mm. in length, from Lake Ngami.

This species is also reported from Lakes Tanganyika, Bangwelu and Mweru.

SYNODONTIS JALLAE, n. sp.

Premaxillary teeth forming a short broad band; movable mandibular teeth about $\frac{1}{5}$ diameter of eye in length, 16 in number. Depth of body 4 times in total length excluding caudal, length of head $3\frac{2}{3}$ times. Head $1\frac{1}{3}$ as long as broad, strongly rugose above from a little in advance of eyes; snout obtusely pointed, about $\frac{1}{2}$ length of head, a little longer than postocular part of head; eye supero-lateral, $6\frac{2}{3}$ times in length of head, a little more than $2\frac{2}{5}$ times in interorbital width; width of mouth about $\frac{1}{2}$ width of head; maxillary barbel $\frac{7}{10}$ length of head, with a narrow marginary membrane at base, not reaching base of pectoral spine; outer mandibular barbel about $\frac{2}{5}$ length of head and $1\frac{1}{2}$ times as long as inner, both of them with short tubercular branches; lips moderately developed. Gill-openings not extending downwards beyond root of pectoral spine. Occipito-nuchal shield very rough like occiput, obtusely tectiform, nearly twice as long as broad, with rounded posterior processes. Humeral process broad, obtusely pointed, upper border curved, longer than broad, granulate, indistinctly keeled, extending about as far back as occipito-nuchal process.

Dorsal i 7; spine $1\frac{1}{10}$ times as long as head, feebly curved, striated, smooth in front and feebly serrated behind in its upper part. Adipose dorsal $4\frac{2}{3}$ times as long as deep, $1\frac{3}{10}$ times as long as its distance from rayed dorsal. Pectoral spine a little more than $\frac{4}{5}$ length of head, not reaching ventral, finely serrated on its outer border and strongly on inner. Ventral not reaching anal. Anal iv 7. Caudal deeply forked, upper lobe the longer; caudal peduncle $1\frac{2}{5}$ times as long as deep.

Colour (of preserved specimen) dark olive-brown above, lighter below; body, fin-membranes and head covered with small dark spots, which become mere specks on belly, throat and head.

One specimen, 170 mm. in length, from Shesheke, S. Rhodesia (Rev. Jalla).

This species closely resembles *S. melanostictus*, but there are fewer mandibular teeth, the mandibular barbels are tuberculous, the humeral process is broader and differently shaped and the spots, especially anteriorly are much smaller.

Since the publication of the first part of this monograph specimens have been received which extend or supplement the distribution of the following species. [EDITOR.]

- P. 325. *Petrocephalus catostoma* Günth. Lialui, Barotseland, N. Rhodesia (Rev. v. Ellenberger).
- P. 330. *Gnathonemus macrolepidotus* Peters. Gwanda, Rhodesia (Bulawayo Museum); Magoye, Rhodesia (D. C. Thwaites); Lialui, Barotseland (Rev. Ellenberger); Lake N'gami (H. F. Kirkham).
- P. 331. *Mormyrus anchietæ* Guim. Magoye, Rhodesia (D. C. Thwaites).
- P. 338. *Hydrocyon lineatus* Blkr. Lialui, Barotseland (Rev. Ellenberger); Lake N'gami (H. F. Kirkham).
- P. 336. *Sarcodaces odœ* Bl. Lake N'gami (H. F. Kirkham).
- P. 342. *Micralstes acutidens* Peters. Victoria Falls, Rhodesia (Bulawayo Museum).
- P. 350. *Labeo cylindricus* Peters. Victoria Falls, Rhodesia (Bulawayo Museum).
- P. 348. *Labeo forskalii* Rüpp. Sawmills, Bulawayo (F. D. McKean).
- P. 356. *Labeo ruddi* Blgr. Sabi River, Transvaal (J. S. Hamilton).
- P. 358. *Labeo altivelis* Peters. Sawmills, Bulawayo (F. D. McKean).
- P. 374. *Barbus holubi* Stdr. Great Fish River, near Gibeon, S.W. Afr. (R. W. E. Tucker); M'fongosi, Zululand (W. E. Jones).
- P. 380. *Barbus sector* Blgr. Sabi River, Transvaal (J. S. Hamilton).
- P. 387. *Barbus aureus* Cope. M'fongosi, Zululand (W. E. Jones)

- P. 401. *Barbus trimaculatus* Peters. Norquane River, Rhodesia (Bulawayo Museum); Umfolozi River and Inyalazi River, Natal (H. W. Bell-Marley); Kuruman. One of the specimens from the Inyalazi River reaches a length of 150 mm.
- P. 404. *Barbus paludinosus* Peters. Lialui, Barotseland (Rev. Ellenberger).
- P. 407. *Barbus longicauda* Blgr. Norquane River, Rhodesia (Bulawayo Museum).
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APPENDIX.

ADDENDA.

ANABAS NANUS, Günth.

Ctenopoma nanum, Günther, Ann. Mag. N.H. (6), xvii, 1896, pl. 269, pl. 13, fig. 23.

Anabas maculatus (non Thomin.), Boulenger, Ann. Mus. Congo, Zool., ii, p. 51 (1902); Steindachner, Denkschr. Ak. Wien, lxxxix, 1913, p. 50.

Anabas nanus, Boulenger, Freshw. Fish. Africa, iv, p. 58, fig. 34 (1916).

“Depth of body equal to length of head, $2\frac{2}{3}$ to 3 times in total length. Snout rounded, as long as or a little shorter than eye, which is 4 to $4\frac{1}{2}$ times in length of head and nearly equals interorbital width; maxillary extending to below anterior fourth of eye; no palatine teeth; praeorbital, praeoperculum, and interoperculum entire; suboperculum entire or more or less strongly denticulate; 2 to 5 spines above and one or two below opercular notch. 5 or 6 very short gill-rakers on lower part of anterior arch. Dorsal xv-xvii 7-10; last spine longest, about $\frac{1}{3}$ length of head; longest soft rays $\frac{1}{2}$ to $\frac{2}{3}$ length of head. Anal vii-ix 9-11, similar to dorsal. Pectoral $\frac{2}{3}$ to $\frac{3}{4}$ length of head. Ventral, in adult, produced into a filament, reaching beyond origin of anal. Caudal rounded. Caudal peduncle 2- $2\frac{1}{2}$ times as deep as long, as long as eye. Scales rugose, strongly ctenoid, 25-30 $\frac{2\frac{1}{2}-3}{9-10}$; lateral lines $\frac{11}{1-10}$. Brownish or olive, with 6-9 more or less distinct dark cross-bands; young with a round blackish spot at base of caudal.

South Cameroon to Upper Congo.” (Boulenger.)

Three specimens, up to 50 mm. in length, from Sesheke, N. Rhodesia (Rev. L. Jalla).

Description of a new Fish of the genus Mastacembelus, from the Zambesi System.—By G. A. BOULENGER, LL.D., F.R.S.

MASTACEMBELUS THOMPSONI.

Depth of body 21 times in total length, length of head $8\frac{1}{2}$ times. Vent equally distant from end of snout and from caudal, its distance from head $3\frac{1}{2}$ times length of latter. Snout 3 times as long as eye, ending in an appendage as long as eye; mouth extending to below anterior border of eye; no praeorbital or praeopercular spines. Dorsal xxxii 95; spines increasing in length, last $\frac{1}{5}$ length of head; distance between first spine and head $\frac{2}{5}$ length of latter. Anal ii 95. Caudal rounded. Pectoral $\frac{1}{4}$ length of head. Scales very small. Blackish brown above, greyish-white beneath.

Total length 265 millim.

A single specimen, from Sesheke, N. Rhodesia (Rev. L. Jalla).

Although 34 African species of this genus are now recognised, only two were known from the Zambesi system—*M. shiranus*, Gthr., from Lake Nyassa and the Upper Shiré, and *M. mellandi*, Blgr., originally described from the Solwesi River in North Rhodesia (Congo watershed), but since recorded from Lialui, Upper Zambesi.

M. thompsoni, named in memory of the late W. Wardlaw Thompson, is allied to *M. shiranus*, *M. nigromarginatus*, Blgr., *M. victoriae*, Blgr., and *M. moeruensisi*, Blgr., and most nearly to the latter, from which it differs chiefly in the more numerous fin-rays and in the more numerous and longer dorsal spines.

M. Jalla of the Paris Mission Society, Sesheke, has kindly supplied the Barotse names for the following fishes. [EDITOR.]

| | | | | |
|--|-----|-----|-----|-------------------------|
| <i>Marensenius castelnaui</i> , Blgr. | ... | ... | ... | <i>ninqa</i> . |
| <i>Mormyrus anchictae</i> , Guim. | ... | ... | ... | <i>motokoia</i> . |
| <i>Sarcodaces oloc</i> , Bl. | ... | ... | ... | <i>molumesi</i> . |
| <i>Hydrocyon lineatus</i> , Blkr. | ... | ... | ... | <i>uquesi</i> . |
| <i>Clarias mossambicus</i> , Peters | ... | ... | ... | <i>minqa</i> . |
| <i>Auchenoglanis ngamensis</i> , Blgr. | ... | ... | ... | <i>Sengongi-wanqa</i> . |

| | | |
|--|----|----------------------------------|
| <i>Synodontis melanostictus</i> , Blgr. | .. | <i>Sengongi</i> . |
| <i>Tilapia macrochir</i> , Blgr. ... | .. | <i>nu</i> . |
| .. <i>melanopleura</i> , A. Dum. | .. | <i>mbofu</i> . |
| .. <i>sparmanni</i> , Smith. ... | .. | <i>setuu</i> or <i>setutwa</i> . |
| <i>Paratilapia zambesensis</i> , G. & T. | .. | <i>ndjindji</i> . |
| .. <i>angusticeps</i> , Blgr. male ... | .. | <i>nolutemambo</i> . |
| .. " " " female... | .. | <i>moshuna</i> . |
| .. <i>marginata</i> , G. & T. ... | .. | <i>sieo</i> . |
| .. <i>wellandi</i> , Blgr. ... | .. | <i>mbuma</i> . |
| <i>Pelmatochromis ngamensis</i> , G. & T. | .. | <i>molumba</i> . |
| <i>Anabas multispinis</i> , Peters ... | .. | <i>mbundu</i> . |
| .. <i>nanus</i> , Gthr. ... | .. | <i>sebulamuki</i> . |
| <i>Mastacembelus thompsoni</i> , Blgr. | .. | <i>motome</i> . |

CORRIGENDA.

- P. 490, etc. Sesheke is in *Northern* not Southern Rhodesia.
- P. 498, etc. For *Mazoe* read Mazui.
- P. 550. For *Sipapoma, South Rhodesia*, read Lialui, Upper Zambesi. Delete words *Bulawayo Museum*.
- P. 558. For *Amphilius longirostris* read *Amphilius natalensis*, Blgr. Delete references and figure 116. Dr. Boulenger has seen the specimens in this Museum and has expressed the opinion that they should be referred to the species described in Ann. Durban Mus. i, 4, p. 432 (1917).

The following species, marked in the Catalogue with an asterisk as not being represented in the Collections of the South African Museum, have since been acquired. [EDITOR.]

Marcusenius castelnavi, Blgr.

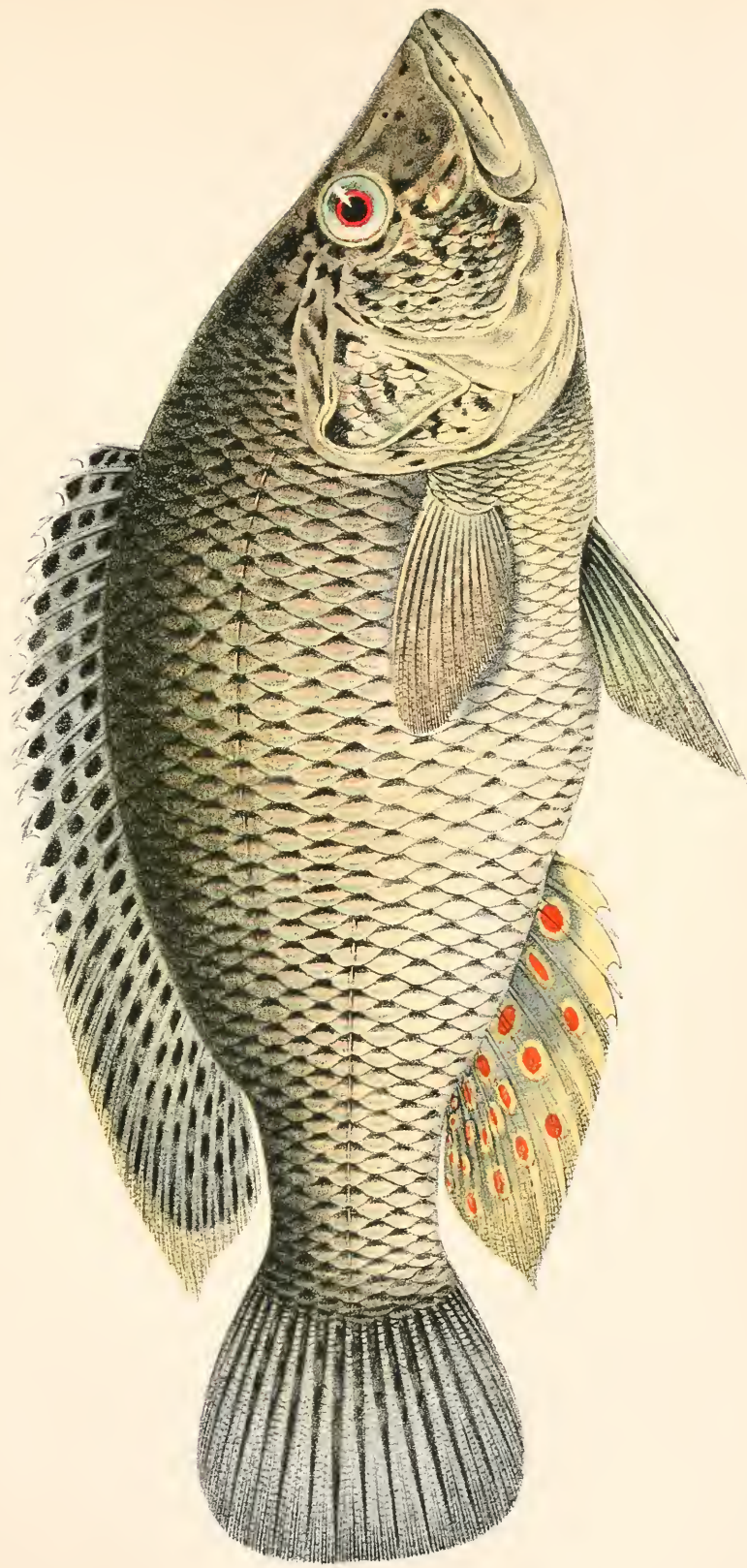
Labeo congoro, Peters.

.. *altivelis*, Peters.

Barbus asper, Blgr. Specimens have been received which seem to prove that this is the adult ♂ of *B. anoplus*, M. Web.

Auchenoglanis ngamensis, Blgr.

Tilapia arnoldi, G. & T.



1911-17

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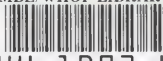
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