

On the systematic position of some East African Helicidae 1.

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Introduction.

H. A. PILSBRY (1919) commented long ago on the confusion attending the classification of the African Helicidae and pointed out that this was largely due to the efforts of H. B. PRESTON (1914), who described a large number of species and several genera from empty shells and assigned them to the Zonitidae! These species were separated on characters which I have found to be variable in a single population of one species e. g. shape of the shell within certain limits and colouration. The only way in which this muddle can be resolved is for living material to be collected in the type localities and the anatomy examined of each species. Even then it is sometimes exceedingly difficult to be sure that the material is really conspecific with the type, since in this family (and of course many others), where the classification is based almost entirely on anatomy, it is possible to have two very distinct species with very similar shells. Many of PRESTON's types are badly preserved and some are obviously juveniles. A large number may ultimately have to be discarded as unrecognisable. Since they mostly come from localities which are now extremely difficult and expensive to travel to, it will be many years before an adequate survey can be made. It is important, however, that some of the progress made should be recorded and in future parts of this series of papers the result of the examination of a number of species will be made known. At the end of this present part a complete list of the East African Helicidae previously described is given in chronological order of their dates of description. A proper check-list is not feasible at present.

Excluding species which are almost certainly not Helicidae this list numbers 56. The majority of these are quite unknown anatomically and in fact have never been recollected. Some may prove to belong to other families and conversely a few other true Helicids may be resting in other families under wrong generic names. The list does not of course contain every East African species originally described in the genus *Helix*. In the past this genus was a repository for most land snails of a certain shape. Such species as *H. usambarica* CRAVEN (*Tayloria usambarica*), *H. mozambicensis* PFEIFFER (*Trochonanina mozambicensis*) and *H. zanguebarica* CRAVEN (*Afropunctum zanguebaricum*) are examples.

Not until the anatomy of every species is known will it be possible to prepare a key for determination. At present the only way to name a species is to make a list of probable names by comparison with all the descriptions and figures and then to refer to the original types. Once the anatomy is known, shell characters such as sculpture, presence and absence of hairs, colour and shape will be valuable and often essential.

Summary of previous work carried out on the classification.

Up to 1913 all the species were referred to *Helix* or to *Fruticicola*, if indeed they were referred to a Helicid genus at all. In that year GERMAIN proposed a genus *Halolimnoblax* including a number of species and a subgenus *Massaihelix* for *Helix butumbiana* MARTENS. The latter species has been discussed in the list; it does not belong to the Helicidae. These names were not based on anatomical characters. PRESTON (1914) proposed his genera on the slightest of shell characters. Unfortunately, since these are the first generic names proposed, with the exception of that of GERMAIN, some of them will undoubtedly replace names based on sounder work which were proposed by PILSBRY (1919). He divided the Helicidae he was studying into three genera as follows.

Dart sacs two, arising from a common base together
with mucous glands
Dart sacs two, separated, each with mucous glands
Darts sacs and mucous glands absent

Halolimnoblax GERMAIN
Vicariihelix PILSBRY
Haplohelix PILSBRY

He expected that some of PRESTON's names would replace these when the anatomy of the genotypes was known. It is in fact even a little doubtful if the name *Halolimnoblax* is correctly used, since the anatomy of *H. bukobae* MARTENS was not and still is not properly known. WIEGMANN dissected a specimen of this and of *H. conradti* MARTENS and his results are exactly what would be expected in juveniles of PILSBRY's first group and he therefore assumed at least *H. bukobae* would have the anatomy of that group when adult.

G. PFEFFER (1931) in a paper which seems to have been rather overlooked and which I found difficult to follow, particularly as none of his results are figured, proposed a genus *Congohelix* with *H. langi* PILSBRY as genotype and also placed in it *H. zonata* PILSBRY, *H. mollitesta* PILSBRY and *H. sericata* PILSBRY, all species of *Halolimnoblax* described from the Congo with their anatomy fully figured. From a study of the genitalia of what he thought was *Zingis gregorii* SMITH (from Kilimanjaro) and *Helix sjoestedti* AILLY he proposed the sinking of *Haplohelix* PILSBRY into *Mikenoella* PRESTON. It should be pointed out that this involved accepting AILLY's identification of snails from Kilimanjaro with specimens from Mt. Kenya. No Kenya material of *Z. gregorii* had been dissected at that date. It also involves the assumption that PRESTON was correct in assigning SMITH's species to the same genus as his own *Mikenoella ahena*. The anatomy of the latter genotype is not known and as I shall show later PFEFFER's conclusion is quite erroneous. PFEFFER raises the subgenus *Massaihelix* to the status of a genus, seemingly on no additional evidence, and suggests *Percivalia* PRESTON as a synonym. I do not know if PFEFFER saw any specimens of the latter but it is over double the size of *Helix butumbiana* and in no way similar save that it is certain that neither belongs to the Helicidae. *H. kilimae* MARTENS is tentatively placed in *Elgonella* but not on any anatomical evidence. He appears to synonymise *Urguessella esau* PRESTON with *Vicariihelix orthotricha* PILSBRY and *Helix conradti* MARTENS. *Halolimnoblax hirsuta* and *H. mukulensis* PILSBRY are suggested as equalling *Urguessella urguessensis* and *U. 'capitata'* PRESTON (sic). This synonymy is not based on any examination of the types so far as I am aware. He treats *Helix 'karevia'* MARTENS as the genotype of *Halolimnoblax* but PILSBRY (1919) had already selected *Helix bukobae* MARTENS from the list

of species included by GERMAIN in his new genus and this selection is valid. PFEFFER retains both *H. karewia* and *H. bukobae* in *Halolimnoblax*. PILSBRY (1919) suggests that *H. karewia* is a *Haplobelax* and that WIEGMANN found no vestiges of a dart apparatus. PFEFFER describes its anatomy as being similar to *H. bukobae*. From figures and descriptions it would not surprise me if *H. langi* and *H. bukobae* were conspecific even though PFEFFER does separate them generically. He admits at one point that further work may show his genus *Congobelax* to be insufficiently distinct from *Halolimnoblax*.

THIELE (1931) follows PFEFFER to some extent but treats *Congobelax* as a subgenus of *Halolimnoblax* and separates the two as follows.

Dart sac and fingers of glands entirely separate	<i>Halolimnoblax</i>
Dart sacs and bases of gland fingers all springing from a common base	<i>Congobelax</i>

He accepts *Vicariibelax* to be a synonym of *Urguessella* but keeps up *Haplobelax* and dismisses *Mikenoella* as unrecognisable. The snails are also placed in the Bradybaenidae (= Fruticolidae = Eulotidae) a family split from the Helicidae. This is no doubt correct as the affinities of the African species are undoubtedly with those of the East. I prefer to follow WATSON (1943) in considering it to be a subfamily.

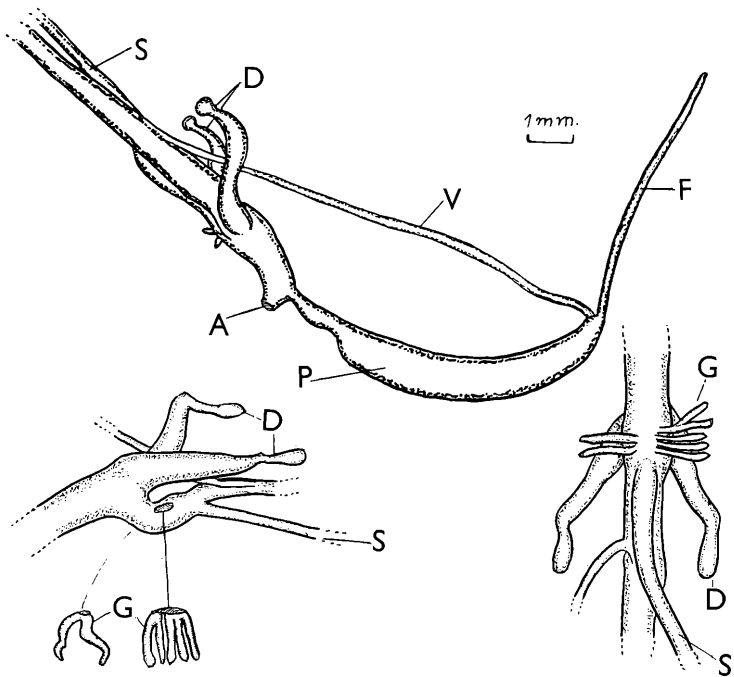


Fig. 1. *Lejeania isseli* (MORELET). — lower part of genital ducts of a specimen collected at Senafe, Kohito Plateau in Eritrea by G. POPOV. (3 views). Symbols: A atrium, D dart sacs, F flagellum, G mucous glands, P penis, S spermathecal duct, V vas deferens.

I have not been able to make much of the differences said to separate *Congohelix* and even if they were evident would not consider them of generic value.

POLLONERA has claimed that the Abyssinian genus *Lejeania* ANCEY has a single dart sac situated on the atrium and is related to European Helicids. I have examined the genital anatomy of one species referred to *Lejeania* namely *L. isseli* (MORELET) (Eritrea, Kohito Plateau, near Senafe, G. POPOV in C. F. HEMMING M 142) and this does not agree with POLLONERA's description. I found a long slender flagellum and two separated but opposite dart sacs which are long and fusiform, narrowed towards the apices which are slightly bulbous; near the base of each sac, but in reality on the vagina between the base of the sacs and the base of the spermathecal duct there are fusiform mucous glands, two on one side and 5 on the other; they are about one third as long as the sacs (see fig. 1). The genitalia are thus rather similar to those of *Vicariihelix* but the position of the glands supports the idea of a relationship with the true Helicidae. It is quite possible that the several species which have been referred to *Lejeania* belong to more than one genus. THIELE (Handbuch p. 710) indicates that the vagina bears several finger-shaped glands between and above two, symmetrical dart sacs, information probably gleaned from PFEFFER's paper. He still places the genus in the subfamily Hygromiinae, but in the species I dissected the right hand ocular retractor passes to the left of the genitalia as in the Helicellinae but in that subfamily the mucous glands are usually well removed from the base of the dart sacs.

In the Helicellinae the dart sacs vary in the single genus *Helicella* almost as much as in the forms which PILSBRY refers to three genera but the structure of the other organs is so similar that the genus *Helicella* appears to be a natural group despite this divergence. *Cochlicella acuta* (MÜLLER) and *Monacha cantiana* (MONTAGU) resemble each other closely in that both have the dart sac replaced by a peculiar appendiculum but they differ so widely in other respects that nobody would ever place them in the same genus. The comparison of the sum totals of a large number of characters is the only reliable method of assessing the affinities of different organisms, save that often the more one looks at them, the less clear cut does the classification seem to become. The decisiveness of a classification based on one character, however practical it may be, is often illusory. The clear-cut characters of whether the dart sacs and mucous glands are together, apart or absent are almost certainly features that could originate suddenly by the mutation of a single gene; it certainly is the case that these differences do not correlate well with the shape and texture of the shells. *Haplohelix* could easily be polyphyletic, derived by reduction from a variety of Helicids with different dart sac arrangements. Extremes of *Halolimnobelix* and *Vicariihelix* are anatomically distinctive but some intermediate conditions exist. Radula characters equally do not correlate well with characters derived from the genitalia. In *Halolimnobelix microspiralis* (PRESTON), *H. purpureocincta* (PRESTON) and *H. bullata* (PRESTON) the main cusps of the marginal teeth are narrow and pointed and there are one or two small ectocones but in a curious new hairy species to be described later the main cusps are bifid. *Haplohelix* cf. *lateaperta* (HAAS) has the marginal teeth as in *Halolimnobelix bullata*. In *Vicariihelix mukulensis* (PILSBRY) and in a new species from Mt. Kulal in Kenya the main cusps are bifid and there is one ectocone but in a further new species from Mt. Kenya the main

cusps are much as in *Halolimnobelix bullata* but there is only one ectocone. Too few species have been examined to comment further but confidence in genera derived purely from characters of the genitalia is not increased and it must be admitted that they are scarcely satisfactory. A detailed comparative study of the anatomy of the East African Helicidae is needed before their generic classification can be firmly established.

List of species described or recorded from Kenya, Uganda, and Tanzania.

An denotes that the species was described or the names changed with some anatomical evidence.

Helix dubia TAYLOR (1880).

Type Locality: Zanzibar. The description recalls a juvenile Trochonaninid and the type appears to have been lost. The locality is a highly improbable one for a true Helicid.

H. karewia MARTENS (1892).

Type Locality: Congo, Karevia, western foot of the mountain, 1200 m. Also in the Butagu Valley and a specimen from Uganda, Sesse in the Berlin Museum; a grey-brown, dull, very plicate, slightly keeled shell. Transferred to *Halolimnobelix* by GERMAIN (1913). The type is a very thin shell with a narrow deep umbilicus, coarse plicae and irregular striae and an expanded aperture.

Zingis gregorii SMITH (1895).

Type Locality: Kenya, Mt. Kenya, lowest forest zone. Later transferred to *Helix* by AILLY (1910) and to *Mikenoella* by PRESTON (1914) — see later paper.

Trochonanina ? rufofusca MARTENS (1895a)

Type Locality: Tanzania, Kilimanjaro, 1200-1700 m. — see later paper.

Helix kilimae MARTENS (1895a).

Type Locality: Tanzania, Kilimanjaro, 3800 m. GERMAIN (1913) places this in *Halolimnobelix* — see later paper.

H. runssorina MARTENS (1895a).

Type Locality: Congo, Ruwenzori, Butagu Valley. GERMAIN (1913) records this species (as *Halolimnobelix*) from Kilimanjaro but PILSBRY doubts the identification. His specimen may have been *H. meruensis* AILLY. I examined the type of this species in the Zoological Museum at Berlin in 1959. It is undoubtedly a true helicid; the shell measures 8×5.5 mm. and has a spire 2 mm. tall; the umbilicus is narrow, but deep, and there are traces of short hairs. In general appearance it resembles the European *Trichia hispida* (LINNAEUS).

H. conradti MARTENS (1895a).

Type Locality: Tanzania, East Usambaras, Derema — see later paper.

H. bukobae MARTENS (1895b).

Type Locality: Tanzania, Bukoba. Later made the genotype of *Halolimnobelix* GERMAIN (1913). Recorded also from Kigezi, Entebbe, Bugishu, Elgon (7000-9000 ft.) and Damba Island in Uganda. The very thin holotype is virtually

destroyed. The Bugishu material (det. CONNOLLY, British Museum) has a very reflexed peristome and may not be correctly named.

H. butumbiana MARTENS (1895b).

Type Locality: Uganda, Butumbi, Migere. Later made the genotype of *Halolimnobelix* subg. *Massaihelix* GERMAIN (1913). GERMAIN very mistakenly considered the locality to be in Masai country. The figure closely resembles certain snails which have been placed in the genus *Sitala* e. g. *S. iredalei* (PRESTON). From a study of their radulae and genitalia, *S. iredalei* and other closely related species have been shown to belong to the genus *Coneuplecta* MOELLENDORFF. I examined the holotype of *H. butumbiana* at Berlin in 1959; it is certainly not a Helicid but possibly a *Coneuplecta* or a *Trachycystis* subg. *Psichion*. The shell measures 4.5×3.2 mm. and the aperture is 2 mm. wide and 1.5 mm. tall; the sculpture is unfortunately worn away. The shell is much lower than that of *Coneuplecta iredalei* (PRESTON) and also lower and wider than that of *Prositala fernandopensis* (GERMAIN) which it also resembles.

H. sesquicincta MARTENS (1900a).

Type Locality: Tanzania, Lake Rukwa, Bamboo thicket on crater of Ngosi volcano. Placed in 'subg. *Phasis*' by MARTENS. I examined the types of this at Berlin and can definitely state that this species is not a true Helicid; the shell is yellow with two brown peripheral bands and has a fine shagreened moiré pattern. It belongs to some genus allied to *Helicarion* FÉRUSSAC, *Zingis* MARTENS or *Sheldonia* ANCEY and I suspect it is congeneric with *Macrochlamys aureofusca* described by MARTENS in the same paper.

H. infrafusca MARTENS (1900b).

Type Locality: Tanzania, Ukinga, E. of Lake Rukwa. The anatomical data given are very scanty. I have examined the type at Berlin; the shell is yellow with a narrow brown band at the periphery and a very broad one below it, but the inside of the umbilicus is yellow; the shell is covered with minute adpressed hairs.

H. fuelleborni MARTENS (1900b).

Type Locality: Tanzania, Ukinga Mountains, Bulongwa, 2000-2300 m. I examined the type of this species in the Zoological Museum at Berlin in 1959. The young shell is slightly keeled and has an elevated spire; it is covered with very short hairs.

H. binaria MARTENS (1900b).

Type Locality: Tanzania, Bulongwa. The describer suggested affinity with the genus *Phasis* now placed in the Endodontidae and also suggested that *H. binaria* was allied to *H. sesquicincta* MARTENS (vide supra); after an examination of the types I am certain that the present form is merely a juvenile of that species. There is the same colour pattern and sculpture observable in both.

Fruticicola bujungolensis POLLONERA (1907).

Type Locality: Uganda, Ruwenzori, Bujungolo. Transferred to *Halolimnobelix* by GERMAIN (1913).

F. bihungae POLLONERA (1907).

Type Locality: Uganda, Ruwenzori, Bihunga. Material from Oubangui Chari collected by B. SUNDLER has been named *Vicariihelix* cf. *bihungae* (POLLONERA) by CONNOLLY (British Museum).

Trachycystis ruwenzoriensis SMITH (1909).

Type Locality: Uganda, Mobuku Valley, 10,000-14,000 ft. Later transferred to *Halolimnolix* by GERMAIN (1913) and PILSBRY (1919). A very thin greenish-amber shell measuring 13.5×7 mm. and costate with irregular ribs.

Helix sjoestedti AILLY (1910).

Type Locality: Tanzania, Kilimanjaro. GERMAIN (1913) places this in *Halolimnolix* — see later paper.

H. alticola AILLY (1910).

Type Locality: Tanzania, Kilimanjaro. GERMAIN (1913) also places this in *Halolimnolix* — see later paper.

H. aliena AILLY (1910).

Type Locality: Tanzania, Meru.

H. (Phasis) meruensis AILLY (1910).

Type Locality: Tanzania, Meru. This species was wrongly referred to *Phasis* which is now recognised to be an Endodontid — see later paper.

Zingis gaziensis PRESTON (1911).

Type Locality: Kenya, Gazi. Later transferred to *Elgonella* by PRESTON (1914). This coastal locality is a very improbable one for a Helicid and probably wrong. The figure does not much resemble a Helicid but a paratype which measures 7×4.5 mm. is undoubtedly a juvenile Helicid.

Z. consanguinea PRESTON (1911).

Type Locality: Kenya, between Rumuruti and Mt. Kenya. Later transferred to *Elgonella* by PRESTON (1914). Very similar to *Z. gaziensis* and also to *H. runssorina* (material compared at Berlin). The types appear to be juveniles.

Trachycystis planulata PRESTON (1911).

Type Locality: Kenya, Mt. Kenya, 9,000-10,000 ft. Later referred to *Halolimnolix* by HAAS (1936). It is distinguished by its flat spire and narrow umbilicus — see later paper.

Zingis kempi PRESTON (1912a).

Type Locality: S. W. Uganda, between Mbarara and Kigezi. Later transferred to *Elgonella* by PRESTON (1914). The type is an unrecognisable juvenile.

Z. papyracea PRESTON (1912a).

Type Locality: S. W. Uganda, Kigezi. Later transferred to *Blayneella* by PRESTON (1914).

Z. planispira PRESTON (1912a).

Type Locality: Uganda, between Entebbe and Mbarara. Later transferred to *Larogiella* by PRESTON (1914). Scarcely distinguishable from *Blayneella perivali* PRESTON.

Natalina permembranacea PRESTON (1912a).

Type Locality: Uganda, Kigezi. Later transferred to *Larogiella* by PRESTON (1914).

Trachycystis nigrotincta PRESTON (1912b).

Type Locality: Kenya, between Mt. Kenya and R. Eusso Nyiro. Later transferred to *Urguessella* by PRESTON (1914). The shell closely resembles that of *U. urguessensis* PRESTON but has a higher spire. The types are worn and dirty shells.

Zingis aurea PRESTON (1913).

Type Locality: Kenya, Jombene Hills, 6,000 ft., also Nyeri and Mweru. Later transferred to *Mikenoella* by PRESTON (1914) — see later paper.

Z. bullata PRESTON (1913).

Type Locality: Kenya, Nakuru. Later made the genotype of *Nakuruella* PRESTON (1914). Very similar to *B. percivali* PRESTON — see later paper.

Elgonella eulotaeformis PRESTON (1914) (Genotype).

Type Locality: S. W. Uganda, Kagambah. This is a distinctive species; the paratypes I have seen, although small, are undoubtedly adult and measure 6.5 × 4.5 mm.; the spire is high and the umbilicus narrow and deep.

E. brunnea PRESTON (1914).

Type Locality: Kenya, Rumuruti. A distinct compact Zonitid-like shell.

E. discolorata PRESTON (1914).

Type Locality: Kenya, Larogi Hills. The type is a juvenile shell.

E. flavidula PRESTON (1914).

Type Locality: Uganda, Mt. Elgon. I have seen specimens from Futuro Dam, in Nyanza, Kenya which match the juvenile type.

E. angustior PRESTON (1914).

Type Locality: Uganda, Mt. Elgon (PRESTON says S. W. Uganda).

E. oribates PRESTON (1914).

Type Locality: Uganda, Mt. Elgon.

E. robini PRESTON (1914).

Type Locality: Kenya, Rumuruti.

E. sobrina PRESTON (1914).

Type Locality: Kenya, Rumuruti. The type is a very small shell, probably not adult, with the apical whorls roughly pitted. Connolly has referred shells from the crop of a guinea fowl (Uganda, Kagera River, C. R. S. PITMAN (British Museum)) to this species.

Burungaella mutandana PRESTON (1914).

Type Locality: S. W. Uganda, Lake Mutanda.

Blayneiyella percivali PRESTON (1914) (Genotype).

Type Locality: Kenya, Larogi Hills — see later paper.

B. purpureocincta PRESTON (1914).

Type Locality: Kenya, Nairobi — see later paper.

B. microspiralis PRESTON (1914).

Type Locality: Kenya, no precise locality — see later paper.

Larogiella venatoris PRESTON (1914).

Type Locality: Kenya, Larogi Hills (near Maralal).

L. angulifera PRESTON (1914).

Type Locality: Kenya, Larogi Hills.

L. fonticula PRESTON (1914).

Type Locality: S. W. Uganda, Lake Mutanda.

L. kombaensis PRESTON (1914).

Type Locality: S. W. Uganda, Komba. Very similar to *H. karewia* MARTENS (type material compared at Berlin) — described from the Congo (Ruwenzori).

L. malasangiensis PRESTON (1914).

Type Locality: S. W. Uganda, Malasangi.

Percivalia nyiroensis PRESTON (1914).

Type Locality: Kenya, Mt. Nyiro. This undoubtedly belongs to the Helicarionidae and to *Trochonanina* subgenus *Montanobloyetia*. It is a distinctive shell in pattern and sculpture. The apex has raised wrinkles and 3-4, very obscure, raised spiral lines.

Mikenoella elevata PRESTON (1914).

Type Locality: Kenya, Larogi Hills. Closely similar to *Zingis gregorii* SMITH but umbilicate.

M. neglecta PRESTON (1914).

Type Locality: S. W. Uganda, Kiduha. Very close in shell characters to *M. abena* PRESTON (described from the Congo) but with rather a narrower umbilicus.

Urguessella urguessensis PRESTON (1914) (Genotype).

Type Locality: Kenya, Mathews Range, Urageess. The aperture is depressed below the penultimate whorl and the umbilicus is wide; the shell is pale and the hairs short and dense all over. Closely similar to *H. mukulensis* PILSBRY. *H. fuscocornea* SMITH from Zomba, Malawi may be conspecific but the hairs on the summit of the shell are short whereas the rest are long — see later paper.

U. esau PRESTON (1914).

Type Locality: Kenya, Urageess. This species is well characterised by having the hairs regularly situated between small elevations on the striae.

U. cuticularis PRESTON (1914).

Type Locality: S. W. Uganda, Malasangi. CONNOLLY (1942) pointed out that this is a juvenile of *Larogiella malasangiensis* PRESTON.

U. capillata PRESTON (1914).

Type Locality: Congo, Burunga at the foot of Mt. Mikeno, 2,000 m. CONNOLLY has referred shells from Uganda (Kidoma, Bugonge, C. R. S. PITMAN (British Museum)) to this species.

Halolimnobelix langi PILSBRY (1919).

Type Locality: Belgian Congo, Ituri Forest, Medje. Specimens from Uganda (Bwamba Forest, E. PINHEY, R. CARCASSON) agree well with PILSBRY's description and figures. It is closely related to *H. bukobae* (MARTENS). *H. camerunensis* (AILLY) is smaller but probably allied.

H. mukulensis PILSBRY (1919).

Type Locality: Congo, Mukule. Specimens from Kenya and Uganda agree well with this species. *H. fuscocornea* SMITH is similar. *H. fuscoolivacea* SMITH is more striate and has a characteristic spiral element between the transverse striae — see later paper.

H. intonsa PILSBRY (1919).

Type Locality: Congo, Boga. Material from Uganda, Ruwenzori, Bwamba Valley collected by G. D. HALE CARPENTER has been referred to this species by CONNOLLY (British Museum). In addition several other of PILSBRY's species described from the Congo side of the Ruwenzories can be expected to occur in East Africa.

H. iredalei CONNOLLY (1925).

Type Locality: Kenya, Cherangani Hills — see later paper.

H. plana CONNOLLY (1925).

Type Locality: Cherangani Hills. Anatomy known to but not described by CONNOLLY — see later paper.

H. viatoris CONNOLLY (1925).

Type Locality: Uganda, Mbarara to Kigezi.

H. lateaperta HAAS (1936).

Type Locality: Tanzania, Ngorongoro Crater — see later paper.

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