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## NEW TAXA OF STREPTAXIDAE AND ENIDAE (MOLLUSCA, GASTROPODA PULMONATA) FROM SOUTH AFRICA AND MALAWI

by

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With 9 text-figures

For various reasons a number of discoveries in the field of Southern African malacology has now reached a point where there is no need for further delay in publication.

In the course of a long term project, the revision of the Streptaxidae of Southern Africa, three new taxa have come to light which are described below. Mr. C. C. Appleton (Bilharzia Research Unit, Nelspruit, South Africa) during an extended period of research in Tongaland (NE. Zululand, South Africa) has found a remarkable new form of the genus *Gulella* L. Pfeiffer, 1856. This is seemingly closely related to a recently described extinct species from Aldabra Island in the western Indian Ocean (Van Bruggen, 1975). It is an unfortunate consequence of the rules of zoological nomenclature that the extinct form on Aldabra, *G. p. peakei* Van Bruggen, 1975, is the nominate subspecies, while the extant, continental form, *G. p. continentalis* n. subsp., undoubtedly the ancestor of the island subspecies, now has to be described as a subspecies of the island form instead of the other way round.

It is convenient to add the description of two new species of *Gulella* as it is unlikely that further material of these will be forthcoming in the near future. One of the species was already discovered in the Transvaal in 1966 by the present author, but the availability of only two specimens of this otherwise quite distinct species was the reason for delay here. The second species is another discovery in Tongaland by Mr. Appleton and, although

founded on a singleton, was deemed sufficiently characteristic to warrant description. This has become necessary in view of the preparation of a forthcoming joint paper with Mr. Appleton on the terrestrial molluscs of Tongaland.

Unfortunately no alcohol material of the *Gulella* species is available; however, species in this genus are usually easily characterized by the shell.

The new species of the family Enidae was collected by Mr. A. J. Hall-Martin (now at the Mammal Research Institute, University of Pretoria) in 1970 during a survey of the vegetation of the Lengwe Game Reserve in Malawi (Nyasaland). This species belongs to the so-called coloured Enidae, a difficult group of species in southeastern Africa. A prolonged study of the specimens, consultation with various colleagues, and a scrutiny of collections in various museums has led to the conclusion that the species is as yet undescribed. Unfortunately no alcohol material is available so that the species may not be more sharply delimited; nevertheless it is now felt that description is warranted.

The following abbreviations have been used: BM — British Museum, (Natural History), London; NM — Natal Museum, Pietermaritzburg, South Africa; RMNH — Rijksmuseum van Natuurlijke Historie, Leiden, Holland; l/d — ratio length/major diameter of shell (for *Gulella* material this has been calculated from micrometer readings).

Acknowledgements are due to the following persons for hospitality in their institutions, professional advice, or other assistance: Prof. P. L. G. Benoit (Musée Royal de l'Afrique Centrale, Tervuren, Belgium), Dr. E. Gittenberger (Rijksmuseum van Natuurlijke Historie, Leiden), Dr. J. J. van Mol (Université Libre de Bruxelles, Belgium), Mr. J. F. Peake and his staff (British Museum (Natural History), London), Dr. A. Zilch (Senckenberg-Museum, Frankfurt am Main, Germany). The Council for Scientific and Industrial Research (C. S. I. R., Pretoria, South Africa) and the Natal Museum have sponsored the 1966 collecting trip on which *Gulella wendalinae* n. sp. was discovered. The illustrations are due to the professional skill of Mr. H. Heijn, staff artist of the Department of Systematic Zoology of Leiden University.

The author owes a special debt of gratitude to Mr. C. C. Appleton for depositing his valuable and extensive Tongaland material in the Leiden museum and to Mr. A. J. Hall-Martin for also placing his material at the disposal of the present author.

## STREPTAXIDAE

***Gulella peakei continentalis*** n. subsp. (figs. 1, 3)

Diagnosis. — A continental subspecies of *Gulella peakei* Van Bruggen, 1975, mainly characterized by the presence of an additional basal process.

Description of shell. — Shell (fig. 1) small, cylindrical-ovoid, greatest width about the middle, with open umbilicus, costulate, creamy white or transparent when fresh. Spire produced, sides slightly to markedly convex, subparallel, apex somewhat flattened, obtusely conical. Whorls six-and-a-half to six-and-three-quarters, convex and sculptured with comparatively prominent, regular, straight and perpendicular, widely distant, costulae, interstices much wider than riblets, smooth, under high magnification very finely granulate. In front view the shell shows only about eleven costulae on the part of the whorl above the aperture; the last whorl has a total of about fifteen riblets. Initial two whorls smooth, very finely granulate under high magnification; penultimate and last whorls comparatively small. Sutures shallow, simple to subcrenulate, somewhat impressed. Aperture (fig. 3) somewhat oblique, invertedly triangular with smoothly rounded base, about as high as wide, peristome fairly thick, expanded and somewhat reflected, white and glossy, dentition more or less five-fold. To the right of the middle of paries a fairly large, obliquely perpendicular, angular lamella, which is nothing but a V-shaped pleat in the peristome, connected with labrum; about halfway down the labrum a superficial swelling may be interpreted as a labral process; somewhat below this, but much deeper inside the aperture, and at a slight distance from the tip of the angular lamella, a blunt inner labral process is seen, slightly above which there is a much smaller and less prominent process or swelling, frequently a mere continuation of the inner labral process (the latter as a whole may alternatively be interpreted as a lamella with a marked constriction); a rather superficial denticle or swelling on the left of the base; a large, blunt and prominent columellar lamella. The inner labral and basal processes correspond to shallow depressions on the outside of the aperture; the columellar lamella corresponds to a shallow furrow on the left of the outside bottom of the aperture, thus adjoining the umbilicus.

Animal unknown.

Measurements of shell: 1.9-2.3 × 1.2-1.4 mm, l/d 1.35-1.75 (mean 1.55, average of 24: 1.55), length last whorl 0.8-0.9 mm, aperture length × width 0.6-0.7 × 0.6-0.7 mm, 6½-6¾ whorls. Table 1 details the measurements of the holotype (no. 22) and 23 paratypes.

Distribution. — Northeastern Zululand.

TABLE I

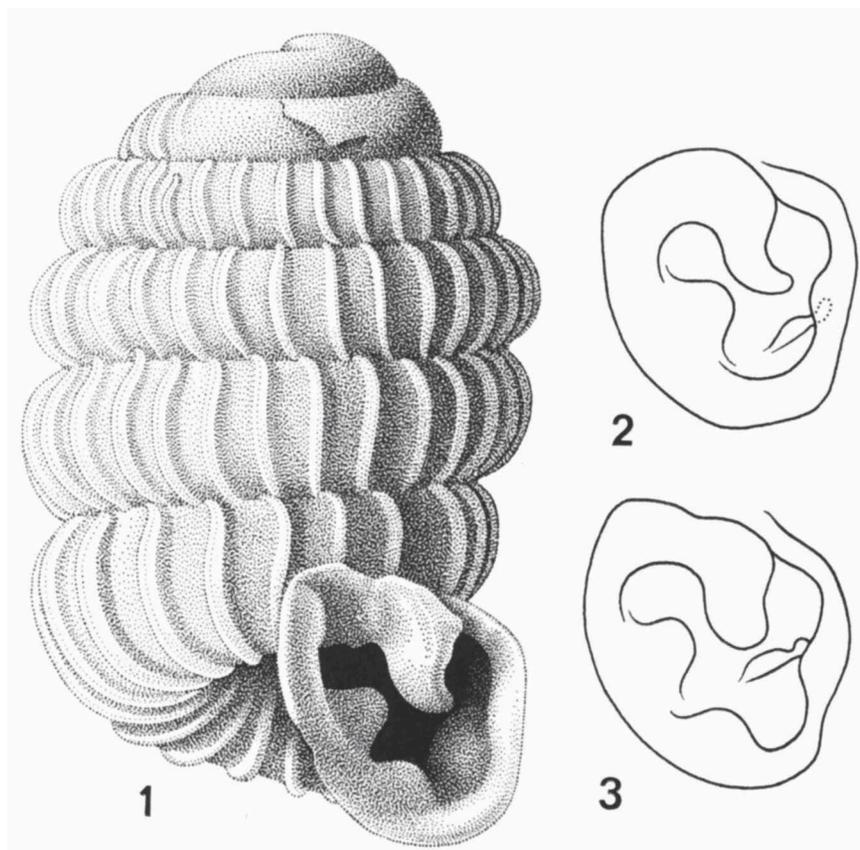
Measurements of type material of *Gulella peakei continentalis* n. subsp.  
The holotype (no. 22) has been indicated by an H.

No.	length x maj. diam.	l/d	length last whorl	aperture length x width	museum
1	1.9 x 1.3 mm	1.41	0.9 mm	0.7 x 0.6 mm	RMNH
2	1.9 x 1.4 mm	1.35	0.8 mm	0.6 x 0.7 mm	RMNH
3	2.0 x 1.2 mm	1.60	0.9 mm	0.6 x 0.7 mm	RMNH
4	2.0 x 1.3 mm	1.52	0.8 mm	0.6 x 0.7 mm	RMNH
5	2.0 x 1.3 mm	1.52	0.9 mm	0.7 x 0.7 mm	RMNH
6	2.0 x 1.3 mm	1.45	0.8 mm	0.7 x 0.7 mm	RMNH
7	2.0 x 1.3 mm	1.45	0.9 mm	0.7 x 0.7 mm	RMNH
8	2.0 x 1.3 mm	1.57	0.8 mm	0.7 x 0.6 mm	RMNH
9	2.0 x 1.3 mm	1.57	0.9 mm	0.7 x 0.6 mm	RMNH
10	2.0 x 1.3 mm	1.57	0.9 mm	0.7 x 0.6 mm	RMNH
11	2.0 x 1.3 mm	1.50	0.9 mm	0.6 x 0.7 mm	RMNH
12	2.0 x 1.3 mm	1.50	0.9 mm	0.6 x 0.7 mm	NM
13	2.0 x 1.3 mm	1.50	0.9 mm	0.7 x 0.7 mm	RMNH
14	2.1 x 1.3 mm	1.62	0.9 mm	0.6 x 0.6 mm	RMNH
15	2.1 x 1.3 mm	1.62	0.9 mm	0.7 x 0.7 mm	NM
16	2.1 x 1.3 mm	1.55	0.9 mm	0.6 x 0.7 mm	RMNH
17	2.1 x 1.3 mm	1.55	0.9 mm	0.7 x 0.7 mm	BM
18	2.1 x 1.3 mm	1.55	0.9 mm	0.7 x 0.7 mm	RMNH
19	2.1 x 1.3 mm	1.55	0.9 mm	0.7 x 0.7 mm	RMNH
20	2.1 x 1.4 mm	1.48	0.9 mm	0.7 x 0.7 mm	RMNH
21	2.2 x 1.2 mm	1.75	0.9 mm	0.7 x 0.6 mm	RMNH
22H	2.2 x 1.3 mm	1.67	0.9 mm	0.7 x 0.7 mm	RMNH
23	2.2 x 1.3 mm	1.59	0.9 mm	0.7 x 0.7 mm	RMNH
24	2.3 x 1.3 mm	1.68	0.9 mm	0.7 x 0.7 mm	RMNH

Material. — Holotype, 23 numbered paratypes, one damaged paratype, and six juvenile shells from South Africa, Zululand (Natal), Lake Sibayi area (Tongaland), in forest leaf litter, December 1972 — November 1973, leg. C. C. Appleton (collector's number ZU 76U); one paratype in British Museum (Natural History) (London), two paratypes in Natal Museum (Pietermaritzburg, South Africa), all other material in Rijksmuseum van

Natuurlijke Historie (holotype no. 55010, paratypes and juveniles no. 55011).

Derivatio nominis. — *continentalis*, Lat. = of the continent, as opposed to *G. p. peakei* as an (extinct) island dweller.



Figs. 1-3. *Gulcella peakei* Van Bruggen, 1975. 1. *G. peakei continentalis* n. subsp., holotype shell, actual length 2.2 mm; Zululand, Lake Sibayi area (RMNH). 2. *G. p. peakei* Van Bruggen, 1975, aperture of holotype, schematic and highly enlarged, to show absence of basal process, and inner labral process partly hidden by outer labral process; Aldabra Island (BM). 3. *G. p. continentalis* n. subsp., aperture of holotype, schematic and highly enlarged, to show presence of basal process, and inner labral process.

Table 1 shows that there is a certain amount of variation in the measurements of the shell. Moreover, the basal process is also subject to some variation, although it is never altogether absent in the material studied. Obviously this is a reliable character easily separating *G. p. peakei* and

*G. p. continentalis* (figs. 2-3). A comparison of the measurements of the two subspecies is made in table 2. This indicates that the continental form is somewhat larger and more slender than the extinct island form, while at the same time both the last whorl and the aperture are comparatively smaller. As in *G. p. peakei* the angular lamella is present in all juvenile shells in the form of a long and conspicuous, simple, ridge, usually stretching inward somewhat beyond the aperture. No other dental processes are present in juvenile shells.

TABLE 2

Comparison of measurements in mm of *Gulella p. peakei* Van Bruggen, 1975, and *G. p. continentalis* n. subsp. Abbreviations: av. — average, n — number of specimens examined. N.B. Mean and average l/d in *G. p. continentalis* are the same; in *G. p. peakei* mean l/d is 1.43, average l/d is 1.44.

	length x maj.diam.	l/d (mean/av.)	last whorl	aperture	n
<i>G. p. peakei</i>	1.7-2.1 x 1.3-1.5	1.30-1.57 (1.44)	0.8-0.9	0.6-0.7 x 0.6-0.7	14
<i>G. p. continentalis</i>	1.9-2.3 x 1.2-1.4	1.35-1.75 (1.55)	0.8-0.9	0.6-0.7 x 0.6-0.7	24

In the Southern African fauna *G. peakei continentalis* obviously has no close allies; species with shells resembling that of *G. peakei* are only found further north in East, Central and West Africa. For a full discussion of the possible relationships of *G. peakei* the student is referred to Van Bruggen (1975: 166-168).

Zoogeographically the occurrence of *G. peakei continentalis* in northern Zululand is interesting as regards its northern, tropical derivation. This part of Zululand harbours more streptaxid elements (and indeed also many other fauna and flora elements) with connections further north, such as *G. gouldi* (Pfeiffer, 1855) and *G. browni* Van Bruggen, 1969 (vide Van Bruggen, 1969: 39, 69; 1973: 421).

The Zululand material proves that *G. peakei* is indeed a forest dweller or at least an inhabitant of sheltering types of vegetation as already surmised in Van Bruggen, 1975: 168. It is somewhat surprising to find that both forms of this species are separated by a distance of about 2600 km in a straight line over the western Indian Ocean. Assuming the continental population to be the original one, it is difficult to explain how the species arrived on Aldabra Island (9°24'S 46°20'E). We may conclude by quoting the final remarks of the earlier paper: "... much of the present flora and

fauna of Aldabra atoll or their ancestors have obviously come from Africa. Perhaps dispersal along the usual paths has taken place in the past when the direction of wind and surface currents was more favourable to such a process than today." (Van Bruggen, 1975: 173).

***Gulella appletoni*** n. sp. (fig. 4)

Diagnosis. — A smooth, minute, markedly cylindrical, species with six-fold dentition consisting of angular lamella, two labral cusps on a common base, a basal denticle and two columellar processes.

Description of shell. — Shell (fig. 4) minute, markedly cylindrical, rimate, smooth and shiny, creamy white. Spire produced, sides flat, almost parallel, apex flattened, obtusely conical. Whorls five-and-a-quarter, slightly convex, without sculpture except behind the labrum, where there are traces of weak costulation; whorls under high magnification very finely granulate. Sutures shallow and simple. Aperture squarish, with smoothly rounded base, about as high as wide, peristome fairly thick, expanded and somewhat reflected, dentition six-fold. To the right of the middle of paries a moderately sized, almost perpendicular angular lamella, connected with labrum; about halfway down the labrum a complex consisting of two cusps on a common base, the lower slightly larger than the upper, the complex not projecting as far as the centre of the aperture and corresponding to a shallow but extensive outside depression; a blunt, mid-basal, deeply situated, denticle; low on the columellar side a superficial, long and blunt, outer columellar process; large, bluntly rounded inner columellar process, reaching about as far as the centre of the aperture, corresponding to fairly deep outside depression adjoining the rimate umbilicus.

Animal unknown.

Measurements of shell:  $1.9 \times 0.7$  mm,  $l/d$  2.50, length last whorl 1.0 mm, aperture length  $\times$  width  $0.5 \times 0.5$  mm (holotype).

Distribution. — Northeastern Zululand.

Material. — Holotype from South Africa, Zululand (Natal), Lake Sibayi area (Tongaland), in forest leaf litter, December 1972 — November 1973, leg. C. C. Appleton (collector's number ZU 76Y), in Rijksmuseum van Natuurlijke Historie (no. 55012).

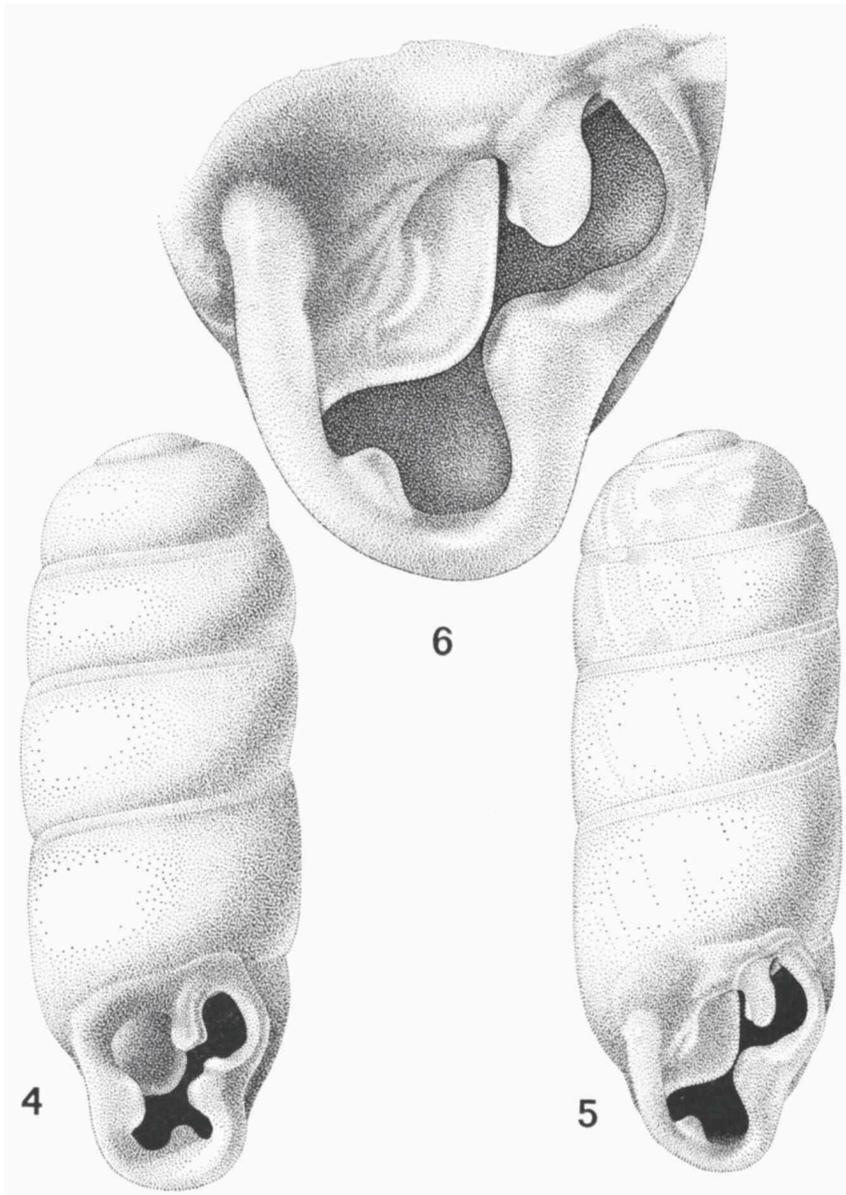
Derivatio nominis. — Named after Mr. C. C. Appleton of the Bilharzia Research Unit, Nelspruit (Transvaal), as a token of appreciation for his untiring collecting activities in Tongaland.

At first sight the new species resembles *Gulella farquhari* (Melvill &

Ponsonby, 1895). In the course of a forthcoming revision of the genus *Gulella* in Southern Africa the present author has been able to study long series of this variable species belonging to various institutions, but mainly the Natal Museum. The shell of *G. farquhari* has the following measurements:  $1.9-3.8 \times 0.9-1.6$  mm, l/d 1.80-2.60 (mean 2.20); an average specimen (Kowie East, NM) measures  $2.8 \times 1.2$  mm, l/d 2.25, length last whorl 1.4 mm, aperture length  $\times$  width  $0.9 \times 0.7$  mm. The species occurs over a large (discontinuous) area in southeastern Africa from Port Alfred (Cape Province) in the south to Vila Manica (Mozambique) in the north and inland as far west as e.g., Grahamstown (Cape Province) and Weenen (Natal). It has been found from sea level to 5000 ft. in the mountains and may prefer a cool to subtropical climate, because it is seemingly absent from hot areas such as the Natal South Coast, the Zululand lowlands and southern Mozambique. *G. farquhari* has an extensive synonymy, but there is no reason to recognize subspecies or even varieties (Van Bruggen, unpublished data). However, there is a noticeable size-cline from south to north, the shells being small in the Eastern Cape Province and becoming progressively larger further north. This results in the largest specimens having been collected in Zululand:  $2.7-3.8 \times 1.2-1.7$  mm, l/d 2.03-2.54, mean 2.28. In Mozambique the shells are again smaller and comparatively more slender (mean l/d 2.34).

Small specimens of *G. farquhari* tend to be comparatively squat, i.e., to have a low l/d. The smallest known specimen (Cape Province, Kowie East, NM) measures  $1.9 \times 1.0$  mm, l/d 1.87. Compared to the only shell of the new species it seems that the two about only share the same length.

Comparing *G. farquhari* and *G. appletoni* as regards biometrical data, one may conclude that the new species has a smaller and more slender shell. Apart from this, the whorls are less convex and the only shell known hardly shows traces of costulation; *G. farquhari* varies from markedly costulate to almost completely smooth. Apart from these differences, the apertural dentition of the two species shows some differences. The outer columellar process of the new species is situated much lower on the columellar lip than the corresponding process in *G. farquhari*. A straight line drawn from the lowermost point of the angular lamella to the tip of the basal denticle in *G. farquhari* runs at an oblique angle to the axis of the shell and cuts across the apex of the labral complex. An equivalent line in the aperture of the new species is found to be almost perpendicular, at the same time hardly touching the apex of labral complex. Altogether it seems that the new species as represented by the single shell is sufficiently set apart from *G. farquhari*.



Figs. 4-6. New species of southern African *Gulella*. 4. *G. appletoni* n. sp., holotype shell, actual length 1.9 mm; Zululand, Lake Sibayi area (RMNH). 5. *G. wendalinae* n. sp., holotype shell, actual length 2.4 mm; Transvaal, Mariepskop Forest Reserve (RMNH). 6. *G. wendalinae* n. sp., aperture of holotype shell, aperture 0.7 x 0.7 mm.

The systematic position of *G. appletoni* is as yet somewhat obscure. Admittedly it does fit into the discontinuous range of *G. farquhari*, which so far in Zululand is only known from two localities in the Zululand uplands, viz., Mfongosi and Eshowe. No material of the species has been collected between these localities and on Mt. Vengo north of Vila Manica (formerly Macequece) in Mozambique. Southern Mozambique is malacologically not very well known, but Zululand is now reasonably well known as regards its terrestrial molluscs, although it is quite easy to overlook a species as small as *G. farquhari*. In view of the known variability of the latter, and particularly that of the Zululand material, *G. appletoni* is for the time being considered to represent a separate taxon of specific rank.

***Gulella wendalinae* n. sp.** (figs. 5-6)

Diagnosis. — A smooth, small species with comparatively few whorls and aperture with four-fold dentition consisting of single angular, labral, basal and columellar processes of which the labral and columellar processes are very large.

Description of shell. — Shell (fig. 5) very small, cylindrical, with completely closed umbilicus, smooth and shiny, creamy white. Spire produced, sides flat, apex flattened and blunt. Whorls five, nearly flat, without a trace of sculpture (only under high magnification the whorls have a somewhat granulate appearance, while in the paratype a few faint and irregular spiral lines may be seen on the fourth whorl in front view), no growth striae. Sutures shallow, simple, strongly margined. Aperture (fig. 6) obliquely ovate, slightly constricted, about as high as wide, moderately obstructed by dental processes, peristome fairly thick, somewhat expanded and reflected, white and glossy, dentition four-fold. To the right of paries a fairly large, vertical, inrunning, angular lamella, hardly touching apex of labrum; a prominent and large, bluntly triangular labral tooth in the middle of labrum, protruding to about the centre of the aperture, corresponding to a shallow outside pit; a small, blunt basal denticle to the left of the base; a large, bluntly rounded, columellar process, protruding as far as or even beyond the centre of the aperture so that in front view labral and columellar processes seem to touch or even overlap each other.

Animal unknown.

Measurements of shell:  $2.4 \times 0.9$  mm, l/d 2.71-2.79. The holotype measures  $2.4 \times 0.9$  mm, l/d 2.79, length last whorl 1.2 mm, aperture length  $\times$  width  $0.7 \times 0.7$  mm; the paratype only differs in being slightly more obese (l/d 2.71) and having a last whorl of 1.1 mm.

Distribution. — Eastern Transvaal escarpment.

Material. — Holotype and paratype from South Africa, Transvaal, Pilgrim's Rest District, Mariepskop Forest Reserve, NE. area (Nature Reserve), in montane forest at an altitude of 4500 ft., 28-29 January 1966, leg. A. C. & W. H. van Bruggen; holotype in Rijksmuseum van Natuurlijke Historie (no. 55013), paratype in Natal Museum.

Derivatio nominis. — This elegant new species has been named after Mrs. Wendaline H. van Bruggen (née Gorter) in recognition of her services in the field and laboratory in the period 1962-1966. The name is not to be confused with that of *G. gwendolinae* (Preston, 1910), presumably named after a lady acquaintance of that author<sup>1</sup>).

Although superficially close to an Eastern Cape Province form, *G. petheri* (Sturany, 1898) var. *ischyrion* Burnup, 1926, on closer inspection the apertural dentition of the new species is strikingly different. In perpendicular view the labral complex and large columellar process of the new species seem to touch each other or even to overlap slightly. Moreover the labral complex is much more triangular in shape than that of *G. petheri* var. *ischyrion*, while the aperture even is somewhat constricted at the base of that complex; there is no trace of constriction in shells of the Cape form. In *G. wendalinae* the columellar lamella is also comparatively much larger and of different shape. The above differential characters combined with the fact that the new form appears to live at an isolated spot at a distance of at least 500 km from the northernmost known locality of *G. petheri* (N. of Pietermaritzburg, Natal) are considered sufficient reasons to designate the present form a new species.

*G. wendalinae* was found in leaf litter in montane forest together with other species of *Gulella* and various other small terrestrial snails. *Archachatina dimidiata* (Smith, 1878) is the locally dominant large snail. The habitat has been described by Van Bruggen (1972: 527-528); those data show that the new species may perhaps occur at least throughout the escarpment forests in the eastern Transvaal.

#### ENIDAE

##### **Rachis (Rachis) cunctatoris** n. sp. (figs. 7-9)

Diagnosis. — A medium-sized species with three pale spiral colour bands followed by a narrower and darker band on the lower suture of the whorls.

<sup>1</sup>) According to Adam (1971: 30) H. B. Preston has three times used the specific epithet *gwendolinae* in describing new species of terrestrial molluscs; it is known that Preston had no daughters, so it seems likely that he named the new species after his wife, whose name is unknown to me.

Description of shell. — Shell (fig. 7) medium-sized, acuminate ovate to turritiform, rimate, thin, smooth, rather dull, with the following colour pattern consisting of spiral bands: (a) a yellowish white band below the suture, followed by (b) a purplish band of about the same width, below which (c) another yellowish white band which is wider than the two topmost bands, and finally (d) a narrow dark bluish-brown band just above the next suture; on the body whorl the pattern is accordingly (a)-(b)-(c)-(d)-(a)-(b), while the dark and narrow band (d) is shown to be situated well below the periphery; apex (about three whorls) uniform purplish blue, columella purplish. Spire produced, sides straight, apex narrowly rounded, apical angle ca.  $40^\circ$ . Whorls  $6\frac{1}{2}$ - $7\frac{1}{2}$ , not very convex, very slightly angulate at the periphery of juvenile shells, regularly increasing, apical whorls smooth and somewhat granulate under high magnification, later whorls with very fine sculpture consisting of oblique growth striae and fine and close microspirial lineation. Sutures shallow and simple. Aperture vertical, subovate, base smoothly rounded, higher than wide, labrum thin, straight and receding somewhat in profile, columella straight, erect, margin well reflected over very narrow umbilicus.

Animal unknown.

TABLE 3

Measurements of type material of *Rachis cunctatoris* n. sp. The holotype (no. 6) has been indicated by an H. One paratype (no. 8) has a damaged apex and another (no. 9) a damaged labrum. Nos. 1, 4, and 6 are shown in figs. 7-9.

no.	length x maj. diam.	1/d	length last whorl	aperture length x width	whorls
1	15.4 x 7.6 mm	2.03	10.4 mm	6.3 x 4.6 mm	$6\frac{1}{2}$
2	15.5 x 6.8 mm	2.28	10.0 mm	6.3 x 4.5 mm	$6\frac{1}{2}$
3	16.3 x 7.0 mm	2.33	10.3 mm	6.5 x 5.1 mm	$7\frac{1}{2}$
4	18.0 x 8.2 mm	2.19	10.8 mm	7.3 x 5.1 mm	$6\frac{3}{4}$
5	18.1 x 8.1 mm	2.23	11.0 mm	8.0 x 5.5 mm	7
6H	18.7 x 8.1 mm	2.31	11.6 mm	7.1 x 5.3 mm	7
7	18.8 x 8.6 mm	2.19	11.8 mm	6.5 x 5.6 mm	$7\frac{1}{2}$
8	20+ x 8.7 mm	2.29+	12.5 mm	7.8 x 5.9 mm	-
9	20.9 x 8.8 mm	2.37	12.8 mm	7.0 x 5.5+mm	$7\frac{1}{2}$

Measurements of shell: 15.4-20.9 × 7.0-8.8 mm, 1/d 2.03-2.37 (mean

2.20, average of 9: 2.25), length last whorl 10.0-12.8 mm, aperture length  $\times$  width 6.3-8.0  $\times$  4.5-5.9 mm, 6½-7½ whorls. Table 3 details the measurements of the holotype (no. 6) and eight paratypes.

Distribution. — Southern Malawi (Nyasaland).

Material. — Holotype, eight paratypes, and five damaged or juvenile specimens from Malawi (Nyasaland), Lengwe National Park, Lower Shire Valley (south of Blantyre), 1970, leg. A. J. Hall-Martin; all specimens in Rijksmuseum van Natuurlijke Historie. The material is labelled as follows:

Holotype (RMNH 55014, fig. 7, no. 6 of table 3), two paratypes (figs. 8 and 9, nos. 1 and 4 of table 3), one shell with damaged aperture (these three RMNH 55015) — Stand no. 9;

one paratype (no. 2 of table 3) and two juveniles (all RMNH 55016) — “Stand No. 3 (first ten points)”;

one paratype (RMNH 55017) (no. 5 of table 3) — Stand no. 12;

two paratypes (RMNH 55018) (nos. 8 and 9 of table 3) — Stand no. 13;

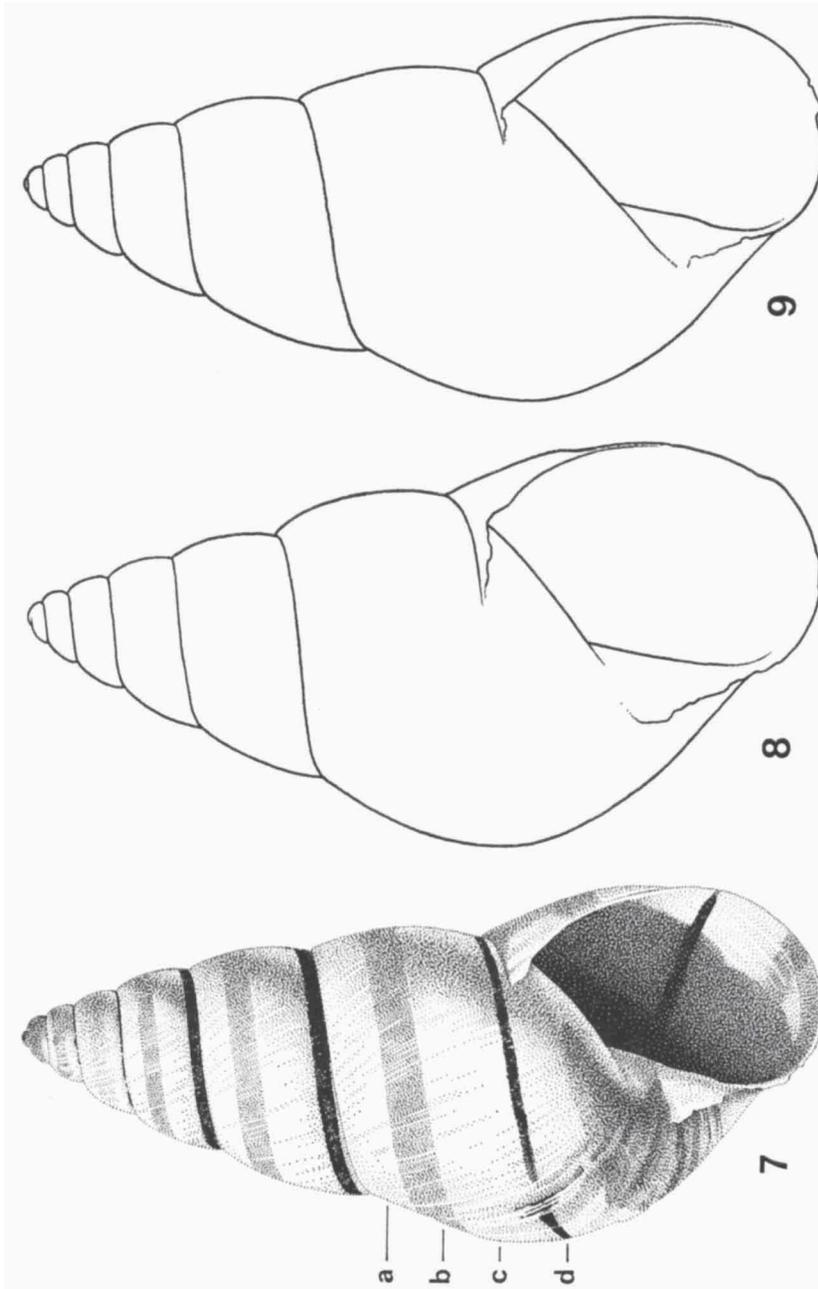
two paratypes (nos. 3 and 7 of table 3), one damaged shell and one juvenile (all RMNH 55019) — “1A”.

Derivatio nominis. — *cunctatoris*, genitive of *cunctator*, Lat. = one who hesitates, used here to indicate the state of mind of the present author as regards this species.

In worn specimens the colour pattern has almost or even completely disappeared, although usually at least a trace of the thin dark band (d) remains. There is a tendency in band (b) to become dissolved into a line of blotches.

Table 3 shows that the material at hand, although taken from a comparatively limited area, shows a considerable amount of variation as regards shape (figs. 7-9) and measurements. Specimens with a total length of 15 mm or less have not been incorporated in the table because these are obviously juvenile.

The new species belongs to the group of the so-called coloured Enidae, a group known for confusion in generic and specific identity. However, *R. cunctatoris* is described here after some considerable hesitation mainly on account of the absence of kindred material in three institutions with important African holdings (British Museum (Natural History), London; Musée Royal de l'Afrique Centrale, Tervuren; Naturmuseum Senckenberg, Frankfurt am Main) and the absence of anything like it in the relevant literature. In the early sixties the present author has made extensive collections for the Natal Museum in Rhodesia and adjacent parts of Mozambique (Portuguese East Africa); although the coloured Enidae are



Figs. 7-9. *Rachis cmictatoris* n. sp. 7. Holotype shell, actual length 18.7 mm (RMNH); colour bands have been indicated with letters a-d (see text). 8. Paratype (no. 1 in table 3), actual length 15.4 mm (RMNH). 9. Paratype (no. 4 in table 3), actual length 18.0 mm (RMNH) All material from Lengwe Game Reserve Malawi

well represented in material from these areas, there are no specimens that might possibly belong to *R. cunctatoris*. A personal scrutiny of African Enidae in various major U. S. A. museums in August, 1973, has also failed to reveal the existence of more specimens. The colour pattern is particularly characteristic; this pattern combined with the measurements and shape of the shell furnishes sufficient characters to recognize the taxon as separate from the species known thus far from southern, central and eastern Africa. As there is no chance for the present of additional material, the specimens are here described as a new species.

According to Zilch (1959: 193-194) it belongs to the genus *Rachis* Albers, 1850 (subgenus *Rachis* s.s.). A search of the general literature (Küster & Pfeiffer, 1845-1855; Kobelt, 1899-1902) and of a number of papers on African land molluscs (Von Martens, 1897; Pilsbry, 1919; Connolly, 1925, 1939; Verdcourt, 1961) and the few papers on the molluscs of Malawi containing descriptions of coloured Enidae (e.g., Dohrn, 1865; Smith, 1893, 1899; see also Melvill & Standen, 1907) has not led to any result. Dr. B. Verdcourt has kindly examined part of the material and he concludes that he has never seen anything like it at the same time expressing his doubt as to whether it belongs to a known species (Verdcourt, personal communication).

Two species of the genus *Rachis* s.s. in southern and central Africa, *R. punctata* (Anton, 1839) and *R. jejuna* (Melvill & Ponsonby, 1893), are obviously fairly close to *R. cunctatoris*. *R. punctata* agrees with the new species in measurements and sculpture, but has an utterly different vertical pattern of streaks and dots. *R. jejuna* (see Connolly, 1939: 436; Van Bruggen, 1966: 329; Van Bruggen, 1969: 25) may sometimes be a lot more slender (i.e. may have a higher l/d, e.g., in the Kruger National Park, Transvaal) than *R. cunctatoris*. Moreover, the aperture of *R. jejuna* is comparatively narrower and the greatest width of the shell lies at a point higher than that of the new species. Of course, again the colour pattern of *R. jejuna* is utterly different from that shown by *R. cunctatoris*.

All material of the new species has been gathered by Mr. Hall-Martin in the course of an ecological reconnaissance of the Lengwe National Park, the report of which has been used as an (unpublished) M.Sc. thesis. Mr. Hall-Martin has kindly allowed the present author to quote from his thesis; the stand numbers refer to the stands of vegetation sampled by Mr. Hall-Martin. Stand no. 3 may be assigned to the "*Pterocarpus antunesii*/*Acacia welwitschi* Shrub-Thicket with Emergent Trees", stand no. 9 to the "*Pterocarpus antunesii* Dry Deciduous Thicket", and stands nos. 12 and 13 to the "*Pterocarpus antunesii* Dry Deciduous Forest". All above associations

belong to the *Pterocarpus antunesii*<sup>1)</sup> community, a forest and thicket community of the hydrosere. It is tempting to conclude that *R. cunctatoris* is somehow associated with the tree *Pterocarpus antunesii*. However, at present data are still insufficient for drawing conclusions in this respect.

Because the area under discussion is little known no apology for quoting from the above thesis is needed. The following four paragraphs from the summary (p. 188) give a concise impression of the Lengwe National Park:

"The Lengwe National Park is situated in the Lower Shire Valley of southern Malawi. The Park is approximately 104 sq. km in area and its boundaries are artificial. There are three major physiographic regions in the Park: a flat alluvial plain; gently undulating uplands, and seasonally flooded dambo regions. The altitude varies from about 80 to 168 m above sea level. There are several rivers which drain the Park but none are perennial. For the greater part of the year surface water is restricted to small seasonal pans. Groundwater levels are, presumably, of greater importance and apparently influence the distribution of vegetation types.

The geology of the Park is relatively simple. Basement Complex rocks are overlain unconformably by rocks of the Karroo sequence. The only rocks exposed in the Park are the calcareous Lupata sandstones which cover the Karroo rocks.

The three major soil types present in the Park are correlated with the major physiographic regions. The alluvial plain is almost entirely covered by dark grey-brown to dark brown Alfisols of the Tomali soil series. The seasonally waterlogged black to very dark grayish-brown heavy clays are Vertisols of the Rift Valley dambo series. The Lupata uplands soils are formed *in situ* from the reddish or pink calcareous Lupata sandstones.

The local climate of the Lengwe National Park is governed by its position within the Lower Shire Valley. There is a clearly defined seasonal rhythm in rainfall and temperature resulting in a hot, wet season from November to April; a cool dry season from May to August and a hot dry season from September to November. The mean annual rainfall is 833,4 mm of which 84 percent falls from December to March. Most rain falls in storms of short duration and high intensity. Temperatures vary from 1,7°C to 45°C while monthly mean temperatures vary from only 20,6°C to 28,9°C. Relative humidity is high and evaporation exceeds rainfall for ten months of the year. Frost is unknown."

The above description shows the Lengwe National Park to be a typically African environment — on the whole seemingly unattractive to terrestrial gastropods which nevertheless somewhat sparingly occur. The other species of *Rachis* are known to inhabit similar areas.

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<sup>1)</sup> Fam. Papilionaceae: *Pterocarpus lucens* Leprieur subsp. *antunesii* (Taubert) Rojo, 1972 (according to Dr. W. J. J. O. de Wilde, Rijksherbarium, Leiden, personal communication).

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