

New mollusca from Mt. Kulal, Kenya.

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With 7 figures.

Mt. Kulal is a rather isolated peak in the Northern Frontier Province of Kenya situated near the southern end of Lake Rudolf and almost on its eastern shore ($36^{\circ} 55' E$, $2^{\circ} 45' N$). To the south is the higher Mt. Nyiro and to the east a much lower peak, Mt. Marsabit (fig. 1).

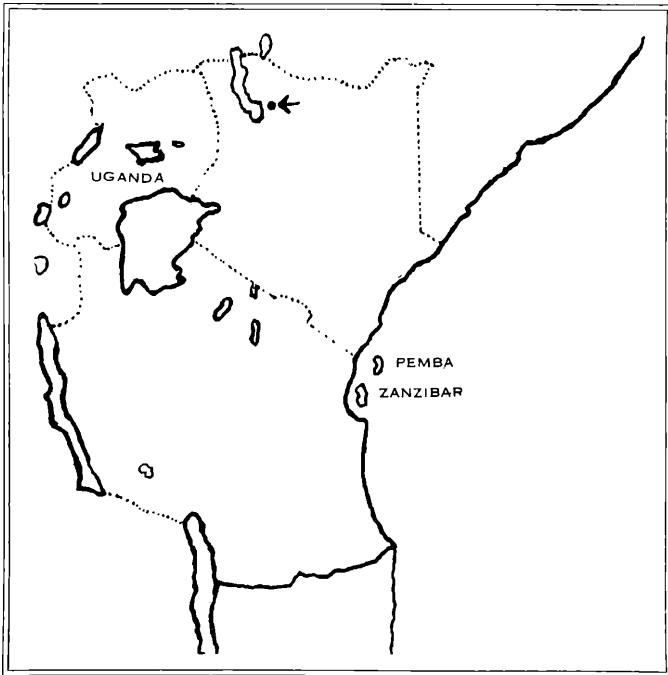


Fig. 1. Map of East Africa showing the position of Mt. Kulal.

Collections of molluscs were made on Nyiro and Marsabit long ago by A. BLAYNEY PERCIVAL and these were described by PRESTON. Kulal, however, had not been investigated although Mrs. G. ("JOY") ADAMSON and Mr. J. G. WILLIAMS both collected some shells on the mountain. I was therefore parti-

cularly pleased when Lord HOWICK (then Sir EVELYN BARING) invited me to accompany him on a safari to Kulal in July 1958; it is most unlikely that I would ever have had the opportunity of investigating it had he not done so. The main collecting carried out was botanical but time was found to collect some molluscs as well, although doubtless, many more species remain to be discovered. On 24th March 1962, Mr. R. J. B. POWER collected some specimens on the mountain which added *Falloonella* to the list, a most interesting discovery. More recently, in November, 1962, Mr. J. ALEXANDER presented me with a collection of snails he made on the mountain, which contained nothing I had not found myself, but added to the knowledge of the animal of one new subspecies.

The mountain rises to just over 2250 m. above the arid plains below, which are at an altitude of 750 m. It is clearly divided into two parts, north and south, joined by a narrow windswept bridge. The plains below are covered with a dry bushland of *Acacia reficiens*, *Disperma* n. sp. and *Acacia mellifera* with drifts bordered with *Acacia tortilis* and *Salvadora persica*. As one climbs one goes through a mixed bush of many species on stony ground (*Coleus*, *Hildebrandtia*, *Euphorbia*, *Lippia*, *Blepharispermum*, *Commiphora* etc.) then through *Acacia nilotica* with some grass, later *Acacia senegal* and *Pennisetum*, followed by proper grasslands with thickets of *Scutia myrtina*, *Carrisa edulis*, *Capparis* spp., *Grewia similis*, *Rhoicissus* spp., *Rhus natalensis*, *Euclea schimperi* and *Rhamnus* spp. The lowermost Junipers are being burnt out. Higher up, the evergreen forest is quite dense and extremely extensive; there may in fact be as much as 40 square miles of it. The main tree constituents are *Apodytes dimidiata*, *Cussonia spicata*, *Cordia abyssinica*, *Cassine aethiopica*, *Cassipourea malosana*, *Casearia* sp. cf. *battiscombei*, *Chaetacme aristata*, *Diospyros abyssinica*, *Dovyalis abyssinica*, *Drypetes gerrardii*, *Ehretia cymosa*, *Juniperus procera*, *Myrsine africana*, *Maesa lanceolata*, *Nuxia congesta*, *Olea hochstetteri* (? dominant), *Olea africana*, *Ocotea kenyensis*, *Olinia usambarensis*, *Phoenix reclinata*, *Pittosporum*, *Pygeum africanum*, *Schrebera alata*, *Syzygium guineense*, *Toddalia asiatica*, *Teclea* spp., *Trichocladus ellipticus*, *Trichilia volkensii* and *Xymalos monospora* (co-dominant higher up). The woody flora is therefore quite unextraordinary and exceedingly similar to that occurring in the central highlands of Kenya and the highlands of Ethiopia and clearly derived from them. The molluscs, however, appear to have evolved more quickly since some are apparently endemic. Further collecting may show that they occur elsewhere in northern Kenya but most of them certainly do not occur in the central highlands.

I had intended to describe most of the new species in the course of revising numerous genera but it appears that the time necessary for this work may never be available. Certain distinctive new species are therefore being described here. Others will have to await more detailed papers. A list of what is known from the mountain can be given, however.

Maizania hildebrandti kibonotoensis (D'AILLY)

Cerastua baringi n. sp. (see below)

Subuliniscus marsabitensis CONNOLLY

Limicolaria sp. close to *Limicolariopsis nyiroensis* (PRESTON) in colour and shape but apex much narrower

Halolimnobelix n. sp. (hairy) (family awaiting revision)

Halolimnobelix n. sp.

Trichotoxon copleyi kulalense VERDCOURT, 1961

Trochonanina filomarginata kulalensis n. subsp. (see below)

Trochonanina sp. near *plicatula* (MARTENS) (airstrip at base of mountain)¹⁾

¹⁾ Possibly *T. marsabitensis* (PRESTON) which may not be synonymous with *T. plicatula* as I previously suggested. PRESTON's type is unfortunately a juvenile.

Falloonella exquisita gudei PRESTON²⁾
Helicarion hians (PFEIFFER)
Tayloria urguessensis urguessensis (PRESTON)
Gonaxis rendille n. sp. (see below)
Gulella mirifica (PRESTON)
Gulella laqueus (PRESTON)
Gulella suavissima (PRESTON)
Gulella kulalensis VERDCOURT, 1962
Gulella sp. indet. (juvenile) (3×1.7 mm., probably a new species)
Streptostele sp. cf. *crassicrenulata* CONNOLLY

The fauna of the three mountains is similar but there are species which have been found on one of the mountains and not on the other two. So little collecting has been carried out that it would be foolish to make any comparison at this stage.

A very large number of *Cerastua* species have been described from north-eastern Africa, particularly by KOBELT, POLLONERA, THIELE and BOURGUIGNAT. A revision of this genus would be a lengthy task although I have accumulated some material towards it. The species described below is, as far as I can tell, undescribed. I have examined the types of all the *Cerastua* species in the museums of Berlin, Paris and London and have also seen several kindly sent on loan from Tervuren. I am therefore confident that it is not identical with any of the numerous species described by THIELE and KOBELT. A specimen was sent to Dr. ZILCH but unfortunately arrived broken, but he was able to confirm that it did not match any species in the Senckenberg-Museum which contains the holotypes of all KOBELT's species. The occurrence of a new species on such an isolated mountain is scarcely surprising. *Conulinus carpenteri* CONNOLLY, although having a much smaller shell than this *Cerastua*, nevertheless resembles it in shape.

***Cerastua baringi* n. sp.**

Figs. 3, 6, 7.

Shell of moderate size, ovate-turritiform, narrowly umbilicate, rather thin, more or less smooth, corneous brown, dull matt, sides of spire slightly convex, summit acute save for extreme apex which is blunt, apical angle 63°. Whorls 5³/₄ in holotype but 7¹/₄ in adult shells, somewhat convex, first 2¹/₂ almost smooth but under high magnifications seen to have traces of spiral sculpture at the end of the second whorl, rest with curved costulae, rather spaced on the third whorl (4 per mm.) but close on the rest (5-8 per mm.), clear-cut, prominent and crisp on the upper whorls and visible to the naked eye, but on the body whorl they are closer, but not prominent, and this whorl appears smoother; the whole of this sculptured part of the shell is covered by close wavy spiral striolae (c. 30-35 per mm.); suture shallow but well marked, the whorl very faintly flattened just below it and the transverse striae strongly sinuate in this area. Aperture pyriform, rounded at the base, scarcely receding; columella slightly

²⁾ Unfortunately the single specimen had been preserved in formalin and no part of the animal could be examined without destroying the shell. Since this is the first specimen of the genus to be found since PRESTON described it I refrained from doing this.

curved, reflexed over the narrow, deep umbilicus; the base of the body whorl is slightly "pinched" around the umbilicus and in not quite adult and juvenile shells the columella bears a ridge where it meets the part of the peristome at the apertural end of the "pinching"

Dimensions: The holotype, chosen because found living and animal has been dissected, is not quite adult. It measures, height 22 mm., breadth 12.5 mm.; aperture, height 11 mm., breadth 7.5 mm. Larger paratypes measure 27×14.5 mm., aperture 12.5×7.5 mm. and 22×14 mm.

Distribution: Kenya. Mt. Kulal, evergreen forest, 1500-2100 m., July 1958, B. VERDCOURT (holotype SMF 170237, paratypes SMF 170238/2 and Coryndon Museum), and same locality, Nov. 1962, J. ALEXANDER (Coryndon and Tervuren Museum), and same locality, mist forest, March 1962, R. J. B. POWER (Smithsonian Institution).

The body is pale grey with the neck and tentacles darker and the hind body pale grey. The pale keel has a remarkably tessellate structure as if made up of thick triangles. The mantle is marked with hieroglyphic-like streaks. The specimen preserved in spirit was dissected and the general characteristics of the genitalia are shown in fig. 6. The outer sheath of the penial complex is truncate at the end like a glove. The vagina is divided into two for a very short distance near to where the spermathecal duct leaves. The spermatheca was distorted and broken owing to the presence of a spermatophore but an unbroken one is also figured from a second specimen. Unfortunately, the spermatophore was ruined in caustic soda but was seen to consist of a long thick body and narrow tail; the body equipped with sets of appendages, each divided into about 9 acute cusps rather like clawed feet. All attempts to mount a whole or even portions of a spermatophore failed since it disintegrated completely. One of the digitiform appendages was, however, stained and mounted in water and is figured here. *C. baringi* differs from the two common Kenya species *C. bambuseti* (MARTENS) (= *mearnsi* DALL) and *C. lagariensis* (SMITH) in its rather more swollen spermathecal sac, longer atrium and less inflated vagina which is divided for a short distance; its closest affinities are, however, with these two species.

When in 1950 I first began to sort out the completely unsorted material which formed the non-marine shell collection of the Coryndon Museum I discovered five specimens of a large coloured *Trochonanina* which were unlocalised. They matched nothing else in the collection nor did they appear to match any described species. I was tempted to throw them away but was loath to do so in case some data came to hand. Nothing further could be done about them until more material turned up. Whilst climbing up the lower slopes of Mt. Kulal, I found some shells which I immediately recognised as being the same species as the five unlocalised specimens. It is very probable that the latter were collected by Mrs. G. ADAMSON, since no one else is known to have presented shells from Mt. Kulal to the museum before 1950, in fact it is practically certain that she was the first person to pick up molluscs on the mountain.

The nearest ally to this mollusc is undoubtedly *Trochonanina filomarginata* (KOBELT) (= *Bloyetia filomarginata* KOBELT). The genus *Trochonanina* needs

revision and new species should be described with caution. I have examined the type and a fair number of other specimens of KOBELT's species and I consider that the Kulal shells represent a distinct subspecies.

***Trochonanina filomarginata* (KOBELT).**

1905 *Bloyetia filomarginata* KOBELT, Nachr. Bl. dtsch. malak. Ges., 37: 128.

1909 *Bloyetia filomarginata*, — KOBELT, Abh. senckenb. naturf. Ges., 32: 7, pl. 4 f. 4.

1960 *Bloyetia filomarginata*, — VERDCOURT, Rev. Zool. Bot. Afr., 61: 245.

***filomarginata filomarginata*.**

Distribution: Ethiopia. Dire Dawa, C. F. HEMMING M 74 (Coryndon Museum), same locality, UHLENHUT (Berlin Museum); Arfatu, MAASS (SMF 63803/8 and Berlin Museum); Ganale oder Dawa, ERLANGER (holotype SMF 4826, paratypes SMF 4827/2, Berlin Museum and British Museum, Nat. Hist.).

There is also a lot in the Berlin Museum collected by UHLENHUT with the locality "Abessinien, Karamoja" but the only Karamoja known to me is in Northern Uganda. I do not know if that is the locality meant, since I have been unable to find out anything about the collector or his itinerary. He collected a number of snails in "Karamoja" which are new records if the locality is the well-known Uganda one.

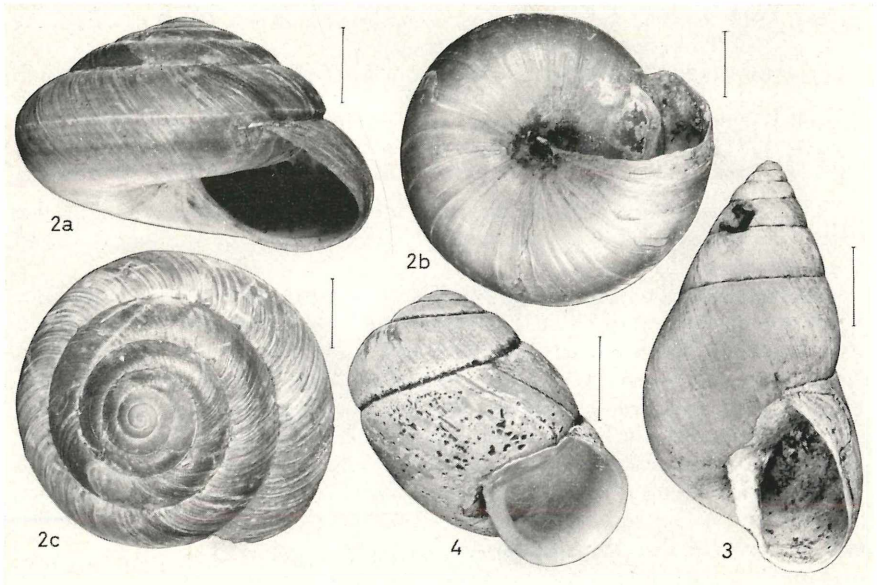


Fig. 2a-c. *Trochonanina filomarginata kulalensis* n. subsp., paratype, Mt. Kulal.

Fig. 3. *Cerastua baringi* n. sp., paratype, Mt. Kulal.

Fig. 4. *Gonaxis rendille* n. sp., holotype, Mt. Kulal.

Many thanks are due to Mr. C. A. SPINAGE for the photographs. The black lines represents 5 mm. in each case.

filomarginata kulalensis n. subsp.

Figs. 2a-c, 5.

This differs in its less flattened shape and darker colour.

Shell rather large, depressed conoid, narrowly perforate, fairly thick, somewhat shining above and below when fresh, chestnut-brown above, the extreme apex somewhat yellowish but scarcely paler; the chestnut-brown colour extends for a short way on to the base, but the peripheral keel and most of the base is cream with some yellowish transverse streaks on the base. Spire exerted, sides noticeably convex, apex bluntly rounded. Whorls $6\frac{1}{2}$, gradually increasing, convex, sharply carinate on the periphery, the keel a little less pronounced towards the outer lip of the peristome; extreme apex, consisting of 2 whorls, with spiral grooves and transverse striae giving a strong wrinkled decussate effect almost visible to a keen naked eye, rest covered with close, fine transverse striae which become a little irregular and whiteish on the body whorl; they vary in number from 6-14(-20) per mm., the upper whorl with the striae placed closest. The base has only vague transverse growth lines but there is a marked spiral element consisting of close, fine, wavy lines. There is no spiral element on the main whorls above. Suture shallow, simple towards apex of shell but slightly margined below. Aperture $\frac{3}{4}$ -lunate, peristome simple, acute, labrum receding gently to base, columella short, slightly reflexed over the narrow umbilicus.

Dimensions: The holotype measures major diam. 24.5 mm., minor diam. 22 mm., height 14 mm.; aperture, height 9 mm., breadth 13 mm. Other specimens are 0.5-1 mm. smaller or larger in every dimension.

Distribution: Kenya. Mt. Kulal, Nov. 1962, J. ALEXANDER (holotype including dissection of animal and radula in SMF 170239, worn paratypes in SMF 170240/7, Coryndon Museum and British Museum), and same locality, in evergreen forest, 1500-2100 m., July 1958, B. VERDCOURT (paratypes in British Museum and Coryndon Museum), and same locality, presumed collected by Mrs G. ADAMSON (Coryndon Museum).

The shell associated with the dissected animal has been selected as the holotype. The specimen which was photographed some years ago is a paratype and is not strictly of the same lot.

Amongst the lot collected by Mr. J. ALEXANDER was one living specimen which was coaxed out of its shell in water. The body is pale, the foot and flanks pale brownish, the head, tentacles and neck grey, the tail grey at the apex, 7 mm. long, and the sole very pale brown, 4 cm. long. The mantle is colourless, marked only with feeble, whitish dots but with no black nor chalky-white marks. On the neck the longitudinal lines between the tentacles are very noticeable. This animal was dissected and the anatomy is that of a typical *Trochonanina* as defined by my key (VERDCOURT 1961b). The main organs are shown in fig. 5. The radula was also extracted from this specimen and agrees well with typical *Trochonanina*; the formula is

$$52 : 2 + 12 : C : 12 + 2 : 52$$

The marginals are bifid with the accessory cusp higher up the shank and smaller than the main cusp.

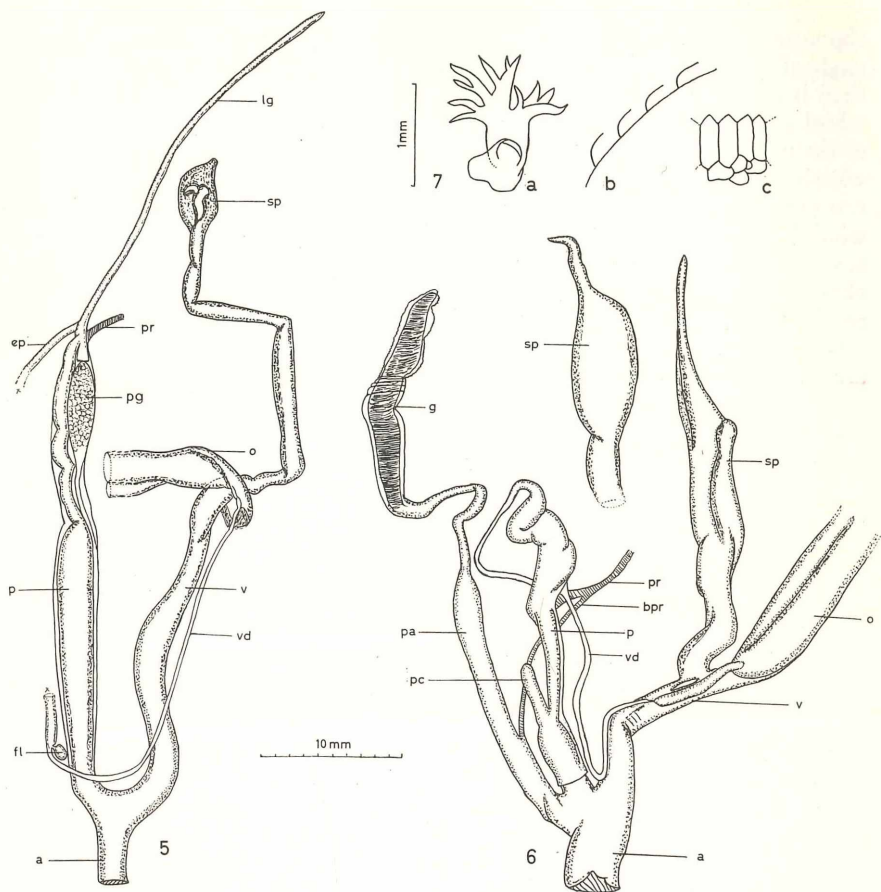


Fig. 5. *Trochonanina filomarginata kulalensis* n. subsp., part of genitalia of holotype. Fig. 6-7. *Cerastua baringi* n. sp. — 6) part of genitalia of holotype and spermatheca from a paratype; 7a) appendage from spermatophore; 7b) arrangement of appendages; 7c) tessellation of the hind body keel.

Explanation of symbols used in anatomical diagrams.

a = atrium, bpr = branch of penial retractor, ep = epiphallus, fl = flagellum, g = gland of penial appendage, lg = lime gland, o = oviduct, p = penis, pa = penial appendage, pc = penial caecum, pg = penial gland, pr = penial retractor, sp = spermatheca, v = vagina, vd = vas deferens.

***Gonaxis (Aristreptaxis) rendille*³⁾ n. sp.**

Fig. 4.

Shell comparatively large, oblong-subrhomboid, umbilicate, fairly thin, yellowish-white, often rather worn, even in living specimens, but probably dull

³⁾ The Rendille are a tribe which inhabit the area surrounding the mountain; they gave a splendid display of dancing on top of Mt. Kulal whilst I was there. Unfortunately they are also destroying the forest by burning in order to extend their grazing.

above and shining on body whorl. Spire distorted, apex, which is contained in an angle of 90° , obtuse, inclined so far backwards as to be just obscured when the shell is lying on a level plane and observed in plan view. Whorls 6, the body whorl considerably flattened above the aperture, the next whorl very convex at the point where the helicoid apical part of the shell is tilted over the lower whorls, rest of whorls slightly convex; extreme apex with rather widely spaced transverse costulae, rest of the shell, save for the flattened part of the body whorl which is almost smooth or obscurely costulate, covered with strong, close, sinuate costulae (7-10 per mm.); suture simple, well defined. Aperture polished within, oblique, rounded-quadrate, peristome thick, white, sinuate, somewhat reflexed, receding to the base, columella part of labrum slightly overhanging the narrow umbilicus. There is no dentition but just inside the aperture on the parietal wall are some transverse ribs often one very near the edge.

Dimensions: The holotype measures, height (measured along shell) 19 mm., height held tilted 16 mm., breadth (measured across shell) 12 mm. (max.) 10.5 mm. (min.), breadth held tilted 16 mm.; aperture, height 8.5 mm., breadth 8.5 mm. Other specimens measure 18.5×13 , 19×13 and 19.5×12.5 mm. A helicoid juvenile with no trace of distortion measures 9 mm. in height and 12.5 mm. in breadth.

Distribution: Kenya. Mt. Kulal, evergreen rain forest, 1500-2100 m., July 1958, B. VERDCOURT (holotype SMF 170241, paratypes SMF 170242/3 and in Coryndon Museum), and same locality, Nov. 1962, J. ALEXANDER (Coryndon Museum, Teruren), and same locality, mist forest, 1860 m., March 1962, R. J. B. POWER (Smithsonian Institution).

The shell of this species is deceptively close to that of *Gonaxis kibweziensis* (SMITH) but the latter has a thinner, less distorted shell with a less tilted apex and the type shell has faint spiral striae on the apical whorls, whereas the shell of *G. rendille* has transverse striae extending to the apex. *G. rendille* also differs in the peristome not being sinuate near the parietal margin. *G. sudanicus* (PRESTON) has a more pointed, smoother apex and is smaller but more coarsely striate. I have already given some account of the radula and genitalia (VERDCOURT 1961a) which clearly distinguish *G. rendille* from the *G. kibweziensis* group. *G. kibweziensis* (SMITH) from the type locality has not been dissected, but the closely similar *G. quadrilateralis* (PRESTON) is known anatomically. The radula of the latter is quite different from that of *G. rendille* in that it has marginal teeth on lateral pleurae (13 : 8-9 : 1 : 8-9 : 13), whereas the radula of *G. rendille* lacks these pleurae (23 : 1 : 23). The animal of *G. rendille* appears pale flesh-pink through the upper whorls of the shell and the tentacles are reddish; it lacks the orange-yellow colour which characterises *G. quadrilateralis* (PRESTON) and presumably its allies.

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