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NEW LAND SNAILS FROM TANGANYIKA TERRITORY.

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THE following new forms herein described are based on material collected by Mr. Arthur Loveridge a few years ago during a trip in Tanganyika Territory, Africa.

*Euaethiops*, gen. nov.

*Description*.—Shells ovate-cylindric, imperforate, marked with axial striae intersected by spiral granulations. Nuclear whorl small as in the other Achatinidae. Aperture elongate ovate. Outer and basal margins rather expanded.

Radula of *E. loveridgei* fan-shaped. Central tooth with sharp, pointed cusp; lateral teeth, provided with rather large basal plate, unicuspid; mesocone large and conic; entocone represented by sharp, lateral protuberance; ectocone a mere protuberance; dentine extending from entocone all along the margin of the mesocone as far as the ectocone; formula:  $\frac{1}{1} + \frac{1}{1} + \frac{1}{1}$ .

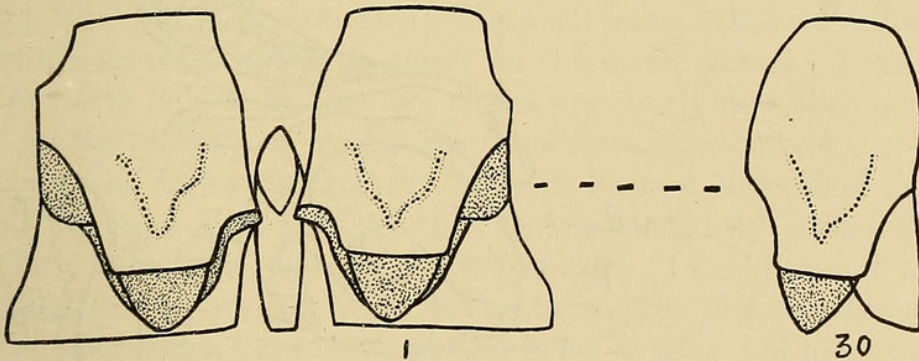


FIG. 1. Radula of *Euaethiops loveridgei*, showing median tooth, first and thirtieth lateral teeth.

Lung long, only moderately vascular both on the cardiac and intestinal sides, differing thus from the heavier venation of *Limicolaria* and *Achatina*. Pulmonary vein large as in the case of Achatinidae in general, and possessing large branches on the cardiac side. Kidney four times the length of the pericardium. Ureter enclosed and extending from the kidney to the rectum at a right angle. Stomach possessing a direct opening on side into kidney, some-



what as in the case of *A. zanzibarica* (dissected by the authors) and other members of the genus *Achatina*. It is, however, round and tumid instead of pear-shaped as in *Achatina*. Liver flat, leaf-shaped, as is typical of many mollusks bearing bulimoid shells.

Genitalia are nearest like those of *Limicolaria*, but differ in several points. Genitalia simple, without accessory organs. Penis thick, moderately long, and curved downward very much as in *Limicolaria*, enveloped in rather thick sheath. Penial retractor, terminal, short, inserted through the sheath and merging with penis at distal end, inserted on the diaphragm as in *Limicolaria*. In *Achatina* the penis is almost straight and curved slightly backward at the distal end, while the retractor muscle in all species heretofore dissected is a branch from the right ocular band. Vas deferens entering the sheath at about two-thirds the distance from the base of the penis; very long, coiling more than half way around vagina before coming into juxtaposition with uterus, and enveloped throughout its whole length by thin transparent membrane.

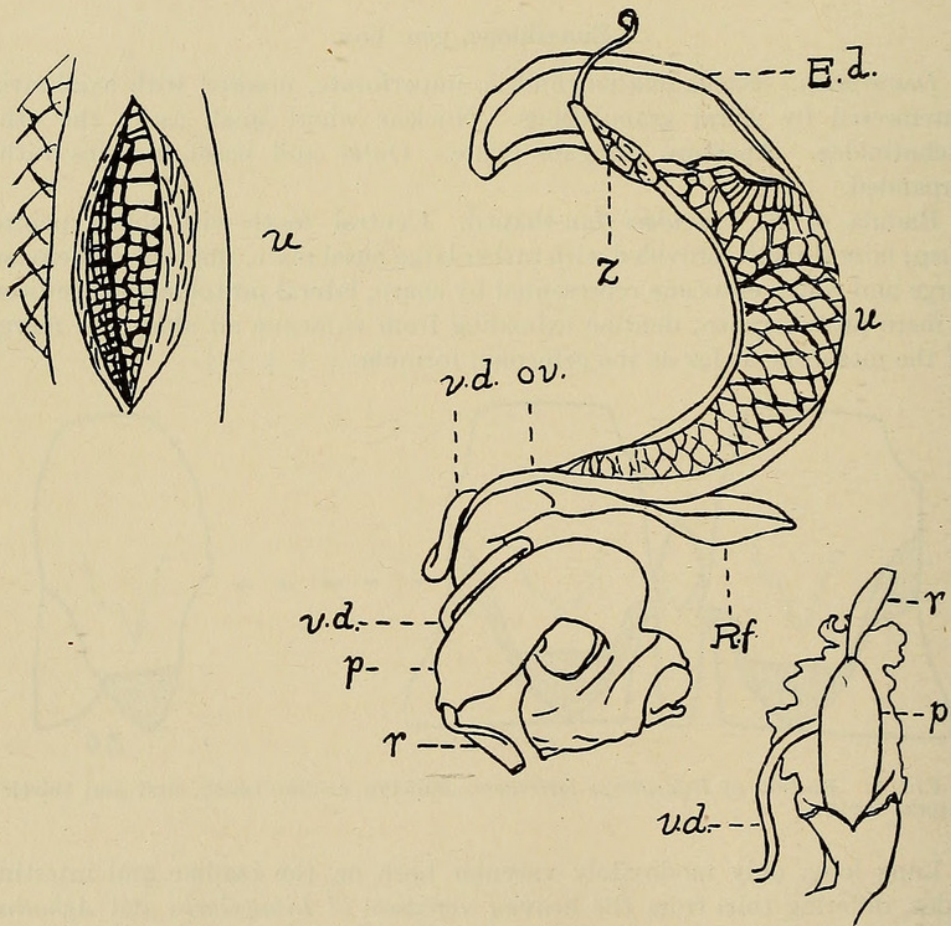


FIG. 2. Genitalia of *Euaethiops loveridgei*, showing penis with lumen partly removed (lower right) and uterus incised on oviducal side (upper left); E. d., albuminiparous gland; z, hermaphrodite duct of ovotestis; u, uterus; ov., oviduct; R. f., spermatheca; v. d., vas deferens; p, penis; r, penial retractor.



Duct of spermatheca quite long, being one-half times shorter, and flat as in *A. panthera*. Vagina short and oviduct only moderately long. Uterus large, long, and composed as in *Limicolaria* of a large sack of translucent membrane filled with closely fitting, leaf-shaped saccules. Albuminiparous gland three sided, columellar, edge keel shaped and coming to a blunt point. Ovotestis short, granulose and bound tightly to the albuminiparous gland.

Length of penis, 10 mm.; of vagina, 7 mm.; of oviduct, 11 mm.; of spermatheca, 23.5 mm.

*Remarks.*—*Euaethiops* differs anatomically from *Limicolaria* in the following points: a larger, thicker albuminiparous gland; a shorter hermaphroditic duct smoother above but heavily granulose at its entrance into the spermoviduct instead of consisting of a long series of granulations as in *Limicolaria*; a large uterus; a wider, flatter and shorter spermatheca; a longer, more twisted vas deferens; a larger penis; and a much shorter, thicker penial retractor.

The shell differs in having a more elongate aperture, nearly one-half the total length of the shell. The columella bends far backward instead of being almost straight and is *truncate* as in *Achatina*. The lip is marginate and expanded backward at the base.

While the anatomy of *Euaethiops* resembles that of *Limicolaria* in the possession of a penial retractor, its radula is closest to the type found in *Achatina*. The shell has a truncate columella which serves to place it closer to the latter genus. Thus this new form fails to fit into any of the previously described genera.

In the recently erected genus *Limicolariopsis* there is a species known as *L. kivuensis* Preston which bears a superficial resemblance to *E. loveridgei* in that it has a slightly reflected lip. The columella is, however, not truncate. In addition it has a sculptured embryonic whorl as in other species of *Limicolariopsis*. The aperture is likewise typical in being smaller and more ovate, and the whorls more numerous as in *Limicolariopsis*. A dissection of *Limicolariopsis kemp*i Prest. shows that this genus is anatomically the same as *Limicolaria*. However, the anatomy of *L. kivuensis* resembles that of *E. loveridgei* in having a rather similar type of penis, but in all other respects, penial retractor, ovotestis, etc., it is entirely identical with *Limicolariopsis* and *Limicolaria*. It is uncertain just what the true status of *L. kivuensis* is, whether it is a case of convergence or an inter-



mediate form. Were it not for the fact that the majority of its characters seem to resemble those of the typical forms of *Limicolariopsis*, it would seem justifiable to place it in *Euaethiops*. The fact is that in shell characters alone, it is barred from that genus because of its untruncate columella and sculptured embryonic whorl, and must for the present remain in *Limicolariopsis*.

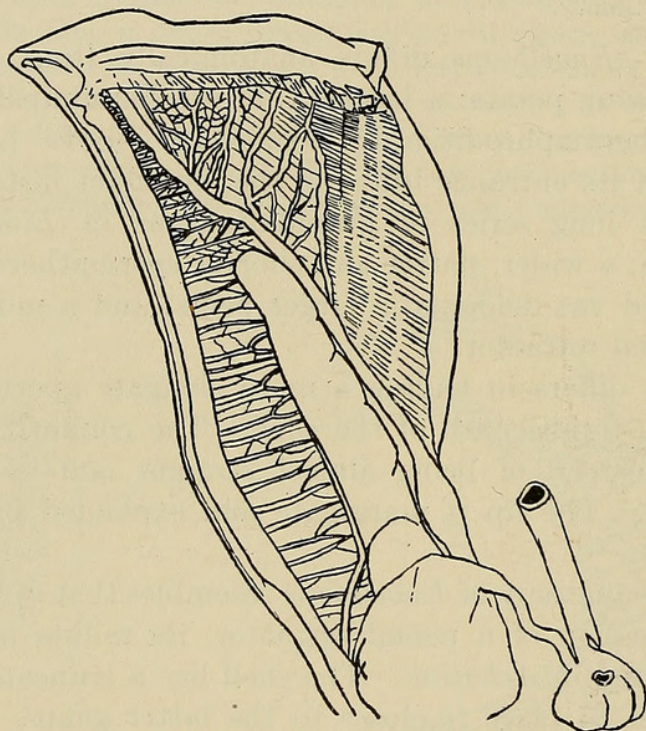


FIG. 3. Pallial system of *Euaethiops loveridgei*, showing vascular system, pericardium, kidney, ureter, intestine and stomach (lower right).

The genus *Euaethiops* belongs next to *Limicolaria*, by reason of the anatomical resemblances between the two. It belongs after *Burtoa* and *Achatina* since its shell characters, such as sculpture, resemble those of the latter.

Genoholotype, *Euaethiops loveridgei* Clench and Archer.

*Euaethiops loveridgei*, sp. nov.

Plate 16, fig. A.

*Description*.—Shell, imperforate, ovate-cylindric, rather thick. Nuclear whorl dark mahogany red. Succeeding whorls with snuff brown ground color, ornamented with wavy or zigzag axial, bistre flames. Interior of aperture deep bluish white in the region of the outer lip, but further inside exhibiting the snuff brown color of the exterior, decorated by the same bistre flames.



Apex smooth, obtuse; succeeding whorls slightly convex, the first four slowly increasing, the fifth and final body whorl rapidly increasing downward. Suture somewhat impressed especially on the body whorl. From the second whorl, following the nuclear whorl to the termination of the body whorl or the aperture, shell entirely covered by axial striae, some deeper than others, and intersected at all points by rows of spiral granulations. Whorls 6-6½.

Aperture elongate-ovate. Outer and basal margins rather expanded downward, the expansion being most marked in adult specimens at the base.

Parietal region covered by rather thin, almost transparent callus. Columella long, folded, bluntly truncated, and, when the shell is viewed from the left side, bent backwards to conform with the expansion of the basal margin.

The shell differs from *Achatina* and *Limicolaria* in shape, chiefly as regards the expanded margin of the aperture, a feature peculiar only to parts of the genus *Archachatina*. It is rather more cylindrical than *Achatina*, which is usually elongate-ovate.

Alt.	Diam.	Ap. length	Ap. width	
70.5	33	34.5	16.5 mm.	Holotype, M. C. Z. no. 58934
70	35	37	20	Paratype, M. C. Z. no. 58935
81 <sup>1</sup>	38	37	19.5	Paratype, M. C. Z. no. 58935

*Holotype*.—M. C. Z. no. 58934; collected in 1926 by Arthur Loveridge, at Bagilo, Uluguru Mts., Tanganyika Territory, Africa.

*Achatina madaziniana*, sp. nov.

Plate 16, fig. B.

*Description*.—Shell acutely ovate, imperforate, rather thin but strong. Nuclear whorl pinkish buff. All following whorls as far as body whorl having pinkish buff ground color. Beginning at second whorl from nuclear whorl and continuing to edge of aperture surface covered with rather straight, longitudinal, liver brown flames set apart at irregular intervals from each other, but tending to fuse together on the last fifth of the body whorl. Ground color of body whorl, cinnamon buff.

Nuclear whorl smooth, slightly flattened. Beginning at the second whorl from the nuclear whorl and continuing to the aperture, surface covered with axial striae at first light, but on the body whorl becoming rather definite growth lines.

These striae and growth lines are intersected over most of the surface by spiral lines set apart at rather irregular distances. These lines are obsolescent on the lower half of body whorl. From fourth whorl from apex to edge of aperture there is a series of rough subsutural folds. Whorls 7.

Aperture acutely ovate. Interior translucent, showing the color pattern of exterior. Outer and basal margins very sharp. Columella long, almost

<sup>1</sup>Apex of this specimen broken and worn.



straight and sharply truncate. Parietal wall almost completely lacking a callus.

<i>Alt.</i>	<i>Diam.</i>	<i>Ap. length</i>	<i>Ap. width</i>	
87	44.5	49.5	23 mm.	Holotype, M. C. Z. no. 53185
76	40.5	43	22	Paratype, M. C. Z. no. 53186

*Holotype*.—M. C. Z. no. 53185; collected Feb. 1923, at Madazini, Tanganyika Territory, Africa, by Arthur Loveridge.

*Paratype*.—M. C. Z. no. 53186; collected Feb. 1923, at Itende, Tanganyika Territory, Africa, by Arthur Loveridge.

*Remarks*.—From the shell characters it seems well to place this species next to *Achatina immaculata* Lam. Neither the radula nor the soft parts have been available for examination, so that this designation remains somewhat tentative. Only two specimens are at hand, and the most adult one from Madazini is chosen as the holotype. The second specimen belongs to the same series of material collected by Mr. Loveridge, and since it comes from the same region as the holotype it is considered as a paratype.



1930. "New land snails from Tanganyika Territory." *Occasional papers of the Boston Society of Natural History* 5, 295–300.

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