EAST AFRICAN SLUGS OF THE FAMILY UROCYCLIDAE

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Introduction

A revision of the African slugs is much needed but could not possibly be carried out with the materials available. Considerable collections of material, particularly topotypes, properly drowned and preserved for dissection purposes are necessary. Studies of the development of the genitalia in single species are needed, since many names have been based on immature individuals. The descriptions and type localities have been so vaguely defined in many cases, that the exact identity of some of the published species will never be ascertained. The anatomy of some of these species has not been illustrated.

A collection of slugs made by myself in the E. Usambara Mountains in Tanganyika during 1950 was in the hands of the late Hugh Watson of Cambridge, England and still awaits examination. A few specimens have also been sent to Berlin for examination by Dr. Urban, a pupil of Dr. Jaeckel. A detailed account of the anatomy and histology of *Trichotoxon thikense* Verdcourt has been given by Dr. Urban in an unpublished thesis 'Anatomie und Histologie von *Trichotoxon thikense* Verdcourt (Ein Beitrag zur Kenntniss der Urocyclinae): Inaugural—Dissertation Humboldt-Universität, Berlin, Sigrid Urban, 1958.' All my spirit material is otherwise preserved in the Coryndon Memorial Museum, Nairobi.

These notes present a synopsis of the East African slugs, in the hopes that collectors will be stimulated to collect material which will be available for a future monographer. Series are needed of both mature and immature forms of the same species. Several new species have been described in this paper since some of the commonest species in the Nairobi area, including one or two of economic importance, are apparently undescribed.

Three families of slugs are represented in East Africa, namely, Veronicellidae, Urocyclidae and Limacidae. The latter family has been recorded on two occasions. Simroth (1897)[1] records *Agriolimax laevis* (Müll.) from Zanzibar, collected by von der Decken long ago. Recently quite large numbers of a small *Agriolimax* have been collected in a Nairobi, Kenya, garden by Mr. J. G. Williams; the late Mr. H. Watson has determined these as *Agriolimax laevis andicolus* (D'Orb.). Other species may have been introduced but have not been recorded. The Veronicellidae have been monographed recently by Forcart (1953).[2]

The complete dissection of a slug is a difficult procedure but an examination of the genitalia for identification purposes is not difficult, provided that a mature individual is chosen and that it has been drowned outstretched prior to preservation. The slug should be slit down both fringes with very fine dissecting scissors, being most careful to keep the points tending outwards so as not to sever any internal organs. The neck tissue can then be cut from right to left and with care the entire back can be separated from the foot. The genitalia can then be seen as a complex mass of organs which, when followed forwards, end in a pore leading to the outside just behind the right-hand tentacle. With care it is possible to completely unravel the organs and their ducts.

Care must be taken with the hermaphrodite gland and its duct. This gland is usually buried in the folds of the liver and the duct is tenuous. The names of the various organs can be made out from the various diagrams accompanying this paper.

[1] Die Nacktschnecken Ost-Afrikas, Deutsch Ost-Afr. 4(2): 5 (1897).
[2] The Veronicellidae of Africa. Ann. Mus. Congo Belge, 8° Zoo. vol. 23 (1953).

List of Slugs described from East Africa

This list has been delayed until the end of the paper since owing to the fact that it will appear in parts, publication at this stage would mean the appearance in print of names not yet validated.

KEY TO THE GENERA OF UROCYCLIDAE RECORDED FROM EAST AFRICA

1. Visceral cavity not penetrating the foot behind the mantle, but anterior as in the Helicarionidae; flagellum elongated . . . . . *Leptichnus*
1. Visceral cavity extending to extreme posterior of the foot 2
2. Dart sac or similar gland not present 3
2. Dart sac or similar gland present but not always secreting a dart; sometimes quite small . 5
3. Epiphallus without flagella . . . . . *Phaneroporus*
3. Epiphallus with flagella 4
4. Flagellum vestigial; hermaphrodite gland lodged in extreme extremity of the liver . *Atoxon*
4. Flagellum long; hermaphrodite gland sited between the albumen gland and the uterus *Dendrolimax*
5. Atrium and dart sac distinct, accessory to each other; dart sac small not secreting a dart (called prostate gland by Pollonera) 6
5. Atrium and dart sac joined, large; nearly always secreting a dart save in sub-genus *Atrichotoxon* . . . . . *Trichotoxon* 8
6. Dart sac elongate, clavate, furnished with retractor muscles 7
6. Dart sac more or less globose or if clavate then without retractor muscles; with small lateral retractors or completely lacking them . . . . . *Bukobia*
7. Dart sac with lateral retractors . . . . . *Urocyclus* subgenus *Mesocyclus*
7. Dart sac very well-developed, with strong apical retractors . *Urocyclus* sub-genus *Urocyclus*
8. Oviduct entering distal end of combined atrium and dart sac 9
8. Oviduct entering at the base or middle of the combined atrium and dart sac . . 10
9. Four to six darts in pairs in secondary sacs . . . . . sub-genus *Trichotoxon*
9. No darts in the dart sac . . . . . sub-genus *Atrichotoxon*
10. Eight to many darts in the dart sac . . . . . sub-genus *Polytoxon*
10. One spiral dart in the dart sac . . . . . sub-genus *Spirotoxon*

ENUMERATION OF THE SPECIES

LEPTICHNUS

Simroth in Abh. Senck. Naturf. Ges. **19**, 296, t.1, f. 7-11 (1896)

Visceral cavity not penetrating the foot to the rear of the mantle but anterior as in the *Helicarionidae*. A long flagellum is present as in *Dendrolimax*. Shell cap-shaped, covered save for a pore over the end. Foot slender, back keeled above and scarcely twice as long as the mantle. Penis long and slender; epiphallus slender with two flagella; spermatheca spherical with very long duct; spermatophore spiral with smooth tube and long narrow apically toothed tail. Dart sac wanting.

L. fischeri *Simroth*, loc. cit. (1896)

Slug about 2.2 cm. long, pale buff with two brown principal stripes.

TANGANYIKA. Simroth merely states 'Deutsch-Ost-Afrika' leg. Fischer with no further details. The specimens are presumably at Berlin but were not found there.

The following slug appears to belong to this genus since the last 8 mm. of the foot are solid and not filled with viscera and there are two long flagella on the epiphallus. The banding of the mantle such as is found in the typical species was not shown by the present specimen. It is presumably a new species, but only one specimen is available so it has been left undescribed.

Leptichnus sp.

A small slug with a very characteristically granulate mantle, the granules so acute as to make the mantle appear prickly. Body pale in front, striped and spotted with purple-brown behind, mantle purple-brown with scattered white spots. Hind body keeled. Total length 2.7 cm., mantle 1.7 cm. long, free front part 5.5 mm. long, pulmonary aperture 8.7 mm. behind the anterior margin. The

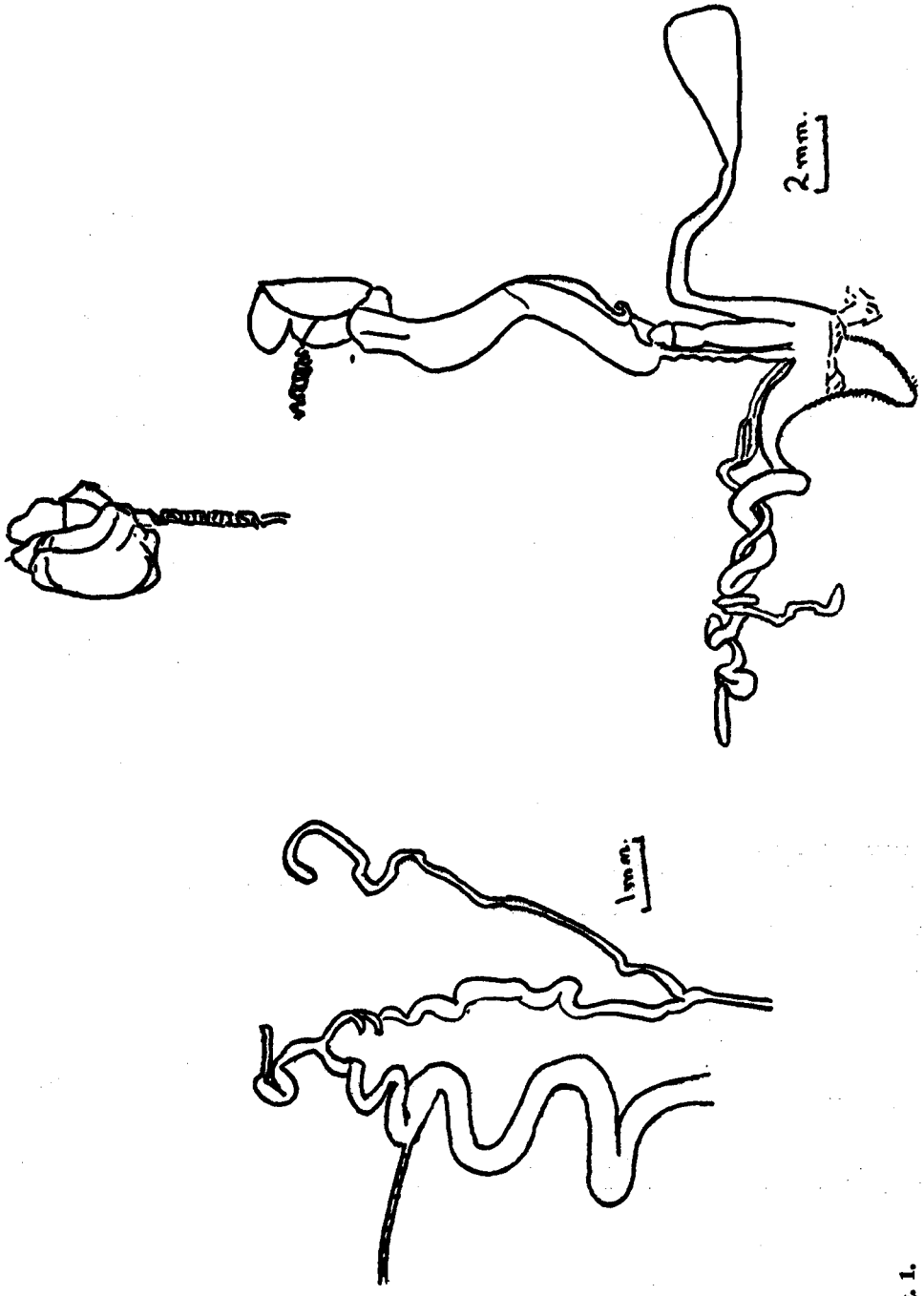

Fig. 1.

viscera do not extend into the rear of the foot, the last 8 mm. of which is solid. The spermatheca is flask-shaped, 4 mm. long and 2 mm. wide, the duct slender, 7 mm. long. The flagellum is very long, 7.5 mm., and the penis 6 mm. long. In the specimen dissected the denticulate verge was exserted. The jaw is of the normal Helicarionid type, 1.75 mm. wide with truncate ends and a median rounded projection. The radula is about 3.5 mm. long and 1.5 mm. wide. The central tooth is tricuspidate with the median cusp much longer than the two accessory cusps. There are 23 lateral and transitional teeth which are also tricuspidate, the endocone narrowly adnate to the mesocone, but the ectocone quite separate. There are about 50 marginal teeth, the inner ones of the normal Helicarionid type with markedly bifid cusps, the inner cone being the largest and the last 10-15 in each row with extra cusps (up to a total of six). This is irregular since some may be two-cusped even near the margin. These multicuspidate teeth are particularly noticeable in the stained nascent rows. (See fig. 1).

TANGANYIKA. East Usambaras, Amani, Mt. Bomole, leg. B. Verdcourt.

PHANEROPORUS

Simroth in Nova Acta Leop.-Carol. **54**, 61 (1889)

Shell with apical nearly symmetrical nucleus, ovate, feebly arched, covered save for a pore at the posterior end of the mantle. Genitalia lacking dart sac; vas deferens short without appendages. Penis clavate with apical retractor; spermatheca slender, tube-like.
Genotype, *P. reinhardti* Simroth

Key to the species

Penis clavate; epiphallus not present . . . . . ***P. reinhardti***
Penis tubular; epiphallus long . . . . . ***P. unicolor***

P. reinhardti *Simroth* in Nova Acta Leop.-Carol. **54**, 61, t.3, f.2, 4, and 17 (1889)

Slug with grey-brown sides and pale keel. Mantle reddish with dark lateral bands and dark fleckings between them.

The narrow penis is swollen into an ellipsoidal sac at the distal end, just below the retractor; the vas deferens enters direct near the top and there is no epiphallus. The spermatheca is tubular, barely enlarged at the apex.

TANGANYIKA. No data given.

P. unicolor *Simroth* in Abh. Senck. Naturf. Ges. **18**, 306, t.1, f. 7 and t. 2, f. 11 (1894)

Slug about 3 cm. long (judging by the figure), fringe and fore-part of body below the mantle, pale yellow-brown, rest of body grey, tinged with violet. The mantle is shown as dark brown with vague spots and a narrow yellow-brown margin. Simroth figured the undeveloped genital organs. The vagina is short and tubular; the penis is long and narrowly tubular, U-shaped; the epiphallus is narrower but as long as the penis. The spermatheca and duct are tubular, slightly clavate distally, about as long as the penis. The hermaphrodite duct is very long.

TANGANYIKA. East Usambara Mountains, leg. L. Conradt.

ATOXON

Simroth in Nova Acta Leop.-Carol. **54**, 58 (1889)

Small to medium-sized slugs. Genitalia without dart sac; epiphallus with a well-developed lime gland and sometimes a minute vestigial flagellum.
Genotype, *A. hildebrandti* Simroth, a Somaliland species.

The species in this genus are most ill-defined and series of strict topotypes are needed for comparative dissections. Many of Simroth's species were poorly described from quite inadequate material, often from immature specimens; moreover the type localities are often not defined. A key is not feasible but the following may help to guide one to the nearest description. The shape of the spermatheca depends partly on whether or not it contains a spermatophore.

A. Spermatheca elongate, gradually passing into a duct shorter than itself:

Brown or buff with marked stripes; spermatheca pear-shaped, drawn out at the apex ***A. taeniatum***

Buff-grey with numerous flesh-coloured granules; spermatheca ovoid-oblong with small apical accessory sac, the whole about four times as long as the narrow duct ***A. kiboense***

Dark brown with interrupted stripes and spots; spermatheca elongate, tapering, about three times the length of the duct . . . . . *A. brunneum*

Buff with brown stripes; spermatheca elongate, passing very gradually into a duct about two thirds of its length . . . . . *A. flavum*

Pale brown with deep brown stripes on the mantle and interrupted stripes on the body and/or oblique curved interrupted stripes; spermatheca elongate, blunt, twice the length of the duct . . . . . *A. lineatum*

Pale ochraceous, mantle with four confused brown stripes and spots, sides pale chestnut irregularly zoned and with obscure stripes and minute spots; spermatheca twice as long as the duct . . . . . *A. ornatum*

B. Spermatheca more globular and more abruptly passing into a duct longer than itself or at least equal.

Buff-brown with grey stripes and spots; spermatheca globular, half the length of the duct . . . . . *A. variegatum*

Yellow-buff with orange-brown spots; spermatheca "with narrow end lobe and long stalk" . . . . . *A. auriantiacum*

Grey-brown with dark stripes; spermatheca globular, five eighths the length of the duct . . . . . *A. carli*

Yellowish with pale brown stripes; spermatheca globular, two thirds the length of the duct . . . . . *A. cavallii*

Ochraceous with a single pale band on each side; spermatheca globular, with duct twice as long or longer; vagina long and atrium inflated . . . . . *A. fuelleborni*

Several species have been described from juveniles and consequently their anatomy is unknown or virtually so. These are enumerated first.

A. robustum *Simroth* in Die Nacktschnecken Ost-Afrikas 10, t.1, f.8 (1897)
About 3.1 cm. long, similar to *A. variegatum* with brown stripes distinct on the mantle and a brown reticulation between them. Topotypic material should be easy to obtain since the locality is known accurately.

TANGANYIKA. Kome Islands, leg. Stuhlmann.

[**A. pallens** *Simroth, op. cit.* 7, t.1., f.2A & B (1897)
1.4-2.5 cm. long, pale yellow-buff with obscure stripes on the mantle and tail. The young have dark stripes.

BELGIAN CONGO. N.W. of L. Albert, Kirima, leg. Stuhlmann.]

A. martensi *Simroth* in Reise in Ostafrika A. Voeltzkow 1903-5, Wiss Ergebn. **2,** 607, t.26, f.15 (1906-10) (1910)
3.3 cm. long, grey-brown with black-brown stripes and spots; the spots are arranged in a vague lateral band on the sides and the mantle. There are scattered spots below this band and the flanks below the mantle are pale.
No accurate data given; 'Ostafrika' leg. Stuhlmann (type presumably in the Berlin museum).

[**A. brunneum** *Simroth* in Die Nacktschnecken Ost-Afrikas 8, t.1, f.3, t,3, f.2 (1897); Pilsbry in Bull. Am. Mus. Nat. Hist. **40,** 287, pl. 8, f.1 & 2 (1919)
3.8 cm. long, brown with brown or greyish, lateral dark stripes and spots; or olive-brown with white longitudinal grooves and minute white reticulation and slightly darker lateral bands, together with some angular black spots; mantle also with black spots. Spermatheca elongate, tapering, about three times the length of the duct (judging by the figures but Simroth says 'of equal length' in his text; he also mentions and figures a small lateral sac on the spermatheca but this was probably abnormal or an artefact).

BELGIAN CONGO. Ruwenzori, in forest at Semliki Ferry, leg. Stuhlmann; Butagu Valley, leg. Bequaert.]

[**A. flavum** *Simroth* in Die Nacktschnecken Ost-Afrikas 9, t.1, f.5 (1897); Pilsbry *op cit.* 289 (1919)
A buff-coloured slug with brown stripes, 2.8-3.7 cm. long. Simroth's original specimen had the

genitalia weakly developed; he states that the rather long receptacle is about the same length as its duct.

BELGIAN CONGO. West of L. Albert Edward. Kishakka (Katambaru), leg. Stuhlmann. Pilsbry *op cit.* 289, pl. 8, f.6, t.f. 146 describes a subspecies *rutshuruense* which he figures as having a narrow, elongate spermatheca passing very gradually into a duct about two thirds of its length.]

A. lineatum *Simroth* in Die Nacktschnecken Ost-Afrikas, 10, t.1, f.9 (1897); Simroth in Rev. Suisse de Zool. **20,** 34 t.3, f.2 (1912); Simroth in Abh. Senck, Naturf. Ges. **19.** 282 (1896)

About 2.3-4.5 cm. long, pale brown with deep brown stripes on the mantle; interrupted dark brown stripes on the body and/or oblique curved interrupted stripes on the body. Spermatheca elongate, somewhat constricted below, twice as long as its duct. The original description indicates that the genitalia were not fully developed but they are however figured in the later reference.

TANGANYIKA. S. Victoria Nyanza, Kome Islands leg. Stuhlmann (type); Bukoba, Bussiro Islands (Carl); Waterigi Hugel (Neumann) locality not traced. (The 1897 reference was meant to appear first.)

Atoxon *sp. aff.* **A. lineatum** *Simroth*

Body with ground colour grey, sides paler beneath the mantle in front. There is one continuous blackish-brown stripe on either side of the mantle and an almost continuous blackish-brown stripe carrying on on either side of the hind body. The hind body is not keeled but there is a white keel line (in life, yellowish in spirit.) The mantle is finely polygonally reticulate; the posterior margin is slightly sinuate. The pallial aperture is very small and the pulmonary aperture is also small and situated 9 mm. from the anterior margin. The area between the stripes on the hind body is dark, save for this keel; the central area between the mantle stripes is marked with obscure dark marks. The total length of the animal is 4.8 cm. and the height near the mantle 1.2 cm. The mantle is 1.5 cm. long. The sole areas are 4, 2.5 and 4 mm. wide respectively, the outer areas transversely striate. The shell is broadly oval, 6.5 mm. long and 5 mm. wide, thickish with hyaline margins; the nucleus and surrounding area is whitish, the rest of the shell yellowish-horn. The sculpture consists of concentric ridges and irregular radial striae; the nucleus itself has faint, close concentric, undulating striae. The genitalia are illustrated in fig. 2. The spermatheca is oblong, constricted about the middle and the duct is very short. Of the organs not illustrated in the figure the hermaphrodite gland is ovoid, 8.5 mm. long and 5.2 mm. wide; the hermaphrodite duct is 4.3 cm. long, convoluted close to where it runs into the albumen gland; the latter is narrowly tongue-shaped, much divided into small lobes, 2.5 cm. long and 5 mm. wide. The common duct is much convoluted 5.7 cm. long.

KENYA. Mt. Marsabit, in the forest, leg. B. Verdcourt.

On a previous visit the year before, I discovered a juvenile of what is probably the same species, although the hind body is slightly keeled.

Animal 3.4 cm. long and 8.5 mm. wide, mantle 15.5 mm. long. Hind body keeled only at the posterior end. Body buff-brown with black markings; the mantle has a broad and distinct dark band on each side and some dendritic marks and spots between the bands; on each side of the hind body is a distinct dark stripe with scattered black spots, both below and above it. The genitalia were undeveloped.

KENYA. Mt. Marsabit, leg. B. Verdcourt.

A. kiboense *Verdcourt sp. nov.*

Body 6 cm. long and 1.1 cm. wide; median portion of sole 2.2 mm. wide; mantle 2.6 cm. long. Ground colour buff-grey, covered with flesh-coloured granules; back with a slightly paler median line but no raised keel save at the extreme hinder end near the caudal pore. Shell 8.5 mm. long and 6. mm. wide, nucleus small and white, rest brownish, concentrically striate, also with some radial striae. Penis tubular, bow-shaped, 9 mm. long and 1.5 mm. in diameter; epiphallus 15 mm. long in the natural convoluted shape; upper flagellum 14 mm. long and 0.5 mm. in diameter with a recurved tip, 1.5 mm. long. Spermatheca ovoid-oblong, 9 mm. long and 4 mm. wide, with an apical, slightly curved, narrowly ovoid accessory sac, 4.5 mm. long and 2 mm. wide, duct narrow about 3 mm. long. Distance from base of spermatheca to atrium 6 mm. Oviduct with basal 2 mm. narrowly tubular and S-shaped, followed by an ovoid part, 3.5 x 2 mm., followed by a tubular portion 8 mm. long and 1.2 mm. in diameter. Hermaphrodite gland 13 x 8 mm. with a practically non-convoluted duct 3 cm long. The general shapes of the various organs can be seen from the diagram in fig. 3.

TANGANYIKA. Kilimanjaro, Marangu, in the grounds of the Kibo Hotel, leg. B. Verdcourt (type in the Coryndon Museum, Nairobi).

A. taeniatum *Simroth op. cit.* 8, t.1, f.4, t.3, f.4, (1897)

Brown or bnff-coloured with marked stripes but Simroth also figures a specimen coloured like *A. pallens* with dark stripes. Body 2.2-3 cm. long. The spermatheca is pear-shaped with tip drawn out and is shortly stalked.

BELGIAN CONGO. Undussuma, leg. Stuhlmann.

Until further material has been seen from the type locality and the complete anatomy elucidated, it is probably best to consider a very similar slug which occurs round Nairobi, Kenya, as a variety of this species. It is very similar in coloration and the spermatheca is of the same type as that figured for *A. taeniatum* but is much broader. Since Simroth figures only the dilated part of the spermatheca and a little of the duct, comparisons are impossible so far as the rest of the anatomy is concerned. The Nairobi form is described below.

Brownish-grey or pale brown with darker brown lateral stripes; body about 4 cm. long. The shell is ovate, 5 mm. long and 3.5 mm. wide. The spermatheca is subglobose about 4 x 3.5 mm. with an apical tubular portion 3 mm. long and 1 mm. wide; the duct is short, 2.5 mm. long. The anatomy is figured in fig. 4.

KENYA. Kikuyu, Ndeiya, about 18 miles W. of Nairobi, leg. B. Verdcourt.

A. ornatum *Pollonera* in Boll. Mus. Zool. Anat. Comp. Torino **21**, (543), 5 (1906); Pollonera in 11 Ruwenzori, 187, t.2, f.6-11 & t.5, f.5 (1909)

Body about 2.9 cm. long, pale ochraceous; head pale, mantle obscurely 4-striped with brown and with spotted margins; back somewhat rugose, carinate; keel pale, obscure in the front half; sides of body pale chestnut, irregularly and interruptedly striped, showing obscure median stripes and minute irregular spots. Sole pale. Spermatheca rounded 'two thirds the length of the duct' but from the figure it appears to be twice as long as the duct.

UGANDA. Entebbe (Abruzzi Exped.)

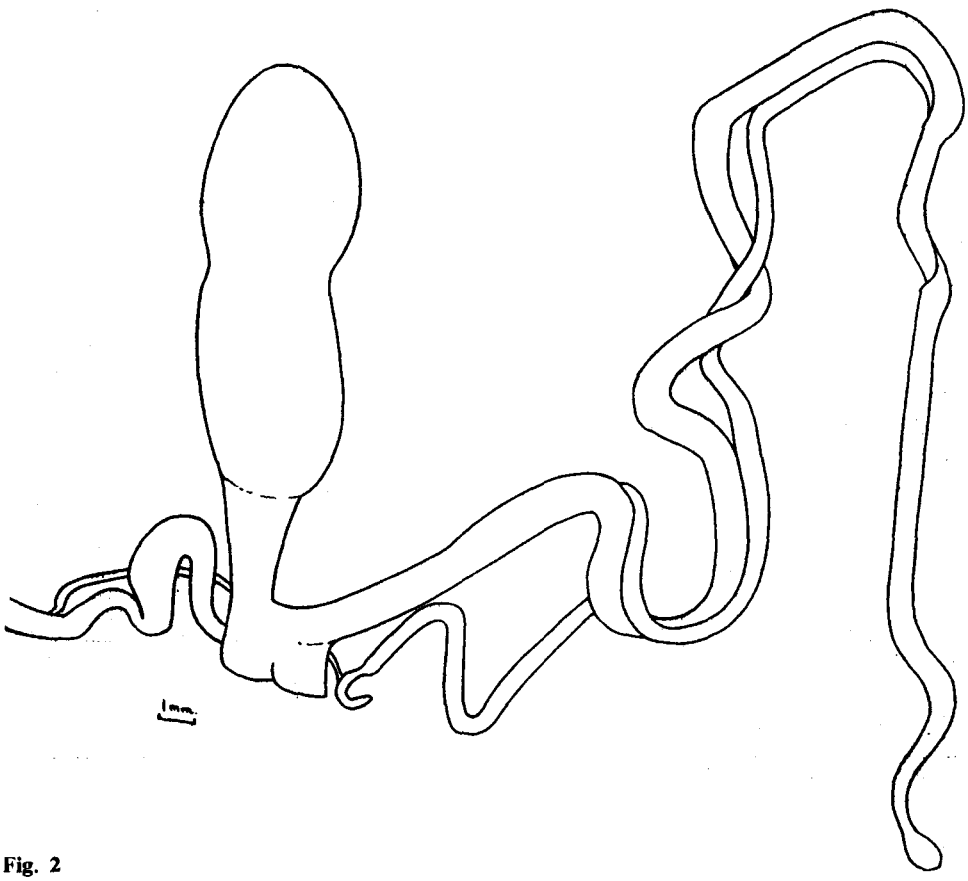

Fig. 2

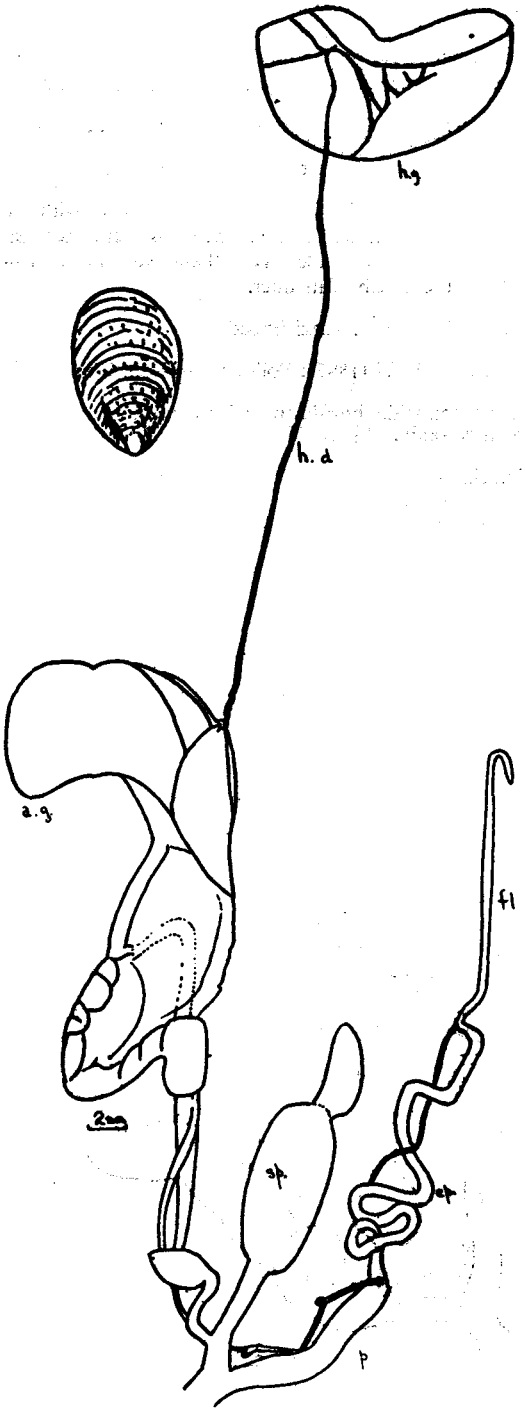

Fig. 3

A. auriantiacum *Simroth* in Die Nacktschnecken Ost-Afrikas 9, t.1, f.6, t.3, f.3 (1897)

Body about 3 cm. long, yellow-buff with a dense mottling of orange-brown spots, some of which are arranged to form an irregular stripe on the hind body. According to Simroth the genitalia are similar to those of *A. flavum*. The spermatheca is longer with a 'narrow tip and a long stalk'.

TANGANYIKA. W. Mpororoberge, 2000 m., SO bei Migore, leg. Stuhlmann.

A. cavallii *Pollonera loc. cit.* 5 (1906); Pollonera in I1 Ruwenzori 188, t.2, f.11, 12, & 13 and t.5, f.2 (1909)

Body about 3.3 cm. long, dirty yellowish in colour, paler in front with a distinct but pale, grey-brown stripe on each side. Mantle minutely granular with distinct zones. Back minutely granular, distinctly carinate throughout its length. Sole pale. 'Penis very big and not much longer' (sic); spermatheca round, two thirds the length of its duct.

UGANDA. Fra Kijemula e Madudu (Abruzzi Exped.)

A. variegatum *Simroth op. cit.* 9, t.1, f.7 (1897); Pollonera in Boll. Mus. Zool. Anat. Comp. Torino, **21** (543), 5 (1906)

Body 3.3 cm. long and 1.6 cm. wide, buff-brown with grey spots and a grey stripe running along each side of the mantle and hind body. Spermatheca spherical, half the length of the duct.

TANGANYIKA. S. Victoria Nyanza, Kome Islands, leg. Stuhlmann.

UGANDA. Fra Kijemula e Madudu (Abruzzi Exped.).

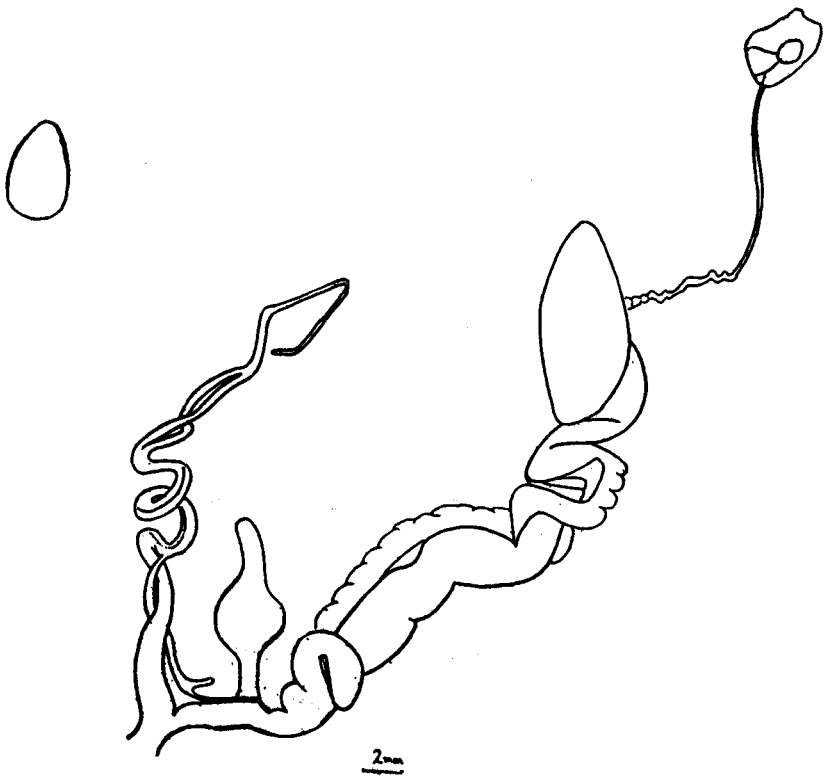

Fig. 4

A. carli *Simroth* in Rev. Suisse de Zool. **20**, 32, t.3, f.1 (1912)
Body 2.7-4.5 cm. long, evenly grey-brown, darker towards the back, becoming darker in more mature specimens; there is a dark band running along each side of the mantle and back, also brown speckles on the sides of mantle and thin brown lines along the grooves of the back. Spermatheca ovoid-globular with a duct about 1.5 times as long.

UGANDA. Busoga, Busu, leg. Carl.

A. fuelleborni *Simroth* in Reise in Ostafrika 1903-5 A. Voeltzkow, Wiss. Ergebn. **2**, 607, t.26, f.16 and t.f. 15 (1910)
An ochraceous slug about 4 cm. long, with a single pale band on each side of the body and mantle. Spermatheca globular with duct about twice as long or longer. The inflated atrium and long vagina seem to distinguish this from any other described species.

TANGANYIKA. Langenburg (i.e. Tukuyu), leg. Fülleborn.

A. sp.
The following specimen had vestigial genitalia merely sufficient to suggest that it belongs to this genus. Body 3.5 cm. long and 0.5 cm. wide, grey with dark grey-brown stripes. Mantle 1.4 cm. long, with a dark stripe on either side and reticulation between; shell pore obvious. Hind body faintly keeled, with a dark stripe on each side and most of the longitudinal grooves dark. It may well be closely allied to the Marsabit species referred to after *A. lineatum* Simroth (q.v.)

UGANDA. Karamoja, Moroto, under bark of Acacia, leg. B. Verdcourt.

(To be continued)

CAPTIONS
Fig. 1. *Leptichnus* **sp. Tanganyika, East Usambaras, Mt. Bomole near Amani, B. Verdcourt. Genitalia (inset not to scale)**

Fig. 2. *Atoxon* **sp. Kenya, N.F.P., Mt. Marsabit, B. Verdcourt. Genitalia in part**

Fig. 3. *Atoxon kiboense* **sp. nov. Tanganyika, Kilimanjaro, Marangu, B. Verdcourt. Genitalia and shell of type**

Fig. 4. *Atoxon taeniatum* **Simroth. Kenya, Kiambu District, Ndeiya, B. Verdcourt. Genitalia and shell**

Flamingos on the Lokippi Salt Lake

The Lokippi Salt Lake, which is filled by the Suguta River, at present covers an area of about six square miles, but after the rains is very much larger. At this time of year (November) it is very shallow.

When on safari in late October I saw tens of thousands of birds on the Lake. Near Naperito Island most of them seemed to be pink Flamingos. Near the edge of the lake most of them were white birds with black legs, black near undersides to their wings, and black heads. In a few cases the white parts were slightly pink.

If these latter are young Flamingos, I suspect there may be a very large number of nests on Naperito Island, which appears to be inaccessible except by raft, and that the island may be a major breeding ground.

R. J. H. Chambers, District Officer, Samburu District