

**A new species of *Vitrina* (Gastropoda, Pulmonata, Vitrinidae) from Kenya
with a discussion of the genus in East Africa**

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Vitrina chyuluensis spec. nov. is described from the Chyulu Hills, Kenya. It has a rather large shell and is characterised by a long spermathecal duct, very fine plicae between distal and proximal parts of the penis, and a three-ridged jaw. The description is followed by a discussion on the classification of East African species of *Vitrina* and on the variation in characters probably of taxonomic significance at specific level. The paper is concluded by some comments on naming *Vitrina* from East Africa.

Key words: Gastropoda, Pulmonata, Vitrinidae, *Vitrina*, taxonomy, Kenya, East Africa.

INTRODUCTION

Quentin Luke during a botanical collecting expedition to the Chyulu Hills, Kajiado District, Kenya (02°39' S, 37°52' E), collected some helicarionoid snails in montane forest on recent volcanic lava. I at first assumed that the seven specimens in the sample belonged to the same species, one more mature than the others. Dissection showed it to be a *Chlamydarion* Van Mol, 1970, which I could not match with described species. In order to verify certain features I dissected a further specimen only to find it had a totally different anatomy and was in fact a *Vitrina* as were four other specimens. One other was a juvenile *Chlamydarion*. I have for many years been attempting to make some sense of the East African species of *Vitrina* Draparnaud, 1801, and dissected numerous specimens from the East African highlands. Almost no molluscs have been collected in the Chyulu Hills and I was not surprised to find the *Vitrina* differed in certain particulars from any I had dissected from elsewhere.

DESCRIPTIVE PART

Vitrina (Calidivitrina) chyuluensis spec. nov. (figs 1–3)

Material examined. – Kenya, Kajiado District, Chyulu Hills main forest, near Camp 3, Mbirikani Group Ranch, alt. 1960 m, leg. Quentin Luke, 14.iii.2004 [RMNH 99586 (shell), (soft parts)/holotype; RMNH 99587/ 3 paratypes].

Diagnosis. – A *Vitrina* with a rather large shell characterised by a long spermathecal duct, very fine plicae between distal and proximal parts of the penis and a three-ridged jaw.

Description. – Shell (fig. 1) typically vitrinoid, thin, very pale greenish brown, of 3½ whorls, with no apical punctures but fairly strong irregular wrinkles.

Animal with mantle faintly to distinctly spotted; right hand mantle flap completely pale and unmarked but with a stripe on mantle just anterior to it parallel to the shell edge and crossing the breathing hole; tail with a distinct black keel strip, not actually keeled but

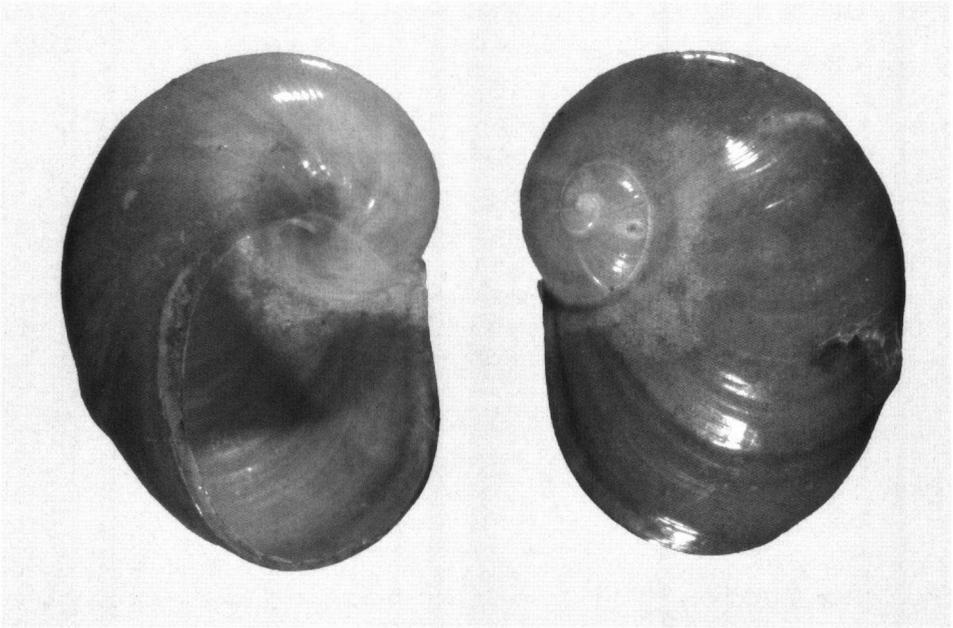


Fig. 1. *Vitrina chyuluensis* spec. nov., shell of holotype (RMNH 99586); measurements $13 \times 10 \times 8$ mm (Dmax x Dmin x H). Kenya, Kajiado District, Chyulu Hills, near camp 3, Mbirikani Group Ranch, alt. 1960 m, Q. Luke leg., March 2004. Photo J. Goud, Leiden.

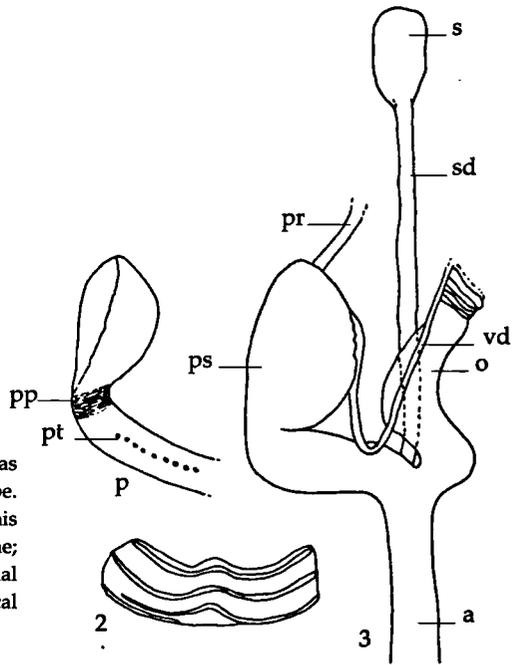
in fact grooved. One specimen had much paler markings but of essentially the same character. Foot uniformly pale.

Genital anatomy (fig. 3). The penial sheath consists of two parts, a muscular ovoid distal part slightly pointed and with the penial retractor attached slightly below the apex; the proximal part is cylindrical, forming a right angle with the upper part with a deep groove between them at the inner angle. In other species of *Vitrina* I have dissected there is a series of strong plicate folds in this groove but these are much reduced in the present species. The series of small tubercles on the lower part nearly always present in African material I have dissected are present, there being nine. The penis itself is clavate, following roughly the shape of the sheath but much more slender. The right ocular retractor passes between the male and the female ducts. Atrium well developed. Vas deferens leaving the penial sheath near base of distal ovoid part. Spermatheca and duct much longer than the penial sheath, totalling ± 13 mm. Jaw (fig. 2) 1.25 mm wide, oxygnathous but three-ridged transversely, a character not observed in any other vitrinid. Thinking it might be an abnormality I dissected a second younger specimen which confirmed the ridging and also the longer spermathecal duct. Radula formula 40.14.c.14.40, the main marginals with lateral cusp towards the base of central cusp, not pincer-like but the outermost marginals have the cusps more equal and pincer-shaped.

Measurements. Shell: $13 \times 10 \times 8$ mm; foot: 27×5 mm.

Distribution. – Kenya, Chyulu Hills.

Ecology. – The montane forest is dominated by *Tabernaemontana* (Apocynaceae), *Neoboutonia* (Euphorbiaceae) and *Ficus thonningii* Bl. (Moraceae); the snails were on the leaves of the under-shrub *Piper capense* L.f. (Piperaceae). The Chyulus are an area of recent



Figs 2-3. *Vitrina chyuluensis* spec. nov. (details as for fig. 1). 2, jaw; 3, genital anatomy of holotype. Abbreviations: a, atrium; o, oviduct; p, penis (shown separately on the left); pp, penial plicae; pr, penial retractors; ps, penial sheath; pt, penial tubercles; s, spermatheca; sd, spermathecal duct; vd, vas deferens.

igneous activity with vast areas of lava and hundreds of small cones rather than large isolated volcanoes.

The black markings on the animals brought to mind *Vitrina nigrocincta* von Martens, 1897, described from Kilimanjaro from material collected by Volkens between 1900 and 3800 m. It might well cover more than one species. It was described from three syntypes, the largest being 8×6×5 mm. Von Martens states that the animal is pale yellowish grey with sharply defined irregular black marks, mantle with a black stripe on the right side parallel to the peristome; the tail has a longitudinal median black stripe. Hubendick's description and illustrations of the anatomy of this species (Hubendick, 1953) are based on Sjöstedt material from 3000–3500 m on Mt. Meru and material from Kibonoto in Berlin. Von Martens does not mention this locality and it is not clear if it is type material; there is no indication who collected it, but he must have had access to preserved animals to give such a detailed description. Hubendick's illustrations show a spermatheca and duct no longer than the penis and material I have dissected from 3100 m on Mt. Kilimanjaro had them only slightly longer.

THE CLASSIFICATION OF EAST AFRICAN *VITRINA*

The commentary which follows forms part of a paper which was never published. Å. Holm collected a species of *Vitrina* found on the forested rim of Ngorongoro Crater which I considered was new. Unfortunately the material selected as holotype and paratype was

misaid and never refound. No further material has ever been collected at Ngorogoro so far as I am aware. As I dissected more material from East Africa further characters came to light which I had not considered when dealing with the Ngorogoro material so until more material is collected there it would be unwise to describe it. Since the crater is a well-known tourist attraction the forested crater slopes probably remain undamaged and further material will one day become available.

Von Martens (1895, 1897) was the first person to describe Vitrinidae from East Africa (as distinct from Ethiopia); he gave information about the mantle flaps and compared the radula of *Vitrina oleosa* von Martens, 1895, with that of *Vitrina draparnaldi* Cuvier, 1817 [i.e. *Phenacolimax major* (Férussac, 1807)]. Pollonera (1909) figured the genital anatomy of *Vitrina ibandensis* Pollonera, 1907. Pilsbry (1919: 283) established the subgenus *Calidivitrina* for *Vitrina oleosa* largely based on the premise that "the marginal teeth all have simple, thorn-like cusps, not bifid as part of them are in typical *Vitrina*" and "the mantle has no shell lobes or if present they are so small they disappear by contraction in alcohol". Another character which is also mentioned is the lack of puncturation of the shell so characteristic of Holarctic species. The many dissections carried out on the extensive material already mentioned demonstrate that either the description of *Calidivitrina* must be considerably modified or more than one group of *Vitrina* with unmodified vagina occur in East Africa. Many specimens have been examined where the marginal teeth are obviously bicuspid and pincer-shaped and others where the position of the smaller cusp becomes higher and smaller and finally is no more than a small nick at the apex of the main cusp. Whether these states correspond to different species or is sometimes mere variation in one species is not yet clear. Shell lobes are very well developed in most species, sometimes almost enveloping the whole shell. In fact some of the largest I have seen have been in Holm 61 from the Ruwenzori, Mijusi Valley, which is strongly at variance with Pilsbry's observations. Finally *Vitrina variopunctata* Connolly, 1925, from Mt Elgon (Connolly, 1925) has either the whole shell or all but half of the body whorl punctate. It is clear therefore that none of the characters Pilsbry mentioned to distinguish *Calidivitrina*, holds for the rest of East Africa.

Hubendick (1953) published a review of the anatomy for the eastern African species with drawings of the dissections of all the type specimens he could locate. His main interest was to determine the relationships of these species to the European species. The results did not establish how many valid species there actually were nor how they could be distinguished anatomically. The drawings of the genitalia are not strictly comparable. He did demonstrate that two quite different groups of vitrinid occurred in eastern Africa. Some material from Muhavura (on the border of Uganda and Rwanda: 1°23' S, 29°41' E) collected by Hedberg had the specialised vagina of *Phenacolimax Stabile*, 1859, but no further material has been discovered. Forcart (in litt.) did determine a green-shelled species with black animals from high altitudes on Mt Kenya as *Phenacolimax spec. nov.* but later (1978) made no reference to this and I think it was in error.

Forcart (in litt.) stated that he had seen no material from Ethiopia that could be attributed to *Calidivitrina*. He had dissected a good deal of material collected by Hugh Scott. Having dealt extensively with European Vitrinidae (1944, 1949, 1952, 1954, 1955, 1956a, 1957, 1959) he turned to those of Africa (1956b, 1959, 1978). In his 1959 paper he refers Ethiopian material to *Phenacolimax Hesse*, subgenus *Arabivitrina* Thiele, 1931. I sent him a considerable amount of material between 1957 and 1960, but eventually he found he could not prepare an account of the actual species involved; he still emphasized (in litt., 1978) the simple marginal cusps and reduced mantle flaps as a distinction of *Calidivitrina* which means, I think, that he could not have examined all the material I sent to him much of which had clearly bicuspid marginals and very extensive mantle flaps. He also mentioned

the lateral serration below the ectocone in some outer marginals in typical *Vitrina* were not found in *Calidivitrina*, but I have found the outermost marginals in some specimens are serrate with up to seven cusps (e.g. Mt. Kenya, Ragati Forest, 2000 m, Holm 173). Forcart also pointed out (in litt., 10.iii.1958) that *Eucobresia* Baker, 1929 (*Semilimax* Hesse, 1923, non Gray, 1847) could not be distinguished from *Calidivitrina*, the latter being the older name. Hausdorf's (2002) recent cladistic analysis of the Vitrinidae is, however, strongly at variance with this. *Calidivitrina* is placed closer to *Arabivitrina* than to *Eucobresia* and he points out that the Vitrininae auct. include the groups in which the vaginal stimulator has been lost, namely *Vitrina* and *Calidivitrina*, and is polyphyletic. He suggests that subfamilies are not necessary. Of the seventeen characters used by Hausdorf in his character matrix used for the analysis, seven are not applicable to *Calidivitrina* since the stimulator and perial tunica are absent; the seventeenth character assumes that the marginal teeth are never multicuspid but this is not always correct. He estimates the number of species of *Calidivitrina* to be eight but also states five *Arabivitrina* occur in East Africa so presumably he is including Ethiopia. I have seen no *Arabivitrina* from East Africa which bearing in mind the close affinity of Ethiopian and Kenya highland plants and animals is surprising. He does not record *Phenacolimax* from East Africa so presumably doubts Hubendick's record.

VARIATION IN CHARACTERS AT SPECIFIC LEVEL

1. Colour of shell and animal.—The colour of the shell varies from white to dark olive green, the latter *always* associated with high altitudes on Mts. Kenya, Kilimanjaro and Ruwenzori. The animal varies from very pale whitish to jet black, the species with dark green shells always having black animals. On Mt. Kenya during the International Geophysical Year expedition in 1957 it was noted by several collectors that *Vitrina* varied considerably in colour. The report at the time mentioned the common *Vitrina* occurring at 3000 m on *Lobelia* may be one species but if so it is very variable. There may of course be several species living together. Usually the mantle and body are yellowish with black or blackish markings and the hind end of the body has a blackish dorsal streak. The sole has numerous small yellowish spots and the tentacles are darkish. Some specimens, however, are very black in appearance and the shell appears dark; others are brown and yellow and some are entirely pale with very pale markings and still others have a very distinct red tinge. Some of the differences remain noticeable in spirit material.

There is evidence, however, that material from one precise locality can be very uniform in colour and anatomy. Some 500 specimens collected near the base camp on the Sirimon Track by Wachters during the Van Goethem Mt. Kenya Bio-Expedition were sampled and found to be virtually identical and uniformly pale in colour.

Von Martens described *Vitrina nigrocincta* from Kilimanjaro with black markings around the mantle edge and much material from the mountain has such markings but some is totally devoid of them. It seems doubtful that species can be distinguished on colour although the green-shelled black animals are not the same as the paler ones although little material has been available for anatomical work.

2. Radula.—As has been mentioned there is considerable variation in the cusps of the marginal teeth varying from virtually thorn-like unicuspid teeth with a mere minute notch at the base of the long cusps to distinctly bicuspid pincer-shaped teeth. My studies of populations from one area indicate that the shape is constant but a more detailed study including possible changes during the development of the animal is needed to check this.

The number of teeth in a row is known to be highly variable in many groups of snails but it may possibly be of some use as a character. The formula in *Vitrina oleosa* from Holm s.n. was given by Hubendick (1953) as 35.13.c.13.35 and I found 30.11.c.11.30 and 27.12.c.12.27 in Holm 61 and Holm 47, all three from the same locality Bujuku Valley (Ruwenzori, Uganda). Widely differing numbers have been found in other species. I found the formula for *V. variopunctata* (Mt. Elgon, Holm 76) to be 15.9.c.9.15 and Peile (in Connolly, 1931) gives 22.10.c.10.22. Up to 54 marginal teeth occur in material from the East Aberdares (Holm 267). There is variation in the cusps of the outermost marginal teeth which can be two-cusped like the rest or three to five- or even seven-cusped. Mordan & Marins (2001) show that the variation in the marginal teeth of the vitrinid genus *Plutonia* Stabile, 1864, in the Azores is even more diverse.

3. Genital anatomy.— Apart from the *Phenacolimax* from Muhavura (Uganda) the variation in the lower ducts of the East African material dissected is restricted. The narrow spermatheca gradually passing into a short duct found in *Vitrina oleosa* differs noticeably from the oblong, ellipsoid or subglobose spermatheca more clearly demarcated from the duct found in all other East African species dissected. The duct varies mostly from under 1 mm to 4 mm but ducts up to 8 mm have been found in one specimen from Mt. Kenya and probably indicates a distinct species. The vagina varies from almost obsolete to 3 mm long.

The internal structure of the penis, particularly of the folds and penial gland, may provide the most useful characters for specific distinctions. Hubendick (1953) discusses this and figures sections but I have found them very confusing. Neubert (1998) gives more intelligible drawings of an Arabian species. The variation and development within one species needs investigation and also the effect of different methods of preservation on the appearance of the organs. Penial glands which appear very different in single preparations may owe the differences to these reasons rather than to intrinsic specific differences.

4. Mantle flaps.— The mantle flap varies from a narrow arc to a large elongate structure which almost covers the shell reaching 9 mm long and 11 mm wide with right hand lobe 5 × 12 mm. The size doubtless varies according to the development of the animal and the mode of preservation may alter the size. Notes need to be made on living animals.

NAMING *VITRINA* FROM EAST AFRICA

Apart from type material most subsequent specimens have been named *Vitrina* sp. or given a name purely on geographical grounds. The following comments may help to direct future field work undertaken to try and sort out the species.

Vitrina oleosa from Ruwenzori is apparently well characterised by its elongate or obovoid spermatheca gradually passing into the duct, reduced mantle lobes, aculeate marginal teeth and yellow-green depressed shell. Pilsbry (1919) described the animal as dirty chamois with pale grey marbling but von Martens (1895) describes it as blackish. Von Martens states there is no neck flap and only a small tongue shaped shell flap and Pilsbry states they are more or less absent. My own examination of Holm 47 and 61 from Mijusi Valley at 3950–4000 m agrees with the shape of the spermatheca and duct and the marginal teeth but the mantle flaps are very well-developed in Holm 65 and perhaps suggests another species may be present. Anything from the Ruwenzori range with a greenish amber shell and uniformly black animal can be assumed to be *V. ibandensis*. Pollonera (1909) figures the genital anatomy of this but makes no mention of mantle flaps; using his

information that the drawing is enlarged by four times the vagina is distinct, 2.5 mm long and the lower part of the penis elongated, 5 mm long. The penis certainly differs from the figures given by Hubendick (1953) of the other two green-shelled *Vitrina* which have been dissected – *V. ericinellae* d'Ailly, 1910, and *V. viridisplendens* d'Ailly, 1910, both from Kilimanjaro. Hubendick also states that the vagina is "very short" and "hardly any" respectively although this is not clear from his figures. Pollonera also described *V. cagnii* Pollonera, 1906, from Ruwenzori but figured only the shell. Pilsby (1919) reduces this without comment to *V. oleosa* and the figures of the shells suggest this is correct, but if it is eventually proved that several species occur on the mountain this name will also have to be taken into account. Attempts to find Pilsby's original dissected material proved unsuccessful. Thiele (1911) also described *V. bambuseti* from Sabinjo (Sabinio) and *V. tenuissima* from Karisimbi (Karisimbi), both volcanoes in the Virunga Mts. in eastern D.R. Congo (formerly Zaire). The material was in spirit but he did not describe the anatomy although Hubendick (1953) later described the latter.

The *Phenacolimax* known from Muhavura (Hubendick, 1953) has not been named but is unlikely to be identical with the Ethiopian species. I have not seen the original Hedberg material and do not know how adequate it is. No further material has been seen.

The only species actually described from Mt. Elgon is the most easily recognised of all East African species, viz. *V. variopunctata* with a small very compressed shell. Connolly pointed out that it was characterised by the whole shell being punctured all over [not just the apical whorl as in *Vitrina pellucida* (Müller, 1774)] and he also figures the radula (Peile, in Connolly, 1931). My observations on material collected by Holm (Holm 76 from E. Elgon at 2900 m) and Anderson (E. Elgon, 2490 m) indicate that the extent of the puncturing can be variable and often lacking on the main part of the body whorl.

Hubendick (1953) describes the genitalia of an unnamed *Vitrina* collected at 4250 m on Koitoboss, Mt. Elgon. His figure does show the inside of the penis but he gives a description of the folds, which is difficult to follow but suggests it is a distinct species.

I have examined specimens of a *Vitrina* (Holm 131) from the eastern side of Mt. Elgon at 3150 m with a small amber shell but very marked mantle flaps and a very characteristic penial gland and pincer-shaped marginal teeth. There are therefore probably three distinct *Vitrina* on Mt. Elgon.

Material from the fairly close Cherangani Hills (Holm 55 and 65), 4 km N. of Kaisungor at 2900 m, has a combination of distinctive characters: a quite strongly striate shell, a long atrium, very distinct vagina, distinctive penial folds and clearly bicuspid pincer-shaped marginal radula teeth. Sample I.F. Thomas 4, collected by Pokot children on giant lobelia at 3150 m on Cherangani, also had clearly bifid marginal teeth with the main cusp about three times the size of the smaller one; the internal penis structure was not conform with that in the Holm material and was taken up entirely by glandular material, the gland cap is acuminate and beneath it there are about a dozen annular flanges.

A great deal of material has been collected in the Kenya Highlands and has mainly been named *Vitrina ugandensis* Thiele, 1911, which was described from Kenya, Mau Escarpment from shells alone, or *V. lactea* Connolly, 1925, described from Mt Kenya (material collected by Kemp and by Gregory is cited). Connolly (1925) merely mentions that *V. lactea* has a less prominent apex but he does, however, give radula information for *V. lactea* provided by Peile. This shows the marginals to be aculeate with a small entocone. Material from rather lower altitudes has usually been attributed to *V. ugandensis* and that from over 3000 m to *V. lactea*. Smith (1903) gave the altitude of material collected by Doherty on the Mau Escarpment as 6500–9000 ft (1950–2700 m). The lowest altitude for *Vitrina* in Kenya is material collected at Thika, Chania Falls, 1500 m (Polhill 110).

Holm 267 from the E. Aberdares at 2900 m is distinctive in having more marginal

teeth than seen in any other East African *Vitrina*, the formula being 50–54.11.c.11.50–54; they are clearly two-cusped and the outer ones distinctly pincer-shaped. The perial gland is distinctive with capitate apex with about a dozen flanges beneath and with a row of seven nodules arranged longitudinally and just overlapping the flanges. Whether these are homologous with the much more spiniform papillae described by Mordan & Martins (2001) for one of the vitrinids from Santa Maria, Azores, is an interesting question. An immature specimen, Holm 168, just labelled Aberdares, but from the same altitude, had the formula 29.9.c.9.29 with similar teeth.

There are at least four species of *Vitrina* on Mt Kenya and it is necessary to decide which should be called *V. lactea*. Hubendick (1953) gives a detailed description and figures of the genitalia of material collected by Holm in the eastern part of the Teleki Valley at 4150–4230 m which he refers to *V. lactea*, but does not mention the colour of the shells or animals nor does the radula description mention the marginal teeth in detail. Other material collected by Holm from the Tyndall Glacier at 4450 m is referred to *V. baringoensis* E.A. Smith, 1894, which both Connolly (1925) and I (Verdcourt, 1956, 1983) have demonstrated is not a *Vitrina*. The anatomy is said to scarcely differ from the material referred to *V. lactea* and the colour of the shell and animal and details of the marginal radular teeth are missing. *Vitrina baringoensis* was based on material from two well-separated localities, Baringo and Mt. Kenya, and probably covers more than one species of shelled Urocyclidae ('*Helicarion*' of earlier authors). Abundant material (10 D), collected by Wachters during the Belgian Mt Kenya Bio-Expedition at the base camp on the Sirimon Track, has shells which exactly match the type material of *V. lactea* and the radula conforms.

Å. Anderson collected many specimens near the Meteorological Station on the Naromoru Track at 3080–3150 m which have shells matching *V. lactea* and a radula agreeing with that depicted by Connolly. Other specimens examined with similar marginal teeth were collected by Anderson in the Teleki Valley at 3715 m. Elsewhere on the mountain material with very different two-cusped pincer shaped marginals occur at varying altitudes, Holm 189 from Ragati Forest at 2000 m, Tattersfield from near Lake Ellis at 3500 m, and Holm s.n. at 3280 m on the W. side of the mountain.

One specimen collected by Liliane (143D) near the base camp on the Belgian Mt Kenya Bio-Expedition has the spermathecal duct 8 mm long, 2–3 times longer than in other material examined; it may well represent a distinct taxon.

Material with dark green shells has been collected by Mrs Joy Bally (later Mrs Joy Adamson) at 3150 m in the MacKinder Valley but no animals were preserved. M. Coe collected material with very soft deep shells and intensely black animals under rocks with little vegetation on the Lewis Glacier moraine at 4440 m. Forcart (in litt., 19.v.1968) suggested this might be a new *Phenacolimax* but no mention was made of it in his paper (1978) and I do not think he dissected it. I hope to trace this material and examine it.

Five species have been described from Kilimanjaro. *Vitrina nigrocincta* was described by von Martens (1897) and has been mentioned previously. I have examined several lots of material which one would expect to be the same as Volkens's lower altitude specimens. Holm 218 from NW. of Bismarck (now Mandara) Hut at 3100 m had the marginal teeth with the long cusps five times as long as the short ones and Holm 203 from near the Hut itself at 2480 m had similar cusps, but Holm 208 from near the Hut at 2480 m had marginals with pincer-like cusps. Both Holm 203 and 208 have the animals marked with black or brown. Holm 266a from Kitoto on the nearby Mt. Meru at an unspecified altitude has marginals similar to those in his 203 and 218. D'Ailly (1910) wrote the account of the molluscs collected by Sjöstedt's Kilimanjaro-Meru-Expedition; unfortunately he gave no anatomical details. He records *V. nigrocincta* from Meru and Kilimanjaro, over 1600 specimens being collected on each mountain. He points out that von Martens's material was

juvenile (presumably on evidence of shell dimensions – there is no evidence he actually saw the material). Material was recorded from 3000–4400 m on Meru and 2500 m on Kilimanjaro. D'Ailly (1910) also described three other species from Kilimanjaro: *V. kiboschoensis* is based on 46 specimens from Kiboscho at 3000 m in the heath zone found mostly between the leaves of *Lobelia deckenii* (Asch.) Hemsl.; *V. ericinellae* is based on 174 specimens from Kiboscho also at 3000 m altitude in the heath zone with olive strigose shells with a white apex and pale brown animals, and *V. viridisplendens* is based on 64 specimens also from Kiboscho at 3000–4000 m near the upper limit of vegetation with a blackish animal and yellow-green or dark greenish brown shell. D'Ailly does not mention Dautzenberg's *V. lobeliaecola* (1908, based on material collected by Alluaud on *Lobelia* in "zône des prairies" at 3200 m) although he cites his paper elsewhere so must have been aware of it. *V. kiboschoensis* could be synonymous; from the descriptions they are similar in colour, measurements and habitat. Hubendick (1953) has dissected specimens of all the species collected by Sjöstedt; it appears that *V. nigrocincta* has a longer vagina and more numerous marginal teeth than the other three but how far the species could be distinguished by such details needs a re-examination of the abundant original material with this view in mind. D'Ailly had a keen eye and his species are probably valid. In 1955 I examined the material in Stockholm and my notes give "dark greenish brown" for *V. viridisplendens*, "grey-black radially flammulate shell white inside and with white tip" for *V. ericinellae* and "yellow-brown" for *V. kiboschoensis*. I collected *V. viridisplendens* near Peter's (now Horombo) Hut at 3750 m under stones in January 1955 but unfortunately sent all the material away for examination instead of doing it myself.

One specimen of great interest remains to be mentioned. Hubendick (1953) mentions a specimen from the Usambaras, Tanzania, collected in spirit and figures its anatomy. He seems to have been totally unaware that this is an exceptional occurrence from a low altitude (± 1000 m; Conradt collected only in the East Usambaras) and is moreover the most southerly record of the genus in Africa. Conradt's collection was made long before von Martens's great work on East African molluscs (1897) so it is curious he made no mention of this specimen. I saw no trace of a *Vitrina* whilst I lived in the area in 1949–1950. It is almost certain to be a distinct endemic species. It is a surprisingly low altitude for the genus.

Described by Thiele (1911) from shells collected by Doherty sent by E.A. Smith to von Martens without the exact locality being given (see Connolly, 1925).

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