Hazel Meredith and her contributions to the study of the land molluscs of Malaŵi

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The contributions to the study of land molluscs in Malaŵi by Hazel Maureen Meredith (1932-2014), a graduate of London and Reading Universities, resident in Malaŵi in the period 1975-1988, are evaluated. The first, and more or less only, work by E.A. Smith on the terrestrial snails of this country, then called Nyasaland, dates back to Victorian times –Hazel Meredith revived this branch of zoology by actively collecting all over the country with special attention for the minute snails dwelling in the leaf litter. Her contact with A.C. van Bruggen at Leiden University resulted in a series of papers in the period 1983-2014. The malacofauna of Malaŵi, at the crossroads of South, East and Central Africa, is rich and diverse. A number of remarkable discoveries is due to Hazel Meredith' untiring efforts (table 2), particularly as regards sampling leaf mould. The meagre Victorian checklist of a mere 30 terrestrial species was expanded to at least 150 species.

Key words: Gastropoda, Caenogastropoda, Eupulmonata, taxonomy, biogeography, history of malacology, Malaŵi.

The first, and for all intents and purposes only, work on the terrestrial snails of Malaŵi, then called Nyasaland (or British Central Africa), dates back to Victorian times. E.A. Smith (1893, 1899) described the material gathered by Harry Johnston & Alexander Whyte. Hazel Maureen Meredith (1932-2014; obituary by Chatfield & Rowson, 2014), a graduate of the Universities of London and of Reading, was attached to the Biology Department of Chancellor College of the University of Malaŵi in Zomba in the period 1975-1988 and mainly charged with teacher training. However, since her university days she was interested in molluscs. Soon she started making collections of Malaŵi material but the scanty literature was of little assistance in identifying the shells. Staff of the Mollusca Section of the Natural History Museum in London referred her to the present author in Leiden who had dabbled in Malaŵi molluscs. This was the start of an intense co-operation that lasted for roughly 35 years, in fact almost until she had to leave the house in Esplanade Road in Newquay. Thus, after a long interval, Hazel Meredith completely revived this branch of science in Malaŵi by actively collecting and promoting malacology. Originally only about 30 species were known to occur in that country. A first checklist (Van Bruggen & Meredith, 1984) amounted to at least 150 species; this list was updated twice (Van Bruggen, 1993b, 2008) – the total (an educated guess) has not changed but many of the unknown taxa have been filled in by taxonomic work throughout the years.

Fig. **1**. Portrait of Hazel Meredith, Malaŵi, 1983. Photo H.P.M.G. Menkhorst.

Hazel Meredith was fond of walking and inspired many of her hiking and mountain-climbing friends and colleagues to bring soil and forest floor leaf mould samples from remote regions. The list is long and the present author has endeavoured to mention all. Some contributed a lot of most valuable material,

J.L. Balaka*	Ms Isobyl Lacroix (variant spellings: La Croix, la Croix; initials shown as IC)
Dr S. Blackmore	J. Mtunda*
Dr R.K. Brummit	Dr R. Noble
J. Chapman	Dr B. Owen
Dr R.J. Dowsett	H. Patel*
Dr C.O. Dudley	Dr J.W. Patterson
Dr D. & Ms L.J. Happold	Ms Pat Royle
Dr B.J. Hargreaves	Dr J.H. Seyani*
Herbarium (abbreviated Herb)	M. Spurrier
P. Kamkodo*	E.J. Tawakali*
K. Kaunda*	Ms Dr Vicky A. Taylor

Table **1**. The above collectors are known to have contributed material to the Hazel Meredith collections. These are mostly expatriates, Malawians are shown with an asterisk. Care should be exercised with the interpretation of JC (for J. Chapman) and IC (for Ms Isobyl Lacroix); Chapman sometimes shows altitude which as a rule is not done by Lacroix. Some contributed a few specimens or the odd bag of leaf litter, others brought copious material and their names feature prominently on the labels.

others obtained only a few specimens. Table 1 shows the names of the collectors who contributed to the Meredith collections in the period 1975-1988. They were mostly expatriates, but there is a sprinkling of Malawians, usually colleagues with a botanical background. Incidentally, on her labels (small and in a fairly neat handwriting, see figs. 4-10) all are shown with their initials only –no collector is mentioned when she had obtained the material herself. Hazel Meredith was the first in Malaŵi to sample leaf litter so that minute snails were recovered, sometimes in large numbers. The way she dealt with the leaf litter samples brought to Zomba for sorting by herself or her assistants was exemplary – after all potentially useful material had been extracted, the remains were treated with boiling water before being dumped in her garden.

As a result, the main land mollusc collections of

Fig. **2**. Hazel Meredith in the field in Malaŵi: Lengwe National Park, near Jasi Hide, 1988. Photo A.C. van Bruggen (slide 233m).

Taxon	Family	Particulars	Publication
Chondrocyclus meredithae nov. spec.	Cyclophoridae	Northernmost record of genus centred in southern Africa (also Madagascar)	Van Bruggen, 1983
Maizania scalarioidea nov. spec.	Maizaniidae	Scalarioid species of subgenus *Micromaizania*	Van Bruggen, 1983
Neomaizania coryli nov. gen. nov. sp.	Maizaniidae	Small maizaniid with pronounced spiral sculpture on shell and peculiar penis	Van Bruggen, 1985
Fauxulus grayi nov. spec.	Orculidae	Northernmost record of genus centred in southern Africa (also Madagascar)	Van Bruggen & Meredith, 1983
Cerastua procrastinationis nov. spec.	Cerastidae	Southernmost representative of an East-Central African mountain-dwelling genus; first collected by A. Loveridge, shells discovered in MCZ by Hazel Meredith	Van Bruggen, 1993a; see also Van Bruggen, 2008: 357
Parennea various spp.	Streptaxidae	Southernmost representatives of a Central-East African taxon	Van Bruggen, 1989
Gulella meredithae nov. spec.	Streptaxidae	A peculiar species with juvenile apertural dentition; now classified in *Dadagulella*	Van Bruggen, 2000; see also Rowson & Tattersfield, 2013: 26-27
Carinazingis regalis nov. gen. nov. sp.	Urocyclidae	Rather aberrant urocyclid with a 'coronet'(frontal organ) on the head	Van Bruggen & De Winter, 1990

Table **2**. Terrestrial malacofauna of Malaŵi: major discoveries by Hazel Meredith and collaborators. It is likely that more interesting discoveries are hidden in her copious as yet unworked material in RMNH.

Malaŵi are now found at four locations, three of which in western Europe, i.e.,

(1) The Natural History Museum, London: H.H. Johnston & A. Whyte material with all types of E.A. Smith (e.g., 1893, 1899);

(2) The Museum of Comparative Zoology, Harvard University, Cambridge, Mass., U.S.A. (MCZ): Loveridge collections (A. Loveridge and collaborators, 1948-1949, see Loveridge, 1953, 1954; some types of Van Bruggen);

(3) Naturalis Biodiversity Center, Leiden (RMNH): H.M. Meredith collections (1975-1988), H.P.M.G. Menkhorst collection (1983), W.N. Gray collection, three trips to Malaŵi by A.C. & W.H. van Bruggen (1988, 1990, 1993) (almost all types of Van Bruggen are in RMNH). N.B. Naturalis Biodiversity Center is the successor to the Rijksmuseum van Natuurlijke Historie;

(4) The Musée Royal de l'Afrique Centrale, Tervuren, Belgium: the arachnologist Dr Rudi Jocqué made a major collecting trip to Malaŵi in 1981 (some mollusc types of Van Bruggen).

In addition, the National Museum of Wales (Cardiff), holds part of the Achatinidae of the Meredith collections and also some archive material. The naked pulmonates (slugs) of these and subsequent collections are still out on loan to Dr J.L. Van Goethem of the Brussels Museum.

In the Meredith material many taxa new to Malaŵi were discovered, including a host of species new to science. Her major discoveries are shown in table 2. There are three eponyms, i.e., *Chondrocyclus meredithae*, *Gulella meredithae*, and *Neomaizania coryli* (an epithet referring to her Christian name: *Corylus* = hazel tree). Incidentally, new research has now revealed that *Gulella meredithae* is a representative of the recently described genus *Dadagulella* Rowson & Tattersfield, 2013: *Dadagulella meredithae* (Van Bruggen, 2000), see Rowson & Tattersfield (2013: 26-27). As regards other organisms, a least one insect species from Malaŵi (an earwig: Dermaptera) was named after Hazel Meredith (Brindle, 1985). Many of the new taxa discovered probably have a wider distribution –endemism, let alone restricted range endemism, among the malacofauna of Malaŵi is a moot point. Borderlines drawn up by colonial powers have no ecological/biogeographical bases and the neighbouring countries have not yet been thoroughly researched in re the terrestrial snails.

Extensive but unfortunately unpublished breeding experiments by Hazel Meredith showed *Achatina (Lissachatina) mulanjensis* Crowley & Pain, 1981, to be a

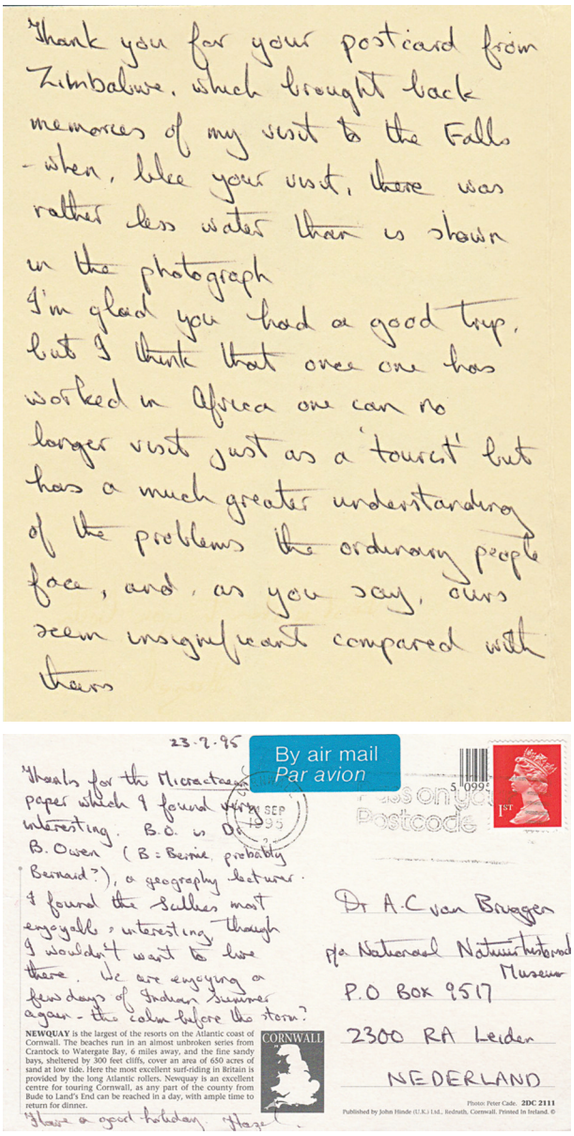
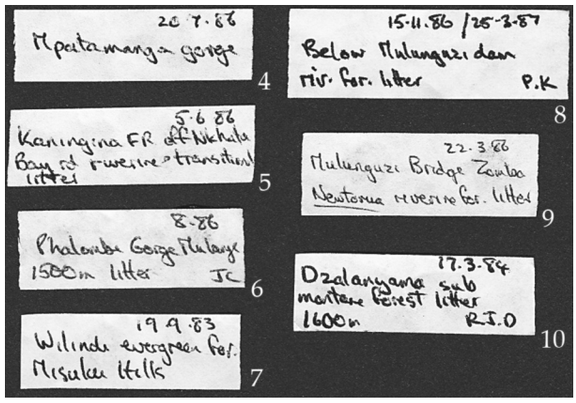


Fig. **3**. Two samples of the handwriting of Hazel Meredith.



Figs. **4-10**. Provisional labels by Hazel Meredith, about three times enlarged, all referring to *Thapsia pinguis* (Krauss, 1848). These labels for small material, rolled up, normally fit all sizes of transparent capsules used. Collectors are indicated by initials (figs. 6, 8, 10); when no collector is mentioned, the material was collected personally by herself (figs. 4, 5, 7, 9). Subsequently the National Atlas of Malawi (1983) is consulted for details such as the names of the districts and the altitudes. Most, if not all, abbreviations speak for themselves, such as F.R. for Forest Reserve, N.P. for National Park, Z.P. for Zomba Plateau, etc. Small specimens are usually derived from leaf litter; this is infrequently mentioned on the labels. Note collector's abbreviation JC in fig. 6 (cf. Table 1), this stands for J. Chapman. In re fig. 10, Dr. R.J. Dowsett always gives altitudes. The labels read as follows: (**4**), 20.7.1986, Mpatamanga gorge; (**5**), 5.6.86, Kaningina FR off Nkhata Bay rd, riverine & transitional litter; (**6**), 8.86, Phalombe Gorge Mulanje, 1500 m litter JC; (**7**), 19.9.83, Wilindi evergreen for., Misuku Hills; (**8**), 15.11.86/25.3.87, Below Mulunguzi dam, riv. for. litter, P.K.; (**9**) 22.3.86, Mulunguzi Bridge Zomba, Newtonia riverine for. litter; (**10**), 17.3.84, Dzalanyama submontane forest litter, 1600 m, R.J.D.

pallid morph of, and therefore a synonym of, *A. immaculata* Lamarck, 1822 (vide Van Bruggen, 2007, 2008). This meticulous work by her is another important achievement and a real contribution to the malacology of Malawi.

Hazel Meredith spent some of her sabbaticals in Leiden with the present author in the then Rijksmuseum van Natuurlijke Historie with all facilities supplied, where they worked together intensely for extended periods. Arriving in Leiden, she always brought more than welcome presents –we owe the magnificent Atlas of Malawi and some relevant books on Malawi to her. The first of our three trips to Malawi (1988) was mainly organized by her so that we (i.e. the author and his wife) could get a general impression of the country and its ecology as far as land snails are concerned. We enjoyed her hospitality in Zomba. At that time she had geese as entirely reliable watchdogs. We distinctly remember her cockerel who awoke us at all sorts of ungodly hours, but ended up being served for our farewell dinner. This trip was a resounding success and wetted our appetite for more. After her return to England, our second and third trips (1990, 1993) were partly used to try to fill in some of the blanks on the molluscan map. She herself was very fond of travelling, e.g., after settling in Cornwall in 1988 she flew repeatedly to New Zealand in order to visit old Malawi friends that had retired to that country.

Finally, the author is grateful to Hazel for regularly closely scrutinizing his manuscripts. English is a language foreign to him and she always willingly corrected his papers, teaching him not to split his infinitives and a host of other things, thereby improving his essays in very many respects. She was a good and patient teacher!

In summary, Hazel Meredith's direct and indirect contributions to the study of the land molluscs of Malawi surpasses that of the early pioneers and other collectors –sustained collecting with leaf litter sampling over many years all over the country has led to major discoveries and new insights in re the composition of the fauna of this country. Indeed, the terrestrial snails of Malawi, at the crossroads of South, East and Central Africa, fully reflect its interesting biogeographical position as an intermediate between those parts of the Afrotropical Region.

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References

Atlas, The National – of Malawi, 1983: i-vi, 1-79. Malawi Government, Lilongwe.

Brindle, A., 1985. A new species of *Isolabes* Verhoeff (Dermaptera: Carcinophoridae) from Malawi. –Nyala 11 (1): 12-14.

Bruggen, A.C. van, 1983. On some terrestrial operculates (Mollusca, Gastropoda Prosobranchia) from Malawi, with the description of two new species. –Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C) 86: 1-14.

Bruggen, A.C. van, 1985. *Neomaizania coryli*, a new genus and species of Maizaniidae (Mollusca, Gastropoda Prosobranchia) from Malawi, South Central Africa. –Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C) 88: 395-403.

Bruggen, A.C. van, 1989. Studies on *Parennea* (Mollusca, Gastropoda Pulmonata, Streptaxidae) additional to the revision by Adam & Van Goethem, 1978. –Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C) 92: 1-56.

Bruggen, A.C. van, 1993a. *Cerastua* in the south revisited, a new taxon in Malawi and Zambia (Mollusca, Gastropoda Pulmonata: Enidae). –Proceedings Koninklijke Nederlandse Akademie van Wetenschappen 96: 143-149.

Bruggen, A.C. van, 1993b. Studies on the terrestrial molluscs of Malawi, an interim progress report with additions to the check-list. –Archiv für Molluskenkunde 122 (Adolf Zilch-Festschrift): 99-111.

Bruggen, A.C. van, 2000. Studies on the Streptaxidae of Malawi (Mollusca, Gastropoda Pulmonata) 5. Description of *Gulella meredithae* nov. spec. –Zoologische Mededelingen Leiden 74: 225-235.

Bruggen, A.C. van, 2007. Terrestrial molluscs recorded from Mt. Mulanje, Malawi. –Nyala 24: 17-37.

Bruggen, A.C. van, 2008. New studies on the land molluscs of Malawi, a second interim progress report. Prolegomena for a new checklist.. –Basteria 72: 353-368.

Bruggen, A.C. van & Meredith, H.M., 1983. *Fauxulus grayi* n. sp., a biogeographically interesting addition to the land snail fauna of Malawi, South Central Africa (Gastropoda Pulmonata: Orculidae). –Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C) 86: 309-323.

Bruggen, A.C. van & Meredith, H.M., 1984. A preliminary analysis of the land molluscs of Malawi: 156-171. In: A. Solem & A.C. van Bruggen, eds., World-wide snails: Biogeographical studies on non-marine Mollusca: I-IX, 1-289. E.J. Brill/Dr. W. Backhuys, Leiden.

Bruggen, A.C. van & Winter, A.J. de, 1990. *Carinazingis regalis* nov. gen. nov. spec. from Malawi, an urocyclid snail with a frontal organ and not belonging to *Gymnarion* (Mollusca, Gastropoda Pulmonata: Urocyclidae). –Proceedings Koninklijke Nederlandse Akademie van Wetenschappen 93: 235-252.

Chatfield, J. & Rowson, B., 2014. Hazel Maureen Meredith (1932-2014). –Journal of Conchology 41 (6): 785-787.

Crowley, T.E. & Pain, T., 1981. *Achatina (Lissachatina) mulanjensis,* a new species from Malawi (Mollusca, Gastropoda, Pulmonata). –Revue de Zoologie africaine 95: 954-958.

Loveridge, A., 1953. Zoological results of a fifth expedition to East Africa VII. Itinerary and conclusions (with an appendix on the avifauna by C.W. Benson). –Bulletin of the Museum of Comparative Zoology at Harvard College 110: 445-487.

Loveridge, A., 1954. I drank the Zambezi: i-xiv, 1-296. Lutterworth Press, London.

Rowson, B. & Tattersfield, P., 2013. Revision of *Dadagulella* gen. nov., the "*Gulella radius* group"(Gastropoda: Streptaxidae) of the eastern Afrotropics, including six new species and three new subspecies. –European Journal of Taxonomy 37: 1-46.

Smith, E.A., 1893. On a collection of land and freshwater shells transmitted by Mr. H.H. Johnston C.B. from British Central Africa. –Proceedings of the Zoological Society of London 1893: 632-641.

Smith, E.A., 1899. On a collection of land snails from British Central Africa. –Proceedings of the Zoological Society of London 1899: 579-592.