

## The family Epitoniidae (Mollusca: Gastropoda) in southern Africa and Mozambique

by

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### ABSTRACT

Eighty species belonging to 15 genera of Epitoniidae are recorded from southern Africa and Mozambique; of these, 37 are new species and 19 are new records for the region.

New species: *Acirsa amara*; *Amaea* (?*Amaea*) *krousma*; *A. (Amaea) foulisi*; *A. (Filiscala) youngi*; *Rutellicala bombyx*; *Cycloscala gazae*; *Opaliopsis meiringnaudeae*; *Murdochella crispata*; *M. lobata*; *Obstopalia pseudosulcata*; *O. varicosa*; *Opalia (Pliciscala) methoria*; *Compressiscala trankeiana*; *Chuniscala rectilamellata*; *Epitonium (Epitonium) sororastra*; *E. (E.) jimpyae*; *E. (E.) sallykaicherae*; *E. (Hirtoscala) anabathmos*; *E. (Perlucidiscala) alabiforme*; *E. (Nitidiscala) synekhes*; *E. (Librariscale) parvonatrix*; *E. (Limiscala) crypticocorona*; *E. (L.) maraisi*; *E. (L.) psomion*; *E. (Parviscala) amiculum*; *E. (P.) climacotum*; *E. (P.) columba*; *E. (P.) harpago*; *E. (P.) mzambanum*; *E. (P.) repandum*; *E. (P.) repandior*; *E. (P.) tamsinae*; *E. (P.) thyraeum*; *E. (Labeoscala) brachyspeira*; *E. (Asperiscala) spyridion*; *E. (Foliaceiscala) falconi*; *E. (F.) lacrima*; *E. (Pupiscala) opeas*.

New genus: *Rutellicala*, type species *R. bombyx* sp.n.

New subgenus (of *Epitonium*): *Librariscale*, type species *Scalaria millicostata* Pease, 1861.

New records: The genera *Acirsa*, *Cycloscala*, *Opaliopsis*, *Murdochella*, *Obstopalia*, *Platiscala*, *Compressiscala* and *Sagamiscala* are recorded from southern Africa for the first time. New species records are: *Cirsotrema (Cirsotrema) varicosa* (Lamarck, 1822); *C. (? Rectacirsa) peltei* (Viader, 1938); *Amaea (s.l.) sulcata* (Sowerby, 1844); *Amaea (Acrilla) xenicima* (Melvill & Standen, 1903); *Cycloscala hyalina* (Sowerby, 1844); *Opalia (Nodiscala) bardeyi* (Jousseume, 1912); *O. (N.) attenuata* (Pease, 1860); *O. (Pliciscala) mormulaeformis* (Masahito, Kuroda & Habe, 1971); *Amaea sulcata* (Sowerby, 1844); *Epitonium (Epitonium) syoichiroi* (Masahito & Habe, 1976); *E. (E.) scalare* (Linné, 1758); *E. (Lamelliscala) fasciatum* (Sowerby, 1844); *E. (Limiscala) lyra* (Sowerby, 1844); *E. (L.) anitsoa* (Iredale, 1936); *E. (Papyriscala) emiliae* (Melvill & Standen, 1903); *E. (Laeviscala) gracile* (Sowerby, 1844); *E. (L.) histicosum* (Jousseume, 1912); *E. (Parviscala) townsendae* (Melvill & Standen, 1903); *E. (Depressiscala) confusum* (Smith, 1890).

New synonyms: *Nystiella* Clench & Turner, 1952 = *Opaliopsis* Thiele, 1928; *Teremachiacirsa* Kuroda & Ito, 1961 = *Alora* H. Adams, 1861; *Fragilopalia* Azuma, 1972 = *Acrilla* H. Adams, 1860; *Acrilla thalia* Bartsch, 1915, and *Acrilla adenensis* Jousseume, 1912 = *Amaea (Acrilla) minor* (Sowerby, 1873); *Scalaria producta* and *erecta* W. H. Turton, 1932, and *S. kowiensis* Turton, 1933 = *Opalia (? Pliciscala) aglaia* (Bartsch, 1915); *Scala (Acrilla) recreata* de Boury, 1921, *Scala reconducta* de Boury, 1921, *Scalaria prolongata*, *whitchurchi* and *perexilis* Turton, 1932 = *Epitonium (Hyaloscala) kraussi* (Nyst, 1871); *Scalaria elongata* W. H. Turton, 1932 = *E. (H.) oppositum* (de Boury, 1921); *S. albanyana* Turton, 1932 = *E. (Lamelliscala) simplex* (Sowerby, 1894); *Scala tangana* Thiele, 1925 = *E. (Laeviscala) fucatum* (Pease, 1861); *Globiscala kashiwajimensis* Azuma, 1962 = *E. (G.) bullatum* (Sowerby, 1844); *Scala virgo* Thiele, 1925 = *E. (Connexiscala) connexum* (Sowerby, 1844).

New combinations: *Acrilla analogica* Barnard, 1963, is a *Platiscala*; *Scala munda* Barnard, 1969, is a *Sagamiscala*; *Epitonium peltei* Viader, 1938, is a *Cirsotrema*.

Types figured: Holotypes of *Scala illovoensis* Barnard, 1963, *Scalaria townsendi* Melvill & Standen, 1903, *Acrilla gracilis* H. Adams, 1860, *Pupiscala actinariophila* Masahito & Habe, 1976; lectotypes of *Scalaria latifasciata* Sowerby, 1874, *S. lyra* Sowerby, 1844, and *Epitonium macromphalus* E. A. Smith, 1910; paratype of *Pupiscala pupiformis* Masahito, Kuroda & Habe, 1971.

### INTRODUCTION

The Epitoniidae is a very large family of heterogastropods, represented in practically all seas from the lower intertidal zone to abyssal depths. As far as is known, all are associated with coelenterates, either as ectoparasites or as foraging

predators. Although a good deal is known about their biology (see references in Robertson 1981 & 1983), epitoniid taxonomy remains in a chaotic state, particularly above the species-level. As might be expected, the Indo-Pacific Epitoniidae have been little studied, other than in a few peripheral areas, and the only revisionary paper dealing with the southern African region is that of Barnard (1963) which covers only 19 species. The present paper, which deals with the epitoniids of southern Africa (Kunene River to Zululand) and Mozambique, increases the list to 80 species. This figure exceeds those listed for tropical West America, the Western Atlantic, Red Sea and Persian Gulf respectively. As a number of additional species are represented by specimens too few or inferior for identification or description, it is clear that the epitoniid fauna of southern Africa is very rich indeed.

#### HISTORICAL PERSPECTIVE

Because of their popularity among shell-collectors, the Epitoniidae (Scalidae, Scalariidae) were treated successively by several of the classical nineteenth-century monographers, such as Kiener (1838–39), Sowerby (1844*a*, and in Reeve 1873–74), Tryon (1887) and Clessin in Küster (1896). Of these, Sowerby's monographs are the most useful, while those of Tryon and Clessin are based almost entirely on the work of their predecessors. All suffer from the omission of microscopic and quantitative characters which has led to seemingly endless problems of identification.

A valuable catalogue of described taxa was published by Nyst (1871). Subsequent studies, at least at the species level, have been mostly regional. The most important are those of Melvill & Standen (1903) for the Persian Gulf area, Jousseume (1912) for the Red Sea, Clench & Turner (1950–52) for the tropical Western Atlantic, and Dushane (1974) for tropical West America. At the supraspecific level most of the available taxa were proposed by the Belgian specialist Eugène Aubourg de Boury (1856–1920) who published no less than 35 papers on the taxonomy and phylogeny of the family. His studies were, however, never completed, and difficulties frequently arise in attempting to interpret his taxa. Although most modern workers have been antagonised by the large number of 'subgenera' proposed by de Boury, sometimes without diagnosis, his work should not be underestimated, as it was deeply rooted in his palaeontological research, and was, after all, the product of a lifetime's specialisation in the family.

All the higher taxa described by de Boury were ranked as subgenera of *Scalaria* [= *Epitonium*]. The first attempt at ordering these into some form of hierarchy was made by the palaeontologist A. E. M. Cossmann in 1912 (summarised by Dollfus 1913). Cossmann's system was, however, vigorously assailed by de Boury (1917) in an article which conveys some idea of his approach and philosophy. Jousseume (1912) raised de Boury's subgenera to full generic rank, and added five new genera which he credited to de Boury. The most useful classification presently available is that of Wenz (1940) who assayed diagnoses of most taxa, with illustrations of type species. In recent years a few additional taxa have been proposed by Japanese malacologists, but most western approaches to epitoniid classification have been essentially destructive, with a tendency towards oversimplification and little attempt at understanding de Boury's work.

Perhaps the most valuable modern contribution to knowledge of the Epitoniidae is the illustrated card-index issued by Sally Diana Kaicher (1980 1981 1983), which provides excellent photographs of many type specimens, including most of the species described (and inadequately figured) by Jousseume.

#### PROBLEMS IN EPITONIID CLASSIFICATION

In scanning the Epitoniidae for synapomorphies that might be useful in formulating a classification, one receives the impression that most lineages have arisen through the genetic 'reshuffling' of a limited number of characters. Certainly convergence is rampant. Apart from the reported absence of a radula in one genus (Beu & Climo 1974), radula studies (eg. Thiele 1928, Clench & Turner 1952, Azuma 1971) have yielded little of value and one must at present rely on shell-characters. Of these the most frequently used feature has been the presence or absence of a basal cord; this cord, however, appears to have been independently derived in several lineages, and within a group may be present or absent in apparently related species. Only two major characters appear to be of greater taxonomic value, namely the presence of pitted intritacalx (in *Opalia*, *Compressis-scala* and *Plastiscala*), and protoconch form. Unfortunately, detailed descriptions of the protoconch are lacking even in most modern texts, and information on the type species of most taxa is not available. Consequently many assumptions have been made in drawing up even a provisional classification. The present study indicates that the protoconch may provide the best guide to relationships yet. Of course ecological factors and evolutionary trends may prove to influence protoconch form (as has been established in other gastropod groups) but this remains to be shown for the Epitoniidae. Two main types of protoconch occur in the taxa studied: (1) Subcylindrical or globular and of few whorls, indicative of direct development: smooth in *Plastiscala*, *Obstopalia* and *Compressis-scala*, axially ribbed in *Murdochella*; (2) Conical and polygyrate, indicating planktonic development: smooth or (under SEM) with very fine axial striae in *Epitonium*, *Gyros-scala*, *Cyclo-scala*, *Amaea*; with spiral rows of pits in *Opalia* (? all); axially ribbed in *Opaliopsis*.

#### TERMINOLOGY

As is my practice, colour terminology in formal descriptions follows the ISCC-NBS system, but in diagnoses and discussions I revert to the vernacular, for the benefit of those without access to these colour charts.

The following structural terms are used:

alate (ribs): forming a wing-like shoulder angle;

auriculate (peristome or columella): forming an expansion or lobe basally;

continuous (ribs): axially (or obliquely) aligned from whorl to whorl;

coronation: subsutural or shoulder angle or spine;

duplex (peristome): of two layers;

fasciole: an inconspicuous cord, with strong growth-lines, adnate to base of columella;

fenestrate (suture, umbilicus): open, but crossed by the termination of the axial ribs;  
 open (umbilicus): not crossed by ribs;  
 perforate (suture): very deeply fenestrate, opening into central axis;  
 reflexed (ribs, columella): bent back;  
 rimate (umbilicus): chink-like;  
 simple (suture): forming a shallow (non-fenestrate) groove.

#### ABBREVIATIONS

AMS = Australian Museum, Sydney  
 BM(NH) = British Museum (Natural History)  
 MHNP = Muséum National d'Histoire Naturelle, Paris  
 MN = *R/V Meiring Naude*  
 NM = Natal Museum  
 NMNH = National Museum of Natural History, Washington  
 NSMT = National Science Museum, Tokyo  
 P.F. = *s.s. Pieter Faure*  
 R. K. = R. N. Kilburn  
 SAM = South African Museum, Cape Town  
 ZMB = Zoological Museum, Humbolt University, East Berlin

#### REJECTED RECORDS NOT INCLUDED IN TEXT

*Acrilla* cf. *cophinodes* (Melvill, 1904), reported by Barnard (1963:105, fig. 18d). The single broken shell on which this record is based can no longer be located (pers. comm. W. Liltved). It is unlikely that the Persian Gulf *cophinodes* would occur on the Agulhas Bank.

*Scalaria gemmula* Turton, 1932: genus *Brookula* Iredale, 1912, family Skeneidae (see Kilburn 1977).

*Scala* (*Dentiscalia*) *turriformis* de Boury (1913a:276, pl. 10, fig. 4): although described from 'Sud de l'Afrique' this locality has never been confirmed. It is presumably one of the many mislabelled shells from the Paetel collection, and may be based on the west Mexican *Opalia crenatoides* (Carpenter, 1864).

#### FOSSIL RECORDS

Superficial study of palaeontological literature reveals only two southern African fossil epitoniids, *Scalaria ornata* Baily, 1855, from the upper Cretaceous Mzamba beds of Transkei, and *Scala zululandiae* Newton (1909:20, pl. 8, figs 18, 19) from the Cretaceous of False Bay, Lake St Lucia, Zululand. *S. ornata* (see Rennie 1930:216 for references) has been referred to *Confusiscalia* de Boury, 1909, a subgenus of *Amaea* (or *Turriscalia*); *S. zululandiae* may not be epitoniid.

*Gyroscala lamellosa* has been reported from Pleistocene deposits (6 or 9 m transgression) at the Great Fish River, eastern Cape Province (Davies 1972).

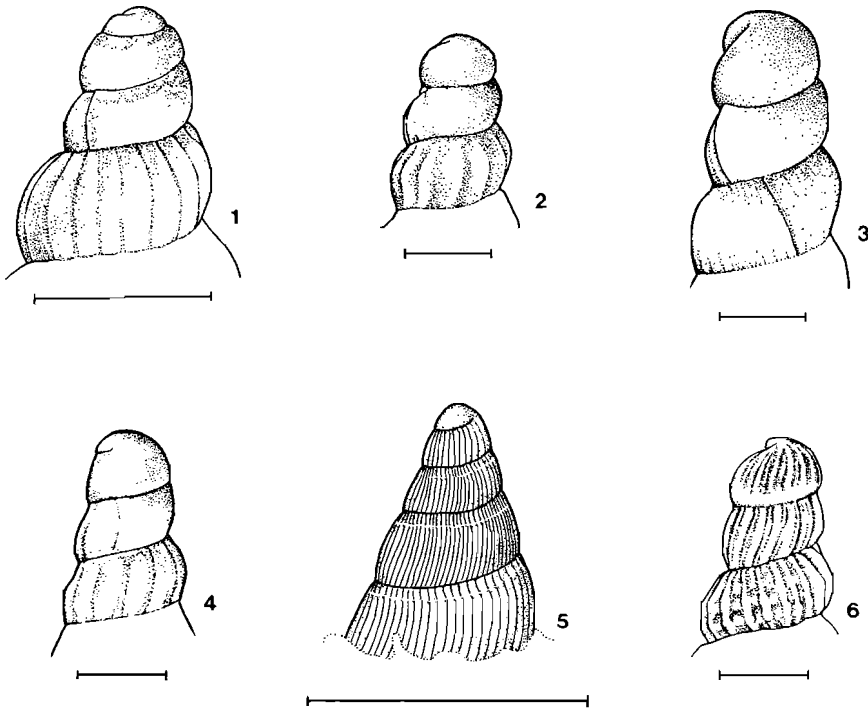
## TAXONOMY

*Acirsa* Mörch, 1857

*Acirsa* Mörch, 1857:77. Type species *Scalaria borealis* Beck, *nom. nud.* [= *Turritella costulata* Mighels & Adams, 1842, *fidé* Clench & Turner, 1950].

Diagnosis: Shell acuminate, solid, with feeble sculpture (often spiral threads and weak axials); peristome incomplete, lip thin; basal angle sometimes present, but no distinct keel.

Notes: This cold-water genus is here reported for the first time from southern Africa. I have not attempted to place the species in question in any of the described subgenera.



Figs 1-6. Protoconch of: 1, *Amaea (Acrilla) minor* (Sowerby, 1873); 2, *Compressiscula transkeiana* sp. n.; 3, *Plastiscala analogica* (Barnard, 1963); 4, *Obstopalia pseudosulcata* sp. n.; 5, *Cycloscala gazae* sp. n. (semidiagrammatic); 6, *Murdochella crispata* sp. n. Scale lines = 0,5 mm.

*Acirsa amara* sp. n.

## Fig. 11

Diagnosis: Shell acuminate with channelled suture, base angular but without cord; sculptured by shallow spiral grooves (11 on penultimate whorl) crossing low, rounded, axial ribs (about 11 on last whorl); base with 3 spiral grooves and coarse growth-lines. Pale orange-brown, with white axial ribs; length 11 mm.

Description: Shell acuminate with about 6 convex teleoconch whorls separated by a channelled suture; periphery of base angular but without a cord, base itself concave, peristome discontinuous, columella callus a thin glaze. Sculptured by shallow spiral grooves, crossed by rather regular growth-lines, and crossing low rounded ribs, more or less equal in width to intervals; spiral sulci first appearing on third teleoconch whorl, initially numbering about 7 (obsolete above suture), increasing in depth and number to 11 on penultimate whorl; axial ribs about 11 on last whorl; base with 3 spiral sulci and coarse growth-lines. Shell tinged with medium orange-yellow, base darker, early whorls paler, axial ribs white.

Protoconch eroded, evidently subcylindrical, with 2 globular whorls, basal diameter about 0,9 mm.

Dimensions: Length 11,1 mm (lip broken).

Type material: Holotype NM A2937/T2769, Agulhas Bank, off Cape St Blaize area, *ex pisce*, R. Le Maitre.

Notes: Although known only from a single shell, there appears to be no comparable species. The axial ribs are visible more by lack of colour than by elevation.

Etymology: *amara* = a trench or waterleat (G.), referring to suture.

#### *Alexania* Strand, 1928

*Alexania* Strand, 1928:63 (*nom. nov. pro Alexandria* Tomlin, 1926, *non* Pfeiffer, 1881). Type species (m) *Alexandria natalensis* Tomlin, 1926.

Diagnosis: Shell globose or oblong-ovate, smooth except for feeble axial riblets on spire, umbilicus absent, aperture large, labrum thin, periostracum present, protoconch mamilliform.

Notes: Robertson & Habe (1965) discussed the complex synonymy of *Alexania* and gave notes on anatomy and ecology, demonstrating the group to be epitoniid rather than a member of the opisthobranch family Acteonidae as originally believed. The only available specimen of the type species with soft parts has now been forwarded to Dr Eveline B. R. Marcus for confirmation of its affinities.

#### *Alexania natalensis* (Tomlin, 1926)

*Alexandria natalensis* Tomlin, 1926:287, pl. 16, figs 1, 2 (shell, radula). Type locality: Umbogintwini, Natal south coast.

*Alexania natalensis*: Kaicher, 1981:3069 (paratype).

Range: Natal to western Transkei.

Type material: Holotype in BM(NH) (*vide* Tomlin). Paratopotypes, 3, NM 3736/T527.

Locality data: NATAL: Umbogintwini (types, also NM A6628, A6368, A9903: C. W. Alexander); Kelso (NM A2224: R. K.). TRANSKEI: Banyana River area, near Bashee River mouth, under rock in pool (NM: R. K.).

*Alora* H. Adams, 1861

*Alora* H. Adams, 1861:272. Type species (monotypy) *Trichotropis gouldii* A. Adams, 1857.  
*Teremachiacirsa* Kuroda & Ito, 1961:263 (syn.n.). Type species (o.d.) *T. annulata* Kuroda & Ito, 1961

Diagnosis: Shell ovate-trochiform, with globular whorls, narrow umbilicus and predominant spiral or cancellate sculpture; aperture with slight pseudosiphonal canal.

Notes: The radula of *Teremachiacirsa annulata* was figured by Azuma (1971:pl. 11, fig. 2).

*Alora rapunculus* Kilburn, 1975

*Alora rapunculus* Kilburn, 1975:607, figs 18a, b. Type locality: off Mozambique.

Notes: No material with precise locality data is yet to hand. This species seems to differ from the Japanese *A. annulata* (Kuroda & Ito, 1961) only in small details, and direct comparison is needed.

*Amaea* H. & A. Adams, 1853

*Amaea* H. & A. Adams, 1853:233. Type species: *Scalaria magnifica* Sowerby, 1844 (s.d. de Boury 1909).

Diagnosis: Shell narrowly to broadly acuminate, usually with a basal cord, sculpture of thin, low axial lamellae, often cancellate; labrum thin to moderately thick; protoconch smooth, conical, polygyrate.

Notes: Although the presence of a basal cord is usually regarded as characteristic of *Amaea*, it is often little more than a strengthened spiral ridge, and is absent in *A. natalis* and *foulisi*, which in other respects are typical *Amaea*.

With hesitation I follow other workers in using the presence of occasional varices among the axial lamellae as a common characteristic of the *Amaea* lineage; such varices certainly occur in occasional individuals of undoubted species of *Epitonium*.

Subgenus *Amaea* s.s.

Diagnosis: Sculpture cancellate, with or without a basal cord; more or less imperforate.

*Amaea (Amaea) natalis* (Barnard, 1963)

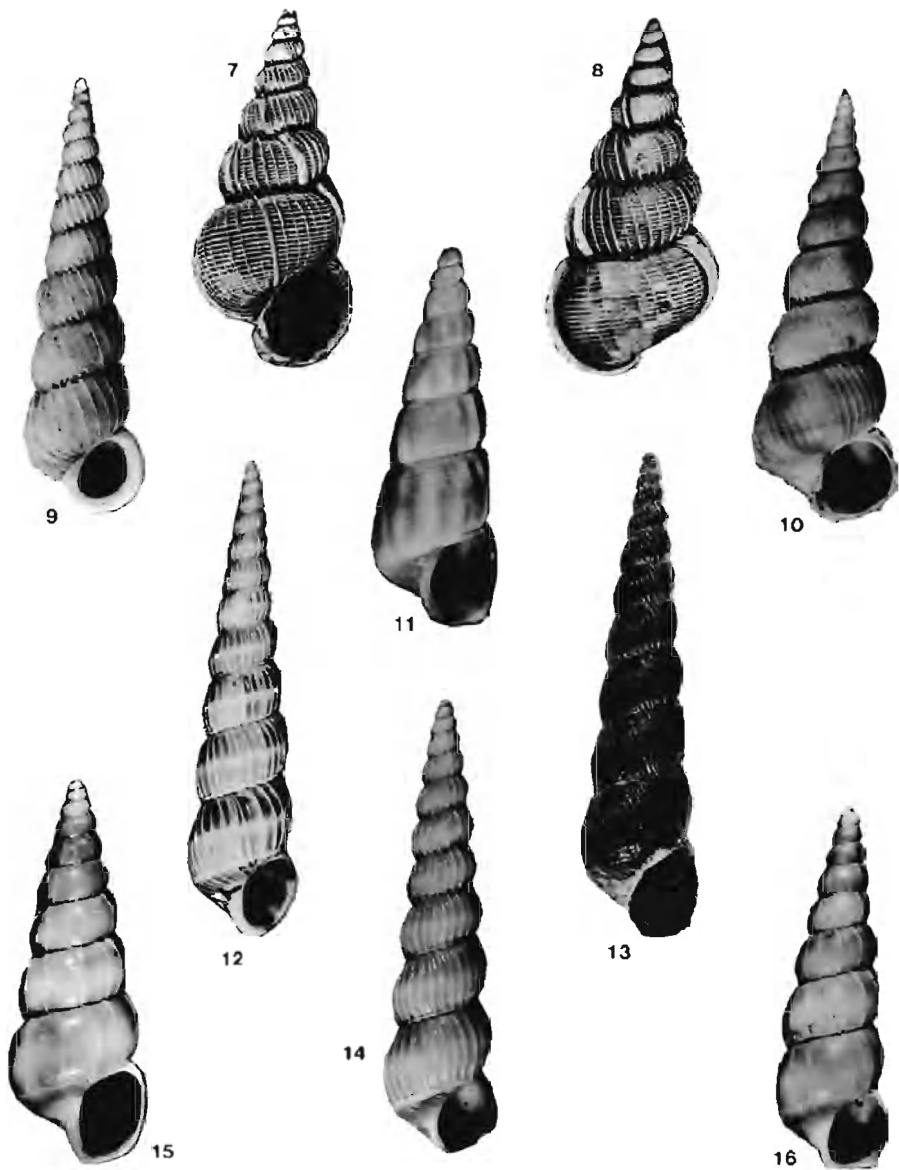
*Acrilla natalis* Barnard, 1963:105, figs 18 e, f; Kaicher, 1981:3030. Type locality: 'Off Cape Natal (Durban), 54 fathoms'.

Notes: No further material of this species has become available since its description. A photograph of the holotype has been published by Kaicher (1981).

*Amaea (Amaea) foulisi* sp. n.

Fig. 10

Diagnosis: Shell acuminate (breadth/length 0,34), suture almost channelled; base concave, rimate, without cord; aperture ovate-quadrate; axial ribs low, erect, fragile, almost straight, forming a weak sutural angle, 20–36 per whorl; spiral lirae low, fine and close on early whorls, anterior ones wide-set on later whorls, obsolete



Figs 7-16. *Acirsa* and *Amaea* species. 7-8, *Amaea (Filiscala) youngi* sp. n., holotype,  $10,3 \times 5,9$  mm, coated with  $MgCl_2$ . 9, *Amaea (s.l.) sulcata* (Sowerby, 1844), NM H112, Conducia Bay, Mozambique,  $10,5 \times 2,8$  mm. 10, *Amaea (Amaea) foulisi* sp. n., holotype,  $15,7 \times 5,3$  mm. 11, *Acirsa amara* sp. n., holotype, length 11,1 mm. 12-14, *Amaea (Acrilla) minor* (Sowerby, 1873): 12, NM 7079, Jeffreys Bay, length 34,0 mm; 13, NM H241, Conducia Bay, Mozambique,  $29,4 \times 7,3$  mm; 14, Holotype of *Acrilla gracilis* H. Adams, 1860, BM(NH) 1981224,  $16,4 \times 4,1$  mm. 15, 16, *Amaea (Acrilla) xenicima* (Melvill & Standen, 1903), NM B6024, Durban Bay: 15,  $6,8 \times 2,5$  mm; 16,  $10,7 \times 3,3$  mm.



below suture and on base of body whorl; interstitial spiral microstriae present; cream, tinged with light brown, forming 3 diffuse bands; length 15,7 mm.

Description: Shell acuminate (breadth/length 0,34) of 10½ strongly convex teleoconch whorls (less convex about periphery), suture deep, almost channelled; base concave, rimate, without a spiral cord, no fasciole; aperture ovate-quadrangle, peristome thin, except for columella, which is slightly expanded basally. Axial ribs thin, fragile, low, erect, prosocline, almost straight, forming a weak angle next to suture; about 20 ribs on 3rd whorl, increasing to 36 on last. Spiral lirae low, on early whorls fine and close (about 18 on 3rd whorl), on later whorls much narrower than their intervals basally, becoming finer posteriorly and obsolete below suture (and on base of body whorl); about 22 on penultimate whorl; interstitial microstriae visible on later whorls, particularly on body whorl. Colour yellowish-white, suffused in places with light yellowish-brown, forming three very diffuse spiral zones of that colour on body whorl.

Protoconch damaged, conical, 2½ strongly convex whorls remaining; translucent with dark suture; basal diameter 0,38 mm.

Dimensions: 15,7 × 5,3 mm.

Range: Transkei continental shelf.

Type material: Holotype NM C5835/T2887, off Ubombo (31°54,8'S, 29°18,8'E), 80 m, mixed sand, mud, shell debris, dredged MN.

Notes: *A. foulisi* differs from *A. natalis* (Barnard, 1963) in its almost channelled suture and in its more widely spaced, slightly coronate axial ribs. The relatively weak spiral ridges distinguish it from Indo-Pacific *Amaea* such as *optima* (Melvill & Standen, 1903), *kieneri* (Tapparone-Canefri, 1876), *thielei* (de Boury, 1913), *marteli* (de Boury, 1913) and *cerea* (Masahito, Kuroda & Habe, 1971).

Etymology: named after Captain George Foulis of the *R/V Meiring Naudé*.

### *Amaea (s.l.) sulcata* (Sowerby, 1844)

#### Fig. 9

*Scalaria sulcata* Sowerby, 1844a:95, pl. 35, fig. 3; *idem*, 1873:pl.13, sp. 97. Type locality: Catanauan Isl., Luzon, Philippines.

*Cirsotrema sulcatum*; Adams, 1861:482.

Diagnosis: Shell subulate (breadth/length 0,27), suture deep, base imperforate, peristome thick, fasciole present; axial ribs thin, low, 17–22, with small coronations at suture, 1–2 thin varices per whorl; dense spiral lirae, alternately weaker and stronger, crossed by close, microscopic axial threads; off-white; 10 mm.

Description (local specimen): Shell subulate (breadth/length 0,27), of 10½ convex, shouldered teleoconch whorls, gradually enlarging in size; suture deep but simple, base imperforate; aperture ovate, peristome thick, slightly auriculate, columella not reflexed, fasciole present. Axial ribs thin, low, straight, prosocline, 13 on 1st teleoconch whorl, increasing to 17 on 3rd and 22 on last whorl, each with a small coronation immediately below suture; 1–2 lamellae per whorl form thin but well-developed varices. Spiral lirae numerous (about 27 on penultimate whorl) and

close-set, alternately more or less larger and smaller, bearing plicules where crossed by fine, dense axial threads. Yellowish-white.

Dimensions: 10,5 × 2,8 mm.

Range: Philippines and Japan to Mozambique.

Regional locality data: NORTHERN MOZAMBIQUE: Conducia Bay (NM H112: K. Grosch).

Notes: *Scalaria sulcata* is unidentifiable from the original description and figure, based on a specimen in the H. Cuming collection. However, the single Mozambique shell has been compared with four examples, from Cuming's collection in the BM(NH), which are labelled 'Bay of Manila, Corregidor, sandy mud, 7 fathoms'. Although the series is doubtfully syntypic, their identification is presumed to be authentic. Compared with the local example they are somewhat broader (breadth/length about 0,34 against 0,27) with more convex whorls, but show much variation within the sample.

#### Subgenus *Filiscalia* de Boury, 1911

*Filiscalia* de Boury, 1911:219. Type species (o.d.) *Turbo martinii* Wood, 1828.

Diagnosis: Resembling *Amaea* s.s. but with a narrow, open umbilicus; no basal cord.

Notes: The type species of *Filiscalia* is a rather aberrant taxon, with an oblong aperture and thin varices arranged at intervals. Wenz (1940) treated it as a subgenus of *Variciscalia* de Boury, 1909, but similar varices occur in some poorly distinguished individuals of *Amaea magnifica* (Sowerby, 1844), type species of *Amaea*. It is here regarded as a very minor subgenus of *Amaea*. Other members are *Amaea secunda* Kuroda & Ito, 1961, of Japan, and probably *Scalaria (Folia-ceiscalia) grossicingulata* de Boury, 1913.

#### ***Amaea (Filiscalia) youngi* sp. n.**

Figs 7, 8

Diagnosis: A *Filiscalia* with strongly rounded whorls, a narrowly open umbilicus, partly hidden behind the reflexed columella, and a slight auricular expansion basally; axial ribs fine but widely spaced, 26–31 on later whorls, an occasional rib varicoid, all feebly angular immediately below suture; intervals with raised, flat-topped spiral lirae, 18–20 on later whorls; white; length about 10 mm.

Description: Shell somewhat broadly acuminate, of about 7 strongly convex teleoconch whorls, suture deep; labrum moderately thickened, base of peristome with a slight auricular expansion, aperture elliptical; base of body whorl strongly rounded, without a basal cord, but with a narrow, open umbilicus, partly hidden behind the reflexed columella lip. Axial ribs thin, low, widely spaced, prosocline lamellae, extending from suture to umbilicus, increasing from about 20 on 3rd whorl to 26–31 on penultimate whorl; an occasional rib on later whorls is thickened to form a varix; both ribs and varices form feeble angles immediately below suture. Intervals between ribs with elevated, somewhat tabulate spiral threads, subequal to

their interspaces; about 16 on 3rd whorl, increasing to 18–20 on penultimate whorl. White.

Protoconch apparently smooth, conical, apex missing, basal diameter 0,4 mm.

Dimensions: 10,3 × 5,9 mm (holotype).

Range: Known only from Durban.

Type material: Holotype NM B6026/T2767, Durban Bay, shallow dredgings, leg. B. J. Young. Paratopotypes 1–3, NM B6027/T2768.

Notes: *Amaea youngi* resembles *A. (F.) martinii* (Wood, 1828), of the tropical Indo-Pacific, in miniature, but differs in the possession of minutely coronated ribs and strong spiral lirae below the suture (where they are fine to feeble in *martinii*), as well as in the absence of interstitial spiral striae. *A. (F.) grossicingulata* (de Boury, 1913) from China has coarser sculpture (eg. 12 spiral lirae on the penultimate whorl instead of about 20) and lacks the subsutural coronations.

Etymology: The name honours the memory of the late Bernard J. Young, whose labours in sorting Durban harbour dredgings brought to light this and many other new or interesting species of Epitoniidae.

#### Subgenus *Acrilla* H. Adams, 1860

*Acrilla* H. Adams, 1860:241. Type species (o.d.) *Aclis acuminata* 'H. & A. Adams' [= *Scalaria acuminata* Sowerby, 1844].

*Fragilopalia* Azuma, 1972:59 (syn. n.). Type species (o.d.) *F. nebulodermata*.

Diagnosis: Shell narrowly acuminate, with numerous, convex whorls; axial ribs thread-like, intervals glossy, with fine spiral striae; no varices; labrum thin; base imperforate, with cord and disc.

Notes: I follow Wenz (1940) in regarding *Acrilla* as a subgenus of *Amaea*; *Acrilloscala* Sacco, 1890, appears to be intermediate in its characters. De Boury (1887) invalidly designated *Acrilla gracilis* H. Adams, 1860, as type species of the taxon, overlooking Adams' designation of *Scalaria acuminata*.

#### Key to southern African species of *Acrilla*.

Axial ribs dense, close, 24–34 per whorl; spiral striae distinct; attains 34 mm **minor**

Axial ribs widely spaced, 10–13 per whorl, spiral striae faint; attains 13 mm . . . . .  
**xenicima**

#### *Amaea (Acrilla) minor* (Sowerby, 1873).

Figs 1, 12–14

*Acrilla gracilis* H. Adams, 1860:241; Smith, 1904:24; *idem*, 1906:50. Type locality: Mouth of the Indus. *Scalaria minor* Sowerby, 1873:pl. 10, sp. 70 (*nom. subst. pro Acrilla gracilis* H. Adams, 1860, *non Scalaria gracilis* Sowerby, 1844).

*Scala minor*; de Boury, 1921:235.

*Acrilla adenensis* Jousseume, 1912:233, pl. 6, figs 27, 28; Kaicher, 1981:3105 (syntype). Type locality: Aden.

*Acrilla thalia* Bartsch, 1915:64, pl. 17, figs 5, 8 (syn. n.); Kaicher, 1983:3581 (holotype). Type locality: Port Alfred.

*Acrilla acuminata* (*non* Sowerby, 1844); Tomlin, 1923:50; Barnard, 1963:105.

Diagnosis: An *Acrilla* with gently convex whorls, axial ribs narrow, low, blunt, prosocline, sinuous, 24–34 per whorl, usually about half width of intervals; spiral

sculpture of shallow scratches, separated by sets of even finer ones; basal cord showing above suture; light brown with ribs, basal cord and mid-whorl band white, rarely uniform white or dark brown; attains 34 mm.

Description: Shell narrowly acuminate, of about 12 evenly and gently convex whorls; aperture oblong-ovate, labrum and columella thin; base imperforate, with a thin, slightly crenulate spiral cord, which shows immediately above suture on spire whorls. Axial ribs thin, low, blunt, prosocline, slightly sinuous, 15–17 on first teleoconch whorl, increasing to 24–34 per whorl, extending onto base; intervals with shallow, irregular spiral grooves, consisting of relatively widely spaced main grooves (sometimes shallowly notching the ribs), separated by series of fine striae. Colour generally light brown, darker below suture and on base, ribs, basal cord and a mid-whorl spiral band white; occasionally pure white or uniform deep brown.

Protoconch evidently of about  $2\frac{1}{2}$  smooth, convex whorls, rather pupoid, basal diameter 0,38 mm.

Dimensions: Maximum length 34 mm (lip broken).

Range: Arabian Sea to eastern Cape Province.

Regional locality records: NORTHERN MOZAMBIQUE: Conducia Bay (NM H241: K. Grosch). CENTRAL MOZAMBIQUE: Beira (NM J3099: E. Roscoe; also Tomlin 1923). SOUTHERN MOZAMBIQUE: Bangwe Is. (NM J6133: Mrs E. Roscoe). NATAL: Durban (NM B1989, A9763: B. J. Young; A1183, B1990: R. K.); off Durban Bluff, 20–22 m (NM B5439: R. K., R. Fregona); Scottburgh (NM A1039: W. Falcon; 3146: H. C. Burnup); Kelso (NM 3147: H. C. Burnup, det. de Boury as *Scalaria minor*); Sezela (NM 955: M. Sweeney); Ramsgate (NM 8799: R. K.); Port Shepstone (NM 3148: H. C. Burnup, det de Boury as *S. minor*; A927, 3145: H. C. Burnup). TRANSKEI: Mzamba (NM B4598: R. K.). EASTERN CAPE: Kwelera, near East London (NM A1884: Mrs C. M. Connolly); Kariega River mouth (NM B5568: G. Drury); Port Alfred (NM B4845: H. Becker); Jeffreys Bay (NM 7079: R. K.; B4788: E. K. Jordan).

Type material: The holotype of *Acrilla gracilis* is BM(NH) 1981224; it is a small, slender example, of 11 teleoconch whorls (protoconch missing, dimensions 16,4 × 4,1 mm). The worn holotype of *Acrilla thalia* Bartsch, 1915, is NMNH 186840, and syntypes of *A. adenensis* Jousseaume, 1912, are in the MHNP.

Notes: Tomlin (1923) and Barnard (1963) seem to have erred in regarding South African material as the eastern *Amaea* (*Acrilla*) *acuminata*. Taiwanese examples, agreeing well with the type figure of that (Sowerby 1844:pl. 35, fig. 130), differ in their much denser, less sinuous axial ribs, numbering about 50 on the 10th teleoconch whorl, instead of 30 or less for that whorl as in *minor*; these are subequal to the intervals in *acuminata*, instead of frequently half their width. More important, the basal cord does not show above the suture in *acuminata*, unlike *minor*, although this character varies slightly in the latter species. In the holotype of *Acrilla gracilis* (Fig. 14) the basal cord is already visible on the first teleoconch whorl, but in some local shells does not appear above the suture until the 7th whorl or later. The species appears to attain a much larger size (29–34 mm for 11–12 teleoconch whorls) in south-east Africa than in the Gulf of Aden and Arabian Sea,

as the holotype of *gracilis* measures only 16,4 mm for 11 whorls (axial ribs 24 on last whorl) and Jousseume (1912) gives 18–22 mm for 12 whorls in *adenensis*.

Under the revised ICZN code (article 59(b) of 1985), the name *Acrilla gracilis* must be permanently rejected, although it can no longer be regarded as a junior secondary homonym of *Scalaria gracilis* Sowerby, 1844.

*Amaea (Acrilla) xenicima* (Melvill & Standen, 1903)

Figs 15, 16

*Scala (Opalia) xenicima* Melvill & Standen, 1903:348, pl. 7, fig. 17. Type locality: Charbar [= Châh Bahâr, Iran], 5 fathoms, and Gulf of Oman, 156 fathoms.  
*Epitonium xenicimum*; Kaicher, 1981:2346 (syntype).

Diagnosis: An *Acrilla* with strongly convex whorls and very thin, sharp, widely spaced axial ribs, 10–13 per whorl; intervals with fine spiral scratches, sometimes obsolete; basal cord showing above suture; off-white to light brown, sometimes with dark zones; maximum length 12,5 mm.

Description: Shell narrowly acuminate with about 10 strongly and evenly convex teleoconch whorls, aperture elliptical, labium and columella thin; base imperforate, with a very thin peripheral cord, showing above suture on spire whorls. Axial ribs very narrow and sharp, widely spaced, strongly arcuate, markedly sinuous on body whorl, where they cross basal cord, 10–13 per whorl; intervals polished, with feeble, scratch-like spiral striae (sometimes obsolete). Colour yellowish-white to light brown, rarely with obscure brown zones.

Protoconch orthoconic, of 4 slightly convex whorls, apparently smooth; maximum diameter 0,4 mm.

Dimensions: 10,7 × 3,3 mm; attains 12,5 mm (lip broken).

Range: Gulf of Arabia and Singapore (Blake & Oliver 1982) to Transkei.

Regional locality data: ZULULAND: Mapelane, just S. of Umfolosi R. mouth (NM B6407: R. K.). NATAL: Durban Bay, shallow dredgings (NM B6024: B. J. Young). TRANSKEI: off Mncwasa Point, 90 m, coarse sand (NM C5898: MN).

Notes: A large series of shells (over 100 individuals) was recovered from a reclamation dump in Durban harbour; all are more or less damaged. Local specimens agree well with BM(NH) syntypes (No. 1903.12.15.20–21); one of these was figured by Kaicher (1982). However, Natal material generally (but not always) has feebler spiral striae and less distinct brown zonation than northern Indian Ocean examples.

*Fragiliscala tosaensis* Azuma (1962:130, figs 5, 6) resembles *Amaea xenicima* in sculpture although less acuminate in shape. *Fragiliscala* Azuma, 1962, of which *tosaensis* is the type (o.d.), may prove to be a synonym of *Acrilla*.

**Rutelliscala** gen. n.

Type species: *R. bombyx* sp. n.

Diagnosis: Shell small, solid, pupoid-pyramidal, with shallow suture, basally convex whorls and mammilliform apex; aperture basally patulous and effuse, forming a wide 'spout', columella truncate. Sculpture of close, dense axial threads,

with weak, spiral striae. Protoconch conical, of about  $3\frac{1}{2}$  whorls, with microscopic axial threads and spiral striae.

Notes: The wide pseudosiphonal canal is distinctive, and resembles that found in some members of the Melanellidae and Rissoacea, although anticipated in some degree in the epitoniid genus *Alora*. The protoconch resembles that found in *Epitonium*. Confirmation of the affinities of *Rutelliscala* from anatomical characters is nevertheless required.

Etymology: *rutellum* (a little shovel, L.) + *scala* (stem-name for group), feminine.

### ***Rutelliscala bombyx* sp. n.**

Figs 17–20a

Diagnosis: See under genus.

Description: Shell rather thick, pyramidal, slightly pupiform, breadth/length 0,44–0,51; teleoconch whorls 5, each gently convex basally, flattened to gently concave below suture, suture very shallow. Aperture ovate, slightly angular posteriorly, both lips evenly curved, base effuse, forming a wide, shallow spout, columella truncate; labial callus moderately thick on columella, adnate except for a very slight rimation, thinner over paries; labrum not thickened, in side view medially concave, prosocline above. Sculpture on first two whorls of 22–25 fairly straight axial ribs, narrower than their intervals, with about 13 interstitial spiral threads; from end of 2nd whorl axials become very low, dense, slightly arcuate, strongly prosocline, approximately 60 on last whorl (but difficult to count because of rib-splitting); spiral threads crossing ribs on later whorls, but feeble and ill-defined. White, surface glossy.

Protoconch conical, of about  $3\frac{1}{2}$  convex whorls, with fine axial threads, intervals pricked, and 2–3 relatively strong spiral threads adapically; translucent white with a brown line below suture; terminating in a well-developed varix; basal diameter 0,40 mm.

Dimensions:  $5,5 \times 2,4$  mm (holotype);  $4,9 \times 2,2$  mm (paratype).

Range: Outer shelf and upper slope of Transkei.

Type material: Holotype NM C6561/T3006, off Mendu Point,  $32^{\circ}21,8'S$ ,  $29^{\circ}0,0'E$ , 300 m, coarse sand. Paratypes 1–3, NM C1280/T3007, off Port Grosvenor, 100–115 m, sand, some mud, solitary corals, shells; paratypes 4–5, NM C8061/T3057, off Mgazi, 180 m, soft mud. All dredged MN.

Notes: The axial ribs are so fine and close as to give the shell a grooved appearance, and the surface bears a somewhat silky sheen.

Etymology: *bombyx* = silk (L.).

### *Cirsotrema* Mörch 1852

*Cirsotrema* Mörch, 1852:49. Type species (M) *Scalaria varicosa* Lamarck, 1822.

Diagnosis: Shell acuminate with a strong basal cord; axial and spiral sculpture well-developed, lacking pitted intritacalx; peristome continuous, thickened.

Range: Hawaii and Polynesia to northern Mozambique.

Regional locality data: NORTHERN MOZAMBIQUE: Nacala Bay, fine sand inside reef, a current, LST (NM H4855: K. Grosch); Conducia Bay (NM H4856, H4857: K. Grosch).

Notes: Most Mozambique shells in the NM collection agree well with the figured holotype (Mermod & Binder 1963, *loc cit.*) of *C. varicosum*, and with a Philippine series. Available material is inadequate for me to decide whether *C. joubini* (de Boury, 1913) (= *Scalaria abbreviata* Sowerby, 1874, *non* Da Costa, 1861) and *C. multiperforatum* (Sowerby, 1874) fall within the range of variation of this species. Two Conducia Bay specimens (see Fig. 22) show some resemblance to *multiperforatum*, as figured by de Boury (1912:pl. 8, fig. 12) and Kaicher (1982, holotype), but for the present are referred to *C. varicosum*.

**Cirsotrema (Cirsotrema s.l.) krousma sp. n.**

Fig. 26

Diagnosis: Shell glossy, with convex whorls and deep suture, umbilicus closed or very slight; aperture with basal fasciole; sculpture of cord-like, very prosocline axial ribs (12–18 per whorl), no varices, intervals with thin, strong spiral lirae, 5–9 per whorl, obsolete below suture, one lira on base of body whorl stronger than others and followed by fine, irregular threads; pale biscuit-colour with white ribs; length about 10 mm.

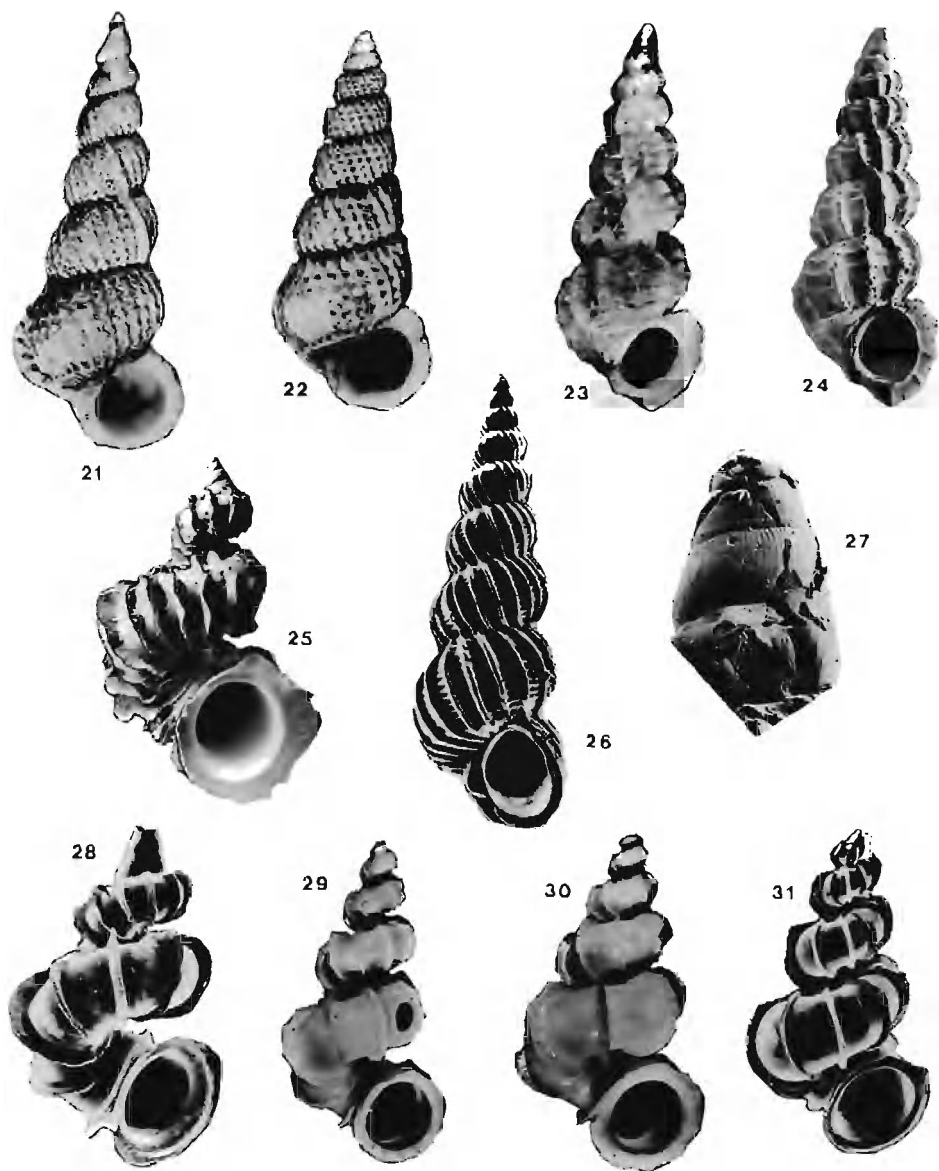
Description: Shell glossy, narrowly acuminate, with  $8\frac{1}{2}$  strongly convex teleoconch whorls and deep suture, umbilicus closed or forming a slight, fenestrate chink; aperture ovate; peristome fairly thin, base flattened with a distinct fasciole, columella reflexed and adnate. No varices; axial ribs strong and regular, rather cord-like, very prosocline, not reflexed, extending onto base of body whorl, 17–18 on first teleoconch whorl, decreasing to 12–15 on body whorl. Spiral lirae well developed, subequal in width to their intervals, 5–9 on lower two-thirds of each whorl, obsolete below suture, and replaced on base of body whorl by fine, irregular spiral threads, the two series separated by a distinctly stronger spiral lira, sometimes separated from those above it by a slight gap. Colour pale to light orange-yellow with white ribs.

Protoconch conical, with 3 smooth, convex whorls; basal diameter 0,4 mm.

Dimensions:  $5,7 \times 2,1$  mm (holotype); paratypes  $8,9 \times 3,1$  mm,  $9,3 \times 3,0$  mm, attaining at least  $10,3$  mm.

Type material: Holotype, NM B6089/T2764, Durban Bay, shallow dredgings, leg. B. J. Young. Paratypes, 1–22, NM B6088/T2765.

Notes: *C. krousma* closely resembles *Scala canephora* Melvill, 1906, but compared with the holotype of that (BM(NH) 1906. 10232) from the Gulf of Oman, is much larger, with less angular whorls and a blunter, less conical protoconch. *Scala proxima* Thiele, 1925, from off Sumatra, also appears similar but is spirally lirate below the suture. *Scala capitata* Thiele, 1925, from off Tanzania, differs in shape.



Figs 21-31. *Cirsoirema* and *Cycloscala* species. 21, *Cirsoirema (Cirsoirema) varicosum* (Lamarck, 1822), NM H4857, Conducia Bay, Mozambique, 41,9 × 15,8 mm; 22, *C. ?varicosum*, NM H4856, Conducia Bay, 34,1 × 14,2 mm. 23, 24, 27, *Cirsoirema (Rectiacirsa) pellei* (Viader, 1938): 23, 24, NM CS853, off Mtamvuma River, 110 m, 4 × 1,5 mm; 27, protoconch, basal diameter 0.3 mm. 25, *Cycloscala gazae* sp. n., holotype, 2,75 × 1,75 mm. 26, *Cirsoirema krousma* sp. n., holotype, 5,7 × 2,1 mm. 28-31, *Cycloscala hyalina* (Sowerby, 1844), NM B2063, Durban Bay: 28, 2,2 × 1,3 mm; 29, 5,7 × 2,9 mm; 30, 6,3 × 3,6 mm; 31, 4,3 × 2,4 mm. Figs 14-18 and 31 are SEM.



The generic position of *krousma* is uncertain, but the strong spiral sculpture is suggestive of *Cirsotrema*.

Etymology: *krousma* = a tune produced by a harp (G.).

#### Subgenus *Rectacirsa* Iredale, 1936

*Rectacirsa* Iredale, 1936:305. Type species (o.d.) *R. fregata* Iredale, 1936.

Diagnosis: Shell tiny, acuminate, with globular whorls, basal keel well developed, sculptured by axial ribs and spiral striae [or a few strong spiral lirae]; protoconch conical, of about 3 whorls.

Notes: The name *Rectacirsa* is applied here with great hesitation, as an alternative to erecting a new subgenus. Although there is much overall resemblance between the western Indian Ocean *Epitonium peltei* Viader, 1938, and the type species of *Rectacirsa*, *R. fregata*, Iredale's figure and Kaicher's photograph (1981:3096, as *Opalia*) of the latter lack the obliquely truncate base of *peltei*. Equally uncertain are the relationships of the taxon: the truncate base is suggestive of *Compressiscalia*, while the strong spiral lirae could indicate affinity with *Cirsotrema*. I would also associate here the rather similar *Cirsotrema pentedesmium* Berry, 1963, from tropical West America; this was synonymised by Dushane (1974:48) with *Scalaria vulpina* Hinds, 1844, although the respective type figures display scant resemblance to one another.

#### *Cirsotrema (Rectacirsa) peltei* (Viader, 1938)

Figs 23, 24, 27

*Epitonium peltei* Viader, 1938:7, pl. 2, figs 13, 14. Type locality: Port Louis harbour, Mauritius, in about 300 feet.

Diagnosis: Shell tiny (4 mm) with strongly convex whorls and deep suture, outer lip weakly fluted, obliquely truncate on left side of base, imperforate, basal cord strong; a single spire varix, axial ribs strong, 8–11 per whorl, crossed by 3–4 strong spiral ridges, interstices with faint spiral striae; off-white with yellowish spiral ridges and brownish-orange protoconch.

Description: Shell with high, acuminate spire, whorls strongly convex with deep suture; aperture obliquely oval, peristome complete, slightly flattened on labial side, labral margin thick and slightly flaring, particularly posteriorly, with 5 weak flutings, basally with an oblique truncation on left side; base of body whorl concave, imperforate, with a strong bordering cord, crenulated by axial rib terminations. Spire with a varix only at termination of antepenultimate whorl; axial ribs strong, discontinuous across suture, approximately half width of intervals; 11 on first teleoconch whorl, decreasing to 8 on body whorl; ribs crossed by 3 spiral ridges on 3rd whorl (earlier whorls worn), increasing to 4 on fourth whorl; interstices with traces of faint spiral striae. Colour yellowish-white with darker spiral ridges; protoconch strong orange.

Protoconch conical, of about  $3\frac{1}{2}$  apparently smooth whorls, but with dense arcuate axial striae and irregular spiral striae visible under SEM; basal diameter 0,3 mm.

Dimensions: 4 × 1,5 mm.

Range: Mauritius to eastern Transkei.

Regional locality data: TRANSKEI: Off Mtamvuna River, 110 m, pebbles (NM C5853:MN).

Notes: The single local specimen agrees precisely with Viader's figures and description, save for the word 'umbilicated', which I believe to be a *laps. cal.* The overall brown colour of the holotype was originally also present in the Transkei shell, but was removed by treatment in an ultrasonic cleaner, and may be epizootic in origin.

### *Cycloscala* Dall, 1889

*Cycloscala* Dall, 1889:316. Type species (s.d. de Boury, 1909) *Scala dunkeriana* Dall, 1889 [= *Scalaria echinaticosta* d'Orbigny, 1842].  
*Solvaclathrus* Iredale, 1936:299. Type species (o.d.) *S. jacobiscala* Iredale, 1936.

Diagnosis: Shell small to minute, later whorls disjunct, axial lamellae erect, usually weakly crenate; protoconch polygyrate, conical, peg-like, with dense, arcuate axial striae visible under SEM.

Notes: Clench & Turner (1951) may perhaps have been justified in treating *Cycloscala* as a subgenus of *Epitonium*, but the group appears sufficiently well defined to warrant full generic status. The type species from the Western Atlantic is actually atypical for the group, the teleoconch whorls in Indo-Pacific representatives being more conspicuously solute (alloiostrophic). There appear to be seven described Indo-Pacific species (although several are of doubtful validity): *anguina* Jousseume, 1912, *hyalina* (Sowerby, 1844), *jacobiscala* (Iredale, 1936), *latedisjuncta* (de Boury, 1911), *laxata* (Sowerby, 1844), *paucilobata* (de Boury, 1911) and *revoluta* (Hedley, 1899). An eighth species is added here. Although de Boury (1909) suggested that *revoluta* was a *Solutiscala* [= *Eccliseogyra*] its protoconch is that of a *Cycloscala*.

### Key to southern African species

Axial ribs 7–10 per whorl, aperture slightly elliptical . . . . . **hyalina**  
 Axial ribs 12–14, aperture circular . . . . . **gazae**

### *Cycloscala hyalina* (Sowerby, 1844)

Figs 28–31

*Scalaria hyalina* Sowerby, 1844a:85, pl. 32, figs 21, 22; *idem*, 1844b:11; Tryon, 1887:57, pl. 11, figs 53, 54 (after Sowerby). Type locality: Catanauan, Luzon Is., Philippines.

*Cycloscala hyalina*; Jousseume, 1912:195, pl. 7, fig. 37.

*Epitonium hyalinum*; Kaicher, 1981:3043.

*Epitonium hyalinum mokuoloense* Pilsbry, 1921:377; Kay, 1979:153. fig. 54G. Type locality: Kaneohe Bay, Hawaii.

? *Scalaria latedisjuncta* de Boury, 1911:329. Type locality: Lifu, New Caledonia.

? *Cycloscala latedisjuncta*; Jousseume, 1912:195, pl. 7, fig. 38.

Diagnosis: Shell of about  $4\frac{1}{2}$  teleoconch whorls, uncoiled from first, axial lamellae 10 on 1st–2nd whorls, 8 on 3rd, 7 on last, weakly fluted with a slight coronation; aperture obliquely ovate; attains at least 6,6 mm.

Description (Durban specimens): Shell with about  $4\frac{1}{2}$  teleoconch whorls, narrowly to widely scalariform from 2nd whorl on. Sculptured by erect, slightly recurved axial lamellae, 10 on 1st and 2nd whorls, decreasing to 8 on 3rd and 7 on last; each lamella has about 4 weak angles, that on the shoulder forming a blunt coronation; no spiral sculpture other than faint crenulations behind the axial lamellae. Aperture obliquely ovate (distinctly longer than wide); peristome not basically auriculate. Translucent glossy white.

Protoconch orthoconic, over 3 whorls (apex damaged), diameter 0,38 mm; sculptured by very fine axial striae (SEM).

Dimensions:  $6,6 \times 3,6$  mm;  $5,9 \times 3,1$  mm.

Range: Hawaii and Red Sea to Natal.

Regional locality data: NATAL: Durban Bay, shallow dredgings (NM B2063: B. J. Young, numerous).

Type material: Four syntypes BM(NH) 198148; one illustrated by Kaicher 1981.

Notes: Populations from extreme ends of the range of *C. hyalina* (ie. Hawaii and Natal) are characterised by the small size of individuals. In more central parts of the range the species attains at least 10 mm in length. Larger Durban examples agree well with the smaller syntypes. *Scalaria latedisjuncta* de Boury, 1911, was distinguished from *C. hyalina* by its small size (5 mm) and more disjunct whorls. Neither character is taxonomically significant.

### *Cycloscala gazae* sp. n.

Figs 5, 25

Diagnosis: Shell of  $2\frac{1}{2}$  teleoconch whorls, uncoiled from first, axial lamellae 12 on first whorl, 13–14 on second, weakly fluted, not coronate, aperture circular: length 3,0 mm.

Description: Shell of  $2\frac{1}{2}$  teleoconch whorls, uncoiled from first whorl. Sculptured by erect, slightly recurved axial lamellae, 12 on first whorl, 13–14 on second; lamellae slightly flattened at periphery, weakly fluted, not forming a coronation; intervals smooth. Aperture circular; peristome not basally auriculate. Translucent white.

Protoconch acutely orthoconic, nearly 5 whorls, basal diameter 0,35 mm; tinged with pale brown; sculptured by dense arcuate axial striae and a few faint spiral threads (SEM).

Dimensions:  $2,75 \times 1,75$  mm (holotype);  $3,0 \times 1,8$  mm (paratype).

Range: Outer continental shelf of Transkei.

Type material (all NM:MN): Holotype, C5831/T2778, off Port Grosvenor ( $31^{\circ}25,6'S$ ,  $29^{\circ}58,0'E$ ), 95–100 m, coarse sand. Paratypes 1–3 (all off Port Grosvenor): C5830/T2781, 100–110 m, pebbles, some sand; C5828/T2779, 82 m, worn calcareous nodules; C5829/T2780, 80 m, calcareous nodules, lithothamnial sheets; paratype 4, C7438/T3175 off Mtamvuna River, 115 m, sponge, rocks; paratype 5, C7873/T3174 off Nqabara Point, 250 m, live sponges, some corals.

Notes: *C. gazae* somewhat resembles *C. revoluta* (Hedley, 1899) from the tropical Pacific, but differs from this and other members of the genus in its more numerous ribs.

Etymology: *gaza*, *-ae*, (L.), a prince's treasure (alludes to the wreck of the *Grosvenor*, reputedly carrying a rich treasure trove, which went aground near the type locality in 1782).

### *Opaliopsis* Thiele, 1928

*Opaliopsis* Thiele, 1928:92. Type species (o.d.) *Scala elata* Thiele, 1925.

*Nystiella* Clench & Turner, 1952:337 (syn. n.). Type species (o.d.) *Epitonium opalinum* Dall, 1927.

Diagnosis: Shell with broad axial ribs; no intritacalx; protoconch conical, of 3–4 whorls, with distinct axial ribs and sometimes interstitial spiral striae, often dark in colour.

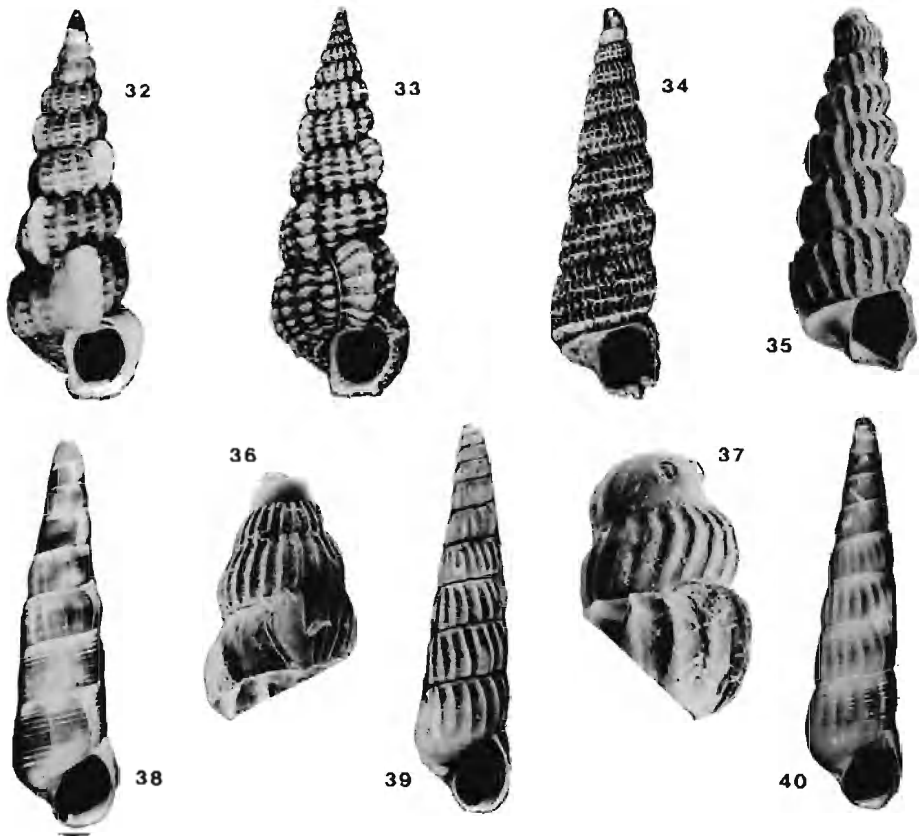
Notes: The respective type species of *Opaliopsis* and *Nystiella* agree closely in general characters. *Nystiella* and *Solutiscula* de Boury, 1909 [= *Eccliseogyra* Dall, 1892, *fidé* Rex & Boss 1973] were grouped in their own subfamily, the Nystiellinae, by Clench & Turner 1952, on the basis of the ribbed protoconch. Abbott (1974:124) cited *Eccliseogyra* as a subgenus of *Nystiella*, but Bouchet (in litt.) considers the former a distinct group, containing fragile species with frilled axial lamellae. *Goniscalia* Marwick, 1943, with stiliform protoconch of 5 whorls is another member of the complex.

### *Opaliopsis meiringnaudeae* sp. n.

Figs 32, 33, 36

Diagnosis: Shell acuminate with deep suture and strongly rounded whorls; aperture slightly flaring basally; base imperforate; a single massive, reflexed varix per whorl; axial ribs strong, rounded, 10–14 per whorl, crossed by widely spaced spiral lirae, about 8 on later whorls; basal cord thin, base with 3–6 spiral lirae, rendered nodulous by terminations of axial ribs; yellowish-white, spiral lirae tinged with orange-brown where they cross intervals; protoconch orange-brown. Length 8.4 mm.

Description: Shell acuminate with a deep suture and about 8 strongly convex teleoconch whorls, whose periphery lies slightly above midline; aperture ovate, slightly flaring basally, columella rather straight; base slightly concave, imperforate; labrum with a massive varix but a thin, sharp lip, which bridges posterior angle of aperture; a single thick, reflexed varix per whorl, varices arranged more or less spirally. Sculptured by strong axial ribs, bearing weak nodules where crossed by widely spaced spiral lirae. Axial ribs rising fairly high at sutures but weak on base, rather straight and orthocline, rounded, subequal to intervals; early whorls with 13–14 axial ribs, body whorl with 10 ribs plus 1–2 varices. Spiral lirae weak on early whorls, about 5 per whorl, increasing in strength and number to 8 on penultimate whorl, those above and below suture thinner than others; on body whorl followed by a thin basal cord (slightly stronger than spiral lirae), base itself with 3–6 lirae, rendered nodular by terminations of axial ribs; intervals between spiral ridges with



Figs 32-40. *Opaliopsis*, *Murdochella* and *Obstopalia* species. 32, 33, 36, *Opaliopsis meiringnaudeae* sp. n., holotype, 8,4 × 2,9 mm, protoconch with basal diameter 0,38 mm. 34, *Murdochella crispata* sp. n., holotype, 7,5 × 2,1 mm. 35, 37, *Murdochella lobata* sp. n., holotype, 3,3 × 1,2 mm, protoconch diameter 0,95 mm. 38, *Obstopalia varicosa* sp. n., holotype, 7,0 × 1,7 mm. 39, 40, *Obstopalia pseudosulcata* sp. n., holotype, 7,6 × 2,0 mm. Figs 35, 36, 37 are SEM; specimens in Figs 33, 39, coated with MgCl<sub>2</sub>.

dense axial microstriae. Colour yellowish-white, spiral lirae tinged with moderate orange where they cross intervals.

Protoconch conical, at least 4 whorls (apex damaged, last 3 with strong, opisthocline axial ribs, 22-26 per whorl, with fine, interstitial spiral threads, about 20 on later whorls; brownish-orange, diameter 0,38 mm.

Dimensions: 8,4 × 2,9 mm (holotype).

Range: Outer continental shelf and upper slope of Transkei.

Type material: Holotype NM C1278/T2772, off Port Grosvenor (29°57,6'S, 31°26,9'E), 100-115 m, coarse sand, some mud, shells, solitary corals. Paratype 1, NM C5846/T2773, off Nthlonyane River, 220-230 m, marine growths. Paratype 2, NM C6918/T2939, off Kei River, 490-500 m, sandy mud. All dredged MN.

Notes: *Opaliopsis meiringnaudeae* is almost indistinguishable from *O. atlantis* (Clench & Turner, 1952) of the western Atlantic, but in the latter the axial ribs rise

higher at the suture and are tinged with brown, and both axials and spirals may be slightly more numerous.

Etyymology: named after the CSIR research vessel *Meiring Naudé*.

#### *Gyroscale* de Boury, 1887

*Gyroscale* de Boury, 1887:15. Type species *Scalaria commutata* Monterosato, 1877 [= *Scalaria lamellosa* Lamarck, 1822].

Diagnosis: Shell medium-sized with high axial lamellae, glossy, smooth intervals, a continuous, thickened peristome, and well-defined, thin basal cord; protoconch conical, of 3 smooth, gently convex whorls. Radula without rachidian, lateral plates somewhat palmate, with three long terminal cusps.

Notes: *Gyroscale* consists of a few species resembling *Epitonium*, but with a basal cord. Treatment of its taxonomic status has often varied according to nationality. Thus most European workers from Thiele (1929) to Fretter & Graham (1982) have subordinated it to *Cirsotrema*, whereas Americans treat *Gyroscale* as a subgenus of *Epitonium*. I have compromised by following Australian and Japanese malacologists in according it full generic status. I would rank as subgenera *Boreoscale* Kobelt, 1902, and *Circuloscale* de Boury, 1887. The two southern African species have been discussed in detail by Kilburn (1972) and Kilburn & Rippey (1982).

#### *Gyroscale coronata* (Lamarck, 1816)

*Scalaria coronata* Lamarck, 1816:11, pl. 451, fig. 5; *idem*, 1822:227. Type locality unknown [= False Bay, here designated].

*Epitonium (Gyroscale) coronatum*; Kilburn, 1972:407 (references and synonymy).

*Epitonium coronatum*; Kilburn & Rippey, 1982:78, pl. 11, fig. 13, text fig. 37.

Additional locality data (see Kilburn 1972): SOUTHERN MOZAMBIQUE: Baia dos Cocos, near Jangamo (NM F8989: A. Jenner). NORTHERN MOZAMBIQUE: Conducia Bay, sandy area near *Thalassodendron* and rocks, LST (NM H384: K. Grosch).

Radula (Fig. 170): resembling that of *G. lamellosa* (Azuma 1971:pl. 11, fig. 4; Clench & Turner 1952:pl. 176, fig. 3); approximately 75 laterals per half-row.

#### *Gyroscale lamellosa* (Lamarck, 1822)

*Scalaria lamellosa* Lamarck, 1822:27. Type locality unknown [= Corsica, des. Clench & Turner, 1951].

*Epitonium (Gyroscale) lamellosum*; Kilburn, 1972:406 (references and synonymy).

*Epitonium lamellosum*; Kilburn & Rippey, 1982:78, pl. 11, fig. 14.

*Scalaria perplexa* Pease in Deshayes, 1863:60, pl. 8, fig. 1. Type locality: Reunion Is.

*Epitonium pyramis* Tinker, 1952; Rehder, 1980:51, pl. 7, fig. 8.

*Cirsotrema commutatum* (Monterosato, 1877); Fretter & Graham, 1982:385, fig. 273.

Range: Mediterranean and tropical Atlantic to Angola; southern Africa from Jeffreys Bay eastwards; Indo-Pacific including California and New Zealand.

Mozambique locality data (see also Kilburn 1972): SOUTHERN MOZAMBIQUE: Bazaruto Is. (NM G3815: Mrs N. Cumming; G2071: Mrs E. Roscoe). NORTHERN MOZAMBIQUE: Mozambique Is. (NM G3731: R. K.); Conducia Bay (NM H282: K. Grosch).

Notes: Rehder (1980) has pointed out that Deshayes' 1863 usage of the name *Scalaria perplexa* predates its publication by Pease (1868:288). He disagrees with

my view that only a single, almost cosmopolitan species is involved, and proposes recognition of three geographically separated species. These are: *E. lamellosum* (Lamarck, 1822) from the Mediterranean and tropical Atlantic, *E. perplexa* (Deshayes, 1863) from the Indo-Pacific, and *E. pyramis* Tinker, 1952, of Hawaii and Easter Island. He states that *pyramis* has more convex whorls and is generally broader than *perplexa*, while in turn *perplexa* is broader with more numerous lamellae than *lamellosa*. In the light of this objection from a highly reputable worker, I have re-examined material and literature, with the following results:

Published rib counts include:

- (a) *lamellosa* s.s.: 9–11 (Fretter & Graham 1982); 8–12 (Nordsieck 1968).
- (b) *perplexa*: 12–13 (Deshayes 1863), 9–13 (Powell 1979).
- (c) *pyramis*: 9–10 (Kay 1979), 10–13 (Rehder 1980).

These figures do not support any separation based on rib number.

Study of the small series of undamaged extralimital adults (*excluding* South African material) in the NM collection suggests that relative breadth (B/L) is equally uniform:

- (a) *lamellosa* s.s. (N = 9): ribs 9–12, B/L 0,40–0,49.
- (b) *perplexa* (N = 8): ribs 11–13, B/L 0,42–0,49.
- (c) *pyramis* (N = 3): ribs 10–11, B/L 0,42–0,48.

In overview, rib-counts of 9–12 and breadth/length of 0,42–0,48 occur in all three populations; Mediterranean/Atlantic individuals may occasionally have one rib fewer and be very slightly narrower (B/L 0,40), but this is certainly not taxonomically significant. Moreover, study of a large collection (N = 91) of South African shells (Jeffreys Bay to Zululand) is equally demonstrative; axial ribs 8–13 (M = 10; SD = 1,37), breadth/length 0,40–0,49 (M = 0,45; SD = 0,025)! In other words, within one population may be found the *entire* range of variation in both rib number and proportionate breadth of the three supposed (allopatric) species. It may be added that whorl-convexity is another facet of individual variation in *lamellosum* and certainly cannot be used to separate out a particular population as a taxonomic unit.

In conclusion, I adhere to my 1972 view and see no alternative to treating *perplexa* and *pyramis* as synonyms (not even subspecies) of *Gyroscaia lamellosa*.

Dushane (1983) extends the known range of *G. lamellosa* to California, regarding *Epitonium basicum* and *E. zephyrium* Dall, 1917, as further synonyms of this almost world-wide species.

#### *Murdochella* Finlay, 1927

*Murdochella* Finlay, 1927:402. Type species (o.d.) *Scala levifoliata* Murdoch & Suter, 1906.

Diagnosis: Shell acuminate, with axial lamellae and frequently spiral threads, basal cord present, peristome discontinuous, labrum fluted by external sculpture; no intritacalx; protoconch bulbous, of 2 whorls, at least partially axially ribbed.

Notes: At present, four species of *Murdochella* are on record, three from New Zealand (see Powell 1979:253) and one (*M. macrina* Iredale, 1936) from New

South Wales. *Scala agulhasensis* Thiele, 1925, type species of *Chuniscula* Thiele, 1928, resembles members of *Murdochella* but its protoconch was described as smooth; this needs confirmation.

Key to southern African species of *Murdochella*

Axial ribs slightly coronate, non-crispate, 15–18 per whorl; no spiral sculpture other than a very strong basal cord ..... **lobata**  
 Axial ribs crispate, non-coronate, about 40 on later whorls, with 3–4 spiral lirae and a strong basal cord ..... **crispata**

***Murdochella crispata* sp. n.**

Figs 6, 34

Diagnosis: A *Murdochella* with flattened, slightly overhanging whorls and a deep suture; each whorl with two anterior spiral cords and 1–2 weaker posterior ones, crossed by dense, crispate axial lamellae (about 40 on last whorl); base with a strong outer cord and 2 inner ones, crossed by axial threads; white; length 7,5 mm.

Description: Shell acuminate, with 8 flattened teleoconch whorls, suture deep, somewhat channelled, each whorl slightly overhanging its successor; base imperforate; aperture elliptical, labrum thin, fluted by external sculpture; labium evenly concave, not calloused; base concave. Sculptured by 3–4 spiral cords, the uppermost 1–2 initially weak, the two anterior cords strong throughout, crossed by thin, reflexed axial lamellae, 16–20 on first teleoconch whorl to about 40 on last, forming vaulted scales where they cross spirals. Base with a strong outer spiral cord and two weaker ones, crossed by thread-like continuations of axial lamellae. White.

Protoconch of 2 whorls; sculptured by dense, arcuate axial riblets, about 16 per whorl, except for the tip which is smooth; diameter 0,43 mm.

Dimensions: 7,5 × 2,1 mm (holotype).

Range: Continental shelf and slope of Transkei.

Type material: Holotype C5832/T2775, off Ubombo, Transkei (31°54,3'S, 29°17,8'E), 60–62 m, coarse sand, oyster-shell conglomerate. Paratypes 1, 2, NM C5834/T2777, off Ubombo, sponge-rubble; 3, 4, NM C5833/T2776, off Port Grosvenor, 82 m, worn calcareous nodules; 5, 6, NM C5842/T2782, off Mbashe River, 200–220 m, sponge-rubble; 7–10, NM C5844/T2783, juvs, off Rame Head, 410–430 m, stones, some sand; 11, NM C5209/T2888, off Kei River, 390 m, coarse sand. All dredged MN.

Notes: The Australian *Murdochella macrina* Iredale, 1936, is narrower than *M. crispata*, with convex whorls and a smooth base. The three New Zealand species have only two spiral keels; furthermore, *M. levifoliata* (Murdoch & Suter, 1906) and *M. alacer* Finlay, 1927, have angular whorls, while *M. superlata* Finlay, 1930, has widely spaced axial ribs.

Etymology: *crispata* = curled or crinkly (L.).



**Murdochella lobata** sp. n.

Figs 35, 37

Diagnosis: A *Murdochella* with strongly convex whorls, a deep suture and a rather quadrate aperture, basal cord strong, forming projection on lip, which is basally flattened; axial ribs sharp, reflexed, straight, with a slight shoulder coronation, 15–18 ribs per whorl, interstices smooth; base concave, glossy, with growth striae; off-white; length 4,1 mm.

Description: Shell acuminate, with about 5½ teleoconch whorls, suture deep, whorls strongly convex, with periphery above midline; aperture somewhat quadrate, labrum basally truncate; base concave but not imperforate, with prominent bordering keel which forms a projection on labrum and shows above suture on spire. Sculptured by sharp, reflexed, rather orthocone axial lamellae, bearing a slight angle around shoulder, and terminating at basal cord; 15–18 ribs per whorl; no distinct spiral sculpture; basal disc glossy, with coarse growth lines. Greyish-white (probably discoloured).

Protoconch subcylindrical, of 2 strongly convex whorls, very tip smooth, remainder with arcuate, opisthocline axial ribs, 17–18 per whorl; termination marked by a flaring varix; maximum diameter 0,95 mm (excluding varix).

Dimensions: 3,3 × 1,2 mm (holotype); attains 4,1 mm (lip broken).

Range: Continental slope of western Transkei.

Type material: Holotype C5845/T2774, off Nthlonyane River, Transkei (32°17,2'S, 29°04,9'E), 220–230 m, branching sponges, gorgonians. Paratypes 1–3, NM C5843/T2784, off Mbashe River, Transkei, 200–220 m, sponge-rubble. All dredged MN.

Notes: *M. lobata* shows the characteristic protoconch of the genus *Murdochella*, but differs from its congeners in its feebly coronate ribs and absence of spiral sculpture. A superficial sculptural resemblance exists to *Scala turrisphari* Hedley, 1905, from New South Wales, type species of the genus *Dissopalialia* Iredale, 1936, but this has a spirally lirate protoconch and different base. Similarly, *Scalaria acus* Watson, 1883, of the tropical Atlantic, type species of *Cylindriscala* de Boury, 1909, approaches *M. lobata* in teleoconch characters (see de Boury 1912:pl. 8, fig. 1), but differs in its conical protoconch of 3 whorls, which bears only exceedingly fine axial threads. Superficially similar is also *Chuniscala rectilamellata* (herein) which differs slightly in shape and whose protoconch bears only fine axial riblets on the last quarter whorl.

Etymology: *lobata* = lobed (L.).

*Obstopalia* Iredale, 1936

*Obstopalia* Iredale, 1936:299. Type species (o.d.) *O. lixa* Iredale, 1936.

Diagnosis: Shell resembling *Opalia*, but peristome incomplete, surface glossy, without punctae or intritacalx; protoconch subcylindrical, of 1½–2 smooth whorls.

Notes: Although described amidst epitoniid genera, Iredale surmised that *Obstopalia* was 'related distantly to *Diffalaba*', a cerithiacean group, and this suggestion was accepted by Wenz (1940). Iredale & McMichael (1962), however,

catalogued it among the Epitoniidae, and the holotype of the type species was illustrated by Kaicher (1983) as an *Epitonium*. There appears to be some resemblance (perhaps superficial) to certain of the subgenera of *Acirsa* Mörch, 1857, recognised by Wenz. The two South African species of *Obstopalia* are included here for completeness. Both local species are characterised by series of opaque white spiral lines or dots on a translucent ground, conveying the superficial appearance of interstitial intritacalx and internal lirae.

Key to southern African species of *Obstopalia*

Axial ribs absent; varices present; protoconch diameter 0,6 mm; aperture somewhat quadrate ..... **varicosa**  
 Axial ribs present; varices absent; protoconch diameter 0,5 mm; aperture obovate ..... **pseudosulcata**

***Obstopalia pseudosulcata* sp. n.**

Figs 4, 39, 40

Diagnosis: An *Obstopalia* with obovate aperture, evenly convex labium and thin labrum; no varices or distinct spiral sculpture; narrow, sharp axial ribs present, 12–20 per whorl; translucent greyish-white with interrupted milk-white spiral lines; protoconch diameter 0,5 mm; attains 10,5 mm.

Description: Shell narrowly acuminate, of  $9\frac{1}{2}$  teleoconch whorls, early ones moderately convex, later ones progressively less so, suture shallow but distinct; aperture obovate, tapering slightly posteriorly; peristome thin, discontinuous, labium evenly concave; base imperforate, somewhat produced. Glossy, without varices or distinct spiral sculpture; axial ribs thin (narrower than intervals), with sloping sides, slightly arcuate, weakly prosocline, obsolete on base and ending just below suture, weak or absent on first 1–2 teleoconch whorls, on later whorls numbering 12–20. Translucent greyish-white with opaque white spiral lines between ribs (weak on early whorls, about 12 rows on penultimate whorl), an additional 2–3 continuous white lines on base of body whorl, obsolete anteriorly.

Protoconch subcylindrical, rather papillose, of about 2 smooth, globular whorls, defined by a low, opisthocline varix; basal diameter 0,5 mm.

Dimensions:  $7,6 \times 2,0$  mm (holotype);  $10,5 \times 2,3$  mm (paratype).

Range: Continental slope of southern Natal and eastern Transkei.

Type material: Holotype NM C5848/T2763, off Rame Head ( $31^{\circ}56,1'S$ ,  $29^{\circ}26,5'E$ ), Transkei, 410–430 m, stones, some sand. Paratype 1, same data, NM C5847/T2766. Paratype 2, NM C4887/T2890, off Qora River, 400 m, sand. Paratype 3, NM B9076/T2996, off Melvill, Natal, 380–420 m, coarse sand, sandstone. All dredged MN.

Notes: *Obstopalia lixa* Iredale, 1936, from New South Wales has feeble axials, strong spiral sculpture and more convex whorls. *O. pseudosulcata* is compared with the other southern African species, *O. varicosa*, in the above key.

Etymology: *pseudo* (false) + *sulcata* (grooved), L.

***Obstopalia varicosa* sp. n.**

Fig. 38

Diagnosis: An *Obstopalia* with somewhat quadrate aperture, columella callus reflexed, meeting paries at a slight angle; no axial ribs or distinct spiral sculpture, but strong, low varices, 1–2 per whorl; translucent greyish-white with interrupted milk-white spiral lines; protoconch opaque, diameter 0,6 mm; length 12,7 mm.

Description: Shell narrowly acuminate, of 10 teleoconch whorls, moderately convex, becoming less so on later whorls, suture shallow; aperture somewhat quadrate, columella meeting paries at a slight angle; peristome discontinuous, labrum preceded by a varix, columella callus slightly reflexed. Surface glossy, with growth-lines, obscure spiral striae and strong, low varices, 1–2 per whorl. Translucent greyish-white with opaque white spiral lines, more or less interrupted, 9–10 series on penultimate whorl, obsolete on base; protoconch opaque white.

Protoconch subcylindrical, papillose, of 2 smooth whorls, the first globular, the second rather flat-sided, basal diameter 0,6 mm.

Dimensions: 7,0 × 1,7 mm (holotype); 12,7 × 2,6 mm (paratype).

Range: Continental slope of eastern Transkei.

Type material: Holotype NM C2082/T2761, off Rame Head, Transkei (31°57,3'S, 29°25,5'E), 380 m, coarse sand, old shell debris. Paratype 1, same data, NM C5849/T2762. Paratype 2, NM C5049/T2889, off Kei River, 134 m, coarse sand. Paratype 3, NM C7170/T3176, off Rame Head, 410–430 m, stones, sand. All dredged MN.

Notes: Compared with *O. pseudosulcata* in the introductory key; differs from the Australian *lixia* in its less convex whorls, indistinct spiral sculpture and stronger varices.

Etymology: *varicosa* = having large veins (lit.), or with varices, L.

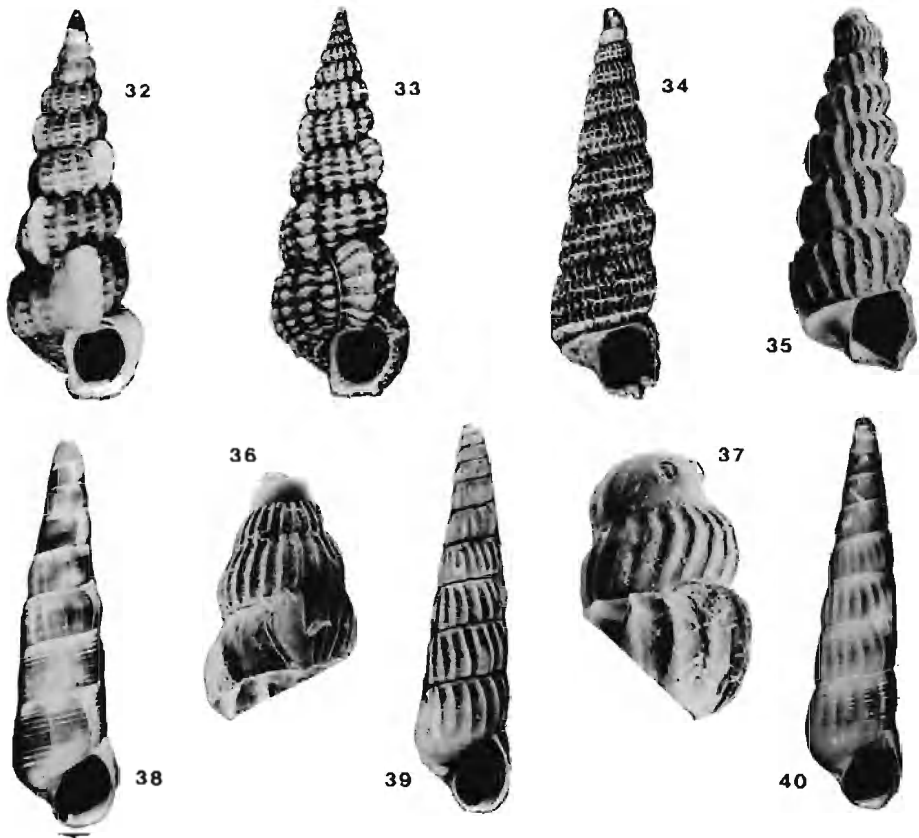
Genus *Opalia* H. & A. Adams, 1853.

*Opalia* H. & A. Adams, 1853:222. Type species *Scalaria australis* Lamarck, 1822 (s.d. de Boury, 1886).

Diagnosis: Thick-shelled, acuminate, with low axial ribs and a microscopically pitted intritacalx (sometimes interstitial); peristome usually double; base imperforate; basal cord present or absent. Protoconch polygyrate, conical (in adults usually decollated or replaced by a domed plug), smooth or (in all ?) with spiral rows of minute pits.

Key to southern African species of *Opalia*

- 1 Axial ribs obsolete or restricted to periphery, but accompanied by subsutural crenules or castellations (at least in young); periphery of body whorl flattened (subgenus *Nodiscalia*) ..... 2
- Axial ribs suture-to-suture; periphery of body whorl rounded (subgenus *Pliciscalia*) ..... 4
- 2 Subsutural crenules obsolete on later whorls; axial sculpture indistinct; body whorl with a conspicuous, weakly nodular, double keel ..... **bardeyi**



Figs 32-40. *Opaliopsis*, *Murdochella* and *Obstopalia* species. 32, 33, 36, *Opaliopsis meiringnaudeae* sp. n., holotype, 8,4 × 2,9 mm, protoconch with basal diameter 0,38 mm. 34, *Murdochella crispata* sp. n., holotype, 7,5 × 2,1 mm. 35, 37, *Murdochella lobata* sp. n., holotype, 3,3 × 1,2 mm, protoconch diameter 0,95 mm. 38, *Obstopalia varicosa* sp. n., holotype, 7,0 × 1,7 mm. 39, 40, *Obstopalia pseudosulcata* sp. n., holotype, 7,6 × 2,0 mm. Figs 35, 36, 37 are SEM; specimens in Figs 33, 39, coated with MgCl<sub>2</sub>.

dense axial microstriae. Colour yellowish-white, spiral lirae tinged with moderate orange where they cross intervals.

Protoconch conical, at least 4 whorls (apex damaged, last 3 with strong, opisthocline axial ribs, 22-26 per whorl, with fine, interstitial spiral threads, about 20 on later whorls; brownish-orange, diameter 0,38 mm.

Dimensions: 8,4 × 2,9 mm (holotype).

Range: Outer continental shelf and upper slope of Transkei.

Type material: Holotype NM C1278/T2772, off Port Grosvenor (29°57,6'S, 31°26,9'E), 100-115 m, coarse sand, some mud, shells, solitary corals. Paratype 1, NM C5846/T2773, off Nthlonyane River, 220-230 m, marine growths. Paratype 2, NM C6918/T2939, off Kei River, 490-500 m, sandy mud. All dredged MN.

Notes: *Opaliopsis meiringnaudeae* is almost indistinguishable from *O. atlantis* (Clench & Turner, 1952) of the western Atlantic, but in the latter the axial ribs rise

- Subsutural crenules strong, axial ribs weak but distinct, body whorl not strongly bicarinate ..... 3
- 3 Shell slender (breadth/length about 0,30 or less) and rather cylindrical; subsutural crenules convex, separated by deep pits; whorls rounded; intritacalx punctae in spiral striae ..... **attenuata**
- Shell broader (breadth/length about 0,40); crenules flattened, separated by shallow pits; whorls more angular; intritacalx punctae not associated with spiral striae ..... **crassilabrum**
- 4 Basal cord distinct; axial ribs numerous (20–40 per whorl); spiral striae fine ..... **aglaia**
- Basal cord not developed; axial ribs fewer than 18 per whorl; spiral striae microscopic ..... 5
- 5 Axial ribs 16–18 per whorl, strongly crenulating suture; relatively large (13–14 mm) and pupiform ..... **mormulaeformis**
- Axial ribs 7–11 on later whorls, barely crenulating suture; small (8 mm or less), not pupiform ..... **methoria**

#### Subgenus *Nodiscala* de Boury, 1889

*Nodiscala* de Boury, 1889:168. Type species (o.d.) *Scalaria bicarinata* Sowerby, 1844.

**Diagnosis:** Sculptured by weak, more or less peripheral axial ribs, suture bordered by crenules or castellations, body whorl with a basal angle but no distinct cord; peristome double.

**Notes:** The protoconch of *Nodiscala* appears to be of the normal conical, three-whorled form, indicative of planktonic development, but, as observed by Jousseau (1912:236) the apex is frequently decollated. Prior to this the apical whorls are filled with a callus plug, which, when beach-rolled, may simulate a 'secondary' protoconch, whose broadly domed form could easily cause confusion. The true protoconch, in at least one species, is microscopically punctate (see under *bardeyi*), giving it a superficially malleated appearance.

#### *Opalia (Nodiscala) crassilabrum* (Sowerby, 1844)

Figs 41, 42

*Scalaria crassilabrum* Sowerby, 1844a:105, pl. 35, figs 115, 116; Tryon, 1887:82, pl. 17, fig. 32. Type locality (here restricted): 'Isl. Mindoro of the Philippines'.

*Nodiscala crassilabrum*; Jousseau, 1912:241, pl. 6, figs 60–62.

*Scala crassilabrum*; Barnard, 1963:103, fig. 18c.

**Diagnosis:** Shell relatively broad (breadth/length about 0,40), whorls with rounded median angle, body whorl weakly biangulate; strong, flattened subsutural crenules separated by shallow pits; axial ribs low, rounded, about 12 per whorl; intritacalx with microscopic, spirally aligned punctae; white; exceeds 9 mm.

**Description:** Shell acuminate (breadth/length about 0,40), of about 8 teleoconch whorls (apex often decollated); whorls concave posteriorly, with rounded median angle, suture deep; aperture elliptical, peristome double, labrum thick, spire with a few varices; base imperforate, concave; body whorl weakly biangulate with

flattened periphery. Axial ribs low, rounded, opisthocline, about 12 per whorl, strongest at periphery, obsolete on base; suture bordered by flattened crenules, about 14 per whorl, separated by shallow pits; intritacalx with spiral rows of microscopic, rounded pits. Colour [dirty] white.

Dimensions: 9,3 × 3,7 mm.

Range: Philippines and Red Sea to Natal.

Regional locality data: ZULULAND: Ledsmen Shoal, 100 m (NM B3556: A. Connell). NATAL: off Umdloti River, 40 fathoms (Barnard, 1963).

Notes: *Scalaria crassilabrum* has reposed under a taxonomic cloud for many years, as not only do the given type localities (Philippines and Sansonati [El Salvador]) indicate the type set to have been composite, but this material cannot be located at the BM(NH) and is evidently lost. Nevertheless, local specimens agree well both with the type figures and with shells from the Philippine Islands, which I have accordingly designated as the restricted type locality. The name *crassilabrum* has been cited in connection with both West America (see Dushane, 1974:71) and the Western Atlantic (see Dall, 1889:320); these records were probably based on *O. (N.) spongiosa* (Carpenter, 1866) and *O. (N.) pumilio* (Mörch, 1874) respectively. Dall (1889) synonymised *O. crassilabrum* with the Mediterranean *O. (N.) hellenica* (Forbes, 1843), which he regarded as an almost cosmopolitan species. Melvill & Standen (1903:349) followed Dall by utilising the name *hellenica* for their Persian Gulf *crassilabrum*. The true *O. hellenica* has been figured and described by Nordsieck (1977:135, fig. 11). Clench & Turner (1950) restored the name *pumilio* to the Western Atlantic taxon. Of course, it is not impossible that *crassilabrum*, *hellenica*, *pumilio*, and *spongiosa* will indeed prove to be vicariants of a single polytypic species.

*Scalaria bicarinata* Sowerby (1844a:104, pl. 35, figs 113, 114) from Negros Is., Philippines, may have been based on a worn *crassilabrum*, but the holotype is also lost and the type figures are poor.

I have not seen the 'very worn' shell recorded from off Cape Vidal by Barnard (loc. cit.) as *crassilabrum*. Two large beach-worn specimens (Fig. 43) from Mzamba, Transkei (NM 7078: R. K.) may be *O. crassilabrum*; the larger of these measures 19,0 × 6,5 mm.

### *Opalia (Nodiscala) attenuata* (Pease, 1860)

Figs 44–46

*Cirsotrema attenuatum* Pease, 1860:400; Kay, 1965:43 (references), pl. 10, figs 9, 10 (sketch of lectotype).

*Nodiscala attenuata*; Jousseume, 1912:238, pl. 6, figs 45, 46, 53, 54; Habe, 1964:48, pl. 14, fig. 9.

*Opalia attenuata*; Kay, 1979:157, fig. 54E; Kaicher 1981:2290 (lectotype).

*Nodiscala bicarinata* (? non Sowerby, 1844); Cernohorsky, 1978:168, pl. 59, fig. 9.

Diagnosis: Shell narrowly acuminate (breadth/length about 0,30); whorls rounded, body whorl weakly biangulate; strong, rounded subsutural crenules are separated by deep pits; axial ribs usually weak, forming a double row of 8–10 low nodules on body whorl; intritacalx with microscopically punctate spiral striae; greyish; maximum length 9,6 mm.

Description: Shell narrowly acuminate (breadth/length about 0,30), often deformed, about 8 teleoconch whorls; whorls moderately convex, not angular, sutures fairly deep; aperture as in *O. crassilabrum*; labrum sometimes with about 5 very low spiral cords on its trailing face, feebly crenulating its margin; spire with a few prominent varices; base imperforate, concave, body whorl with periphery flattened, sometimes flanked by two nodular angles. Axial ribs generally weak, sometimes obsolete in places, consisting of gentle folds on early whorls, on body whorl forming a double row of 8–10 low nodules; suture bordered by a series of irregular, rounded crenules, 10–12 on later whorls, separated by distinct pits; intritacalx bearing microscopically pitted spiral striae. Dull greyish-white.

Dimensions: 9,6 × 2,7 mm; 8,9 × 2,6 mm.

Range: Hawaii and Red Sea to eastern Transkei.

Regional locality data: NATAL: Durban Bay, shallow dredgings (NM A4134: B. J. Young). TRANSKEI: Mzamba, beach-drift (in J. P. Marais colln.).

Notes: Durban shells agree well with the lectotype (designated Kay 1965) in the BM(NH) (no. 1962796), save in being somewhat less strongly crenulate at the suture. Cernohorsky (1978) may be correct in synonymising *attenuata* with *Scalaria bicarinata* Sowerby, 1844, but his figure seems to show a strongly ribbed *attenuata*. As indicated under *Opalia crassilabrum*, *S. bicarinata* is a *nomen dubium*.

Unlike *O. crassilabrum*, in which the holes in the intritacalx are simple spirally aligned foveolations, in *O. attenuata* (and evidently *O. bardeyi*) these holes are arranged along shallow spiral striae. These striae are microscopic, in contrast with the coarse striae present in *O. texta* (E. A. Smith, 1903) from the Maldives (holotype BM(NH) 1903.9.17.29).

### *Opalia (Nodiscala) bardeyi* (Jousseume, 1912)

Figs 47–50

*Nodiscala bardeyi* Jousseume, 1912:239, pl. 6, fig. 47, pl. 7, fig. 3. Type localities: 'Djibouti, Aden.'

*Nodiscala bardeyi* var. *elongata* Jousseume, 1912:240, pl. 6, fig. 44. Type localities as above.

*Nodiscala bardeyi* var. *minor* Jousseume, 1912:240, pl. 7, fig. 4. Type localities as above.

*Opalia bardeyi*; Kaicher, 1981:3120.

Diagnosis: Shell variable in proportions, whorls with median angle, body whorl with a feebly nodular double keel; no distinct axial ribs; fine subsutural crenules in juveniles, obsolete in adults; punctate spiral microstriae present; white; attains 9 mm.

Description: Shell varying in proportions, acuminate, with about 7 gradually increasing teleoconch whorls, each medially angulate; suture deep; aperture obliquely ovate, rather strongly descending; peristome double, labrum very thick and projecting; spire usually with 1–2 strong varices; base imperforate, concave, with a strong peripheral angle, rendering body whorl bicarinate, both keels usually weakly nodular, particularly in young; no distinct axial ribs, although an occasional coarse growth-line is present; suture bordered by weak crenules (about 16 per whorl) in juveniles, becoming more or less obsolete in adults; surface with finely pitted spiral striae. White.

Protoconch conical, of about  $3\frac{1}{2}$  slightly convex whorls, yellowish, darker at suture, diameter 0,35 mm; surface with spiral rows of minute punctae, about 16 rows on last whorl.

Dimensions (apex missing):  $9,4 \times 3,1$  mm;  $5,3 \times 2,0$  mm.

Range: Gulf of Aden to eastern Transkei.

Regional locality data: TRANSKEI: Mzamba, beach-drift (NM B4530: R. K.; also in J. P. Marais colln). NATAL: Durban, off Bluff in 20–22 m, juveniles (NM B6291: R. K.).

Type material: Syntypes in MHNP.

Notes: Beaches just south of the Mtamvuna River have yielded a number of more or less worn shells which resemble *Scalaria bicarinata* Sowerby, 1844, in having a double keel and in lacking axial ribs. In the latter species, however, the suture is bordered by conspicuous crenules, whereas these are very fine to obsolete in Transkei material. Although Jousseau's figures of his *Nodiscala bardeyi* do not permit comparison, Kaicher (1981) has provided good photographs of the badly worn syntypes of *bardeyi* and its two 'varieties'. Juveniles from Durban agree well with these specimens. *Nodiscala gracilis* Masahito, Kuroda & Habe, 1971, of Japan, needs to be compared with *O. bardeyi*.

Only vestiges of intritacalx remain in the present material. The punctations appear to resemble those of *O. crassilabrum* juveniles, but form striations in adults.

#### Subgenus *Pliciscala* de Boury, 1887

*Pliciscala* de Boury, 1887:19. Type species (o.d.) *Scalaria gouldi* Deshayes, 1861.

Diagnosis: An *Opalia* with fine to strong axial ribs and distinct spiral threads, formed by rows of intritacalx pits, suture not crenulate, basal cord sometimes present, peristome double.

Notes: Originally based on species from the Eocene of the Paris Basin, *Pliciscala* was later extended (de Boury 1917) to include the Recent *Scalaria cerigottana* Sturany, 1896, of the Mediterranean and *S. mammosa* Melvill & Standen, 1903, of the Persian Gulf. The group differs from *Opalia* s.s. in its relatively fine axial ribs and distinct spiral threads, and in the presence of a double peristome. In the last character it resembles *Nodiscala*, but is distinguished by the lack of subsutural crenules and the presence of well-developed suture-to-suture axial ribs.

The South African *Epitonium aglaia* Bartsch, 1915, is only provisionally referred to *Pliciscala*; the availability of better material may result in a reconsideration of its affinities.

#### *Opalia* (? *Pliciscala*) *aglaia* (Bartsch, 1915)

Figs 51, 52

*Epitonium aglaia* Bartsch, 1915:63, pl. 17, fig. 4. Type locality: Port Alfred.

*Scalaria aglaia*; Turton, 1932:84.

*Opalia aglaia*; Kaicher, 1981:3092.

*Scalaria producta* Turton, 1932 (non Jeffreys, 1884):84, pl. 19, sp. 603 (syn. n.). Type locality: Port Alfred.

*Scalaria kowiensis* Turton, 1933:370 (nom. subst. pro *producta*).

*Scalaria erecta* Turton, 1932:84, pl. 19, sp. 604 (syn. n.). Type locality: Port Alfred.

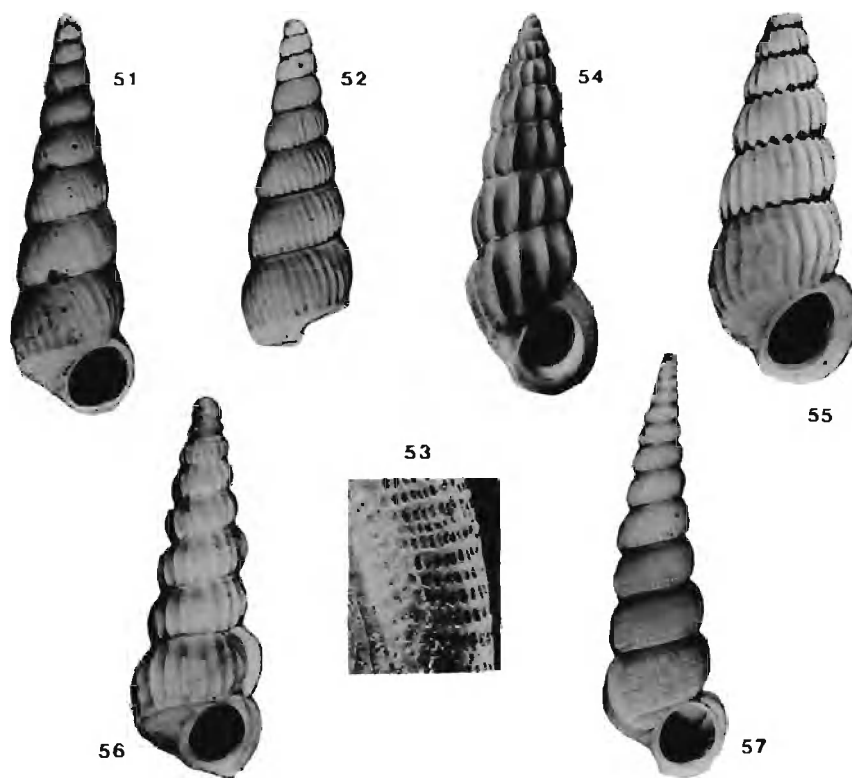


Diagnosis: Shell with convex whorls, a deep, simple suture, and distinct basal cord; a single weak varix per whorl; axial ribs fine, arcuate, prosocline, 20–40 per whorl, crossed by very fine spiral threads with micropunctate interstices; white; attains 20 mm.

Description: Shell acuminate, with at least 9 convex teleoconch whorls, suture deep; base concave, aperture obliquely ovate, labrum moderately thick with traces of a second peristome layer; basal cord distinct. Sculptured by a single weak varix per whorl, and fine, arcuate, prosoclinely sloping axial ribs and fine spiral threads, densest below suture; axial ribs not crenulating sutures, approximately 30–40 per whorl, becoming weaker and fewer (about 23–24) on last whorl, spiral threads 23–27 on penultimate whorl; interstices with microscopic punctae; axial ribs terminate at basal cord, where their intervals are markedly concave; base with fine spiral lirae crossed by axial threads. White.

Dimensions: 20 × 6,4 mm; 18,8 × 5,8 mm.

Range: Known only from Port Alfred.



Figs 51–57. *Opalia* (*Pliciscula*), *Platiscula* and *Compressiscula* species. 51, 52, *Opalia* (? *P.*) *aglaia* (Bartsch, 1915), NM 7083, Port Alfred: 51, 18,8 × 5,8 mm; 52, length 15,4 mm. 53, 54, *O.* (*P.*) *methoria* sp. n., holotype, 7,1 × 2,5 mm, SEM; 53, magnification of labral intritacalx. 55, *O.* (*P.*) *mormulaeformis* (Masahito, Kuroda & Habe, [1971], NM A4133, Durban Bay, 13,8 × 5,4 mm. 56, *Compressiscula transkeiana* sp. n., holotype, 7,7 × 2,6 mm. 57, *Platiscula analogica* (Barnard, 1963), NM C6515, off Shixini Point, Transkei, 350 m, 18,3 × 5,1 mm.

Locality data: EASTERN CAPE PROVINCE: Port Alfred, beach-drift (NM 7083: R. K.; B4164: H. Becker).

Type material: Holotype NMNH 187037 (*vide* Bartsch, 1915). Types of Turton's taxa in OUM.

Notes: This rare species is known only from beach-worn shells and sculptural details require confirmation; fortuitously the presence of microscopic interstitial pits is revealed through the labial glaze in the base of a broken shell.

Turton's *Scalaria kowiensis* and *S. erecta* were separated from *aglaia* by their slightly fewer axial and spiral ridges, but Turton did not take into account the reduction in axial ribbing apparent on the last whorl. Bartsch's figure of 34 spiral threads for the penultimate whorl of *aglaia* seems high; moreover his illustration, heavily retouched, omits the basal cord and incorrectly shows the axial ribs as reaching the base, while the measurements of 12 × 6 mm cited for the holotype are disproportionate to the figure (a length of 18–20 mm for such a 7-whorled specimen is more likely).

### ***Opalia (Pliciscala) methoria* sp. n.**

Figs 53, 54

Diagnosis: Shell acuminate, whorls strongly convex, spire sometimes with an occasional varix; axial ribs strong and broad, weaker below suture (which is feebly crenulated) and on base, numbering 7–11 on later whorls, intervals with microscopic spiral striae, their interstices with chalky micropunctae; white; attains about 8,0 mm.

Description: Shell acuminate, sometimes rather pupoid, teleoconch whorls about 8, strongly and evenly convex, suture moderately deep, weakly and irregularly crenulated by ribs: aperture obliquely ovate; spire sometimes with an occasional varix; base with a weakly angular periphery. Axial ribs strong and broad with sloping sides, on later whorls weaker below suture and on base of body whorl, slightly sinuous and prosocline, decreasing from 12–14 on first teleoconch whorl to 7–11 on later whorls; intervals with very minute spiral striae, separated by rows of chalky punctae, most conspicuous on labral varix. White.

Dimensions: 7,1 × 2,5 mm (holotype); 8,2 × 2,8 mm; 6,0 × 2,2 mm (paratypes).

Range: Known only from Durban Bay, Natal.

Type material: Holotype NM B6031/T2770, Durban Bay, shallow dredgings, B. J. Young. Paratypes, 50, NM B6032/T2771, same data.

Notes: Over a hundred specimens were picked out of a reclamation dump in Durban Bay, but most are more or less worn. There is a slight variation in width (breadth/length 0,34–0,37), but characters are otherwise very constant.

Of described taxa, *O. (P.) hidryma* (Melvill, 1899) from Pakistan, is similar but brown with straighter ribs and coarser spiral sculpture. The Arabian *O. (P.) mammosa* (Melvill & Standen, 1903), of which *Scalaria (Nodiscala) alba* de Boury, 1911, from the Red Sea, is probably a synonym, is much smaller with a brownish apex and a more conspicuously crenulate suture. Also comparable are *O. (P.) soror* (Odhner, 1919) from Madagascar and *O. (P.) matajiroi* (Kuroda, 1954) of

Japan, which have more numerous axial ribs (14–15 per whorl) and a stronger angle above the base of the body whorl; *soror* and *matajiroi* seem to differ from one another only in relative strength of spiral striae and may prove to be conspecific.

Etymology: *methoria* = a boundary (G.).

*Opalia (Pliciscala) mormulaeformis* (Masahito, Kuroda & Habe, 1971)

Fig. 55

*Nodiscala mormulaeformis* Masahito, Kuroda & Habe (in Kuroda, Habe & Oyama), 1971:248, pl. 63, fig. 1. Type locality: Sagami Bay, Japan.

Diagnosis: Shell relatively large (13–14 mm); narrowly pupoid, whorls strongly convex, outer lip thick, but no previous varices; axial ribs strong, crenulating suture and reaching base, 16–18 per whorl, sharp with sloping sides, intervals with fine, close, spiral threads and pitted interstices; white.

Description: Shell narrowly pupoid, apex decollated (6–6½ whorls remaining), teleoconch whorls strongly and evenly convex, suture deep, closely crenulated by crests of ribs; aperture elliptical, peristome double, labrum thick and expanded, but spire without previous varices; periphery of base with a blunt, rounded cord, sometimes rendered nodulous by the ribs. Axial ribs strong, narrow, prosocline, extending from suture to base, slightly sinuous, crests sharp with sloping sides, 16–18 per whorl (number not changing with growth); intervals and sides of ribs crossed by fine, close spiral threads (evidently 30–40 on penultimate whorl), with minutely punctate interstices. White.

Dimensions: 13,8 × 5,4 mm; 12,5 × 5,1 mm.

Range: Japan to Natal.

Regional locality data: NATAL: Durban Bay, shallow dredgings (NM A4133, B2015: B. J. Young).

Notes: Only two local examples are known, but these agree well with two paratypes of *O. mormulaeformis* kindly loaned by Dr Tadashige Habe. The only comparable species appears to be *O. (N.) sumatrensis* (Thiele, 1925), which (from the type figure) differs in its coarser spiral striae, stronger basal angle and more angular whorls.

*Plastiscala* Iredale, 1936

*Plastiscala* Iredale, 1936:302. Type species (o.d.) *Scala morchi* Angas, 1871.

Diagnosis: Shell narrowly acuminate with blunt apex; peristome simple (not duplex); base imperforate; peripheral cord thin or absent; sculptured by fine axial and spiral ridges, with occasional varices, interstices microscopically punctate; protoconch mamillate, of 1½–2 whorls, smooth, last whorl sometimes with brephic axials.

Notes: The blunt, rather bulbous, paucispiral protoconch of *Plastiscala* contrasts with the conical, multispiral protoconch of most other epitioid genera such as *Opalia*, *Amaea* and *Epitonium*. The micropunctate intritacalx visible between the spiral ridges is otherwise found only in *Opalia*. Whereas this sculpture was not mentioned by Iredale, its presence in the Australian type species, *P. morchi*, was

noted by Verco (1906:148), and was also observed by me in the holotype of *Scala suturalis* Hinds, 1843, a third member of the genus. *Scala (Plastiscala) verconis* Cotton, 1939, and *Scala invalida* Verco, 1906, from Australia, are probably also congeneric, although the feeble subsutural crenules of *invalida* may prove it to be an *Opalia*.

*Plastiscala analogica* (Barnard, 1963) **comb. n.**

Figs 3, 57

*Acrilla analogica* Barnard, 1963:106, fig. 18g, h; Kaicher, 1983:3094. Type locality: 36°40'S, 21°26'E, 200 fathoms.

Diagnosis: Shell slender with strongly convex whorls, and a fine basal cord; varices broad, low and rounded; axial ribs thin, close, straight, about 40 on 8th whorl, fine to obsolete on last whorl; spiral lirae 24–32 on later whorls, their intervals with pitted intritacalx; pale biscuit-colour; attaining 15,0 mm.

Description: Shell narrowly acuminate with blunt apex, breadth/length 0,28–0,33, whorls strongly convex with a deep suture, teleoconch whorls about  $9\frac{1}{2}$  in number; peristome thin; base concave, with thin peripheral cord, sometimes showing above suture on spire. Sculptured by fine axial ribs and spiral threads, and a single, strong varix per whorl; varices not continuous, relatively broad and rounded, each succeeded by a thin flange-like axial ridge; axial ribs thin, straight, prosocline, close and rather irregular; first whorl with 23–27 ribs, increasing to about 40 on 8th whorl, becoming very fine and feeble to obsolete on last whorl, disappearing at basal cord; spiral lirae 10–18 on first whorl, increasing to 16–20 by 3rd and 24–32 by 9th, base with 12–15 weak threads; intervals between spiral threads filled with pitted intritacalx, in places levelling surface and obscuring lirae. Colour pale orange-yellow, sometimes darker at periphery, early whorls paler.

Protoconch of 2 bulbous whorls, smooth, with well-developed defining varix; maximum diameter 0,55–0,75 mm.

Dimensions: 18,3 × 6,0 mm; 18,3 × 5,1 mm.

Operculum paucispiral, resembling that of *Opalia eolis* (see Clench & Turner 1950:pl. 107, fig. 4).

Range: Agulhas and Transkei continental slope and outer shelf, 51–510 m.

Locality data: AGULHAS AREA: off Stilbaai area, 366 m (holotype); off Cape St Blaize area, *ex pisce* (NM A4398: R. Le Maitre); 34°27'S, 25°42'E, 467 m (paratype). TRANSKEI (all NM:MN) off Mbashe River, 200–220 m, sponge-rubble (C5840); off Port Grosvenor, 80 m, lithothamnion nodules, juv. (C5839), do, 82 m (C5841); off Rame Head, 410–430 m, stones, some sand (C188); do, 380 m, coarse sand, shell debris, juvs (C2083); off Qolora River, 440–446 m, fine sand, stylasterids (C4628), do, 510 m, sandy mud (C6567); off Nthlonyane, 51 m, sandy mud, corals (C5838); off Shixini Point, 350 m, coarse sand, broken shell (C6515), do, 400–420 m, coarse sand, fine shell rubble (C6480), do, 500 m, muddy sand, coral rubble (C6617); off Qora River, 300 m, coarse sand (C6739).

Type material: Holotype SAM A9026, paratype SAM A9299 (*fide* Giles & Gosliner 1983).

Notes: A rare species, known mainly from juveniles and damaged adults. Juveniles, in which sculpture is relatively strong, may appear rather different to the early whorls of adults, which appear to be very susceptible to erosion. Several juveniles show purple stains from pigmented mantle-gland secretion, and the operculum is visible in one. No microsculpture is present on the protoconch (SEM study).

Barnard noted superficial resemblance only to the European Oligocene *Amaea* (*Undiscalia*) *undatella* (von Koenen, 1887). The closest ally to *analogica* appears to be *Platiscala suturalis* (Hinds, 1843) from the Straits of Malacca; the holotype (BM(NH)) has more prominent varices and fewer, stronger spiral threads (about 12 on penultimate whorl instead of 24–32).

*Sagamiscala* Masahito, Kuroda & Habe, 1971

*Sagamiscala* Masahito, Kuroda & Habe, in Kuroda, *et al.* 1971:258. Type species (o.d.) *S. globosa* Masahito, Kuroda & Habe, 1971.

Diagnosis: Shell globose with low spire and small umbilicus; adult sculptured by growth-lines and weak spiral threads, peristome thin; protoconch conical with 2–3 smooth whorls.

Notes: This inadequately known genus may prove to be non-epitoniid.

*Sagamiscala munda* (Barnard, 1969) **comb. n.**

*Scala munda* Barnard, 1969:649, fig. 24b. Type locality: off Cape Point N. 89° E, 36 miles, 700 fathoms. *Epitonium* (*s.l.*) *mundus*; Kaicher, 1983:3031.

Notes: The holotype has been refigured by Kaicher (1983). No additional material is available.

*Claviscala* de Boury, 1909

*Claviscala* de Boury, 1909:256. Type species (o.d.) *Scalaria richardi* Dautzenberg & de Boury, 1897.

Diagnosis: Shell medium to large, rather narrow and orthoconic, with strong axial ribs, fine spiral striae and relatively inconspicuous varices; base of body whorl with a single cord; aperture ovate-quadrangle; without intritacalx.

Notes: Regarded by Wenz (1940:792) as a subgenus of *Turriscala* de Boury, 1889, an inadequately known taxon. I follow Bouchet (pers. comm.) in treating *Claviscala* as a full genus, differing from *Compressiscala*/*Gregorioiscale* in lacking an intritacalx.

*Claviscala terebralioides* (Kilburn, 1975)

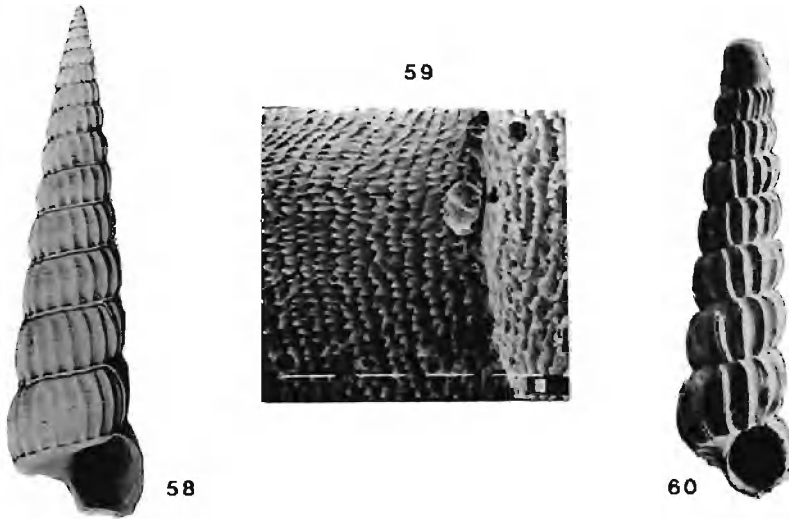
Fig. 58

*Opalia* (*Claviscala*) *terebralioides* Kilburn, 1975:606, fig. 17. Type locality: Southern Mozambique, between Inhaca Is. and Limpopo River, about 150 fath.

Range: Western Transkei to southern Mozambique, continental slope.

Additional material: TRANSKEI: off Shixini Point, 500 m, muddy sand and coral-rubble, dead (NM C6616: MN).

Notes: The Transkeian specimen is immature but fresher than the holotype, although it similarly lacks the protoconch. Axial ribs number 13 on what is probably the 1st teleoconch whorl, increasing to 20 on the 16th; on later whorls 1/2 of these per whorl are varicoid and sharp-edged; the microscopic sculpture of cancellate striae extends onto the basal disc; no intritacalx. Colour close to light yellowish-brown (ISCC-NBS). Dimensions: 47,0 × 13,0 mm.



Figs 58–60. *Claviscalia* and *Chuniscalia* species. 58, *Claviscalia terebralioides* (Kilburn, 1975), NM C6616, off Shixini Point, Transkei, 500 m, 47 × 13 mm; coated with MgCl<sub>2</sub>. 59, 60, *Chuniscalia rectilamellata* sp. n., holotype, 3,6 × 0,9 mm, SEM; 59, microsculpture, scale line = 0,01 mm, suture on right; 60, entire shell.

#### *Compressiscalia* Masahito & Habe, 1976

*Compressiscalia* Masahito & Habe, 1976:170. Type species (o.d.) *C. japonica* Masahito & Habe, 1976.

Diagnosis: Shell with conspicuous basal keel and disc, axial ribs and feeble spiral striae, varices strong, aperture circular, columella strongly curved; base obliquely truncate; intritacalx present; protoconch (? in type species) cylindrical, blunt, of 2 globose whorls.

Notes: *Compressiscalia* is used provisionally, but may prove to be a synonym of *Confusiscalia* de Boury, 1902, or *Gregorioiscalia* Cossmann, 1912 (which may differ in its microscopic sculpture of plate-like granules (de Boury, 1913:294)). Information on the protoconch of the respective type species is, however, lacking.

In addition to the type species and *C. transkeiana* (herein), *Scala nierstraszi* Schepman, 1909, of Indonesia appears to be a *Compressiscalia* (it also resembles the type species of *Confusiscalia*), as does *Scalaria watsoni* de Boury, 1911, of the Western Atlantic. On the other hand, *Scala unilateralis* von Martens, 1902, referred here by Masahito & Habe, was shown by de Boury (1913a) to be a typical *Gregorioiscalia*.

***Compressiscula transkeiana* sp. n.**

Figs 2, 56

Diagnosis: A *Compressiscula* with small, almost circular aperture, obliquely truncate base; varices strong and flaring, non-aligned; axial ribs strong, 12–14 per whorl, intritacalx faintly striate; yellowish-white; length 8,8 mm.

Description: Shell acuminate with blunt apex and obliquely truncate base, teleoconch whorls convex, 7; aperture small, almost circular, peristome continuous, fairly thick, labrum backed by a heavy varix, labium strongly and evenly curved; base of body whorl concave, with a massive basal cord crenulated by rib terminations and forming a projection on labral varix; this cord shows above suture on spire whorls. Last 2–3 spire whorls each with a strong, rather flaring, non-aligned varix; axial ribs strong, very slightly opisthoclinal, straight on early whorls, slightly arcuate on later ones, 12–14 per whorl throughout, narrower than intervals, their sides gradually sloping; no distinct interstitial sculpture, intervals somewhat deep where axial ribs meet basal cord. Intritacalx thin, chalky, with faint, minutely pitted striae, visible mainly on varices. Yellowish-white.

Protoconch subcylindrical, blunt, of nearly 2 globular, smooth whorls, delimited by a varix; basal diameter 0,5 mm.

Dimensions: 7,7 × 2,6 mm (holotype); 5,5 × 1,8 mm (paratype 1). Paratype 2 measures 8,8 mm in length (lip broken).

Range: Continental slope of Transkei.

Type material: Holotype, NM C4692/T2891, off Qolora River, Transkei (32°46,2'S, 28°37,5'E), 440–446 m, fine sand, stylasterids. Paratype 1, NM C5882/T2785, off Rame Head, 410–430 m, stones, some sand. Paratype 2, NM C4886/T2892, off Qora River, 400 m, sand. Paratype 3, NM C6903/T2937, off Kei River, 450 m, muddy sand. Paratype 4, NM C6817/T2938, off Stony Point, 360 m, coarse sand. All dredged *MN*.

Notes: The Japanese *Compressiscula japonica* Masahito & Habe, 1976, is larger, proportionally broader and possesses spiral striae and axially aligned varices. *C. nierstraszi* (Schepman, 1909) from Indonesia is broader than *transkeiana*, with fewer ribs and distinct spiral striae.

***Chuniscalca* Thiele, 1928**

*Chuniscalca* Thiele, 1928:93. Type species (o.d.) *Scala agulhasensis* Thiele, 1925.

Diagnosis: Shell tiny, with a strong basal cord; axial lamellae but no spiral sculpture other than a blunt ridge above suture in type species; protoconch of 1½ smooth, bulbous whorls.

Notes: Wenz (1940) and Thiele (1929) treated *Chuniscalca* as a subgenus/section of *Cirsotrema*. This may be correct, but as described the protoconch resembles that of *Compressiscula*. There is also a marked resemblance to *Murdochella*, in which, however, the protoconch is ribbed. *Chuniscalca* may prove to be a synonym of *Papuliscula* de Boury, 1911.

*Chuniscala agulhasensis* (Thiele, 1925)

*Scala agulhasensis* Thiele, 1925:105 (139), pl. 11, fig. 15. Type locality: Agulhas Bank, 35°16'S, 22°26,7'E, 155 m.

Notes: Known only from the holotype, presumably in the ZMB.

*Chuniscala rectilamellata* sp. n.

Figs 59, 60

Diagnosis: Shell narrowly but very gradually acuminate, breadth/length 0,25–0,29, apex blunt, suture fairly deep, aperture slightly effuse basally; axial ribs strong, forming a prominent, rounded shoulder, almost straight and orthocline, terminating at strong basal cord, 12–17 per whorl; no spiral sculpture; length 3,9 mm.

Description: Shell very narrowly acuminate (breadth/length 0,25–0,29) with blunt apex; 7½ gently convex teleoconch whorls, to which axial ribs contribute a prominent but rounded shoulder; suture fairly deep; base concave, with strong spiral cord, no umbilicus; aperture small, ovate, slightly effuse basally; peristome thin, columella rather straight, labrum slightly sinuous in side view. Axial ribs strong, discontinuous, almost orthocline, straight except for a slight prosocline inclination at each end, terminating at basal cord, 14–17 on 1st whorl, decreasing to 12–14 on last; no obvious spiral sculpture. Under very high magnification, a cryptic sculpture of spiral threads, incised by axial grooves into rugose denticles (Fig. 59) is apparent. All types discoloured brown.

Protoconch bulbous, of about 1½ globular whorls, the 1st slightly depressed and tilted, smooth except for sinuous axial threads on last quarter-whorl; maximum diameter 0,40 mm.

Dimensions: 3,6 × 0,9 mm (holotype); 3,6 × 1,0 mm, 3,9 × 1,0 mm (paratypes).

Range: Continental slope of Transkei.

Type material: Holotype C5874/T2893, off Rame Head (31°56,1'S, 29°26,5'E), 410–430 m, stones, some sand. Paratypes 1, 2, NM C5903/T2896, 3, NM C5854/T2895, and 4, NM C7600/T7600, same data. Paratypes 5, 6, NM C5856/T2894, off Whale Rock, 150–200 m, sponge-rubble. All dredged MN.

Notes: *C. rectilamellata* is less tapering than *C. agulhasensis*, with a deeper suture, fewer and stronger ribs and no spiral ridge above the suture. Unfortunately all available specimens are chalky and discoloured. Adult shape and sculpture are very similar to *Scala turrisphari* Hedley, 1905, from New South Wales, but the protoconch of this, the type species of *Dissopalina* Iredale, 1936, bears spiral lirae, not present in *rectilamellata*. The phyletic significance of the exceedingly fine, denticulate spiral sculpture observed in *rectilamellata* will only become apparent when SEM is more widely used in epitoniid studies. Perhaps this is comparable with the plate-like granules noted by de Boury (1913) in *Gregorioiscala*.

Etymology: *rectus* (straight) + *lamella* (a little blade), L.

Genus *Epitonium* Röding, 1798

*Epitonium* Röding, 1798:91. Type species (s.d. Suter 1913) *Turbo scalaris* Linné, 1758. *Viciniscala* de Boury, 1909:258. Type species (o.d.) *Scalaria pallasii* Kiener, 1838.



Diagnosis: Shell variable in shape; no basal cord or intritacalx; axial ribs fine and filiform to strong and lamellate; spiral lirae relatively weak or absent; umbilicus present or absent; protoconch conical, of 3–5 whorls, superficially smooth, but (under SEM) with microscopic axial striae, sometimes crossed by faint spiral striae.

Notes: See Clench & Turner (1951:251) and Dall (1889:299) for full synonymy and discussion of the status of *Scala* Bruguière, 1789. The subgeneric classification here used is very tentative and is aimed solely at grouping together similar species for convenience sake.

Key to the subgenera of *Epitonium* in southern Africa and Mozambique

- |    |  |                              |
|----|--|------------------------------|
| 1  | Suture opening into the widely open umbilicus . . . . .  | <b>Epitonium</b> <i>s.s.</i> |
| —  | Suture not opening directly into umbilicus . . . . .   | 2                            |
| 2  | Intervals with microcancellate sculpture . . . . .   | <b>Laeviscala</b>            |
| —  | Not as above . . . . .   | 3                            |
| 3  | Intervals smooth or with faint spiral scratches . . . . .  | 4                            |
| —  | Intervals with distinct spiral sculpture . . . . .   | 13                           |
| 4  | Suture simple, coronations feeble or absent, umbilicus never fenestrate                                  | 5                            |
| —  | Suture fenestrate, coronations usually present, umbilicus sometimes fenestrate . . . . .                 | 11                           |
| 5  | Shell acuminate . . . . .  | 6                            |
| —  | Shell not acuminate . . . . .  | 7                            |
| 6  | Umbilicus wide; glossy, often tinged with brown . . . . .  | <b>Depressiscala</b>         |
| —  | Umbilicus closed; not glossy, white . . . . .  | <b>Pupiscala</b>             |
| 7  | Axial ribs thick, often continuous . . . . .   | <b>Nitidiscala</b>           |
| —  | Axial ribs thin, not continuous . . . . .  | 8                            |
| 8  | Broad, whorls tumid, peristome thin . . . . .  | 9                            |
| —  | Narrow, whorls not very tumid, peristome usually fairly thick . . . . .                                  | 10                           |
| 9  | Teleoconch of 6–7 whorls; ribs usually not filiform; often marked with brown                             | <b>Papyriscala</b> (part)    |
| —  | Teleoconch of only 3–3,5 whorls; ribs usually filiform; white; minute                                    | <b>Minutiscala</b>           |
| 10 | Umbilicus absent . . . . .   | <b>Hyaloscala</b>            |
| —  | Umbilicus present . . . . .  | <b>Perlucidiscala</b>        |
| 11 | Umbilicus closed . . . . .   | <b>Hirtoscala</b>            |
| —  | Umbilicus open or fenestrate . . . . .   | 12                           |
| 12 | Umbilicus open; ribs low, numerous, not coronate . . . . .   | <b>Papyriscala</b> (part)    |
| —  | Umbilicus widely fenestrate; ribs high, relatively few (usually 10 or less), strongly coronate . . . . . | <b>Lamelliscala</b>          |
| 13 | Shoulder coronate . . . . .  | 14                           |
| —  | Shoulder not coronate . . . . .  | 15                           |
| 14 | Umbilicus narrowly fenestrate or open . . . . .  | <b>Parviscala</b>            |

- Umbilicus widely open ..... **Asperiscala**
- 15 Peristome very thick ..... **Labeoscala**
- Peristome thin ..... 16
- 16 Axial ribs tubular in section ..... **Librarisocala**
- Ribs not as above ..... 17
- 17 Shell globose, aperture very large, axial ribs usually obsolete on later whorls  
**Globiscala**
- Shell not globose, aperture normal, axial ribs well developed throughout 18
- 18 Umbilicus closed or narrowly fenestrated ..... **Sodaliscala**
- Umbilicus open ..... 19
- 19 Suture deep, whorls strongly rounded, aperture ovate or oblong-ovate .....  
**Limiscala**
- Suture shallow, whorls moderately rounded, aperture elongate .....  
**Foliaceiscala**

Subgenus *Epitonium s.s.*

Diagnosis: Shell medium-sized to large, more or less broadly conical; suture perforate, crossed by terminations of axial ribs; umbilicus open, wide; axial ribs continuous, relatively few (6–14), sometimes coronated, intervals sometimes with faint spiral striae; peristome with basal auricle.

Notes: This well-defined group is characterised chiefly by the gaping umbilicus and perforated suture, only the axial ribs joining successive whorls.

Key to subgenus *Epitonium s.s.* in southern Africa and Mozambique

- 1 Axial ribs not coronated, shell large (up to 70 mm long) ..... **scalare**
- Axial ribs coronated or alate; shell small (up to 16 mm long) ..... 2
- 2 Ribs thick, markedly reflexed (anteriorly tubular) with weak coronations .....  
**syoichiroi**
- Ribs lamellate, at most slightly flexed, alate at shoulder ..... 3
- 3 Broad (breadth/length 0,64–0,69), with strong, slightly reflexed ribs .....  
**sallykaicherae**
- Narrower (breadth/length 0,60 or less), with fragile, erect ribs ..... 4
- 4 Protoconch diameter 0,44 mm; adult length about 5,4 mm (5 teleoconch whorls) ..... **jimpyae**
- Protoconch diameter 0,60 mm; adult length about 12 mm (6 teleoconch whorls) ..... **soroastra**

*Epitonium (Epitonium) scalare* (Linné, 1758)

*Turbo scalaris* Linné, 1758:764 (type figure, designated Clench & Turner, 1951, Gualtieri, 1742:pl. 10, fig. 22). Type locality unknown [= Amboina, des. Kuroda *et al.*, 1971].

*Epitonium (Epitonium) scalare*; Clench & Turner, 1951:252 (synonymy), pl. 108.

*Epitonium scalare*; Dance, 1966:8, pl. xxi, xxii; Kuroda *et al.*, 1971:252, pl. 62, fig. 5; Azuma, 1971:99, pl. 12, fig. 6 (radula).

*Scalaria pretiosa* Lamarck, 1816:3, pl. 451, figs 1a, b; *idem.*, 1822:226; Mermod & Binder, 1963:160, fig. 225 (holotype). Type locality: 'Océan des Grandes Indes'.

Diagnosis: A large *Epitonium s.s.* (up to 70 mm) with oblong-ovate aperture; ribs low, not reflexed, 8–10 per whorl, not coronate; scratch-like interstitial striae very faint; pale brownish-grey with white lamellae.

Range: Japan and Red Sea to Natal.

Regional locality data: NATAL: Durban Bay dredgings (NM B6834: B. J. Young).

Notes: Although only a single broken shell is known from Natal, live-taken specimens from north of Beira and from the Bazaruto area have been seen in private collections.

The 'precious wentletrap' of popular writers is too well known to warrant description. Dance (1966) has given an account of the early literary history of the species.

*Epitonium (Epitonium) syoichiroi* Masahito & Habe, 1976

Figs 61, 63, 70

*Epitonium syoichiroi* Masahito & Habe, 1976:169, fig. 1. Type locality: Enshu-Nada, Honshu, Japan, in about 50 m.

*Scala trochoides* (non de Boury, 1912), *partim*; Barnard, 1963:100.

Diagnosis: A small (16 mm) *Epitonium s.s.*, with oblong-ovate aperture; axial ribs low, strongly reflexed, rather thick, 8–10 per whorl, with weak shoulder coronations; faint interstitial scratch-like striae, strongest on early whorls; white or biscuit-colour.

Description: Shell conical, of  $5\frac{1}{2}$  strongly convex teleoconch whorls, suture perforated, whorls joined by axial ribs, umbilicus widely open; aperture oblong-ovate, peristome double, strongly expanded at base. Axial ribs low, rather thick, crests sharp and moderately incurved, but anterior to periphery inrolled to form a tube, slightly opisthocline, with a small, blunt shoulder coronation; 8–10 lamellae per whorl, more or less aligned up spire; intervals glossy, with fine scratch-like spiral striae, strongest on early whorls. White to light yellowish-brown with white ribs, sometimes lightly suffused around periphery with brown.

Protoconch broken, diameter 0,5 mm.

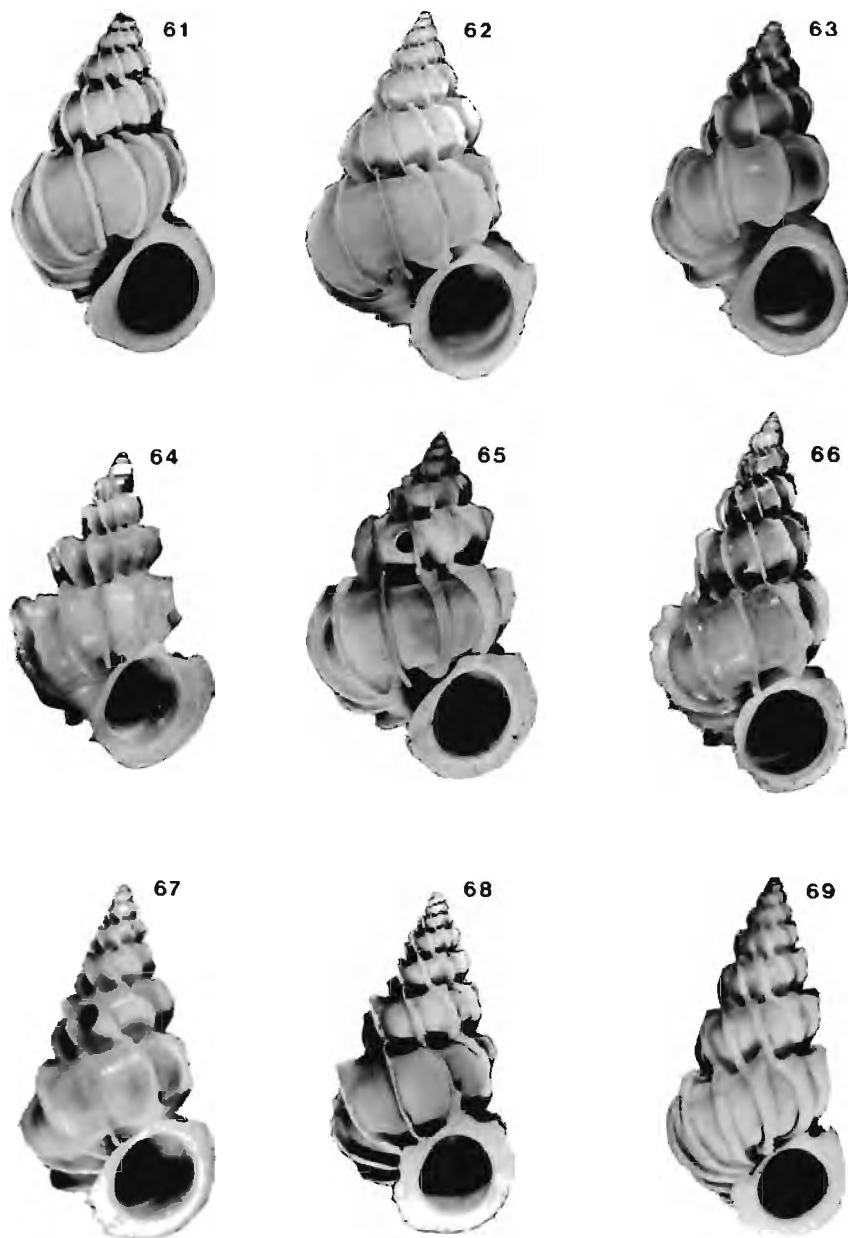
Dimensions: 16,0 × 10,2 mm; 15,2 × 8,8 mm.

Range: Japan to Comores and Natal.

Regional locality data: NATAL: off Mvoti River, 27 fath. (SAM A3601); off Umhlanga Rocks, 12–14 fath., coarse sand (NM A404: R. K. and R. Cruickshank); Durban Bay dredgings (NM A9771: B. J. Young).

Type material: Holotype NSMT 52443, paratype NSMT 52444.

Notes: Barnard (loc. cit.) agreed with Tomlin's identification of a Natal shell as *trochoides* de Boury, 1912 (for the Zululand shell so identified by Barnard see *E. sororastra*). But, while local shells do resemble this West African species, specimens of *trochoides* in the BM(NH) and MHNP (Fig. 62) differ in their thinner and less reflexed lamellae and less auriculate base. Consequently, I prefer to refer Natal material to the Japanese *syoichiroi*. Local shells agree closely with the actual holotype (Fig. 63) of *E. syoichiroi* (NSMT 52443) and with a paratype (NSMT 52444), save that their spiral striae are slightly coarser but less conspicuous. I



Figs 61–69. *Epitonium* species, subgenera *Epitonium* s.s. and *Lamelliscula*. 61, 63, *E. (E.) syoichiroi* Masahito & Habe, 1976: 61, NM A404, off Umhlanga Rocks, 12–14 fath., 15,2 × 8,6 mm; 63, Holotype, 16,6 × 9,7 mm, Enshu-Nada, Honshu, Japan, 50 m. 62, *E. (E.) trochoides* (de Boury, 1912), Grand Bassam, Ivory Coast, 35 m, MHNP colln., 22,5 × 14,3 mm. 64, *E. (E.) jimpyae* sp. n., holotype, 4,1 × 2,5 mm. 65, *E. (E.) sallykaicherae* sp. n., holotype, 13,5 × 8,7 mm. 66, *E. (E.) sororasira* sp. n., holotype, 8,1 × 4,1 mm. 67, 68, *E. (L.) fasciatum* (Sowerby, 1844): 67, NM J8582, Pemba, Mozambique, 14,5 × 7,8 mm; 68, NM J7245, Cerf Is., Seychelles, 16,7 × 9,3 mm. 69, *E. (L.) simplex* (Sowerby, 1894), NM 2618, Sezela, Natal, 13,8 × 6,8 mm. Specimens in 61, 62, 65, 68, 69, coated with MgCl<sub>2</sub>.

regard this as of geographic significance only. A shell from Mayotte, Comoro Islands (NM J5459: Mrs E. Roscoe) provides an intermediate locality. *Scala (Scala) couturieri* de Boury, 1912, from unknown habitat, has erect, non-coronated lamellae and a non-auriculate peristome.

***Epitonium (Epitonium) sallykaicherae* sp. n.**

Figs 65, 71

**Diagnosis:** A small (14 mm) *Epitonium* s.s. with ovate aperture; axial ribs 8–9 per whorl, high, thin, moderately reflexed, with a blunt but conspicuous shoulder angle, spiral striae faint; white or yellowish-grey with white ribs; protoconch diameter 0,6 mm.

**Description:** Shell broadly pyramidal (breadth/length 0,64–0,69) of 6 strongly rounded teleoconch whorls; suture perforated, whorls joined only by axial ribs; umbilicus widely open; aperture ovate, peristome double, auricle strong, columella moderately expanded over umbilicus. Axial ribs high, thin, moderately reflexed with a blunt but conspicuous angle around shoulder; 8–9 ribs per whorl throughout, obliquely aligned. Intervals glossy with only very faint traces of axial and spiral striae. White or yellowish-grey with white ribs.

Protoconch narrowly conical, of about 5 whorls, last two convex, apical ones rather stiliform; white, sutures tinged with brown; basal diameter 0,6 mm.

Dimensions: 13,5 × 8,7 mm (holotype); 11,1 × 7,7 mm (paratype).

Range: Natal to Gulf of Oman (and probably Japan).

Type material: Holotype NM B5879/T2914, off Durban, Natal (29°52,6'S, 31°10,0'E), 100 m, very fine muddy sand. Paratype 1, NM B7745/T2952, same data. Paratype 2, NM H5936/T2953, Muscat, Oman, 10–30 fathoms, W. Falcon colln.

Notes: This appears to be the *Epitonium* identified by Japanese workers as *Scala liliputana* A. Adams, 1861. However, that species was not figured and the types are not amongst the Adams material in the BM(NH) (Ms K. Way, *in litt.* 22/iii/84) or among those in the Redpath Museum (Dr V. Conde, *in litt.* 23/v/84). Consequently *liliputana* remains a *nomen dubium*. Furthermore, Adams (1861:481) specifically stated that the intervals between the ribs in his species are 'conspicuously lirate', which does not apply to the present taxon, nor does he refer to its strongly alate ribs.

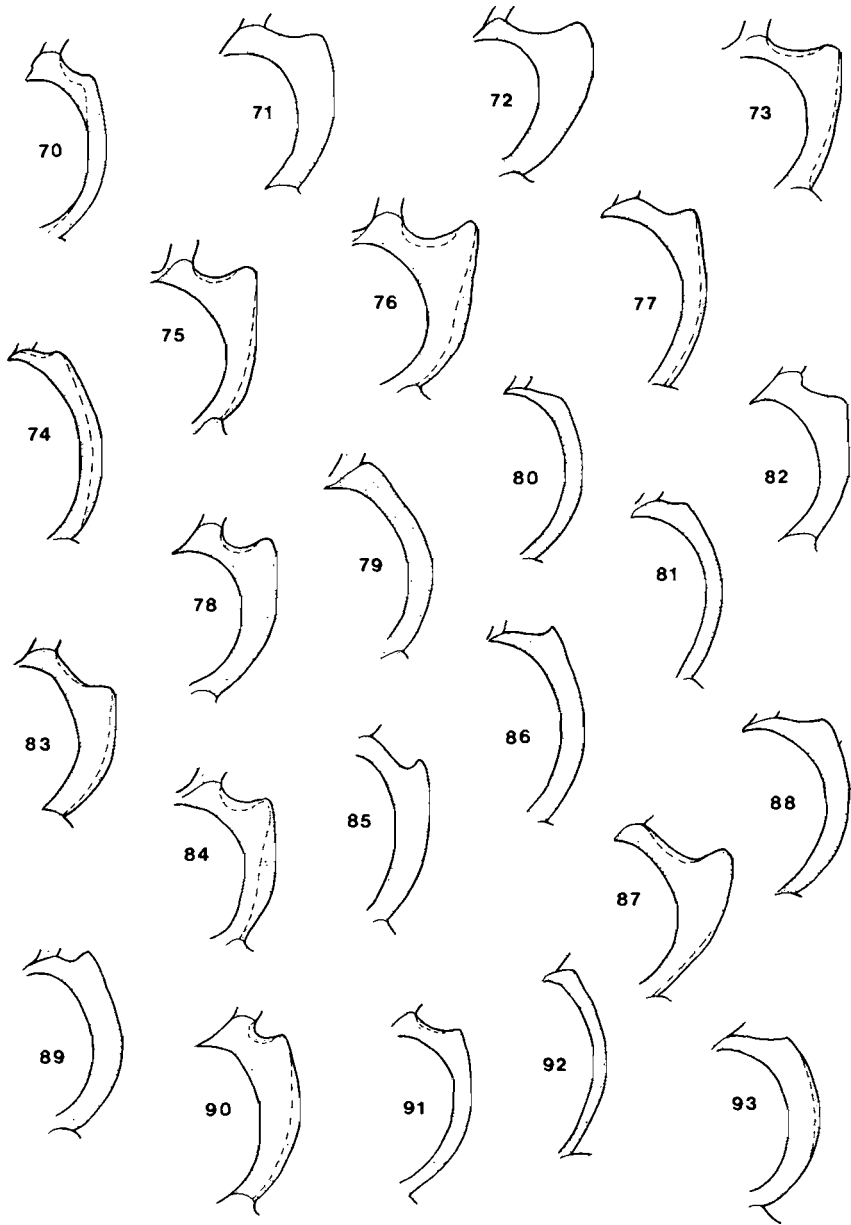
*E. (E.) trochoides* (de Boury, 1912) from West Africa has weaker, lower shoulder coronations and distinct scratch-like spiral striae, and attains at least 22,5 mm in length.

Etymology: Honouring Mrs Sally Diana Kaicher, whose illustrations of epitoniid types have been indispensable for the present study.

***Epitonium (Epitonium) jimpyae* sp. n.**

Figs 64, 72

**Diagnosis:** A tiny (5,4 mm), fragile *Epitonium* s.s. with oblong-ovate aperture; axial ribs 9–10 per whorl, high, thin, lamellate, not reflexed, with a strong, angular shoulder expansion, intervals smooth; white; protoconch diameter 0,44 mm.



Figs 70-93. Diagram of rib profiles in some *Epitonium* species; broken line indicates degree of inrolling of crest. 70, *E. syoichiroi*; 71, *E. sallykaicherae*; 72, *E. jimpyae*; 73, *E. fasciata*; 74, *E. anabathmos*; 75, *E. simplex*; 76, *E. pteroen*; 77, *E. tenebrosus*; 78, *E. columba*; 79, *E. crypticocorona*; 80, *E. amiculum*; 81, *E. mzambanum*; 82, *E. climacotum*; 83, *E. repandum*; 84, *E. repandior*; 85, *E. thyræum*; 86, *E. harpago*; 87, *E. tamsinae*; 88, *E. townsendi*; 89, *E. spyridion*; 90, *E. gracile*; 91, *E. fucatum*; 92, *E. opeas*; 93, *E. histricosum*.

Description: Shell small and fragile, broadly pyramidal, of about 5 convex teleoconch whorls; suture fenestrate, perforate; umbilicus open, wide; aperture oblong-ovate, peristome duplex, moderately wide, auriculate, columella rather straight, reflexed. Axial ribs lamellate, thin, sharp, erect, straight, continuous, prosocline, 9–10 per whorl, at shoulder with a flaring, angular, slightly reflexed expansion; intervals smooth. White.

Protoconch acutely conical, of  $4\frac{1}{2}$  transparent, convex whorls, basal diameter 0,44 mm.

Dimensions: 4,1 × 2,5 mm (holotype); 5,1 × 2,7 mm (paratype). Attains at least 5,4 mm in length.

Range: Continental shelf of eastern Transkei.

Type material: Holotype NM C5859/T2915, off Ubombo (31°55,3'S, 29°21,4'E), 96 m, sand and gravel. Paratype 1, off Mtamvuna River, 120–140 m, sponge-rubble (NM C5879/T2906); paratypes 2, 3, do, 110 m, pebbles (NM C5886/T2905); paratype 4, off Port Grosvenor, 110–115 m, sand, some mud, solitary corals, shells (NM C1279/T2909); paratype 5, do, 80 m, lithothamnion nodules and sheets (NM C5894/T2910); paratype 6, do, 95–100 m, coarse sand (NM C5862/T2908); paratype 7, off N'tafufu River, 50 m, mud, sand (NM C5884/T2907).

Notes: The delicate axial lamellae of *E. jimpyae* are invariably imperfect and none of the types is undamaged. The flaring, winged form of the lamellae is suggestive of several species of *Lamelliscala*, but the open umbilicus, into which leads the fenestrated suture, shows this species to be an *Epitonium s.s.* There is slight resemblance to *E. (E.) krebsii* (Mörch, 1874) of the western Atlantic, but that has less flaring, non-alate lamellae.

Etymology: This species is named in honour of my wife, for her help and encouragement.

### **Epitonium (Epitonium) sororastra sp. n.**

Fig. 66

*Scala trochoides* (non de Boury, 1912), *partim*; Barnard, 1963:100.

Diagnosis: Closely resembling *E. jimpyae* but attaining at least 12 mm and with a larger protoconch (basal diameter 0,60 mm).

Description: Shell narrowly pyramidal, of about 6 convex teleoconch whorls; suture widely fenestrate, perforate; umbilicus open, wide; aperture oblong-ovate; peristome duplex, thin but moderately wide (? non auriculate), columella reflexed. Axial ribs thin, lamellate, sharp, straight, continuous, prosocline, 8–9 per whorl, shoulder with a flaring, angular expansion; intervals smooth. White.

Protoconch as in *E. jimpyae* but larger (basal diameter 0,60 mm).

Dimensions: 8,1 × 4,1 mm (holotype); 11,2 × 6,1 mm (paratype, protoconch and one teleoconch whorl missing).

Range: Zululand to western Transkei, 138–164 m.

Type material: Holotype NM C5080/T2936, off Kei River, Transkei (32°49,3'S, 28°31,2'E), 138 m, coarse sand, dredged *MN*. Paratype SAM A9019, off Durnford Point, Zululand, 90 fath., dredged *P.F.*

Notes: The axial lamellae are very fragile and are chipped in both types.

Etymology: *soror* (a sister) + *astra* (large), L.

*Lamelliscalca* de Boury, 1909

*Lamelliscalca* de Boury, 1909:258. Type species (o.d.) *Scalaria fasciata* Sowerby, 1844.

Diagnosis: Shell small to medium, with high, often lamellate, shouldered axial ribs, a widely fenestrate umbilicus and a deeply fenestrate (but not perforated) suture; intervals between ribs smooth or with faint, microscopic spiral scratches.

Notes: Members of the subgenus *Lamelliscalca* may resemble *Epitonium s.s.*, save that the umbilical opening is crossed by the terminations of the axial ribs and the suture is deeply pitted but does not open into the umbilicus.

Probable synonyms of *Lamelliscalca* are *Turbiniscalca* and *Anguliscalca* de Boury, 1909, which differ by small degrees only.

Key to southern African and Mozambican species of *Lamelliscalca*

- 1 Umbilicus relatively wide; ribs 6–8; intervals brown or brown-tinged . . . . . **fasciatum**  
 — Umbilicus narrow; ribs 8–10; intervals white . . . . . 2
- 2 Broad (breadth/length about 0,64); on early whorls coronations reaching almost to middle of previous whorl, crest of each rib strongly rolled over . . . . . **pteroen**  
 — Narrow (breadth/length 0,54–0,61); coronations relatively low, crest of each rib scarcely inrolled . . . . . **simplex**

*Epitonium (Lamelliscalca) fasciatum* (Sowerby, 1844)

Figs 67, 68, 73

*Scalaria fasciata* Sowerby, 1844a:84, pl. 32, figs 12, 13; *idem*, 1844b:11; *idem*, 1873:pl. 3, sp. 13. Type locality: Catanauan, Luzon Is., Philippines, sandy mud at 8–10 fath.

*Lamelliscalca fasciata*; Jousseume, 1912:194.

Diagnosis: A narrow *Lamelliscalca* (breadth/length 0,54–0,61) with 6–8 thin axial lamellae per whorl, each erect but gently recurved, with an angular coronation on shoulder; intervals smooth; umbilicus wide; white, tinged medially with pale brown; length 18 mm or more.

Description: Shell narrowly conical (breadth/length 0,54–0,61) with about 6½ rounded teleoconch whorls, suture very deeply fenestrate, but not perforated; umbilicus widely fenestrate, partly covered by labial expansion; peristome wide, double, somewhat auriculate basally. Axial ribs 6–8 per whorl (7 in local examples), thin, lamellate and erect, but gently recurved towards crest, prosocline, continuous, with an angular shoulder coronation, which is distinctly recurved; intervals smooth. Colour white, middle of each whorl tinged with light brown.

Dimensions: 17,6 × 9,5 mm; 12,9 × 7,8 mm; 13,5 × 8,0 mm.

Operculum with nucleus near centre; translucent strong yellowish-brown.

Range: Japan and Red Sea to Natal.



Regional locality data: NORTHERN MOZAMBIQUE: Pemba (formerly Porto Amelia) (NM J8582: Mrs T. e Sousa); Conducia Bay (NM H283: K. Grosch). NATAL: Durban Bay, shallow dredgings (NM A9772: B. J. Young).

Notes: All regional examples are damaged, but agree well with NM specimens from the Philippines, Comores and Seychelles. Fresh shells from Cerf Island, Seychelles (NM J7245: R. C. Wood) have a dark brown operculum and a protoconch diameter of 0,5 mm. The species attains a length of at least 27 mm (Jousseume 1912).

Among the species compared with *Scalaria fasciata* by its describer was *S. replicata* Sowerby, 1844, which was reported from Port Elizabeth by Sowerby (1892). Not only is the record highly suspect (it was based perhaps on a fresh shell of *E. simplex* (Sowerby, 1894)), but *Scalaria replicata* is a *nomen dubium*. The syntypes (Dushane 1974:fig. 99) are so badly broken that detailed comparison is impossible and the type locality (Lord Hood's Island) could refer to an island either in Polynesia or in the Galapagos group. Different species agreeing with the type figures occur both in the Indo-West Pacific (Habe 1964:pl. 14, fig. 99) and tropical West America (Dushane 1974:figs 95–98). In the absence of considerably more detail than is offered by the original description and figures there can be no certainty as to the identity of *replicata*.

*Epitonium (Lamelliscala) simplex* (Sowerby, 1894)

Figs 69, 75, 164, 168

*Scalaria simplex* Sowerby, 1894b:371; *idem*, 1897:12, pl. 6, fig. 5. Type locality: Natal.  
*Epitonium simplex*; Kilburn & Rippey, 1982:78, 213, pl. 11, fig. 12; Kaicher, 1981:3040.  
*Scala aculeata* (non Sowerby, 1844); Smith, 1903:385; Barnard, 1963:101.  
*Scalaria aculeata*; Turton, 1932:81, pl. 19, sp. 581.  
*Scalaria albaniana* Turton, 1932:81, pl. 19, sp. 582 (*syn. n.*). Type locality: Port Alfred.

Diagnosis: A narrow *Lamelliscala* (breadth/length 0,42–0,51), with narrow umbilicus; 8–10 rather thick and strongly reflexed ribs per whorl, with sharp, somewhat foliar coronations; intervals with faint, microscopic spiral scratches; white; up to about 16 mm in length.

Description: Shell pyramidal (breadth/length 0,42–0,51), of about 8 strongly convex teleoconch whorls, separated by a narrowly fenestrate (but not perforate) suture, umbilicus shallowly and narrowly fenestrate; aperture ovate, its inner border less curved than the outer, peristome thick, duplex, moderately auriculate and adnate to the prominent fasciole. Axial ribs 8–10 per whorl, high, moderately thick and strongly reflexed, continuous, prosocline; shoulder with prominent recurved, angular, somewhat foliar coronations; intervals glossy and smooth, save for scratch-like spiral microstriae; crests of lamellae with rugose growth-striae. White.

Protoconch rather broadly conical, 3½ convex whorls, translucent with very fine, arcuate axial striae; basal diameter 0,48–0,50 mm.

Dimensions: 13,8 × 6,6 mm; 11,8 × 4,9 mm; 16,3 (apex missing) × 6,9 mm.

Operculum as in *E. fasciata* (Fig. 164).

Radula (Fig. 168): rachidian small, narrowly lanceolate, laterals claw-shaped, varying in length, with hooked tip and no cusps.

Range: Northern Mozambique to eastern Cape Province, littoral down to 50 m. Regional locality data (all NM colln.): NORTHERN MOZAMBIQUE: Mozambique Is. (G3724:R. K.). CENTRAL MOZAMBIQUE: Beira (J3103: Mrs E. Roscoe). SOUTHERN MOZAMBIQUE: Bazaruto Is. (G5002, J5460: Mrs E. Roscoe). ZULULAND: Mapelane, Umfolosi River mouth (B4773: J. P. Marais). NATAL: Mvoti River mouth (A1052: H. C. Burnup); Tongaat (A935, A877: H. C. Burnup); Durban (8785: R. K.; A851: H. C. Burnup); Durban Bay shallow dredgings (B7202: B. J. Young); off Durban Bluff, 20–22 m (A7086: R. K., R. Fregona); Umbogintwini (C1051: C. W. Alexander); Umkomaas (940: H. C. Burnup); Umzinto coast (942, 939: H. C. Burnup); Kelso (A964,921: H. C. Burnup); Sezela (A963, B4846, A6607, 2618, 2619: H. C. Burnup); Port Shepstone (A930, A861, A962: H. C. Burnup). TRANSKEI: Mzamba (A5035, A5033: J. P. Marais; 7088, B4603: R. K.); Mbotyi (A1890: Mrs C. M. Connolly); off Mbotyi, 50 m, sand (C5885: MN); off Whale Rock, 20–26 m, sand, gorgonians (C5864: MN); Hluleka (C1416: R. K.); Xora (6900: R. K.); Banyana River (B1233: R. K.); Sandy Point (C3718: R. K.); Kei River mouth (C3543: R. K.). EASTERN CAPE PROVINCE: Bulugha (7090: R. K.); Kwelera (A603: Mrs V. Armstrong); Gonubie (A1880: Mrs C. M. Connolly); East London (B6959: M. Harison); Port Alfred (B4844: H. Becker; B4790: E. K. Jordan; B6966: ex Albany Mus.); Port Elizabeth (5509: R. K.; A2608: F. Graeve); Jeffreys Bay (7086: R. K.).

Type material: Holotype of *Scalaria simplex* is BM(NH) 99.4.14.11.39, ex J. H. Ponsonby colln.; dimensions 9,5 × 4 mm. Two syntypes of *Scalaria albanyana* in OUM.

Notes: The supposedly lost types of *Scalaria aculeata* Sowerby, 1844 (see Kilburn & Rippey 1982) have now been figured by Kaicher (1983). They differ from *E. simplex* in their more slender, acuminate form (breadth/length 0,36–0,38 instead of 0,42–0,51). The two taxa were recognised as distinct by de Boury, who identified local shells under the M/S name '*Scalaria melvilli*'. The holotype of *S. simplex* is worn but recognisable as the present species. Turton's *Scalaria albanyana* is based on broad examples. The occurrence of *E. simplex* in Mozambique renders an Indo-Pacific range for the species likely; possibly it is *E. simplex* that has been recorded from Indo-Pacific localities as the Mediterranean *Scalaria muricata* Risso, 1826 (an unidentifiable species, according to Jeffreys 1884).

*Epitonium (Lamelliscala) pteroen* Kilburn, 1977

Fig. 76

*Epitonium pteroen* Kilburn, 1977:186, fig. 15. Type locality: Santa Carolina Is., Bazaruto Archipelago, Mozambique.

Diagnosis: A broadly pyramidal *Lamelliscala* (breadth/length 0,64) with a narrow umbilicus; 10 strongly reflexed axial ribs per whorl, with prominent coronations extending high up preceding whorl, crest of each rib strongly rolled over; intervals smooth; white; length about 9 mm.

Notes: Still known only from the unique holotype.

Subgenus *Hirtoscala* Monterosato, 1890

*Hirtoscala* Monterosato, 1890:149. Type species (s.d. Cossmann 1912) *Scalaria cantraini* Weinkauff, 1866.

Diagnosis: Shell small to medium, pyramidal, umbilicus closed, suture very narrowly fenestrate, peristome thick, duplex, weakly auriculate; axial lamellae coronate, intervals smooth or with faint spiral striae.

Notes: Dushane (1974:41) used *Hirtoscala* as a broad grouping for species with 'an exaggerated, sometimes tubular spine at the periphery of the whorl'. Shoulder coronations have evolved independently in a number of subgenera, and the name is here applied to a restricted species-complex, closely allied to *Lamelliscala*, but with a closed umbilicus, and in some cases a brown coloration (as in the European *Clathrus* Oken, 1915).

Key to *Hirtoscala* in southern Africa

- Brown, narrow (breadth/length 0,39–0,44), attaining 20 mm, continental shelf . . . . .  
**tenebrosum**
- White, squat (breadth/length 0,48–0,59), barely exceeding 5 mm, littoral . . . . .  
**anabathmos**

*Epitonium (Hirtoscala) tenebrosum* (Sowerby, 1903)

Figs 77, 94–95

*Scala tenebrosa* Sowerby, 1903:220, pl. 4, fig. 6; Thiele, 1925:105(139); Barnard, 1963:99. Type locality: off Cape St Blaize, 37 fath.

*Epitonium tenebrosum*; Kaicher, 1981:2349 (type = lectotype, here designated).

Diagnosis: Shell fairly large (19,7 mm), breadth/length 0,39–0,44, axial ribs strong, reflexed, 14–21 per whorl, coronation strong, intervals smooth or with fine scratch-like spiral striae; uniform pale brown.

Description: Shell narrowly pyramidal (breadth/length 0,39–0,44) of about 9 moderately convex teleoconch whorls, suture very narrowly fenestrate; umbilicus closed or a slight rimation; aperture ovate, peristome thick, auriculate, columella reflexed, fasciole well developed. Axial ribs strong, rather low, strongly reflexed, straight, slightly prosocline, more or less continuous, 14–16 on early whorls, increasing to 15–21 on last whorl; coronation strong, its position somewhat variable. Intervals (in fresh shells) with fine scratch-like spiral sculpture; surface of lamellae with minute, wrinkled axial striae. Colour uniform light brown.

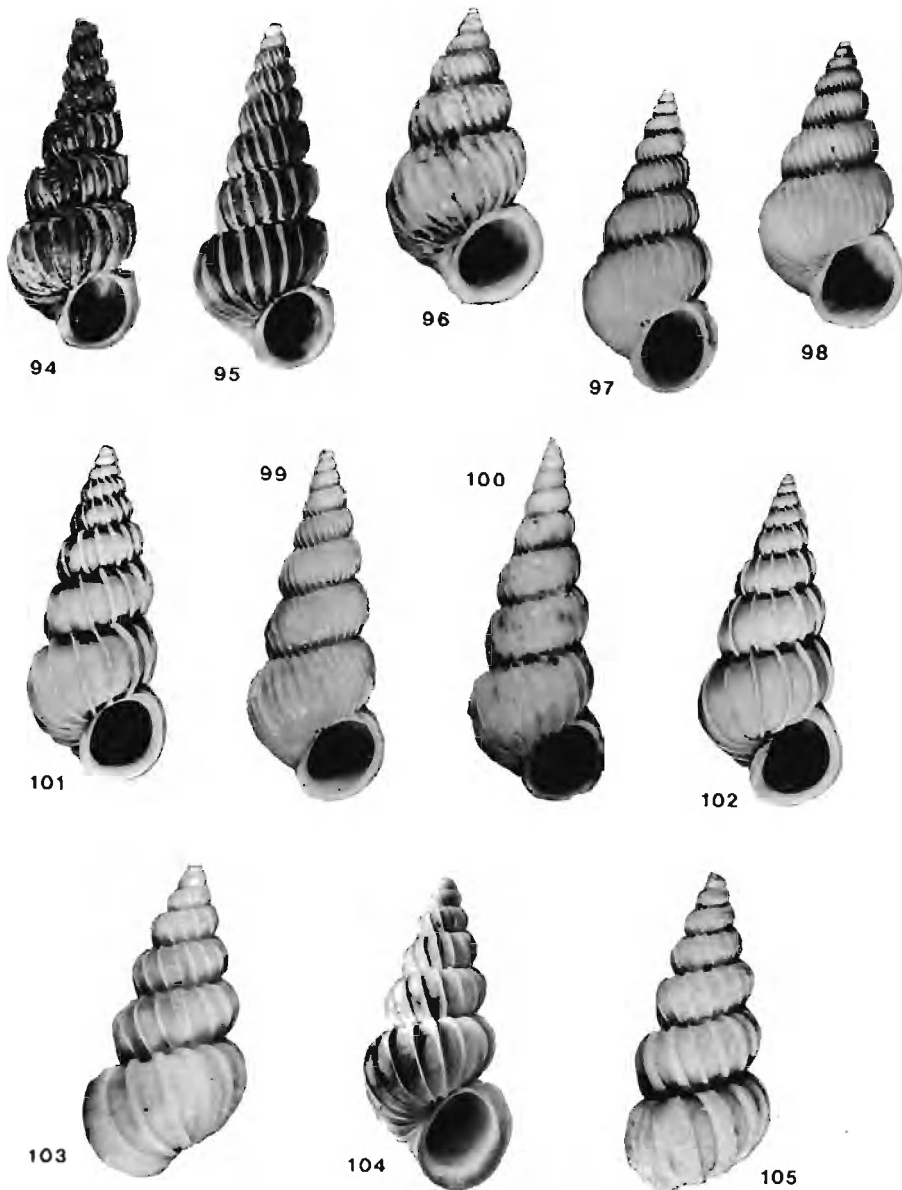
Protoconch: No data available.

Dimensions: 19,7 × 7,7 mm; 15,0 × 6,5 mm.

Range: Agulhas Bank, from Algoa Bay westwards, and up the Atlantic shelf to off St Helena Bay, 58–143 m; also Angola (Thiele 1925).

Additional locality data (see Barnard 1963): off Cape St Blaize, *ex pisce* (NM B847, A4409; R. Le Maitre).

Type material: Two syntypes were mentioned by Sowerby, one from off Cape St Blaize, the other from 34°7'S, 25°43'E. One is now in BM(NH), no. 1903.7.27.48, the other is SAM A3599. Both are marked as being 'The Type', and both are



Figs 94–105. *Epitonium* species, subgenera *Hirtoscala*, *Hyaloscala* and *PerLucidiscala*. 94–95, *E. (Hirtoscala) tenebrosus* (Sowerby, 1903): 94, Paralectotype, SAM A3599, 16,7 × 6,6 mm; 95, NM B847, between Cape St Blaize and Algoa Bay, *ex pisce*, 15,0 × 6,5 mm. 96, *E. (Hirtoscala) anabathmos* sp. n., holotype, 4,2 × 2,3 mm. 97–100, *E. (Hyaloscala) kraussi* (Nyst, 1871): 97, Neotype, NM A842, 5,4 × 2,4 mm; 98, NM B4772, Mapelane, Zululand, 5,5 × 2,7 mm; 99, NM A1887, Simonstown dredgings, 9,1 × 3,5 mm; 100, NM 2721, Port Shepstone, 8,6 × 3,3 mm. 101–102, *E. (Hyaloscala) oppositum* (de Boury, 1921): 101, NM A5030, Mzamba, 6,1 × 2,4 mm; 102, do, 6,2 × 2,7 mm. 103–105, *E. (PerLucidiscala) alabiforme* sp. n.: 103, 104, Holotype, 3,7 × 1,7 mm; 105, Paratype, 4,2 × 2,0 mm.

labelled 'off Cape St Blaize, 37 fathoms'! Of the two, the BM specimen agrees better with the type figure and with the given measurements (actual dimensions  $15,7 \times 6,2$  mm), and is clearly the fresher example; it was figured by Kaicher (1981:2349). Consequently, it is here designated as the lectotype. The SAM paralectotype (Fig. 94) is larger ( $16,7 \times 6,6$  mm) but damaged, the apical whorls being missing and a false umbilicus having been produced by some boring organism; it is thus presumably the 'secondary' specimen from  $34^{\circ}7'S$ ,  $25^{\circ}43'E$ , 55 fathoms, listed by Sowerby.

Notes: This offshore species was reported by Bartsch (1915:63) from the Port Alfred littoral. This record was understandably queried by Turton (1932:81) and Barnard (loc. cit.), and was probably based on wave-battered examples of *Epitonium simplex*.

I have not been able to examine an intact protoconch but Barnard's reference to '1½ whorls' is presumably erroneous, protoconch whorls numbering 3½–5 in the genus *Epitonium*.

***Epitonium (Hirtoscala) anabathmos* sp. n.**

Figs 74, 96

Diagnosis: Shell small (5 mm), breadth/length 0,48–0,60, axial ribs thin, moderately recurved, 15–24 per whorl, with small, blunt shoulder spines; intervals smooth; white.

Description: Shell rather broadly pyramidal (breadth/length 0,48–0,60) with 5 strongly convex whorls, periphery median, suture very narrowly fenestrate, umbilicus closed; aperture ovate, peristome duplex, moderately thick, base with a weak auricle, fasciole distinct. Axial ribs thin, rather low, moderately recurved, slightly arcuate, prosocline, more or less continuous, becoming progressively more widely spaced with growth, shoulder with a small, blunt, reflexed coronation; ribs 17–20 on first teleoconch whorl, 15–24 on last. Intervals smooth. White.

Protoconch conical, of about 3½ moderately convex whorls; maximum diameter 0,38 mm.

Dimensions:  $4,2 \times 2,3$  mm (holotype);  $4,2 \times 2,0$  mm,  $5,4 \times 2,8$  mm (paratypes).

Range: Zululand to western Transkei, littoral.

Type material: Holotype NM A5034/T2926, Mzamba, Transkei ( $30^{\circ}51'S$ ,  $29^{\circ}46'E$ ), beach-drift, J. P. Marais. Paratypes 1–5, Mzamba (NM B7551/T2946: R. K.); 6, Nthlonyane, Transkei (NM B7553/T2945: R. K.); 7–8, Mbotyi, Transkei (NM A6503/T2949: Mrs C. M. Connolly); 9–10, Shelly Beach, S. of Port Shepstone, Natal (NM 8792/T2950: R. K., NM B4202/T2947: Mrs R. Cock); 11–12, Scottburgh, Natal (NM A1021/T2948: W. Falcon); 13–14, Tongaat, Natal (NM 3141/T503: H. C. Burnup); 15, Mapelane, Umfolosi R. mouth, Zululand (NM B4774/T2951: J. P. Marais).

Notes: This species is somewhat intermediate between the subgenus *Lamelliscala* (as represented by atypical species such as *E. simplex* and *E. pteroen*), and typical *Hirtoscala*. Its fine lamellae are also suggestive of *Hyaloscala*, but the pinprick-like sutural fenestrations and small coronations (which give the spire a stepped

appearance) distinguish it. Specimens in the Burnup collection were given the M/S name of '*Scala tongaatensis*' by de Boury.

Etymology: *anabathmos* = a stairway, G.

#### Subgenus *Hyaloscala* de Boury, 1889

*Hyaloscala* de Boury, 1889:246. Type species (o.d.) *Scala clathratula* Kanmacher, 1797.

*Delicatscala* de Boury, 1909:257 (**syn.n.**) Type species (o.d.). *Scalaria ducalis* Mörch, 1875 [? = *Scalaria albida* d'Orbigny, 1842, *vide* Dushane 1974].

Diagnosis: Shell small and translucent, suture simple, umbilicus closed; axial ribs thin, sometimes low and numerous; intervals smooth and glossy, sometimes with very faint and irregular spiral grooves; peristome fairly thin, not or only weakly auriculate.

Notes: *Hyaloscala* is here used for a large group (not well represented in southern Africa), which resembles *Niuidiscala* but has thin axial ribs. *Sodaliscala* de Boury, 1909, to which that author referred *Scala oppositum*, has distinct spiral striae.

#### Key to species of subgenus *Hyaloscala* in southern Africa

Axial ribs 11–15 per whorl ..... **oppositum**  
 Axial ribs 17–37 per whorl ..... **kraussi**

#### *Epitonium (Hyaloscala) kraussi* (Nyst, 1871)

Figs 97–100, 169

*Scalaria lactea* Krauss, 1848 (*non* Blainville, 1827, *nec* Menke, 1830):94, pl. 5, fig. 27; Sowerby, 1874:pl. 12, sp. 93; Turton, 1932:82. Type locality: 'in litore natalensi' [= Kelso, here restricted].

*Scala (Hyaloscala) lactea*; de Boury, 1913b:90.

*Epitonium lacteum*; Bartsch, 1915:63.

*Scalaria kraussi* Nyst, 1871:116 (*nom. subst.*); Thiele, 1925:104 (138).

*Scalaria kraussii* Nyst, 1871:117.

*Scala kraussi*; Barnard, 1963:100.

*Epitonium kraussi*; Kilburn & Rippey, 1982:78, pl. 11, fig. 16.

*Epitonium shepstonensis* E. A. Smith, 1910:204, pl. 7, fig. 15; Kaicher, 1981:3113 (syntype). Type locality: Port Shepstone.

*Scala (Hyaloscala) reconducta* de Boury, 1921:234, text fig. Type locality: Port Alfred.

*Scalaria reconducta*; Turton, 1932:83, pl. 19, sp. 599. **syn. n.**

*Epitonium reconductum*; Kaicher, 1983:3592 (holotype).

*Scala (Acrilla) recreata* de Boury, 1921:234, text fig. **syn. n.** Type locality: Port Alfred.

*Acrilla recreata*; Turton, 1932:84.

*Scalaria prolongata* Turton, 1932:83, pl. 19, sp. 596. **syn. n.** Type locality: Port Alfred.

*Scalaria whitechurchi* Turton, 1932:83, pl. 19, sp. 597. **syn. n.** Type locality: Port Alfred.

*Scalaria perexilis* Turton, 1932:83, pl. 19, sp. 600. **syn. n.** Type locality: Port Alfred.

*Scalaria clathratula* (*non* Kanmacher, 1797); Sowerby, 1892:24; Turton, 1932:83.

*Scalaria jukesiana* (*non* Forbes, 1852); Sowerby, 1897:12.

Diagnosis: A *Hyaloscala* with fine, low, erect or slightly reflexed axial ribs, 17–37 on later whorls; faint, microscopic, interstitial spiral scratches only in some populations; breadth/length 0,34–0,53; white; maximum length 16 mm, but usually less than 10 mm.

Description: Shell narrowly pyramidal, variable (breadth/length 0,34–0,53), of 8 convex teleoconch whorls; suture simple, umbilicus closed; aperture ovate, peristome fairly thin, particularly over paries, auricle weak, columella rather straight. Axial ribs fine, low, erect or slightly reflexed, rising a little at suture,

prosocline, straight, 17–37 on later whorls. Intervals smooth or with very shallow, scratch-like spiral grooves. White.

Protoconch conical, of about  $3\frac{1}{2}$  slightly convex whorls, maximum diameter 0,35–0,45 mm.

Dimensions: 16,0 × 5,9 mm; 12,7 × 5,5 mm; 7,2 × 3,2 mm.

Operculum ovate, thin, translucent light yellowish-brown, nucleus excentric, growth-lines coarse.

Radula (Fig. 169): no rachidian, laterals slender, clavate, curved, with three distal cusps, about 17 plates per half-row (Natal example).

Range: Zululand to Namibia, littoral and inshore; also Angola (Thiele 1925).

Regional locality data (all NM): ZULULAND: Mapelane, Umfolosi River mouth (B4772: J. P. Marais). NATAL: Tongaat (2620: H. C. Burnup); Umdloti (A941, A843: H. C. Burnup); off Durban Bluff, 20–22 m (B7052–3: R. K.); Umbogintwini (A845: W. Falcon; A867: C. W. Alexander); Kelso (type locality); Port Shepstone (A844, 3143–4, 2621: H. C. Burnup). TRANSKEI: Mzamba (B4623: R. K.); Lwandile/Mdumbi (C202: R. K.); off Nqabara Point, 30 m, very fine sand (C5027: MN); Xora River mouth (B7209: Mrs P. Palmer); Sandy Point (C3755: R. K.). EASTERN CAPE PROVINCE: Kwelera (A1881: Mrs C. M. Connolly); East London (A2027, A1512: R. K.; A840: H. C. Burnup; B6207: ex Albany Mus.); Port Alfred (B6360, B4797: E. K. Jordan; B6961, B6209: ex Albany Mus.; 949: H. Becker; 7084: R. K.); Port Elizabeth (B6214: D. H. Kennelly; A2612, B509: F. Graeve; A1886: Mrs C. M. Connolly). FALSE BAY: Gordons Bay (B6878: Mrs C. M. Connolly); off Macassar Beach, 70–80 ft (A1851: Mrs C. M. Connolly); Simonstown dredgings (A1887, A1873: Mrs C. M. Connolly); Glencairn (A3434: Mrs C. M. Connolly); Millers Point (7080: R. K.; A1888: Mrs C. M. Connolly). NAMIBIA: between Walvis Bay and Swakopmund (B5647: C. T. Stuart).

Type material: All type material of *Scalaria lactea* Krauss, 1848, was destroyed during the last world war (Janus 1961). In view of the problematic nature of many members of *Hyaloscala*, a neotype is here designated (Fig. 97): NM A842/T3003, Kelso, Natal (30°22'S, 30°43'E), beach-drift, leg. H. C. Burnup, dimensions 5,4 × 2,4 mm, 22 axial ribs on last whorl. The lectotype (here designated) of *Epitonium shepstonensis* E. A. Smith, 1910, is BM(NH) 1911.8.30.9, figured by Kaicher (1981:3113). Two paralectotypes, NM 2484/T2810, are evidently the 'slightly more slender form' mentioned by Smith. The types of *Scala recreata*, *Scalaria prolongata*, *whitechurchi* and *perexilis* Turton, 1932, are in OUM; one syntype of *whitechurchi* in NM B7224/T2811, ex Albany Mus., don. W. Turton. Holotype of *Scala reconducta* in MHNP (fig. Kaicher 1983), paratype in OUM.

Notes: *Epitonium kraussi*, as here interpreted, is very variable in shell breadth, in density and strength of ribbing and in the presence/absence of interstitial sculpture. Possibly several sibling species are involved, but at present no means of satisfactorily subdividing the taxon is apparent to me. It is not unlikely, either, that *kraussi* will prove a synonym of the European *Epitonium (Hyaloscala) clathratulum* (Kanmacher, 1797), which is morphologically very similar. The presence of *kraussi* in Namibia and Angola may indicate a continuous range up the West African coast. Narrow specimens of *kraussi* were identified by de Boury as the Australasian

*E. (H.) jukesianum* (Forbes, 1852), but that species has a larger protoconch (diameter 0,48–0,50 mm, instead of 0,35–0,45 mm as in *kraussi*). *Scala reconducta* and *S. recreata* were based on narrow juveniles; in the holotype of *recreata* the body whorl has been broken back, so that its line of suture remains as a simulated basal cord, which misled de Boury into referring it to *Acrilla*.

De Boury (1913*b*) rejected Nyst's claim that *Scalardia lactea* Krauss, 1848, was a junior secondary homonym. Certainly it would appear that this combination was used by Blainville, 1827, and Menke, 1830, for *Turbo lacteus* Linné, 1758, which is now referred to the genus *Turbonilla*. Nevertheless, under article 59(*b*) of the revised ICZN code, Nyst's action must be perpetuated.

Natal shells are generally small (8 mm or less) and rather globose (breadth/length 0,44–0,53), with very low, non-reflexed lamellae (Fig. 98). However, narrow (breadth/length 0,37–0,43) and larger specimens (up to 16 mm) do occasionally occur in the same area (Fig. 100). In the western Cape, *E. kraussi* attains its maximum size and has higher, sometimes slightly recurved lamellae and traces of feeble spiral sculpture (Fig. 99); occasional individuals of this form extend as far east as Sandy Point. However, in Durban Bay a morph with similar axial sculpture occurs, so that a clear variation pattern is difficult to deduce.

*E. kraussi* is a common littoral species. It can be collected in crevices in rock pools, evidently associated with the sea anemone *Anthothoe stimpsoni* (Verrill), or (pers. comm. Mrs C. M. Connolly) a large black sand-dwelling anemone.

*Epitonium (Hyaloscala) oppositum* (de Boury, 1921)

Figs 101, 102, 167

*Scala (Sodaliscalia) opposita* de Boury, 1921:233, text fig. Type locality: Port Alfred.

*Scala opposita*; Turton, 1932:82.

*Epitonium oppositum*; Kilburn & Rippey, 1982:78; Kaicher, 1983:3591 (holotype).

*Scalardia burnupi* (de Boury M/S) Turton, 1932:82. Type locality: Port Alfred.

*Scalardia elongata* Turton, 1932:82, pl. 19, sp. 592 (*syn. n.*). Type locality: Port Alfred.

*Scalardia fragilis* (*non* Hanley, 1840); Sowerby, 1892:24; Turton, 1932:82.

Diagnosis: A *Hyaloscala* closely resembling *E. kraussi* but with 11–15 axial ribs per whorl.

Description: Shell narrowly pyramidal (breadth/length 0,35–0,45), of about 8½ convex teleoconch whorls, suture simple, umbilicus closed; aperture and peristome as in *E. kraussi*. Axial ribs thin, low, erect, rising slightly at suture, straight, slightly prosocline, 11–15 per whorl (usually 12 or 13). Intervals glossy and smooth, save for traces of faint spiral scratches. White.

Protoconch as in *E. kraussi*; maximum diameter 0,38 mm.

Dimensions: 12,0 × 4,7 mm (exceptionally large); 9,7 × 4,0 mm; 9,0 × 3,2 mm; 8,4 × 2,9 mm.

Operculum as in *E. kraussi*.

Radula (Fig. 167): no rachidians, lateral plates resembling those of *kraussi* but mostly bicuspidate, about 15 in a half-row.

Range: Eastern Cape Province to Zululand, littoral.

Locality data (all NM): EASTERN CAPE PROVINCE: Jeffreys Bay (A2024: R. K.); Algoa Bay (A2603: F. Graeve); Port Alfred (B6205, B6210: ex Albany



Mus.; 8786: R. K.); Chalumna River mouth (8826: R. K.); Hickmans River mouth, East London (B7118: R. K.). TRANSKEI: Kei River mouth (C3554: R. K.); Sandy Point (C3752: R. K.); Xora River mouth (B7210: R. K.); Lwandile/Mdumbi (C160: R. K., R. Fregona); Coffee Bay (B6963: W. Tyson); off Whale Rock, 20–26 m, sand, gorgonians (C5865: MN); Mgazi (B7207: Mrs P. Palmer); Msikaba (C5795: R. K.); Mbotyi (8830; R. K.; A1882: Mrs C. M. Connolly); Mzamba (B4609: R. K.). NATAL: Port Shepstone (numerous samples); Shelley Beach (A3750: R. K.); Sezela (A967, 2616, 2626: H. C. Burnup); Scottburgh (A971: H. C. Burnup); Umkomaas (A972: H. C. Burnup); Durban (A868: H. C. Burnup), off Durban Bluff, 20–22 m (C5865: R. K., R. Fregona); Tongaat (A879, A969: H. C. Burnup); Sheffield Beach, Umhlali district (A9766: R. K.). ZULULAND: Mapelane, Umfolosi River mouth (B6391: R. K.).

Type material: Holotype of *S. opposita* in MHNP, paratype (*vide* Turton) in OUM. Syntypes of *S. burnupi* and *S. elongata* in OUM.

Notes: NM material of this common epitoniid was identified by G. B. Sowerby (3rd) as *Scala fragilis* Hanley, 1940, by E. A. Smith as *S. candidissima* Monterosato, 1877, and by E. de Boury as '*Scala burnupi*' (M/S). The last name was validated by Turton 1932, but is clearly a synonym of *S. opposita* de Boury, 1921, the holotype of which was illustrated by Kaicher 1981. Material has also been compared with the set of *oppositum* in OUM, which includes the paratype mentioned by Turton, and with the material described by the latter as *burnupi* and *elongata*. *S. elongata* was based on narrow individuals; although said to lack 'transverse' striae, these are present in all three syntypes.

The identity of *Scalardia fragilis* Hanley, 1840, remains unresolved. De Boury (1913:80) regarded it and *S. albida* d'Orbigny, 1842, as synonyms of *S. eburnea* Potiez & Michaud, 1838. Clench & Turner (1951:260) rejected *eburnea* as a *nomen dubium* and used the name *Epitonium albidum*, with *Scalardia fragilis* Sowerby, 1844 (*non* Hanley, 1840) as a synonym. Four syntypes of *S. fragilis* are in the BM(NH) (1907.81.84: H. Harvey); of these one retains traces of a coronation, but the others closely resemble the tropical Atlantic *E. albidum*. *E. oppositum* has lower ribs than *E. albidum* and a shallower suture.

*E. (H.) candidissimum* (Monterosato, 1877) from the Mediterranean resembles *oppositum* in form and sculpture, and indeed no differences are discernible to me, other than the larger average size of *candidissima*. In view of their widely disjunct ranges, two species are at present recognised here.

#### Subgenus *Perlucidiscala* de Boury, 1912

*Perlucidiscala* de Boury in Jousseume, 1912:196. Type species (by virtual tautonymy) *P. perlucida* Jousseume, 1912.

Diagnosis: Closely resembling *Hyaloscala* but with an open umbilicus.

#### ***Epitonium (Perlucidiscala) alabiforme* sp. n.**

Figs 103–105

Diagnosis: Shell narrowly pyramidal, breadth/length about 0,46–0,48, suture deep, whorls inflated, with their periphery posterior, umbilicus narrow, aperture oblique;

axial ribs fairly low, rounded, not reflexed, 13–16 per whorl, compound behind lip; no spiral sculpture; white; length 4,2 mm.

Description: Shell narrowly pyramidal (breadth/length about 0,46–0,48), of 5 strongly convex teleoconch whorls, their periphery situated about  $\frac{1}{3}$  whorl below each suture; suture very deep but simple; umbilicus narrow, deep; aperture oblong-ovate, rather oblique, peristome moderately thick, except for labium, which is not reflexed; no auricle. Axial ribs fairly low, rather narrow, but varying much in width, with a wide compound rib behind labrum; rounded, not reflexed, slightly prosocline, straight, discontinuous, 15–16 ribs on 2nd whorl, decreasing to 13–14 on penultimate. Intervals between ribs smooth. White.

Protoconch damaged; basal diameter 0,38 mm.

Dimensions: 3,7 × 1,7 mm (holotype); 4,2 × 2,0 mm (paratype).

Range: Natal.

Type material: Holotype NM B7270/T2927 Durban Bay, shallow water dredgings. Paratopotype NM B7271/T2958. Both leg. B. J. Young.

Notes: The conspicuously swollen posterior part of each whorl and the deep suture distinguish *E. alabiforme* from *E.(P.) perlucidum* and *E.(P.) lachrymulum* (Jousseume, 1912) from the Red Sea.

Both type specimens have developed a dense terminal rib-complex, which in the holotype (Fig. 103) has fused into a single thick cord, which strengthens the labrum and partly constricts the aperture.

Etymology: Resembling certain members of the cerithiacean genus *Alaba* H. & A. Adams, 1853.

#### Subgenus *Nitidiscala* de Boury, 1909

*Nitidiscala* de Boury, 1909:257. Type species (o.d.) *Scalaria unifasciata* Sowerby, 1844.

Diagnosis: Shell small, narrow, suture simple, base imperforate; axial lamellae thick, low, often continuous, neither strongly prosocline nor coronated, intervals smooth and glossy (except sometimes for faint, scratch-like spiral microstriae).

Notes: *Nitidiscala* has been used by Keen (1971) and Dushane (1974) for almost any west American species with smooth intervals; whereas species such as *E. hexagonum* (Sowerby, 1844) and *E. colpoicum* Dall, 1917, do show the characteristic cord-like ribs of *Nitidiscala*, most of the others could be better accommodated in other subgenera. Species of *Laeviscala* in particular may closely resemble *Nitidiscala*, apart from their distinctive microsculpture.

#### Key to species of *Nitidiscala* in southern Africa and Mozambique

- Suture shallow; axial ribs with rounded crests, thinner, barely continuous, 8–10 per whorl ..... **eboreum**
- Suture deep, almost fenestrate; axial ribs with declivous crests, thick, continuous, 11–12 per whorl ..... **synekhes**

*Epitonium (Nitidiscala) eboreum* (E. A. Smith, 1906)

## Fig. 106

*Scala eborea* Smith, 1906:50, pl. 8, fig. 1; Barnard, 1963:101. Type locality: Port Shepstone (here restricted).

*Scalaria eborea*; Turton, 1932:82.

*Epitonium eboreum*; Kaicher, 1981:2369 (lectotype, here designated).

**Diagnosis:** A *Nitidiscala* with fairly shallow suture; breadth/length 0,40–0,45; axial ribs with rounded crests, more or less discontinuous, 8–10 per whorl; intervals with faint spiral scratches; white or pale yellow with white ribs; length 9 mm.

**Description:** Shell relatively thick, narrowly pyramidal (breadth/length 0,40–0,45), of about 7 moderately convex teleoconch whorls; suture simple, fairly shallow; base imperforate; aperture ovate, slightly angular posteriorly, peristome thick, except over paries, forming a very slight auricle, fasciole strong. Axial ribs low, moderately broad, reflexed, non-coronate, more or less discontinuous, moderately prosocline, slightly arcuate; 8–10 per whorl, crests rounded. Intervals smooth, except for irregular scratch-like spiral microstriae, highly polished. Colour yellowish-white to [very] pale orange-yellow with white ribs; sometimes uniform white.

Protoconch conical, about  $3\frac{1}{2}$  moderately convex whorls; basal diameter 0,35 mm.

Dimensions: 8,6 × 3,5 mm; 8,3 × 3,3 mm; 6,5 × 2,7 mm. Attains a length of 9 mm (Smith).

Operculum translucent light yellowish-brown, nucleus near columellar margin, about 0,3 length from anterior end.

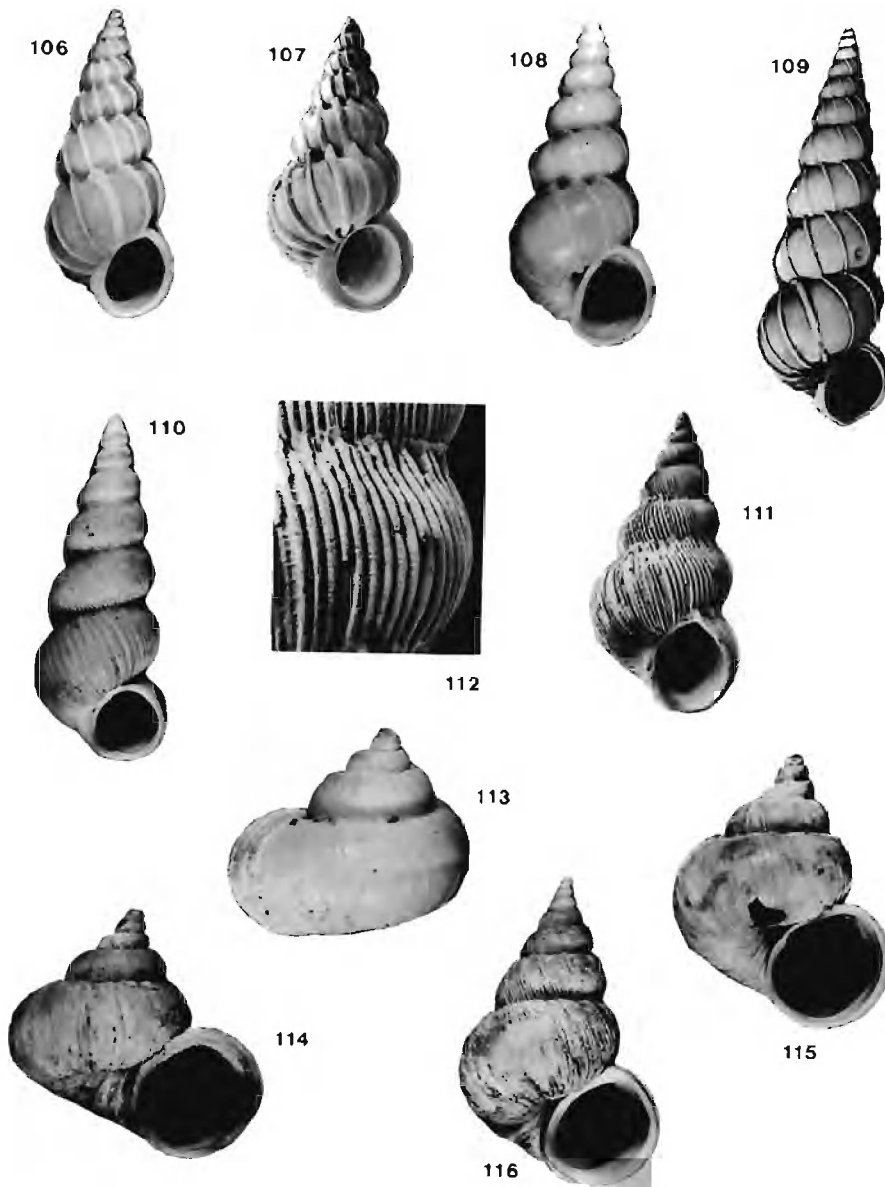
Range: Southern Zululand to eastern Cape, littoral.

Regional locality data: ZULULAND: Mapelane, Umfolosi River mouth (NM B7552: R. K.). NATAL: Tongaat (NM A947: H. C. Burnup); Durban (NM A943: H. C. Burnup), Durban Bay, shallow dredgings (NM B7211: B. J. Young), off Durban Bluff, 20–22 m (NM B7050: R. K., R. Fregona); Umbogintwini (NM A866: C. W. Alexander); Scottburgh (NM A948: H. C. Burnup); Kelso (NM A852, A946: H. C. Burnup); Sezela (NM A846: H. C. Burnup); Port Shepstone (NM A944, A945, A880: H. C. Burnup). TRANSKEI: Mzamba (NM A5032: J. P. Marais); Mbotyi (NM A1891: Mrs C. M. Connolly). EASTERN CAPE PROVINCE: Chalumna River mouth (NM 7089: R. K.); Port Alfred (Turton 1932).

Type material: Lectotype (here designated) BM(NH) 1906.6.23.27, Port Shepstone, figured Kaicher (1981:2369). Location of Durban syntype mentioned by Smith 1906 unknown.

Notes: A specimen from Mzamba beach-drift retains the dried body and operculum.

A junior secondary homonym is *Epitonium (Laniscala) eboreus* Lan, 1976 [= *eboreum*, emend. Lan, 1978, ICZN article 34b]; this is a synonym of *Scala (Discoscala) edgari* de Boury (1912:90, pl. 7, figs 2, 3), in the genus *Cirsotrema*.



Figs 106–116. *Epitonium* species, subgenera *Nitidiscala*, *Depressiscala* and *Librarisca*. 106, *E. (N.) eboreum* (E. A. Smith, 1906), NM A944, Port Shepstone, 6,4 × 2,6 mm. 107, *E. (N.) synekhes* sp. n., holotype, 3,7 × 1,8 mm. 108–109, *E. (D.) confusum* (E. A. Smith, 1890): 108, NM B6803, Durban, 8,1 × 3,5 mm; 109, NM H5489, Conducia Bay, Mozambique, 21,8 × 7,3 mm. 110–112, *E. (L.) parvonatrix* sp. n.: 110, Holotype, 9,0 × 3,5 mm; 111, Paratype, NM B7223, 4,5 × 2,2 mm; 112, enlargement of sculpture on penultimate whorl of 111, showing scuffed ribs. 113–115, *E. (L.) macromphalus* E. A. Smith, 1910: 113, Lectotype, NM 2485, 5,1 × 5,6 mm; 114, Mzamba, Transkei, 9,1 × 5,9 mm J. P. Marais colln. and 115, Durban, 7,0 × 5,6 mm, NM D145. 116, *E. (L.) millecostatum* (Pease, 1861), NM 952, Isipingo, Natal, 9,1 × 5,9 mm. Specimens in 106 and 109 coated with MgCl<sub>2</sub>. 107, 111 and 112 are SEM.

**Epitonium (Nitidiscala) synekhes** sp. n.

Fig. 107

Diagnosis: A *Nitidiscala* with deep suture, breadth/length 0,49; axial ribs continuous, crests declivous, 11–12 per whorl; white; length 3,7 mm.

Description: Shell relatively thick, narrowly pyramidal (breadth/length 0,49), of about 5 moderately convex teleoconch whorls, suture deep, almost fenestrate, base imperforate; aperture ovate, rounded posteriorly, peristome thick, duplex, feebly auriculate below, fasciole strong. Axial ribs low, broad, reflexed, with declivous crests (sloping towards growing face), continuous, rising high across suture, moderately prosocline, slightly arcuate, 12 on early whorls, 11 on last whorl. Intervals smooth, polished. White.

Protoconch as in *E. eboreum*.

Dimensions: 3,7 × 1,8 mm (holotype).

Range: Northern Mozambique, littoral.

Type material: Holotype NM J4211/T2928, Conducia Bay, northern Mozambique, 14°55'S, 40°41'E, beach-drift, K. Grosch.

Notes: Compared with *E. (N.) eboreum* in key given above. The markedly continuous ribs are somewhat suggestive also of the tropical subgenus *Connexiscala* de Boury, 1909. However, in the three known members of that group, *E. continens* (Melvill & Standen, 1903), *E. cultellicosta* (de Boury, 1913) and *E. connexum* (Sowerby, 1844), synonym *Scala virgo* Thiele, 1925, the axial ribs are more numerous, less prosocline and barely indented at the suture.

Etymology: *synekhes* = continuous (G.).

Subgenus *Depressiscala* de Boury, 1909

*Depressiscala* de Boury, 1909:258. Type species. (o.d.) *Scalaria aurita* Sowerby, 1844.

*Nipponoscala* Masahito & Habe, 1973:135. Type species (o.d.) *N. aureomaculata* Masahito & Habe, 1973.

Diagnosis: Shell medium-sized, acuminate with simple suture and open umbilicus (sometimes partially hidden by columella); peristome fairly thin; axial ribs low, not coronate, intervals smooth and glossy, sometimes with faint spiral sulci; often marked with brown.

Notes: *Depressiscala* was ranked as a full genus by Clench & Turner (1952), but does not differ in major respects from several other subgenera of *Epitonium*. It is particularly similar to *Glabriscala* de Boury, 1909 (type species (o.d.) *Scalaria glabrata* Hinds, 1843), which differs from *Depressiscala* only in its fenestrate umbilicus. *Nipponoscala* was separated from *Depressiscala* solely on colour and on the supposed absence of an umbilicus in the latter, yet the type species of *Depressiscala* in fact possesses an umbilicus, albeit partially hidden by the expanded columella.

*Epitonium (Depressiscala) confusum* (E. A. Smith, 1890)

Figs 108, 109

*Scalaria turricula* Sowerby, 1844 (*non* Cantraine, 1842), *partim*:92, pl. 33, fig. 61 (not pl. 34, fig. 88 = *Scalaria candeana* d'Orbigny, 1842); Sowerby, 1873:pl. 8, fig. 59. Type locality: Catanauan Island, Luzon, Philippines.

*Scalaria confusa* E. A. Smith, 1890:273 (*nom. subst.*)

*Epitonium confusum*; Kaicher, 1981:2299.

*Scala confusa*; Melvill & Standen, 1903:342.

? *Epitonium oahuense* Pilsbry, 1921:376, fig. 11d. Type locality: Oahu, Hawaii.

Diagnosis: A *Depressiscala* with low axial ribs, 9–11 per whorl, intervals with or without faint spiral sulci, umbilicus moderately wide; white suffused with brown; attains 22 mm.

Description: Shell attenuate, up to 11 convex teleoconch whorls, suture deep but simple, umbilicus moderately wide; aperture ovate, peristome fairly thin, columella rather straight, only slightly expanded over umbilicus, not auriculate basally. Axial ribs low, filiform, slightly reflexed, not continuous, 9–11 (usually 10) per whorl, intervals glossy and smooth or with very inconspicuous spiral grooves. White, suffused with brown when fresh.

Protoconch conical, of at least 3 gently convex whorls (apex broken), basal diameter 0,45 mm.

Dimensions: 21,8 × 7,3 mm; 7,8 × 3,5 mm.

Range: Philippines and Arabian Sea to Natal, also St Helena.

Regional locality data: NORTHERN MOZAMBIQUE: Nacala (NM J2888: K. Grosch); Conducia Bay (NM H5489: K. Grosch). NATAL: Durban Bay, shallow dredgings (NM B603: B. J. Young).

Type material: Holotype BM(NH), Catanauan, Luzon, 10 fathoms, sandy mud; dimensions 18,2 × 7 mm.

Notes: Local examples (Fig. 108) are faded and more or less damaged, but agree with the holotype save in being more solid and in having thicker ribs and more distinct spiral sculpture. All Durban shells so far seen are immature. The large Conducia Bay shell (Fig. 109) has even deeper spiral grooves than usual.

Sowerby (1844) included both West Indian and Philippine material under his *Scalaria turricula*. Smith (1890) distinguished the Philippine species as *S. confusa*, adding the localities North-Western Australia, Sandwich Islands [= Hawaii] and St Helena. Like Smith I cannot see any significant difference between Indo-Pacific and St Helena examples, although local material will probably prove distinct, when fresh adults are available.

Subgenus *Minutiscala* de Boury, 1909

*Minutiscala* de Boury, 1909:257. Type species (o.d.) *Scalaria nana* Jeffreys, 1884.

Diagnosis: Shell tiny, of few whorls, fragile, with numerous filiform axial ribs, spiral striae weak or absent; umbilicus narrowly open to closed, peristome thin.

Notes: The following species is referred here with great uncertainty.

*Epitonium (Minutiscala) blaisei* (Barnard, 1963)

*Scala blaisei* Barnard, 1963:102, fig. 18a. Type locality: off Cape St Blaize, 125 fathoms.  
*Epitonium blaisei*; Kaicher, 1981:3058 (holotype).

Diagnosis: Shell fragile, pyramidal, breadth/length about 0,57, protoconch mammillate, umbilicus a slight slit; suture deep but simple, peristome thin, without fasciole or auricle; axial ribs fine, filiform, 40–48 per whorl, forming slight angle below suture, no spiral sculpture; length 3,5 mm.

Description: Shell tiny, fragile, pyramidal (breadth/length approximately 0,57), with mammillate protoconch, teleoconch whorls about 3, strongly convex, suture deep but simple; umbilicus forming a very slight fissure; aperture ovate, peristome thin, without auricle or fasciole. Axial ribs thin, low, filiform, mostly about one-third width of their intervals, slightly arcuate, prosocline, about 40 on first whorl, increasing to about 48 (*vide* Barnard) on last; ribs form a slight angle below suture, giving whorls a slightly shouldered appearance; no spiral sculpture. Off-white.

Protoconch conical, of about 3½ weakly convex whorls, smooth, basal diameter about 0,30 mm.

Dimensions: 3,5 × 2 mm (Barnard).

Range: Agulhas Bank.

Type material: Holotype SAM A9025, dredged *P.F.*

Notes: The type figure was inaccurate and the unique holotype is now damaged, but has fortunately been illustrated in intact condition by Kaicher 1981.

Subgenus *Librariscala* sgen. n.

Type species: *Scalaria millecostata* Pease, 1861.

Diagnosis: Shell pyramidal to acuminate, with convex whorls, a simple suture and a thin peristome, umbilicus open or closed; sculptured by dense, tubular axial riblets and interstitial spiral threads.

Notes: Some members of this group resemble *Limiscala*, but have axial ribs whose crests are rolled over like scrolls (Fig. 112).

Etymology: From *libraria*, -ae, f. (L.), a library (collection of scrolls).

Key to southern African species of *Librariscala*

- |   |   |                      |
|---|---|----------------------|
| 1 | Umbilicus present; shell broadly pyramidal to globose-turbinata .....       | 2                    |
| — | Umbilicus absent; narrowly pyramidal to acuminate; breadth/length 0,39–0,53 |                      |
|   |   | <b>parvonatrix</b>   |
| 2 | Broadly pyramidal (breadth/length 0,61–0,69), umbilicus narrow .....        |                      |
|   |   | <b>millecostatum</b> |
| — | Globose-turbinata with low spire (breadth/length 0,79–1,29), umbilicus wide |                      |
|   |   | <b>macromphalus</b>  |

*Epitonium (Librariscala) macromphalus* (E. A. Smith, 1910)

Figs 113–115

*Epitonium macromphalus* Smith, 1910:203, pl. 7, figs 14,14a; Kaicher, 1981:2325 (syntype). Type locality: Tongaat, Natal.

*Scala macromphalus*; Barnard, 1963:102.

Diagnosis: Shell broadly turbate (breadth/length 0,79–1,29) with low spire, somewhat circular, projecting aperture, thin peristome and wide umbilicus; axial ribs forming tube-like threads, approximately 65–75 per whorl, interstices sometimes with very faint spiral striae; white; fragile; width about 8 mm.

Description: Shell broadly turbate, usually wider than long (breadth/length 0,79–1,29), with conical spire, papilliform apex and projecting labrum; teleoconch whorls numbering 6–7, very convex with median periphery; sutures deep but simple, umbilicus relatively wide and deep; aperture circular to somewhat ovate with a thin peristome, columella not reflexed or expanded. Axial ribs low, thin and very numerous (an estimated 65–75 on body whorl), irregularly spaced, prosocline, slightly sinuous, crests completely reflexed but generally worn away except behind labrum, inside umbilicus and at suture; interstices sometimes with very faint spiral microstriae. Dull white.

Protoconch broken, maximum diameter 0,38 mm.

Dimensions: 5,9 × 6,0 mm; 6,3 × 8,1 mm; attains a breadth of at least 8,5 mm.

Operculum shaped as in *E. fasciatum*, translucent light orange.

Range: Natal to eastern Transkei.

Locality data: NATAL: Sheffield Beach, Umhlali district (NM A9767: R. K.); Tongaat (type locality); Reunion Rocks, Durban (NM D145: J. P. Marais); Isipingo (NM 3043: C. W. Alexander); Mtwalume (J. P. Marais colln.). TRANSKEI: Mzamba (J. P. Marais colln.).

Type material: Lectotype (Fig. 113) NM 2485/T502, Tongaat, leg. H. C. Burnup, 5,1 × 5,6 mm; large fragment missing from adapertural side of body whorl. Paralectotype 1, NM B7060/T2792, juvenile, 3,7 × 3,4 mm, with operculum. Paralectotype 2, BM(NH) 191.8.30.8; fig. Kaicher (1981).

Notes: *E. macromphalus* is a rare and fragile species, seldom seen in undamaged state.

### *Epitonium (Librarisca) millecostatum* (Pease, 1861)

Fig. 116

*Scalaria millecostata* Pease, 1861:40. Type locality: Sandwich Islands [= Hawaii].

*Scala millecostata*; E. A. Smith, 1901:109, pl. 1, fig. 5.

*Epitonium millecostatum*; Robertson, 1981:3 (references), figs 1 (habitat), 2 (shell), 3 (radula), 4 (faecal contents), 5 (egg capsule), 6 (veliger), 7 (map); Kaicher, 1981:2342 (holotype).

? *Limiscalia dautzenbergi* Jousseume, 1912:226, pl. 5, figs 6–7. Type locality: Aden and Perim Island.

Diagnosis: Shell broadly conical (breadth/length 0,61–0,69) with narrow umbilicus, evenly convex whorls and very dense and numerous axial ribs, 60–100 on later whorls, strongly prosocline, their crests completely reflexed to form tubes, interstices with inconspicuous spiral microlirae (often obsolete on adult whorls); dull white; maximum length 9,1 mm.

Range: Hawaii and Red Sea to eastern Transkei.

Regional locality data: SOUTHERN MOZAMBIQUE: Benguera Island, Bazaruto Archipelago (NM G3662: Mrs N. Cumming). NATAL: Isipingo (NM 952: H. C. Burnup, rec. Smith 1910). TRANSKEI: Mbotyi (in Mrs M. Quickelberge colln.).



Notes: Robertson (1980) has described the morphology, ecology and reproduction of this species, showing it to be an obligate symbiont of the zoanthid *Palythoa*.

Kaicher (1981:3095) has published a good photograph of the holotype of *Limiscala dautzenbergi*, which appears to be a broad example of *Epitonium millecostatum*.

***Epitonium (Librariscala) parvonatrix* sp. n.**

Figs 110–112

Diagnosis: Shell narrowly pyramidal to acuminate in shape, breadth/length 0,39–0,53, with strongly convex whorls, impressed below suture, umbilicus closed or rimate; axial ribs very dense, inrolled to form tubes, finer on spire than on later whorls, 32–60 (rarely as few as 18) per whorl; spiral threads distinct, 25–28 on penultimate whorl; white; length 9,0 mm.

Description: Shell narrowly pyramidal to acuminate (breadth/length 0,39–0,53), of about 8 teleoconch whorls; whorls strongly convex, with median periphery, slightly to strongly impressed below suture; suture shallow, simple; umbilicus closed or forming a hairline groove; aperture ovate, peristome fairly thin, duplex, slightly auriculate basally, with a distinct, sometimes strong, fasciole; paries usually separated from body whorl by a slight groove. Axial ribs low and filiform, with almost completely reflexed or inrolled crests, more or less fusing below suture and on base, strongly prosocline, very slightly arcuate, varying in width (subequal to or several times width of intervals); ribs relatively fine on spire (about 37–60 per whorl), becoming thicker and more widely spaced on last whorl, where they number about 32–41 (rarely as few as 18). Intervals between ribs with low, fine spiral threads, 25–28 on penultimate whorl, extending onto base of body whorl. White.

Protoconch somewhat cyrtoconic, about 3½ slightly convex whorls; basal diameter 0,35 mm.

Dimensions: 9,0 × 3,5 mm (holotype); 6,0 × 2,5 mm, 4,5 × 2,2 mm (paratypes).

Range: Natal to Transkei littoral.

Type material: Holotype NM C3753/T2916, Sandy Point, Western Transkei (32°34'S, 28°33'E), beach-drift, R. K. Paratype 1, 2 km N of Port Edward, Natal, NM B7750/T2917, J. P. Marais; paratypes 2–6 in J. P. Marais colln, same data. Paratypes 7, 8, off Durban Bluff, 20–22 m, R. K., R. Fregona, NM B7223/T2918, NM B7054/T2924.

Notes: *E. parvonatrix* varies greatly in shell-proportions, those from more northern localities (Fig. 111) being shorter and more squat than from further south (Fig. 110). The former show some resemblance to the shell figured by Maes (1967:pl. 8, fig. B) as '*Epitonium* cf. *E. symmetrica* Pease', but have finer and denser axial riblets. *Scalaria symmetrica* Pease, 1867, from Tahiti, has 16 thick, continuous ribs per whorl. Slender adults are comparable to four taxa, *Scalaria (Cirsotrema) dentiscalpium* Watson, 1883, *Scala angulicincta* de Boury, 1913, *Scala sericifila* Dall, 1889, and *Scala (Acrilla ?) cophinodes* Melvill, 1904. *S. dentiscalpium* from the Torres Straits is twice as large, with somewhat less dense axial ribs

and stronger spiral sculpture. *S. angulicincta* has an angular periphery; the given type locality of Philippines may be erroneous, as *angulicincta* appears remarkably similar to *S. sericifila* from Honduras. Finally, *S. cophinodes* from the Gulf of Oman has more numerous, less convex whorls for the same size. (Incidentally, Barnard's figure (1963: fig. 18d) of the Agulhas Bank shell recorded by him as *Acrilla* cf. *cophinodes* bears no resemblance to *E. parvonatrix*).

Etymology: *parvus* (little) + *natrix* (a water snake), L.

#### Subgenus *Papyriscala* de Boury, 1909

*Papyriscala* de Boury, 1909:258. Type species (o.d.): *Scalaria latifasciata* Sowerby, 1874.

Diagnosis: Shell moderately small, fragile, usually broadly pyramidal, whorls strongly convex, suture moderately deep, simple to narrowly fenestrate, umbilicus open, narrow; peristome thin, simple, not auriculate; axial ribs numerous, thin, low, non-coronate at shoulder; spiral sculpture absent or forming a few faint scratches; usually brown or with brown spiral bands.

Notes: A syntype of the type species *Scalaria latifasciata* Sowerby (1874:pl. 15, sp. 117a, b) from Mauritius has been examined (BM(NH) 1891.7.28.1); it is here designated as lectotype (Fig. 117). This specimen measures 21,6 × 13,6 mm, with 5½ teleoconch whorls remaining; there are 23 thin, rather low but lamellate ribs per whorl, their crests slightly reflexed; intervals are smooth except in places for groups of faint scratch-like microstriae; suture narrowly fenestrate on later (? female) whorls; body whorl with 3 bands of light to greyish-brown (ISCC-NBS system), the median one twice the width of the others. Apart from its much larger size *latifasciata* appears remarkably similar to the earlier *Scalaria trifasciata* Sowerby, 1844 (= *Scalaria clementina* Grateloup, 1840, non *Melanopsis clementina* Michelin, 1833, *vide* Nyst).

#### Key to subgenus *Papyriscala* in southern Africa and Mozambique

With brown spiral bands; axial ribs 12–22 per whorl . . . . . **robillardi**  
 Uniformly dark (unless faded), with white ribs; ribs 21–36 . . . . . **emiliae**

#### *Epitonium (Papyriscala) robillardi* (Sowerby, 1894)

Figs 118, 119

*Scalaria robillardi* Sowerby, 1894a:42, pl. 4, fig. 5. Type locality: Mauritius.

*Scala robillardi*; E. A. Smith, 1903:385; Thiele, 1925:103 (137); Barnard, 1963:100.

*Papyriscala robillardi*; Jousseau, 1912:211, pl. 5, figs 3–5.

*Epitonium robillardi*; Kaicher, 1981:3037; (syntype).

Diagnosis: A *Papyriscala* with simple suture and narrow umbilicus; breadth/length 0,46–0,60; axial ribs 12–22; with 3 brown spiral bands (2 visible on spire), rarely absent; length 10 mm.

Description: Shell relatively broad but variable (breadth/length 0,46–0,60), spire often almost twice length of aperture (aperture/total length 0,29–0,37); suture deep but simple, whorls very convex with their periphery above midline; umbilicus open, narrow; aperture ovate, peristome thin, columella only slightly reflexed over

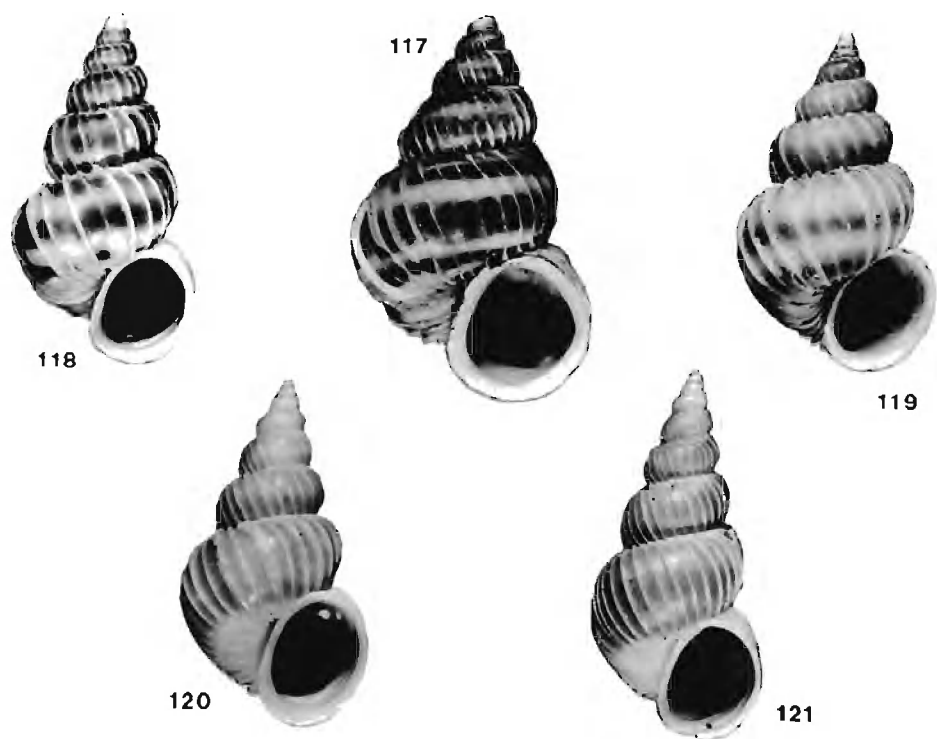
umbilicus. Axial ribs thin, low, weakly reflexed, straight, prosocline, discontinuous, 16–19 on third teleoconch whorl, increasing to 16–22 on last (7th) whorl (rarely as few as 12); intervals smooth. Ground colour light brown to yellowish-white, with 3 spiral bands of brownish-orange or moderate brown (2 of which show on spire whorls); ribs and base of body whorl pale to white; rarely uniform brown with white ribs, or uniform white.

Protoconch conical, of 3 convex whorls, basal diameter 0,38 mm.

Dimensions: 8,6 × 4,8 mm; 10,0 × 5,1 mm. Attains a length of 15 mm in Red Sea (Jousseume).

Range: Red Sea and India to Natal.

Regional locality data: NORTHERN MOZAMBIQUE: Nacala (NM J7172: Mrs H. Boswell); Mozambique Is. (NM G3745: R. K.). CENTRAL MOZAMBIQUE: Beira (Barnard, 1963). SOUTHERN MOZAMBIQUE: Benguera Is., Bazaruto Archipelago (NM J4636, G4060: R. K., Mrs E. Roscoe). NATAL: Durban Bay (NM 2104, 3139: H. C. Burnup, det. de Boury as '*Scala gaziensis* Preston' [M/S]; NM 7087: R. K.; A9891: B. J. Young).



Figs 117–121. *Epitonium* species, subgenus *Papyriscala*. 117, *E.(P.) latifasciatum* (Sowerby, 1874), holotype, BM(NH) 1891.7.28.1, 21,6 × 13,6 mm. 118–119, *E.(P.) robillardii* (Sowerby, 1894): 118, NM J4636, Benguera Island, Mozambique, 8,6 × 4,5 mm; 119, NM 7087, Durban Bay, 6,9 × 4,0 mm. 120–121, *E.(P.) emiliae* (Melvill & Standen, 1903), NM 7085, Durban Bay, 6,6 × 3,6 mm and 7,7 × 3,7 mm respectively.

Notes: Although commonly washed up in particularly sheltered bay habitats in Natal and Mozambique, *E. robillardi* does not appear to have been taken alive. An occasional rib in most individuals is thicker and more strongly reflexed than normal. In several shells from Durban Bay (NM 7087) such ribs occur throughout, and number as few as 12 per whorl. Such specimens may prove specifically separable.

*Epitonium (Papyriscala) emiliae* (Melvill & Standen, 1903)

Figs 120, 121

*Scala emiliae* Melvill & Standen, 1903:343, pl. 7, fig. 6. Type locality: Karachi, Pakistan, 3 fathoms.

*Epitonium emiliae*; Kaicher, 1981:2313 (holotype).

? *Scala algoensis* Thiele, 1925:105 (139), pl. 23, fig. 14. Type locality: Algoa Bay (depth unrecorded).

Diagnosis: Shell as in *robillardi*, but axial ribs finer (21–36 on body whorl, and more oblique; reddish- or yellowish-brown with white ribs and base; length 10,7 mm).

Description: Shell closely resembling *E. robillardi*, but axial ribs finer, 21–36 on body whorl (1–3 fewer on 3rd whorl), more oblique, sometimes with an occasional thicker rib, intervals almost smooth, with traces of a few spiral scratch-like striae when fresh. Uniform light greyish-reddish-brown to light brown (fading to light yellowish-brown) with white ribs and base of body whorl pale, rarely uniform yellowish-white. Protoconch as in *robillardi* but slightly smaller (diameter 0,43 mm).

Dimensions: 10,7 × 5,3 mm; 9,3 × 4,3 mm; 8,4 × 4,8 mm.

Range: Gulf of Arabia to Algoa Bay.

Regional locality data: SOUTHERN MOZAMBIQUE: Benguera Island, Bazarruto Archipelago, *Thalassodendron* bed in channel, about 12 m (NM G4482: R. K.). NATAL: Durban Bay (NM G2559: B. J. Young; 7085: R. K.). EASTERN CAPE PROVINCE: Port Elizabeth harbour dredgings (NM A5648, A8603: F. Graeve).

Notes: The holotype of *Scala emiliae* was a faded specimen (figured by Kaicher 1983); a topotype (NM H5929: W. Falcon) is pale brown. A similar species is *Papyriscala vallata* Jousseume (1912:212, pl. 6, figs 37–39) from the Red Sea; this is much smaller (less than 6 mm) with slightly fewer (17–20) and stronger ribs. Comparison between *Scala emiliae* and *Scalaria tenuilirata* Sowerby (1874: pl. 15, sp. 118) from Japan, would be desirable, but the holotype of the latter is not in the BM(NH) (*pers. comm.* Ms K. Way) and is presumably lost. Japanese writers identify with *tenuilirata* the subsequently described *Papyriscala castanea* Habe (1961:33, pl. 14, fig. 22), although this appears to be twice the size of Sowerby's figure and of *emiliae* (the axial ribs are also slightly more reflexed than in the last).

*Scala algoensis* was based on a broken shell from an unrecorded depth in Algoa Bay. Species associated with it indicate the station to have been a shallow one, inviting comparison between *algoensis* and specimens of *emiliae* from inshore dredgings at that locality. The only apparent point of conflict is Thiele's reference to the umbilicus as 'überdeckt'; however, if the lip is broken back in the present material the umbilicus is indeed hidden in face view by the columella callus.

Subgenus *Limiscala* de Boury, 1909

*Limiscala* de Boury, 1909:258. Type species (o.d.) *Scalaria lyra* Sowerby, 1844.  
*Limiscala* Dollfus, 1913:250 (*nom. null.*).

Diagnosis: Shell as in *Papyriscala* but with well-developed spiral threads.

Notes: *Limiscala* is here used in a very broad sense. With the exception of *E. lyra* the remaining species here referred could also be grouped under *Sodaliscala*, save that the umbilicus is open, not fenestrate.

Key to subgenus *Limiscala* in southern Africa and Mozambique

- |   |  |                       |
|---|--|-----------------------|
| 1 | Shell broad (breadth/length 0,58–0,67); axial ribs dense and numerous (27–45 per whorl); with spiral brown bands . . . . . | <b>lyra</b>           |
| — | Shell narrower (breadth/length 0,42–0,53); axial ribs fewer (12–19 per whorl); without brown bands . . . . .               | 2                     |
| 2 | Axial ribs forming inconspicuous coronations within suture . . .   | <b>crypticocorona</b> |
| — | Axial ribs not coronate . . . . .  | 3                     |
| 3 | Suture simple, breadth/length 0,42; aperture oblong-ovate . . . . .  | <b>antisoa</b>        |
| — | Suture narrowly fenestrate; breadth/length 0,50–0,53 . . . . .   | 4                     |
| 4 | Relatively large (protoconch diameter 0,5 mm, adult length about 10 mm, with 6½ teleoconch whorls) . . . . .               | <b>maraisi</b>        |
| — | Relatively small (protoconch diameter 0,4 mm, adult length about 4 mm with 5½ whorls) . . . . .                            | <b>psomion</b>        |

*Epitonium (Limiscala) lyra* (Sowerby, 1844)

Figs 122, 123

*Scalaria lyra* Sowerby, 1844a:89, pl. 32, figs 38, 39, pl. 34, figs 81, 82; *idem*, 1844b:13; *idem*, 1873:pl. 4, sp. 23. Type locality: Masbate Is, Philippines.  
*Epitonium (Limiscalia) lyra* [sic]; Cernohorsky, 1972:196, pl. 56, fig. 7.

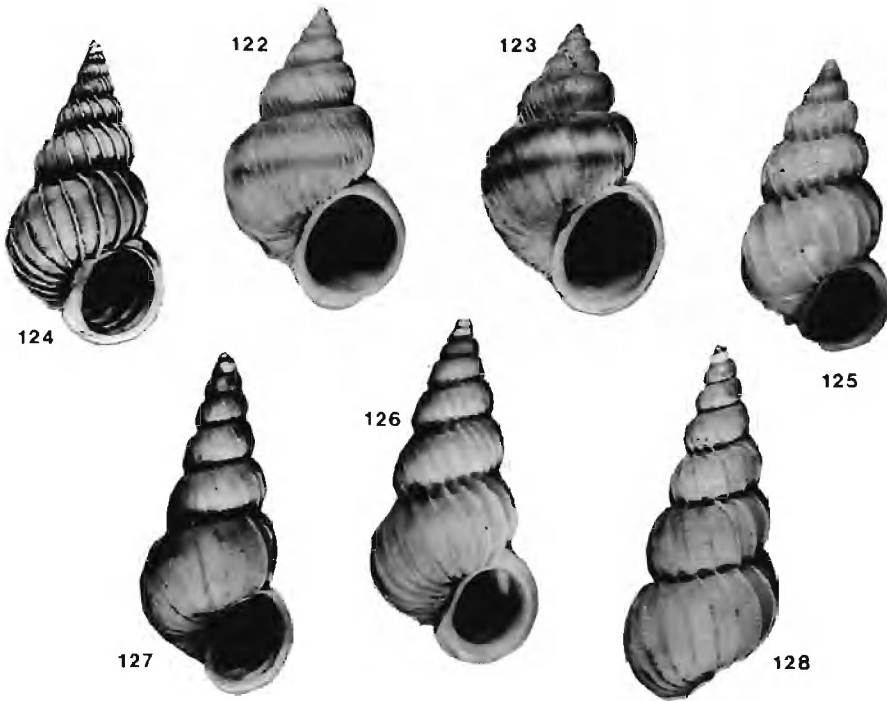
Diagnosis: Shell broadly pyramidal (breadth/length 0,58–0,67); umbilicus narrow; axial ribs low, dense, 27–45 per whorl, spiral threads fine and dense; white with two pale brown spiral bands; length 14 mm or more.

Description: Shell broadly pyramidal, breadth/length 0,58–0,67, with relatively low spire, deep suture and strongly convex whorls with their periphery above median; umbilicus open, narrow; aperture oblong-ovate, peristome thin, simple, labium narrowly reflexed over umbilical opening. Axial ribs thin, low, erect with reflexed crests, arcuate, prosocline, 27–32 on 3rd teleoconch whorl, increasing to 37–45 on last (6th) whorl. Intervals with fine, close spiral threads, irregular in strength. Dull white with 2 light brown, equidistant spiral bands, both visible on spire, but only developing on about 5th teleoconch whorl; occasionally only faintly banded, sometimes light brown with two diffuse, moderate brown bands and a white base.

Dimensions: 14,5 × 8,6 mm; 11,7 × 7,9 mm; exceeds 20 mm in length in Mauritius and elsewhere.

Range: Japan and Red Sea to Mozambique.

Regional locality data: NORTHERN MOZAMBIQUE: Pemba (formerly Porto Amelia) (NM J8583: Mrs T. e Sousa); Mozambique Is (NM G3720: R. K.).



Figs 122–128. *Epitonium* species, subgenus *Limiscalia*. 122–123, *E.(L.) lyra* (Sowerby, 1844): 122, Lectotype, BM(NH) 1979162, 21,2 × 13 mm; 123, NM J5476, Benguera Is., 14,5 × 9,1 mm. 124, *E.(L.) maraisi* sp. n., holotype, 9,9 × 4,9 mm. 125, *E.(L.) psomion* sp. n., holotype, 3,6 × 1,9 mm. 126, *E.(L.) crypticocorona* sp. n., holotype, 6,8 × 3,2 mm. 127–128, *E.(L.) antisoa* (Tredale, 1936): 127, NM C1071, off Port St Johns, 30–50 m, 10 × 4,2 mm; 128, NM C1113, off Port St Johns, 38–40 m, 19 × 7,5 mm. Specimen in Fig. 124 coated with MgCl<sub>2</sub>.

SOUTHERN MOZAMBIQUE: Benguera Is, Bazaruto Archipelago (NM G4092, J5475, G4665, G2131, J5476: Mrs E. Roscoe; J4638: R. K.).

Type material: Three syntypes (BM(NH) 1979162), from Isle of Masbate, Philippines, on the reefs; the only undamaged shell (fig. 122), measuring 21,2 × 13,0 mm, is here designated lectotype.

Notes: Variation in shell proportions was illustrated by Sowerby (1844a); the syntypes show distinct spiral sculpture, which Sowerby (under *Scalaria dubia*) implied was absent in *lyra*. Mozambique examples agree with the syntypes and with NM shells from various parts of the Indo-West Pacific. Although not recorded from the Red Sea by Jousseume (1912), two specimens from Eilat are in the NM collection (G6002: D. Peled). The globose shape, rather chalky surface, interstitial spirals, fine ribs, and strong spiral bands are diagnostic. No examples with protoconch or soft parts are available.

***Epitonium (Limiscalia) crypticocorona* sp. n.**

Figs 79, 126

Diagnosis: Shell pyramidal (breadth/length 0,47), suture narrowly fenestrate; umbilicus open, narrow; peristome thick, basally auriculate; axial ribs fairly thick,

reflexed, 12–19 per whorl, with a weak coronation inside suture; intervals with thin, low spiral lirae, about 20 per whorl, weak on base; white; length about 7 mm.

Description: Shell pyramidal (breadth/length 0,47) of  $5\frac{1}{2}$  moderately convex teleoconch whorls, separated by a deep, narrowly fenestrate suture; umbilicus open but narrow; aperture oval, peristome thick, labrum strongly expanded below suture and forming an auricle at base; no fasciole. Axial ribs moderately thick, crests strongly reflexed, more or less continuous, 17–19 per whorl, decreasing to 12–15 on last, with a blunt, slightly recurved coronation situated level with suture, often fused to corresponding rib on previous whorl. Intervals between lamellae with thin, low, tabulate spiral lirae, subequal to their interspaces, about 20 on penultimate whorl, finest below suture, weak on base. White.

Protoconch conical with a sharp apex,  $4\frac{1}{2}$  slightly convex whorls, basal diameter 0,45 mm.

Dimensions: 6,8 × 3,2 mm (holotype); 5,5 × 2,6 mm (paratype).

Range: outer continental shelf of Natal and Transkei.

Type material: Holotype NM C5867/T2933, off Mgazi River, Transkei (31°44,7'S, 29°33,7'E), 180 m, soft mud. Paratype 1, off Park Rynie, Natal, 130 m, living (NM B7117/T2956); paratypes 2, 3, off Mbashe River, Transkei, 200–220 m, sponge-rubble, broken and juvenile shells (NM C5871/T2957). All dredged MN.

Notes: The teleoconch whorls of the holotype are more loosely coiled than in paratype 1, and the ribs are thinner and the umbilicus wider. These differences may be ascribed perhaps to the mud habitat of the holotype, paratype 1 having been dredged on a clean substratum.

Etymology: *crypticus* (secret) + *corona* (a crown), L.

### **Epitonium (Limiscala) maraisi sp. n.**

Fig. 124

Diagnosis: Shell pyramidal (breadth/length about 0,50), suture narrowly fenestrate; umbilicus open, fairly wide; no fasciole; axial ribs non-coronate, low, thin, erect, 14–16 per whorl; spiral lirae rather wide-set and irregular, weak on base and below suture; white; exceeds 10 mm; protoconch with maximum diameter 0,50 mm.

Description: Shell pyramidal (breadth/length about 0,50) of about  $6\frac{1}{2}$  convex teleoconch whorls; suture narrowly fenestrate; umbilicus open, moderately wide; aperture ovate, peristome moderately thin with a slight auricle, no fasciole, labium moderately expanded over umbilical opening. Axial ribs non-coronate, low, thin, erect, slightly arcuate, prosocline, discontinuous, rising slightly below suture where they form a feeble angle, 14–16 per whorl. Spiral sculpture of approximately 11 lirae on 3rd whorl, feeble below suture; on later whorls lirae more wide-set and irregular, with occasional finer intermediaries; weak on base of last whorl. White.

Protoconch conical (tip damaged), of at least 3 moderately convex whorls; basal diameter 0,50 mm.

Dimensions: 9,9 × 4,9 mm (holotype); exceeds 10,2 mm (apex missing).

Range: Transkei littoral.

Type material: Holotype NM B7746/T2929, Mzamba (30°51'S, 29°46'E), beach-drift, J. P. Marais. Paratype 1, Coffee Bay, in J. P. Marais colln.; paratype 2, Banyana River area, east of Mbashe River (NM B1263/T3004: R. K.); paratype 3, Sandy Point (NM C3754/T3005: R. K.).

Notes: This rare species is known only from slightly damaged shells picked out of beach-drift. It resembles *E. (S.) antisoa* in its relatively wide umbilicus, but is larger and broader, and has a fenestrate suture. *Papyriscala margarita* Jousseume, 1912, from Aden, is also similar but has only faint spiral striae.

Etymology: named after Mr J. P. Marais, collector of the holotype of this and several other new Epitoniidae.

**Epitonium (*Limiscala*) *psomion* sp. n.**

Fig. 125

Diagnosis: Shell as in *E. maraisi* but small (3,6 mm for 5½ teleoconch whorls) and protoconch with maximum diameter of only 0,40 mm.

Description: Shell pyramidal (breadth/length 0,50–0,53), of about 5½ convex teleoconch whorls; suture narrowly fenestrate; umbilicus open, narrow to moderately so, partly hidden by columella; aperture ovate, peristome moderately thin, without auricle or fasciole. Axial ribs not coronate, thin, low, erect, slightly arcuate, prosocline, rising slightly at suture, 16 per whorl; spiral lirae well spaced, about 10 per whorl, obsolete below suture and on base of last whorl. White.

Protoconch conical, of 3½ moderately convex whorls, bearing minute axial and spiral threads with pricked interstices (SEM); basal diameter 0,40 mm.

Dimensions: 3,6 × 1,9 mm (holotype).

Range: Littoral of eastern Transkei and Natal south coast.

Type material: Holotype, NM B7748/T2934, Mzamba, Transkei (30°51'S, 29°46'E), beach-drift, J. P. Marais. Paratype 1, Shelley Beach, S. of Port Shepstone, in J. P. Marais colln.

Notes: *E. psomion* resembles *E. maraisi* in miniature, with a proportionally smaller protoconch. It also resembles *E. (Parviscala) townsendi* (Melvill & Standen, 1903) but lacks a coronation and has a distinct umbilicus.

Etymology: *psomion* = a tiny morsel (G.).

*Epitonium (Limiscala) antisoa* (Iredale, 1936)

Figs 127, 128

*Folaceiscala antisoa* Iredale, 1936:300, pl. 22, fig. 16. Type locality: Sydney Harbour, New South Wales. *Epitonium antisoa*; Kaicher, 1981:3055 (holotype).

Diagnosis: Shell narrowly pyramidal (breadth/length 0,40–0,42), suture simple; umbilicus open, fairly wide; peristome thin, no auricle or fasciole; axial ribs very low and thin, not reflexed, 15–18 per whorl, not coronate; spiral lirae thin, low, 11–15 per whorl, obsolete on base; white; length 19 mm.



Description (local shells): Shell narrowly pyramidal (breadth/length 0,42), of 7 strongly rounded teleoconch whorls, suture deep but simple, umbilicus open, moderately wide; aperture oblong-ovate, peristome thin, no auricle or fasciole, labium barely reflexed. Axial ribs very low, thin, erect, straight, prosocline, discontinuous, slightly higher below suture where they form a weak angle; 15 lamellae on 3rd whorl, 15–18 on last. Intervals between lamellae with thin, low, somewhat tabulate spiral lirae, narrower than their interstices, 12–15 per whorl, obsolete below suture and on base of last whorl. White.

Protoconch missing.

Dimensions: 10 × 4,2 mm (NM C1113); 19 × 7,5 mm (holotype).

Range: Transkei continental shelf to New South Wales.

Regional locality data: TRANSKEI: off Port St Johns, 30–50 m (NM C1071), mud, worm-tubes, organic debris; off Port St Johns, 38–40 m, substrate as above (NM C1113). Both dredged *MN*.

Notes: The holotype of *Folaceiscala antisoa* (AMS C60654) agrees in all respects with local shells save in being twice as large. However, future studies may well demonstrate two species to be separable.

#### Subgenus *Sodaliscala* de Boury, 1909

*Sodaliscala* de Boury, 1909:257. Type species (o.d.) *Scalaria multistriata* Say, 1909.

*Firmiscala* de Boury, 1909:257 (*syn. n.*) Type species (o.d.) *Scalaria multicosmata* Sowerby, 1844.

*Avalitiscala* de Boury in Jousseume, 1912:221 (*syn. n.*) Type species (s.d. Wenz 1940) *A. avalites* Jousseume, 1912.

Diagnosis: As in *Parviscala*, but shoulder not coronate; suture usually simple, sometimes narrowly fenestrate; umbilicus closed or narrowly fenestrate.

Notes: The present taxon is a convenient means of grouping non-coronate species of *Parviscala*. *Sodaliscala* is in most respects somewhat intermediate between *Parviscala* and *Papyriscala*.

#### Key to the subgenus *Sodaliscala* in southern Africa and Mozambique

Body whorl more than half total length, breadth/length 0,63; small (2,7 mm); ribs erect and lamelliform ..... **illovoense**  
 Body whorl less than half total length; breadth/length 0,39–0,45; attains 11 mm; ribs thick and recurved ..... **multicosmatum**

#### *Epitonium (Sodaliscala) illovoense* (Barnard, 1963)

##### Fig. 132

*Scala illovoensis* Barnard, 1963:101, fig. 18b. Type locality: off Illovo River, 27–30 fathoms.  
*Epitonium illovoensis* [sic]; Kaicher, 1981:3033 (holotype).

Diagnosis: Shell broadly pyramidal (breadth/length 0,63), suture simple, umbilicus closed; peristome thin; axial ribs thin, erect, not reflexed or coronated, 11 per whorl; spiral lirae well developed, about 12 on penultimate whorl; white; length 2,7 mm (juvenile).

Description: Shell broadly pyramidal (breadth/length 0,63), of just over 3 strongly rounded teleoconch whorls, separated by deep but simple sutures; umbilicus closed; aperture ovate, peristome fairly thin; fasciole weak, no auricle. Axial ribs thin, erect, not reflexed, slightly prosocline, not coronated, slightly arcuate, 11 per whorl; spiral lirae close-set, fairly strong, about 12 on penultimate whorl. White.

Protoconch orthoconic, of 4 whorls, basal diameter 0,45 mm.

Dimensions:  $2,7 \times 1,7$  mm.

Range: Continental shelf of Natal.

Type material: Holotype (Fig. 132) SAM A9023, dredged *P.F.*

Notes: Known only from the juvenile holotype, which is not in fresh condition. Superficially resembles *E. townsendi* (Melvill & Standen, 1903) but lacks both coronations and umbilicus and has a simple suture.

*Epitonium (Sodaliscala) multicostratum* (Sowerby, 1844)

Figs 129–131

*Scalaria multicostrata* Sowerby, 1844a: pl. 34, fig. 96; *idem*, 1844b:28; de Boury, 1913:92. Type locality: Corregidor, Philippines.

*Epitonium multicostratum*; Kaicher, 1981:2338.

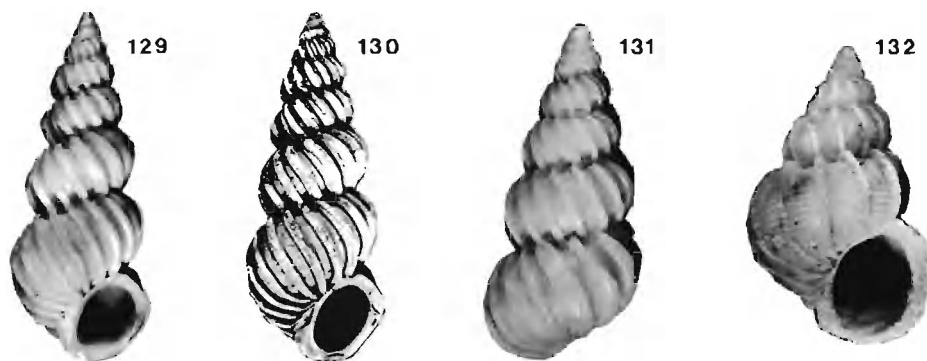
*Scala durbanensis* E. A. Smith, 1906:49, pl. 7, fig. 17. Type locality: 'Durban' [here corrected to Sezela, Natal].

Non: *Epitonium durbanense*; Bartsch, 1915:63.

*Scala durbanensis*; Turton, 1932:81.

Diagnosis: Shell narrowly pyramidal (breadth/length 0,39–0,45), suture simple with an occasional tiny fenestration, umbilicus almost closed; peristome thick, duplex, slightly auriculate, fasciole strong; axial ribs thick, strongly reflexed, 11–15 per whorl; spiral striae fine and numerous; white; length about 11 mm.

Description: Shell narrowly pyramidal (breadth/length 0,39–0,45), of about 7 convex teleoconch whorls; suture deep, more or less simple, with an occasional chink-like fenestration; umbilicus almost closed (slightly fenestrated); aperture



Figs 129–132. *Epitonium* species, subgenus *Sodaliscala*. 129–131, *E. (S.) multicostratum* (Sowerby, 1844): 129–130, NM 2622, Durban,  $11,3 \times 4,4$  mm, 130, whitened with  $MgCl_2$ ; 131, NM J7224, Mozambique Is,  $8,2 \times 3,7$  mm. 132, *E. (S.) illovoense* (Barnard, 1963), holotype, SAM A9023,  $2,7 \times 1,7$  mm.

oblong-ovate, inner margin less curved than outer; peristome thick, duplex, slightly auriculate, labially adnate, with a strong fasciole. Axial ribs thick, strongly reflexed, continuous, strongly prosocline, slightly arcuate, without coronations; 11–15 per whorl, with an occasional rib interpolated or fused with its neighbour. Intervals between lamellae with very fine, irregular, raised striae, finest below suture, an estimated 30–40 on penultimate whorl; crossed by growth-striae. White.

Dimensions: 11,3 × 4,4 mm; 9,9 × 3,9 mm; 8,2 × 3,7 mm.

Range: Philippines to eastern Transkei.

Regional locality data: NORTHERN MOZAMBIQUE: Mozambique Is (NM G945, J7224: R. K.). NATAL: Durban (NM 2622: H. C. Burnup); Sezela (type locality of *durbanensis*); 2 km N of Port Edward (J. P. Marais colln). TRANSKEI: Mzamba (J. P. Marais colln).

Type material: Four syntypes of *Scalardia multicostata* are in the BM(NH), labelled 'Is. of Corregidor, coarse sand, 7 fath.'. The holotype of *Scala durbanensis* is BM(NH) 1906.6.23.35. As indicated above, the type label reads 'Isezela' [= Sezela] not 'Durban' as published.

Notes: Few examples of this rare Indo-Pacific species are known from Natal. Records from Port Alfred (Bartsch, Turton) were evidently based on *E. oppositum* or *E. eboeum*.

#### Subgenus *Parviscala* de Boury, 1887

*Parviscala* de Boury, 1887:11. Type species (o.d.) *Scalardia algeriana* Weinkauff, 1866.

Diagnosis: Shell small, pyramidal to acuminate, suture usually narrowly fenestrate, rarely simple; umbilicus closed (or very narrowly fenestrate); axial ribs coronate, intervals with spiral threads.

Notes: A large number of subgeneric names have been proposed for species with spirally lirate interstices, including *Cinctiscala*, *Firmiscala*, *Sodaliscala*, *Reticuliscala* and *Asperiscala* de Boury, 1909, *Labeoscala*, *Amiciscala*, *Avalitiscala* and *Innesiscala* de Boury in Jousseume, 1912, and *Crenuliscala* Iredale, 1936. Of these, *Asperiscala*, *Sodaliscala* and *Labeoscala* are here used for restricted groups of similar (if not necessarily related) species. The other subgeneric names will require individual evaluation when other epitoniid faunas are studied. An alternative view is to synonymise all names based on spirally sculptured species, as was done by Clench & Turner (1952), who unfortunately selected the name *Asperiscala*, which in this sense becomes a synonym of *Parviscala*. The very large number of species that would have to be included in *Parviscala* s.l. negates much of the practical value of such a grouping.

#### Key to species of *Parviscala* in southern Africa and Mozambique

- |   |  |                |
|---|--|----------------|
| 1 | Axial ribs 6–10 per whorl . . . . .                                      | 2              |
| — | Axial ribs 12–30 per whorl . . . . .                                     | 5              |
| 2 | Ribs 6 per whorl, coronations raised to (or above) level of suture . . . | <b>columba</b> |
| — | Ribs 9–10 per whorl, coronations on shoulder . . . . .                   | 3              |

- 3 Ribs very strongly reflexed, their crests involuted ..... **repandior**  
 — Ribs only moderately reflexed, their crests not involuted ..... 4
- 4 Brown with thick white ribs; exceeds 14 mm (8 teleoconch whorls) .....  
**climacotum**  
 — White, ribs thin and delicate; attains 7 mm (6 teleoconch whorls) .....  
**repandum**
- 5 Acuminate (breadth/length 0,34–0,40); coronations hook-like ..... 6  
 — Pyramidal (breadth/length 0,47–0,67), coronations not hooked ..... 7
- 6 Axial ribs high and erect, 13–14 per whorl; coronation situated on shoulder ...  
**thyraeum**  
 — Axial ribs fine and low, 18–24 per whorl; coronation below suture, strongest  
 on varicoid ribs ..... **harpago**
- 7 Axial ribs fine, 27–30 per whorl; suture simple; tiny (2,9 mm), fragile .....  
**amiculum**  
 — Axial ribs strong, 12–18 per whorl; suture narrowly fenestrate, at least on later  
 whorls ..... 8
- 8 Axial ribs with alate, almost spout-like shoulder angles; spiral lirae weak;  
 umbilicus narrow ..... **tamsinae**  
 — Shoulder coronations rather weak; spiral lirae distinct; umbilicus closed .. 9
- 9 Narrow (breadth/length 0,47–0,49); axial ribs lamellate, 12–14 per whorl .....  
**townsendi**  
 — Broader (breadth/length 0,63–0,67); axial ribs thick, 14–18 per whorl  
**mzambanum**

**Epitonium (Parviscala) amiculum** sp. n.

Figs 80, 134

Diagnosis: Shell fragile, narrowly pyramidal (breadth/length 0,48), suture simple, base barely rimate; peristome thin, not auriculate; axial ribs fine, fairly low, slightly reflexed, 27–30 per whorl, feebly coronate at shoulder; spiral lirae strong, about 15 per whorl, extending onto base; yellowish-white; length 2,9 mm.

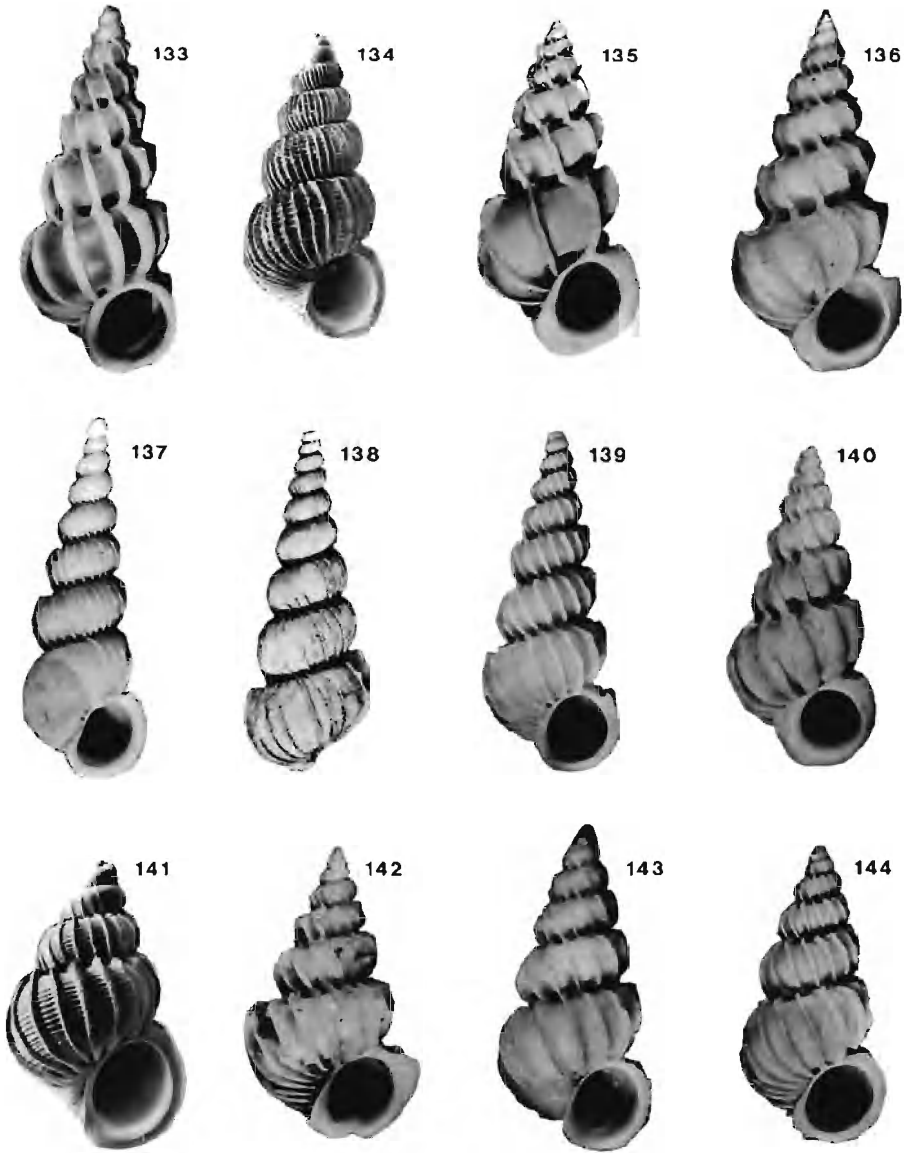
Description: Shell tiny and fragile, narrowly pyramidal (breadth/length about 0,48), of just over 4 strongly convex, feebly shouldered whorls, suture deep, simple; umbilicus represented by a slight rimation; aperture ovate, peristome thin, not auriculate, columella not reflexed. Axial ribs fine, thin, fairly low, erect, straight, slightly reflexed, with a very slight shoulder coronation; about 30 on 3rd whorl, decreasing to 27 on body whorl. Spiral lirae well raised, subequal in width to their rectangular interstices, about 15 on penultimate whorl, extending onto base of body whorl. Colour glossy yellowish-white.

Protoconch worn, tip damaged, maximum diameter 0,38 mm.

Dimensions: 2,9 × 1,4 mm (holotype).

Range: Known only from the continental shelf of Zululand.

Type material: Holotype NM A6184/T2935, off St Lucia Lighthouse, 50 m, from CSIR (Water Res.) bottom sample.



Figs 133–144. *Epitonium* species, subgenus *Parviscala*. 133, *E.(P.) climacotum* sp. n., holotype, 14,8 × 6,2 mm. 134, *E.(P.) amiculum* sp. n., holotype, 2,9 × 1,4 mm. 135, *E.(P.) columba* sp. n., holotype, 6,3 × 2,8 mm. 136, *E.(P.) repandum* sp. n., 6,9 × 3,2 mm. 137–138, *E.(P.) harpago* sp. n.: 137, Holotype, 5,9 × 2,1 mm; 138, Paratype, 6,9 × 2,6 mm. 139, *E.(P.) thyracum* sp. n., holotype, 5,7 × 2,3 mm. 140, *E.(P.) repandior* sp. n., holotype, 11,1 × 5,0 mm. 141, *E.(P.) mzabanum* sp. n., holotype, 3,0 × 2,0 mm. 142, *E.(P.) tamsinae* sp. n., holotype, 4,2 × 2,8 mm. 143–144, *E.(P.) townsendi* (Melvill & Standen, 1903): 143, Holotype BM(NH) 1903.12.15.5, 4,8 × 2,3 mm; 144, NM B7156, Durban Bay, 4,5 × 2,1 mm. Figs 134, 141 are SEM; 135, 138, 140, 144 coated with MgCl<sub>2</sub>.

Notes: This delicately sculptured species is in many respects a miniature of *E. (P.) amicum* (Jousseume, 1894) of the Red Sea, but has finer ribs. *E. amicum* is type species of *Amiciscalca* de Boury in Jousseume, 1912.

Etymology: *amiculum* = a miniature *Epitonium amicum*.

***Epitonium (Parviscala) climacotum* sp. n.**

Figs 82, 133

Diagnosis: Shell fairly thick, narrowly pyramidal (breadth/length 0,42–0,51), peristome thick, narrowly auriculate, fasciole distinct; axial ribs thick, strongly reflexed, continuous, 9–10 per whorl, shoulder bluntly coronate; spiral striae dense; orange-brown with white ribs; length about 15 mm.

Description: Shell fairly thick, narrowly pyramidal (breadth/length 0,42–0,51) with turreted spire; teleoconch whorls at least 8, strongly convex with median periphery; suture and umbilicus shallowly fenestrate; aperture ovate; peristome thick, duplex, with narrow auricular expansion basally, labium partly expanded over umbilicus, fasciole distinct. Axial ribs thick, crests strongly reflexed, 9–10 per whorl, continuous, shoulder bluntly coronate. Intervals with dense spiral striae and faint growth-lines. Colour moderate to brownish-orange with white ribs, rarely uniform white; external colour showing through to interior.

Protoconch broken, basal diameter 0,45 mm.

Dimensions: 14,8 × 6,2 mm (holotype); 10,8 × 4,8 mm; 8,5 × 4,3 mm (paratypes).

Range: Known only from Natal littoral.

Type material: Holotype NM B6799/T2793, Durban Bay, shallow dredgings, leg. B. J. Young. Paratypes 1–11, NM B7041/T2794, same data.

Notes: *E. climacotum* somewhat resembles *E. gravieri* (Jousseume, 1912) but is much larger (with proportionately larger protoconch), with more numerous ribs, coronations situated nearer the suture, and a brown ground colour. The angular coronations give the spire a terraced appearance, similar to that of some *Lamelliscala* spp.

Etymology: *climacotum* = terraced (G.).

***Epitonium (Parviscala) columba* sp. n.**

Figs 78, 135

Diagnosis: Shell translucent, narrowly pyramidal (breadth/length 0,44–0,49); peristome auriculate, fasciole present in adult; axial ribs lamelliform, high, reflexed only at blunt shoulder coronation, 6 per whorl; interstices with fine spiral striae, pricked by growth-lines; white; length about 6 mm.

Description: Shell thin, translucent, narrowly pyramidal (breadth/length 0,44–0,49), of 5½ strongly convex teleoconch whorls, periphery median; suture and umbilicus shallowly fenestrate; aperture ovate, peristome duplex, strongly expanded at shoulder and base, columellar side relatively narrow but reflexed at umbilicus, fasciole developed only in adult. Axial ribs lamelliform, thin, high and erect, reflexed only at shoulder where form a blunt coronation, prosocline,

continuous, 6 per whorl, surface microscopically rugose. Interstices glossy, with fine spiral striae, pricked by growth-lines. Translucent white.

Protoconch conical, of  $3\frac{1}{2}$  convex whorls, diameter 0,50 mm.

Dimensions:  $6,3 \times 2,8$  mm (holotype);  $5,4 \times 2,4$  mm,  $5,1 \times 2,5$  mm (paratypes).

Range: Known only from Natal littoral.

Type material: Holotype NM B7112/T2796, Durban Bay, shallow dredgings, B. J. Young. Paratypes 1–25, NM B7113/T2797, same data.

Notes: *E. columba* is very similar to *Scala malayana* Thiele, 1925, from Sumatra; the latter lacks coronations and is much smaller (length 2,8 mm for  $3\frac{1}{2}$  teleoconch whorls). The wing-like axial lamellae are distinctive among South African *Epitonium*. Although straight, the backward flexure of the shoulder angle gives the lamellae a slightly arcuate appearance. Practically all known specimens, including the holotype, have been bored by naticids or muricids. *E. columba* may prove to belong to the subgenus *Laeviscalia*.

Etymology: *columba*, = a dove, L.

#### ***Epitonium (Parviscala) harpago* sp. n.**

Figs 86, 137, 138

Diagnosis: Shell acuminate, breadth/length 0,34–0,36, suture very narrowly fenestrate, umbilicus closed or very narrowly fenestrate; columella flattened, fasciole strong, no auricle; axial ribs thin, low, erect, barely reflexed, 18–24 per whorl, coronations mostly vestigial, but an occasional varicoid rib with a conspicuous hooked coronation; spiral lirae strong, rounded, about 14 per whorl; white; length about 8 mm.

Description: Shell acuminate (breadth/length 0,34–0,36), of about  $8\frac{1}{2}$  strongly convex teleoconch whorls, suture very narrowly fenestrate; umbilicus closed or very narrowly fenestrate; aperture somewhat reniform with a flattened columella; peristome fairly thick, duplex, without a distinct auricle but fasciole strong. Axial ribs thin, low, erect, barely reflexed, prosocline, almost straight, with a vestigial subsutural coronation, an occasional rib (up to 4 per whorl) thickened and varicoid, with a conspicuous, adapically-directed coronation; each whorl with 18–24 ribs. Spiral lirae well developed, more or less subequal to their interstices, rounded, varying in strength, approximately 14 on penultimate whorl, weak below suture, fine on base. White.

Protoconch conical, apex missing, translucent, whorls slightly convex, basal diameter 0,40 mm.

Dimensions:  $5,9 \times 2,1$  mm (holotype);  $8,3 \times 2,7$  mm,  $7,0 \times 2,4$  mm (paratypes).

Range: Natal littoral.

Type material: Holotype NM B6028/T2919, Durban Bay, shallow dredgings, B. J. Young. Paratypes 1–17, NM B7205/T2930, same data.

Notes: Allied to *Scala laidlawi* Melvill & Standen, 1903, from the Gulf of Oman, but with rounder whorls and more prominently uncinat coronations.

Etymology: *harpago* = a gaff, L.

**Epitonium (Parviscala) mzambanum** sp. n.

Figs 81, 141

Diagnosis: Shell broadly pyramidal (breadth/length 0,63–0,67), suture very narrowly fenestrate (at least on later whorls), no umbilicus; peristome fairly thick, auricle weak, fasciole strong; axial ribs weakly coronated below suture, low, rather thick, slightly reflexed (particularly below suture), 14–18 per whorl; spiral lirae strong, about 18 on penultimate whorl; white; length 3,2 mm.

Description: Shell broadly pyramidal (breadth/length 0,63–0,67) of about 4 strongly convex teleoconch whorls; suture deep, very narrowly fenestrate, at least on later whorls; umbilicus closed; aperture ovate, peristome duplex, moderately thick, slightly auriculate, fasciole thick. Axial ribs weakly coronated below suture, low and rather thick, slightly reflexed (strongly so below suture), almost straight, prosocline, 17–18 on 3rd whorl, 14–15 on body whorl. Spiral lirae strong, close, about 18 on penultimate whorl, extending onto base of body whorl. White.

Protoconch unknown.

Dimensions: 3,0 × 2,0 mm (holotype); 3,2 × 2,0 mm (paratype).

Range: Eastern Transkei littoral.

Type material: Holotype, NM A5031/T2920, Mzamba, (30°51'S, 29°46'E), beach-drift, J. P. Marais. Paratopotype in J. P. Marais colln.

Notes: Superficially resembling *Epitonium (Hirtoscala) anabathmos*, which, however, has smooth interstices. In its shape, closed umbilicus and dense spiral threads, *E. mzambanum* also resembles *E. (Sodaliscala) illovoense*, which has fewer, more lamellate ribs.

Etymology: after the type locality, Mzamba (Fossil Head).

**Epitonium (Parviscala) repandum** sp. n.

Figs 83, 136

Diagnosis: Shell narrowly pyramidal (breadth/length 0,46), peristome slightly auriculate, fasciole thick; axial ribs thin, fragile, fairly strongly reflexed, 10 per whorl, coronation low on shoulder; spiral striae fine; length about 7 mm.

Description: Shell narrowly pyramidal (breadth/length 0,46), with 6 strongly convex teleoconch whorls, periphery median; suture and umbilicus narrowly fenestrate; aperture moderately ovate, peristome fairly thick, markedly duplex, base slightly auriculate, narrowly expanded over umbilicus, with relatively wide fasciole. Axial ribs thin and fragile, 10 per whorl, erect with a fairly strongly reflexed crest bearing a blunt shoulder coronation (about  $\frac{1}{3}$  whorl below suture), continuous, prosocline; surface of each lamella microscopically rugose. Intervals with fine spiral striae but no distinct axial threads. White.

Protoconch conical, of  $4\frac{1}{2}$  convex, translucent whorls; basal diameter 0,43 mm, delimited by 1st teleoconch rib.

Dimensions: 6,9 × 3,2 mm (holotype).

Range: Continental shelf of southern Natal.

Type material: Holotype NM B6847/T2795, off Park Rynie, Natal (30°23,2'S, 30°50,8'E), 140 m, some sand, sponge-rubble, dredged MN.



Notes: *E. (L.) repandum* closely resembles *E. (L.) gravieri* (Jousseume, 1912) of the Red Sea and Seychelles in the low position of its coronations. However, in *repandum* the lamellae are much thinner and more delicate, and number 10 as against 7–8 in *gravieri*.

Etymology: *repandus* = bent back (L.).

**Epitonium (Parviscala) repandior** sp. n.

Figs 84, 140

Diagnosis: Shell as in *E. repandum* but axial ribs very strongly reflexed with involute crests, coronation near suture; 11 mm.

Description: Shell narrowly pyramidal (breadth/length 0,45) with  $7\frac{1}{2}$  strongly convex teleoconch whorls, each with a median periphery, suture and umbilicus fenestrate, the suture more deeply so; aperture moderately ovate, peristome thick, duplex, base slightly auriculate, with a wide fasciole. Axial ribs strongly prosocline, moderately thin, but strongly and broadly reflexed, with involute crests, their surface microscopically granulose. Ribs 10 per whorl, with a blunt, reflexed shoulder coronation. Intervals with fine, dense spiral threads. White.

Protoconch missing.

Dimensions: 11,1 × 5,0 mm (holotype).

Range: Southern Mozambique, littoral.

Type material: Holotype NM J8577/T2940, Benguera Island, Bazaruto Archipelago, in beach-drift, sandflats in North Bay; Mrs E. Roscoe, July, 1974.

Notes: *E. repandior* resembles *E. (P.) repandum* (herein) and *E. (Laeviscalia) gravieri* (Jousseume, 1912), but the axial ribs are much more strongly reflexed, with their crests so arched as to form incomplete tubes, and the coronations are nearer the suture. *E. (P.) gradilis* (Jousseume, 1912) of the Gulf of Aden similarly has more erect ribs (numbering 12 per whorl) and stronger spiral sculpture.

Etymology: *repandior* = more bent back (L.).

**Epitonium (Parviscala) tamsinae** sp. n.

Figs 87, 142

Diagnosis: Shell fragile, biconic-pyramidal (breadth/length 0,67); free edge of expanded columella oblique and straight, base auriculate, no fasciole; axial ribs thin, erect, slightly reflexed, 13 per whorl, coronations rather alate, somewhat spout-like; spiral threads very fine; white; length 4,2 mm.

Description: Shell fragile, biconic-pyramidal (breadth/length 0,67) of  $4\frac{1}{2}$  strongly convex teleoconch whorls, suture finely fenestrate; umbilicus more or less fenestrate (slightly open anteriorly). Aperture ovate; peristome moderately thick, duplex, columella strongly reflexed, its free edge oblique and straight, base auriculate; no fasciole. Axial ribs 13 per whorl, thin, erect, slightly reflexed, strongly prosocline, almost straight, continuous, shoulder with strongly projecting, somewhat spout-like coronations. Intervals with microscopic spiral threads. White.

Protoconch acutely conical, of about  $4\frac{1}{2}$  whorls, basal diameter 0,43 mm.

Dimensions: 4,2 × 2,8 mm.

Range: Continental shelf of western Transkei.

Type material: Holotype NM C5868/T2922, off Ubombo, Transkei (31°54,8'S, 29°18,8'E), 80 m, mixed sand and mud, shell debris.

Notes: This new species is somewhat similar in sculpture to *E. jousseaumei* (de Boury, 1886) from New Caledonia, *E. bouryi* (Jousseaume, 1886) from the Red Sea, and *E. malcolmense* (Melvill, 1898) from the Persian Gulf. *E. jousseaumei* has more numerous lamellae, with more conspicuously spout-like coronations, and is imperforate. *E. bouryi* is narrower, with higher axial lamellae and a non-auriculate base. *E. malcolmense* (based on a broken shell) has fewer lamellae and more prominent coronations. Both *jousseaumei* and *bouryi* were described as members of the subgenus *Crisposcala* de Boury, 1886, whose protoconch, according to de Boury (1917:28), bears microscopic spiral ridges. In *tamsinae* the protoconch is apparently smooth.

Etymology: Named after my daughter, Tamsin Lee.

### **Epitonium (Parviscala) thyraeum sp. n.**

Figs 85, 139

Diagnosis: Shell acuminate (breadth/length about 0,35–0,40); umbilicus narrowly fenestrate; fasciole distinct, peristome not auriculate; axial ribs erect, slightly reflexed, continuous, with sharp, hook-like coronations, 13–14 ribs per whorl; spiral lirae thin, strong, 10–12 per whorl, obsolete below suture; white; length about 11 mm.

Description: Shell acuminate (breadth/length approximately 0,35–0,40) of about 9 strongly convex teleoconch whorls, separated by a narrowly fenestrate suture; umbilicus narrowly fenestrate; aperture ovate, peristome moderately thick, duplex, without auricle but a distinct fasciole. Axial ribs erect, slightly reflexed, continuous, prosocline, straight, with a sharp, adapically directed and slightly recurved shoulder coronation; 13–14 lamellae per whorl, an occasional one thicker than the others. Intervals between lamellae with thin, raised spiral lirae, subequal in width to their interstices, 10–12 per whorl, becoming obsolete above shoulder and fine on base of body whorl. White.

Protoconch conical, tip missing, transparent, with microscopic axial striae; basal diameter 0,43 mm.

Dimensions: 5,7 × 2,3 mm (holotype); 8,9 × 3,3 mm, 11,3 × 3,9 mm (paratypes, protoconchs missing).

Range: Known only from Natal.

Type material: Holotype NM B2248/T2921, Durban Bay, shallow dredgings, leg. B. J. Young. Paratypes 1–13, NM 9892/T2913, same data.

Notes: *E. thyraeum* is very closely allied to the Sino-Japanese *E. eximium* (Adams & Reeve, 1848). However, two syntypes of the latter, BM(NH) 1950.4.18.10–11, differ in having the upper third of each whorl with smooth interstices, the remainder with 6 strong, widely spaced spiral cords.

Etymology: *thyraeus* = outlying, G.

*Epitonium (Parviscala) townsendi* (Melvill & Standen, 1903)

Figs 88, 143, 144, 153

*Scala townsendi* Melvill & Standen, 1903:347, pl. 7, fig. 14. Type locality: Charbar [= Chāh-Bahār, Iran], 20 fathoms.

*Epitonium townsendi*; Kaicher, 1981:2354 (syntype).

Diagnosis: Shell pyramidal (breadth/length 0,47–0,49), umbilicus closed or slightly fenestrate; fasciole sometimes present; axial ribs lamelliform, slightly reflexed, bluntly coronate on shoulder, rather strongly prosocline, 12–14 per whorl, spiral lirae low, tabulate; white; length 4,5 mm.

Description: Shell pyramidal (breadth/length 0,47–0,49), teleoconch whorls 5, strongly convex, with very narrowly fenestrated suture; umbilicus closed or weakly fenestrate; aperture ovate, peristome moderately thick, very slightly auriculate, columella slightly reflexed, fasciole sometimes present. Axial ribs erect, slightly reflexed, most strongly so on shoulder where bluntly coronated, rather straight, prosocline, 12–14 per whorl. Intervals between lamellae with low, tabulate spiral lirae, mostly subequal to their interstices, but varying in width, about 12 per whorl below shoulder, with a series of feeble threads above shoulder and on base of body whorl. White.

Protoconch (Fig. 153) transparent, conical, of about 4½ moderately convex whorls, diameter 0,48 mm.

Dimensions: 4,5 × 2,1 mm; 4,3 × 2,1 mm.

Range: Persian Gulf to Transkei.

Regional locality data: NATAL; Durban Bay, shallow dredgings (NM B7156: B. J. Young). TRANSKEI: off Mbotyi, 80 m, soft mud (NM C5878:MN); off Port Grosvenor, 82 m, worn calcareous nodules (NM C5887:MN), and 60 m, sand, broken shell (NM C5881:MN); off Mncwasa Point, 90 m, coarse sand (NM C5897:MN).

Type material: Holotype BM(NH) 1903.12.15.5, ex F. W. Townsend colln.; dimensions 4,8 × 2,3 mm.

Notes: Local material agrees very closely with the holotype (Fig. 143).

Subgenus *Labeoscala* de Boury, 1912

*Labeoscala* de Boury in Joussemae, 1912:214. Type species (by virtual tautonomy) *L. labeo* Joussemae, 1912.

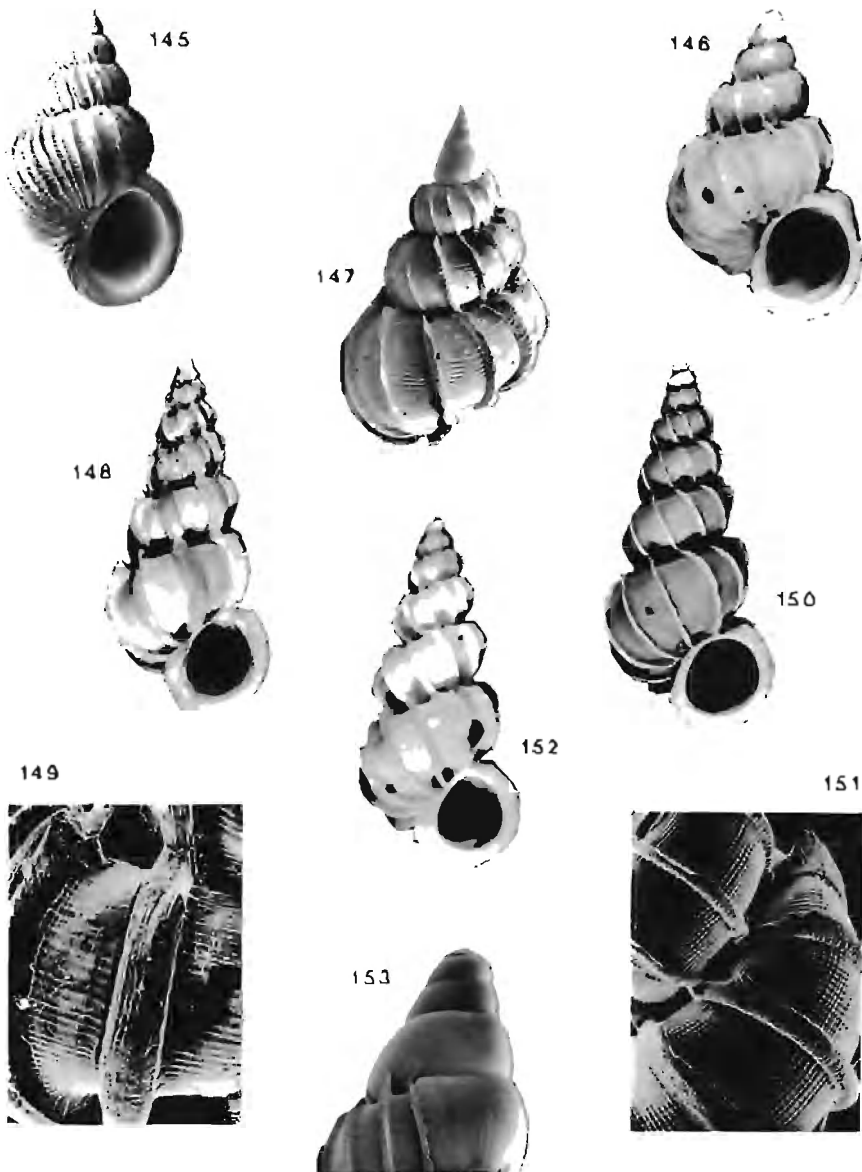
Diagnosis: Resembling *Sodaliscala* but with a greatly thickened peristome; suture simple, umbilicus closed or rimate.

Notes: This subgenus, which was omitted by Wenz (1940), contains at least four species in addition to the new one here described, namely *E. labeo* and *E. perimense* (Joussemae, 1912) from the Red Sea and *E. thelecterium* and *E. rissoinaeforme* (Melvill & Standen, 1903), from the Persian Gulf area.

*Epitonium (Labeoscala) brachyspeira* sp. n.

Fig. 145

Diagnosis: A minute *Labeoscala* with low spire, body whorl 0,69 of total length, breadth/length 0,64; axial ribs mostly thinner than their intervals, an occasional one



Figs 145-153 *Epitonium* species, subgenera *Labeoscala*, *Asperiscala*, *Laeviscala* and *Parviscala* (part) 145, *E. (Labeoscala) brachyspira* sp. n., holotype, 2.5 × 1.6 mm. 146-147, *E. (Asperiscala) spyridion* sp. n., 146, Holotype, 4.0 × 2.5 mm; 147, Paratype (juvenile), 2.6 × 1.8 mm. 148-149, *E. (Laeviscala) gracile* (Sowerby, 1844): 148, NM B309, Durban Bay, 6.8 × 3.1 mm. 149, interstitial sculpture of body whorl magnified. 150-151, *E. (Laeviscala) fucatum* (Pease, 1861): 150, NM B7110, Durban Bay, 10.5 × 4.6 mm; 151, interstitial sculpture of same, magnified. 152, *E. (Laeviscala) hispidosum* (Jousseume, 1912), NM B7109, Durban Bay, 5.5 × 2.5 mm. 153, *E. (Parviscala) townsendi* (Melvill & Standen, 1903): NM CS881, off Port Grosvenor, 60 m. protoconch, basal diameter 0.44 mm. 145, 147, 149, 151, 153 are SEM.

varicoid, 21–24 per whorl; spiral lirae thin, close, about 18 per whorl, strong on base; length 2,5 mm.

Description: Shell broadly pyramidal (breadth/length 0,64), with a low spire (body whorl 0,69 of total length), about 4 convex teleoconch whorls; suture simple, moderately shallow; aperture large, more or less ovate, slightly pointed behind, peristome duplex, thick, except over paries, not auriculate, fasciole strong, adnate to columella. Axial ribs of irregular width, an occasional one variciform, mostly thinner than their intervals, not coronate, prosocline, barely arcuate, about 21 on 2nd whorl, 24 on last whorl. Intervals with thin, close spiral lirae, approximately 18 on penultimate whorl, weak below suture but strong on base of body whorl. White.

Protoconch worn, basal diameter about 0,3 mm.

Dimensions: 2,5 × 1,6 mm (holotype).

Range: Natal littoral.

Type material: Holotype NM B7747/T2931, Reunion Rocks, S. of Durban, J. P. Marais, March, 1979.

Notes: *E. brachyspeira* differs from *E. thelecterium* and *E. rissoinaeforme* in its thicker, closer ribs; *E. perimense* and *E. labeo* have a higher spire, deeper suture and fewer ribs.

Etymology: *brachys* (short) + *speira* (a spire), G.

#### Subgenus *Asperiscala* de Boury, 1909

*Asperiscala* de Boury, 1909:257. Type species (o.d.) *Scalaria bellastrata* Carpenter, 1864.

Diagnosis: Resembling *Parviscala* but more bulbous, with a widely open umbilicus.

Notes: *Asperiscala* was used by Clench & Turner (1952) as a portmanteau subgenus for all species with distinct spiral sculpture, but is here applied in de Boury's original sense, to *Parviscala*-type species with partial 'uncoiling'.

#### **Epitonium (*Asperiscala*) *spyridion* sp. n.**

Figs 146, 147

Diagnosis: Shell broadly pyramidal (breadth/length 0,63–0,69), suture narrowly fenestrate, umbilicus wide, open; peristome rather thin; axial ribs rather low, thin, sharp, slightly reflexed, weakly coronate, 10–13 per whorl; intervals with thin, close spiral lirae and very fine axial striae; white; length 4 mm.

Description: Shell broadly pyramidal (breadth/length 0,63–0,69), of about 4 strongly convex teleoconch whorls, suture deep and narrowly fenestrate; umbilicus wide, open; aperture ovate with a moderately thin peristome, no auricle, columella barely reflexed. Axial ribs rather low, thin, sharp, erect, slightly reflexed, with a weak shoulder angle; 10–13 ribs on 3rd whorl, 12 on last. Intervals between ribs with thin, low, close spiral threads, about 20 on penultimate whorl, plus a series of finer ones below suture; spirals crossed by very fine axial striae. White.

Protoconch acutely conical of 4½ slightly convex whorls, bearing minute axial striae; maximum diameter 0,5 mm.

Dimensions: 4,0 × 2,5 mm (holotype); 2,6 × 1,8 mm (paratype).

Range: Natal littoral.

Type material: Holotype, NM B7169/T2923, Durban Bay, shallow dredgings. Paratopotype NM B7170/T2924. Both leg. B. J. Young.

Notes: Known only from two shells, one juvenile, the other an imperfect adult.

Etymology: *spyridion* = a small basket (G.).

#### Subgenus *Laeviscala* de Boury, 1909

*Laeviscala* de Boury, 1909:257. Type species (o.d.) *Scalaria subauriculata* Soubervie in Soubervie & Montrouzier, 1866.

*Graciliscala* de Boury, 1909:257. Type species (o.d.) *Scalaria gracilis* Sowerby, 1844.

Diagnosis: Shell narrowly pyramidal, suture fenestrate (not perforate), umbilicus narrowly and shallowly fenestrate; peristome thick, weakly auriculate; axial ribs relatively few, often thick, reflexed, usually weakly coronate; intervals with dense, cancellate microstriae, intersections more or less granulose.

Notes: De Boury evidently distinguished *Graciliscala* from *Laeviscala* by its distinct subsutural coronations. Iredale (1936:297) would appear to have acted as first revisor in selecting *Laeviscala* as senior synonym, although noting its inaptness.

#### Key to *Laeviscala* in southern Africa and Mozambique

- |   |  |                   |
|---|--|-------------------|
| 1 | Coronation situated on shoulder, prominent; axial ribs 7–10 .....      | 2                 |
| — | Coronation close to suture, weak and strongly reflexed, axial ribs 6–7 | <b>gracile</b>    |
| 2 | White; ribs only slightly reflexed .....                               | <b>histicosum</b> |
| — | Tinged with light brown; ribs strongly reflexed .....                  | <b>fucatum</b>    |

#### *Epitonium (Laeviscala) gracile* (Sowerby, 1844)

Figs 90, 148, 149

*Scalaria gracilis* Sowerby, 1844a:86, pl. 32, figs 33, 34; *idem*, 1844b:12; *idem*, 1873: pl. 8, fig. 53. Type locality: Dumaguete, Negros Is, Philippines.

*Graciliscala gracilis*; Jousseume, 1912:205, pl. 6, figs 1–8.

*Epitonium gracilis*; Kaicher, 1981:3053 (syntype).

*Graciliscala rostrata* Jousseume, 1912:204, pl 7, figs 56, 57. Type locality: Djibouti.

*Epitonium rostratum*; Kaicher, 1981:3075 (holotype).

Diagnosis (local form): A *Laeviscala* with 6–7 thick, reflexed axial ribs per whorl, with a blunt, strongly reflexed coronation below suture; white; maximum length 9,0 mm; breadth/length 0,40–0,49.

Description (local form): Shell narrow (breadth/length 0,40–0,49), of 8 strongly rounded teleoconch whorls, separated by a deeply fenestrate suture; umbilicus shallowly and narrowly fenestrate; aperture ovate, peristome thick, moderately expanded anteriorly, bordered by a narrow fasciole. Axial ribs thick, moderately recurved, particularly below suture where they bear a blunt coronation, prosocline, continuous, 6–7 per whorl throughout. Intervals with cancellate, granulate microstriae. White.

Protoconch conical, of  $3\frac{1}{2}$  moderately convex whorls, 1st one somewhat mamilliform; basal diameter 0,4 mm; termination at first axial lamella.

Dimensions: 9,1 × 3,9 mm; 9,0 × 3,6 mm; 6,6 × 3,2 mm.

Range: Philippines and Red Sea to Natal.

Regional locality data: NORTHERN MOZAMBIQUE: Mozambique Is (NM G3735: R. K.). SOUTHERN MOZAMBIQUE: Inhassoro (NM J4639: Mrs E. Roscoe). NATAL: Durban Bay, shallow dredgings (NM B309: B. J. Young).

Notes: Local material agrees essentially with 4 syntypes of *Scalaria gracilis* (BM(NH) 198143), and with a series in the NM from Cebu. However, minor differences exist, which at present are difficult to interpret. South-east African shells appear, for example, to be broader than Philippine material (breadth/length 0,40–0,49, instead of 0,36–0,39), axial ribs number 6–7 per whorl (instead of 7–8), the coronation spine is somewhat further from the suture and whorls are more convex. These characters are shared by *Graciliscala rostrata* Jousseume, 1912, based on a single juvenile from the Gulf of Aden, which is well figured by Kaicher (1981). (The rib number of '5' erroneously given by Jousseume was, incidentally, corrected to 6 by Kaicher.) Whether *rostrata* should be regarded as a valid species, subspecies or genetic morph remains to be established.

*Epitonium (Laeviscala) fucatum* (Pease, 1861)

Figs 91, 150, 151

*Scalaria fucata* Pease, 1861:400; Kay, 1965:43 (references), pl. 6, figs 11, 12 (lectotype). Type locality: 'Sandwich Islands' [= Hawaii].

*Epitonium fucatum*; Cernohorsky, 1972:196, pl. 56, fig. 6; Kay, 1979:153, fig. 54 I; Kaicher, 1981:2330 (lectotype).

*Scala tangana* Thiele, 1925:104 (138), pl. 23, fig. 11 (syn. n.). Type locality: Tanga, Tanzania.

Diagnosis: A *Laeviscala* with 8–10 moderately reflexed axial ribs bearing an angular shoulder coronation; tinged with pale brown; maximum length 13 mm; breadth/length 0,44–0,45.

Description: Shell narrowly pyramidal (breadth/length 0,44–0,45), of about 8 strongly convex teleoconch whorls, with a deeply fenestrate suture; umbilicus shallowly and narrowly fenestrate; aperture oval, peristome thick, narrowly auriculate basally and moderately expanded over umbilicus; no fasciole. Axial ribs 8–10 per whorl, erect but with strongly reflexed crests, continuous, shoulder with a blunt, reflexed coronation; surface of lamellae minutely rugose under high magnification. Intervals with spiral and axial microstriae, forming a granulose-cancellate sculpture. White, usually suffused with brown between ribs around middle of each whorl.

Protoconch conical, of about 3 convex whorls; basal diameter 0,43 mm.

Dimensions: 11,8 × 5,2 mm; 10,9 × 4,9 mm. Attains at least 13 mm in length.

Range: Hawaii and Tanzania to Natal.

Regional locality data: NATAL: Durban Bay, shallow dredgings (NM B7110: B. J. Young).

Notes: Durban Bay specimens agree well with the lectotype of *Scalaria fucata* (BM(NH) 1961168, designated Kay 1965) and with Thiele's excellent figure of his *Scala tangana*. Although Sowerby (1892:24) listed *Scalaria fucata* from Port Elizabeth, no reliance can be placed on records in this work. Only empty shells have been found locally. In Hawaii *E. fucata* is associated with 'the large sea anemone *Radianthus papillosa*' (Kay 1979).

*Epitonium (Laeviscalia) histricosum* (Jousseume, 1912)

Figs 93, 152

*Graciliscalia histrica* Jousseume, 1912:206, pl. 6, figs 9–16. Type locality: 'Suez, Aden, Perim, Djibouti'.  
*Epitonium histricosum*; Kaicher, 1981:3065 (syntype).

Diagnosis: A *Laeviscalia* with thin, evenly reflexed axial ribs, 9 [7–8] per whorl, with a coronation below suture; intervals with microscopic spiral and feeble axial striae; fasciole present; peristome with a distinct basal auricle; white; length 6 mm.

Range: Red Sea to Natal.

Regional locality data: NATAL: Durban Bay, shallow dredgings (NM B7109: B. J. Young).

Notes: A single imperfect shell (5,5 × 2,5 mm in size) appears to agree with *G. histrica* (a syntype of which was well illustrated by Kaicher 1981) save in having 9 ribs per whorl instead of 7–8. The interstices appear to show distinct spiral striae but only weak axial ones, so that *Parviscalia* may prove a better repository for the species.

Subgenus *Foliaceiscalia* de Boury 1912

*Foliaceiscalia* de Boury, 1912:93. Type species (o.d.) *Scalaria dubia* Sowerby, 1844.

Diagnosis: Shell fragile, conical, umbilicus narrow or closed; suture simple; whorls globular; axial ribs fine, filiform, with fine interstitial spiral threads.

Notes: *Foliaceiscalia* was treated by Wenz (1940) as a synonym of *Limiscalia* (as '*Limniscalia*'), and was used by Iredale (1936) as a loose grouping for all species with spiral lirae and rounded whorls. De Boury introduced it in a very restricted sense, and it is here used for species resembling *Globiscalia* but narrower and with stronger spiral threads and a smaller aperture. Sutures are much shallower than in *Limiscalia* and the non-tubular axials distinguish the group from *Librarisca*.

The chief problem concerns the identity of the type species, *Scalaria dubia* Sowerby, 1844. Based on a broken shell, it was poorly described and figured, and the type is evidently lost (the 'probable holotype' figured by Kaicher (1981:3036) possesses only slightly prosocline ribs, unlike Sowerby's figure). The specimen illustrated by De Boury (1912:pl. 7, fig. 4) as *dubia* agrees indifferently with the figures of Sowerby 1844a and 1873, but may well be *Scalaria grayi* Nyst, 1871 (= *Scalaria striata* Gray, 1847, non Defrance, 1827), which Tryon (1887:60) claimed, without substantiation, to be the adult state of *dubia*. The type species of *Foliaceiscalia* should thus perhaps be cited as '*Scala dubia* de Boury, 1912 (non Sowerby, 1844) [= *Scalaria grayi* Nyst, 1871]'

Key to southern African species of *Foliaceiscalia*

- Axial ribs dense and numerous (48–65 per whorl); suture shallow; umbilicus open; columella flattened ..... **falconi**  
 Axial ribs widely spaced and fewer (21–27 per whorl); suture deep; umbilicus closed or rimate; columella curved ..... **lacrima**



**Epitonium (Foliaceiscala) falconi** sp. n.

Fig. 154

Diagnosis: Shell ovate-pyramidal, breadth/length 0,52–0,61, suture shallow; umbilicus narrow; aperture oblong-ovate, columella oblique, slightly flattened; axial ribs fine, filiform, fairly close, 48–65 per whorl; interstitial spiral lirae fine, flat-topped, about 14 on penultimate whorl; white; length 6,5 mm.

Description: Shell ovate-pyramidal (breadth/length 0,52–0,61), of 5 convex teleoconch whorls, suture shallow, simple, umbilicus narrow, open; aperture large, oblong-ovate, with flattened paries and oblique, slightly flattened columella; peristome thin, particularly in parietal region, not expanded basally, labium partly reflexed over umbilicus, no fasciole. Axial ribs fine, thread-like, rather straight, about 48 on 3rd whorl, increasing to about 65 on last, rising slightly across suture to form tiny leaf-like expansions. Intervals with fine, flat-topped spiral lirae, about 10 on 3rd whorl, increasing to about 14 on penultimate whorl, obsolete below suture, finer, weaker and more irregular on base of body whorl. White.

Protoconch conical, rather stiliform, of 3 gently convex whorls; first one depressed; maximum diameter 0,47 mm; translucent with brownish suture.

Dimensions: 6,5 × 3,4 mm; 4,4 × 2,7 mm.

Range: Natal littoral.

Type material: Holotype NM A1017/T2798, Umbogintwini (30°01'S, 30°55'E), W. Falcon. Paratype 1, NM 8798/T2799, Scottburgh, Natal south coast, broken, R. K.; paratype 2, Reunion Rocks, S. of Durban, in J. P. Marais colln.

Notes: *E. falconi* appears to be a miniature version of *Scalaria grayi* Nyst, 1871, from northern Australia and Indonesia, which attains at least 38 mm in length; despite being much larger, *grayi* appears to have many fewer axial ribs. *Scalaria schepmani* (Melvill, 1910) from the Persian Gulf, is similar in form, but has fewer (about 36), more widely spaced axial ribs per whorl, and was described as imperforate. *Scala aequalis* Thiele, 1925, from off Sumatra, is much narrower in shape.

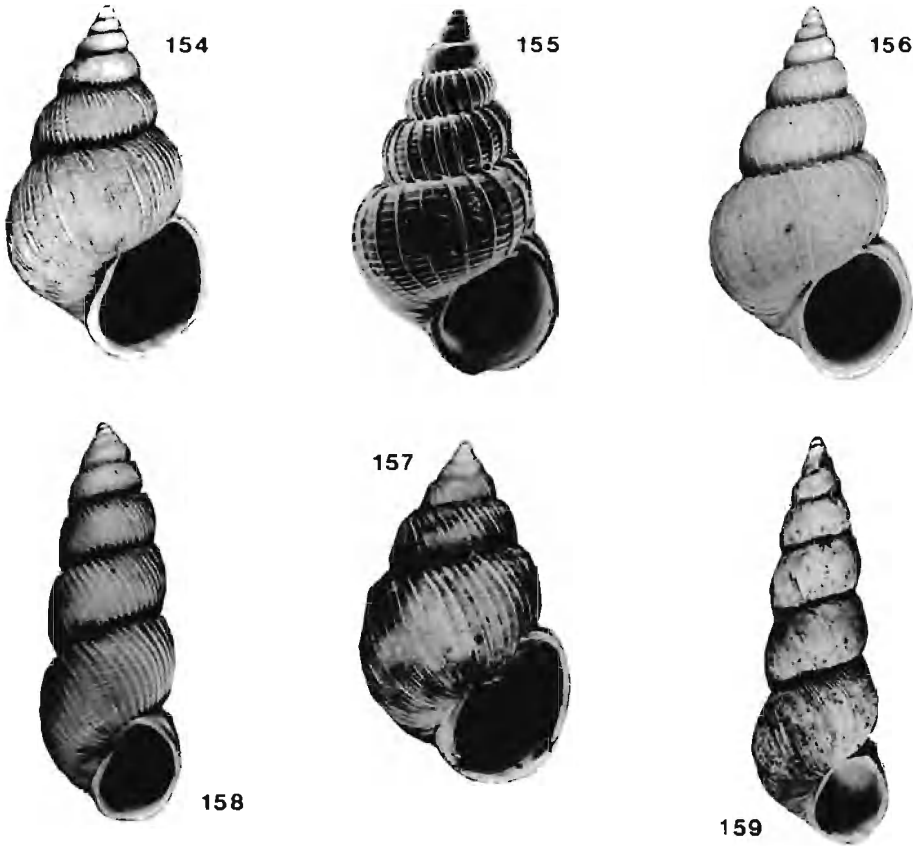
Etymology: Named after its discoverer, William Falcon (1872–1956).

**Epitonium (Foliaceiscala) lacrima** sp. n.

Figs 155, 156

Diagnosis: Shell ovate-pyramidal (breadth/length 0,50–0,53), suture deep, umbilicus rimate or closed, columella curved, axial ribs thin, low, wide-set, not reflexed, 21–27 per whorl; spiral lirae tabulate, 8–10 per whorl; translucent white; length 4,7 mm.

Description: Shell ovate-pyramidal (breadth/length 0,50–0,53), with 5 strongly convex teleoconch whorls, suture deep but simple; umbilicus absent or chink-like; aperture and peristome as in *E. falconi*, but columella more curved and not expanded. Axial ribs thin, widely spaced, low, not reflexed, rather straight, slightly prosocline, 22–23 on 3rd whorl, 21–27 on last. Intervals with somewhat tabulate



Figs 154–159. *Epitonium* species, subgenera *Foliaceiscula* and *Pupiscula*. 154, *E.(F.) falconi* sp. n., holotype, 6,5 × 3,4 mm. 155–156, *E.(F.) lacrima* sp. n.; 155, Paratype, NM A9890, 4,3 × 2,2 mm; 156, Holotype, 4,6 × 2,5 mm. 157, *E.(F.) actinariophila* (Masahito & Habe, 1976), holotype, NSMT 52452, Okinoshima, Shikoku, Japan, 7,4 × 4,6 mm. 158, *E.(P.) pupiforme* (Masahito, Kuroda & Habe, 1971), paratype, NSMT 53478, Sagami Bay, Japan, 9,3 × 3,1 mm. 159, *E.(P.) opeas* sp. n., holotype, 14,1 × 4,7 mm. Fig. 155 is SEM, 154, 156 coated with MgCl<sub>2</sub>.

spiral lirae, 8–10 per whorl, sometimes obsolete below suture, becoming denser on base of body whorl, interstices quadrate. Translucent white.

Protoconch conical, of about 3½ convex whorls, basal diameter 0,38 mm.

Dimensions: 4,6 × 2,5 mm (holotype); 4,3 × 2,2 mm (paratype); 4,7 × 2,7 mm (paratype from Karachi).

Range: Natal to Pakistan.

Type material: Holotype NM B7683/T2932, Durban Bay, shallow dredgings, leg. B. J. Young. Paratypes 1–2, NM A9890/T2954, same data; paratype 3, Karachi, Pakistan (NM H5928/T2955: W. Falcon).

Notes: Superficially similar to *Scala tomlini* de Boury, 1913, from Singapore, which has stronger, more orthocline ribs, a thicker columella and a shorter aperture.

Etymology: *lacrima* = a teardrop, L.

Subgenus *Globiscala* de Boury, 1909

*Globiscala* de Boury, 1909:258; *idem*, 1912:98 (full description). Type species (o.d.) *Scalaria bullata* Sowerby, 1844.

Diagnosis: Shell globose-turbinate with thin peristome and open umbilicus, sutures simple; axial sculpture of irregular filiform riblets, but usually obsolete, spiral sculpture of feeble grooves or fine threads.

Notes: In addition to the type species may be mentioned *Scala bonaespei* Barnard (1963:104, fig. 17b) from 2743–3255 metres off Cape Point; a syntype of this was figured by Kaicher (1981:3126). This abyssal species is here not considered part of the South African fauna.

*Epitonium (Globiscala) bullatum* (Sowerby, 1844)

Figs 160–163, 171

*Scalaria bullata* Sowerby, 1844a:94, pl. 34, fig. 87; *idem*, 1844b:27; *idem*, 1873: pl. 2, fig. 8. Type locality: Isl. Capul, Philippines, coral reefs.

*Scala bullata*; Smith, 1906:49; de Boury, 1912:102, pl. 7, figs 8, 9; Barnard, 1963:103, fig. 17c (radula).

*Globiscala bullata*; Joussemaume, 1912:217.

*Epitonium bullatum*; Kaicher, 1981:3122 (holotype); Kilburn & Rippey, 1982:78, pl. 11, fig. 15.

*Scala (Globiscala) papyracea* de Boury, 1912:99, pl. 7, figs 5, 6. Type locality: 'Province de Natal'.

*Epitonium (Globiscala) woolacottae* Kerslake, 1958:157, text fig; Kaicher, 1981:3035 (holotype). Type locality: Caloundra, South Queensland.

*Globiscala kashiwajimensis* Azuma, 1962:133, fig. 2 (**syn. n.**). Type locality: off Kashiwajima, Tosa, Japan, 20 fath.

Diagnosis: Shell ovate-turbinate, varying greatly in breadth, and in height of spire; body whorl evenly convex, umbilicus narrow; early whorls with fine axial threads, becoming more widely spaced and irregular on later whorls; intervals with shallow spiral grooves; white; attains 27 mm.

Description: Shell ovate-turbinate, varying greatly in proportions (breadth/length 0,62–0,76, aperture/total length 0,35–0,48); about 6 teleoconch whorls; whorls convex, body whorl not angular, suture moderately shallow, pliculated by rib terminations; aperture ovate to ovate-quadrate, rather produced basally, columella almost straight, slightly reflexed, peristome thin, simple, labrum slightly sinuous in side view; umbilicus open, narrow but deep. Axial sculpture consisting of low, filiform riblets on early whorls (24–29 on 1st whorl, 28–39 on 3rd), becoming progressively more sinuous, irregular, inconspicuous and widely spaced, so that on later whorls these riblets may simulate coarse growth-fractures; an occasional riblet is varicoid. Spiral sculpture inconspicuous, of very shallow, irregularly spaced spiral grooves. White.

Protoconch conical, of 3½ convex whorls, basal diameter 0,38 mm.

Dimensions: 27,2 × 20,2 mm; 24,2 × 15,4 mm.

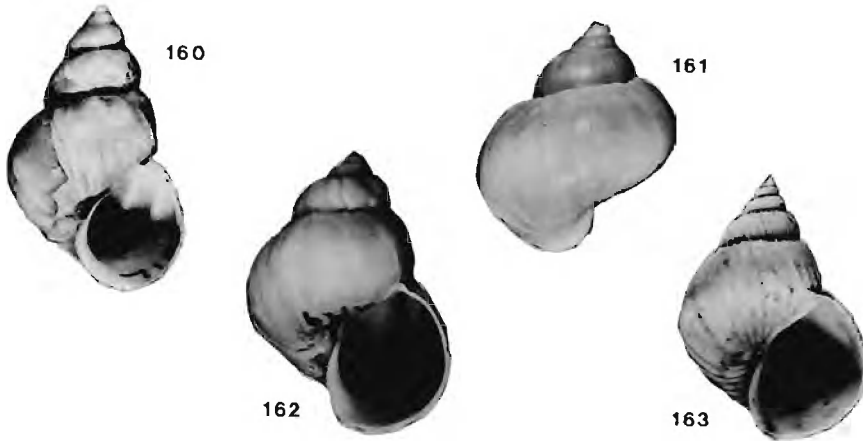
Operculum: similar to that of *E. oppositum* in shape; transparent yellowish, rather delicate.

Radula: without rachidians; lateral plates well-spaced, 14–16 per half-row, apically bifid, with a blunt lateral cusp (Fig. 171).

Range: Japan and Red Sea to Algoa Bay.

Regional locality data: SOUTHERN MOZAMBIQUE: Benguera Is, Bazaruto Archipelago (NM G4608: Mrs E. Roscoe); Bazaruto Is (NM J5466: Mrs E.

Roscoe). NATAL: Tongaat (NM 8387: W. Falcon; 9092: H. C. Burnup); Durban (NM 2625, 2623, 9138: H. C. Burnup; A1885: Mrs C. M. Connolly; 7135, B3050: R. K.); Hibberdene (Barnard 1963); Port Shepstone (NM A841: H. C. Burnup). TRANSKEI: Mzamba (NM B4596: R. K.); Lwandile/Mdumbi (NM C29: R. K.); Coffee Bay (NM B6162: Y. McLellan). EASTERN CAPE PROVINCE: Port Elizabeth, beach-drift (NM 7150: R. K.).



Figs 160–163. *Epitonium (Globiscala) bullatum* (Sowerby, 1844): 160, NM 7135, Durban, 22,5 × 13,9 mm; 161, NM 9120, Sezela, 13,5 × 8,7 mm; 162, NM 9119, Natal, 21,8 × 16,6 mm; 163, NM 9138, juvenile, Durban, 8,5 × 6,4 mm.

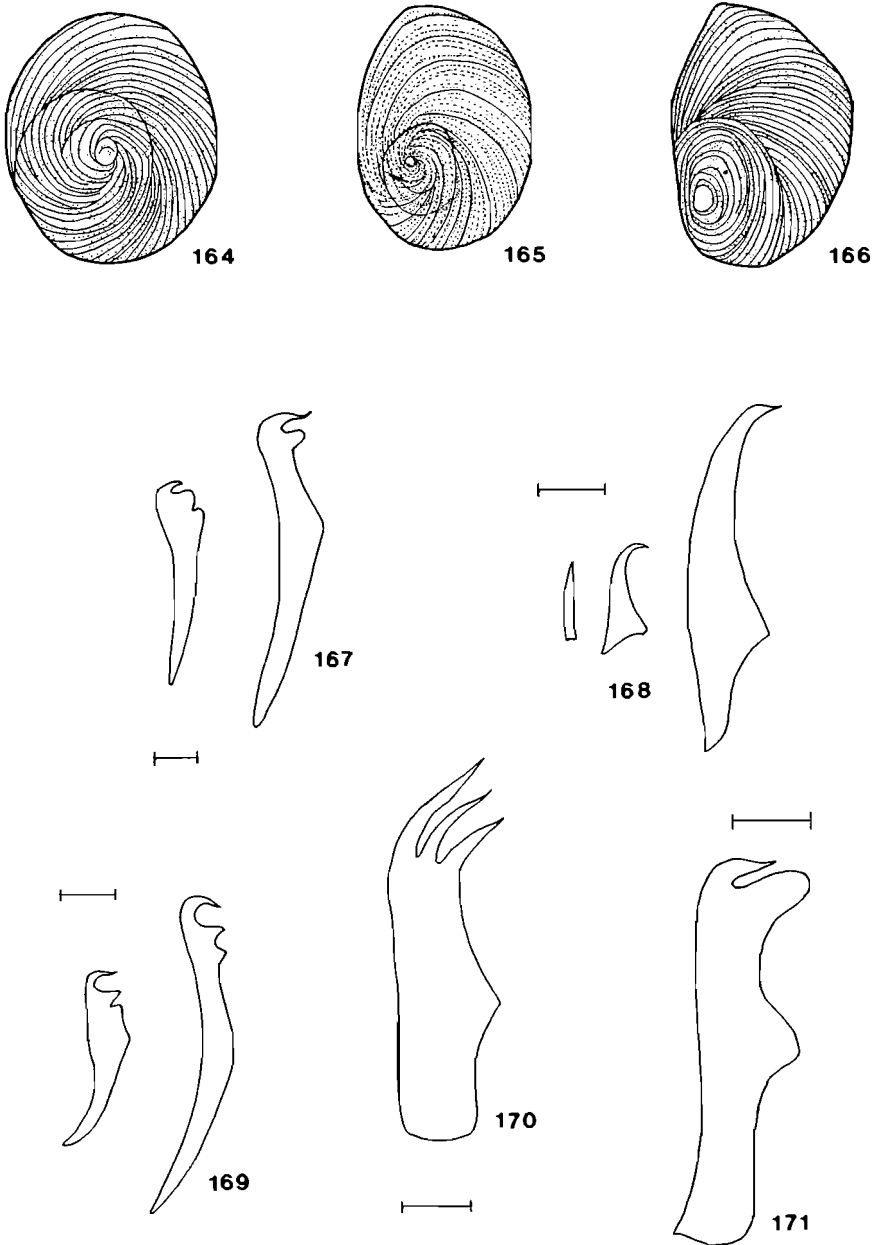
Notes: This unusually variable species (see Figs 160–163) has been described under four different names from different parts of its range. The holotype of *bullatum* was a broken juvenile, but de Boury (1912:pl. 7, figs 8, 9) illustrated as typical a Red Sea shell. He separated Natal material as *Scala papyracea*, claiming that it differed in its more elongate form, smaller aperture, deeper sutures and straighter, weaker axial riblets. However, both extremes occur together in Natal and Mozambique, and I am unable to recognise more than one taxon. *E. woolacottae* was not compared directly with *E. bullatum*, but its describer subsequently (in Bowman 1978) concluded it to be a synonym of that. I concur. Finally, *G. kashiwajimensis* was not compared with *bullatum* and its variants, but is clearly another synonym.

*E. bullatum* lives under rocks in low-tide pools, associated with the actinian *Pseudactinia flagellifera* (Hertw.) on which it feeds; on occasion it may be found partly covered by the basal disc of the anemone. Juvenile *bullatum* (Fig. 163) shelter among coralline algae, probably feeding on the small anemones that are attached to the fronds.

#### Subgenus *Pupiscala* Masahito, Kuroda & Habe, 1971

*Pupiscala* Masahito, Kuroda & Habe, in Kuroda *et al.*, 1971:256. Type species *Pupiscala pupiformis* Masahito, Kuroda & Habe, 1971.

Diagnosis: Shell subulate, with deep suture, no umbilicus (or a slight opening), a thin peristome and thin, low axial lamellae, interstitial spiral threads present or absent.



Figs 164–171. Opercula and radulae. 164–166, Opercula of: 164, *Epitonium simplex*; 165, *E. oppositum*; 166, *E. eboreum*. 167–171, Radula plates of: 167, *E. oppositum*; 168, *E. simplex* (rachidian on left); 169, *E. kraussi*; 170, *Gyroscala coronata*; 171, *E. bullatum*. Scale-line = 0,01 mm.

Notes: A paratype of the type species of *Pupiscala* (NSMT 53478) from Sagami Bay, Japan, is here figured (Fig. 158). A second Japanese species referred to *Pupiscala*, *P. actinariophila* Masahito & Habe, 1976, differs widely in shape, and may belong to *Foliaceiscala* (Fig. 157). (A broken shell from Port Shepstone (NM 3142: H. C. Burnup) agrees closely with *actinariophila* but has much rounder whorls and stronger spiral threads.)

*Pupiscala* may be a synonym of *Subuliscala* de Boury, 1909 (type species (o.d.). *Scalaria banoni* Tournouër, 1874).

### **Epitonium (*Pupiscala*) opeas sp. n.**

Figs 92, 159

Diagnosis: Shell subulate (breadth/length 0,33), suture channelled; axial ribs thin, dense, very numerous (about 114 on last whorl), feebly coronate at suture; no spiral sculpture; chalky white; length 14 mm.

Description: Shell subulate (breadth/length 0,33), of about 8 moderately convex whorls, with a channelled, simple suture; umbilicus slight, forming a narrow slit behind labium; aperture ovate, peristome thin, not auriculate, fasciole weak. Axial sculpture thin, dense, rather chalky, prosocline, arcuate, forming a weak coronation that rises slightly above suture; ribs very numerous (approximately 114 on body whorl), some compound. Chalky white.

Dimensions: 14,1 × 4,7 mm.

Range: Agulhas Bank off Tsitsikama coast, depth unknown.

Type material: Holotype NM B844/T2925, off Cape St Blaize area, *ex pisce*, leg. R. Le Maitre.

Notes: Although known only from a single shell with worn apex, no described *Epitonium* appears closely comparable. Somewhat similar to *E. (P.) pupiforme* (Masahito, Kuroda & Habe, 1971) from Japan, but that has strong spiral threads, many fewer axial ribs (about 35–38 on the body whorl), and a distinct if feeble columella pleat.

Etymology: Superficially resembling some members of the pulmonate genus *Opeas* Albers, 1850, family Subulinidae.

### ACKNOWLEDGEMENTS

I wish to thank the Council for Scientific and Industrial Research (CSIR) and the National Research Institute for Oceanology for supporting this project. Much of the material studied was dredged from the *R/V Meiring Naudé*, the use of which is gratefully acknowledged. Part of this work was carried out at the British Museum (Natural History) in 1978 and I thank Dr J. D. Taylor for providing access to the collections and the British Council and CSIR for funding the trip. Thanks are extended to Mrs Ruth Fregona for preparation of line illustrations and for other assistance, and to Mr J. P. Marais for aid in processing bottom samples. Dr P. Bouchet of the Muséum National d'Histoire Naturelle kindly read part of the M/S and gave valuable comments. Dr O. Davies checked the etymology of my proposed

new names. Material was kindly loaned by Ms K. Way (BM(NH)), Dr P. Bouchet (MHNP), Mr W. R. Liltved (SAM), Mr Akihiko Matsukuma (NSMT), Mr J. P. Marais and Mrs M. Quickelberge.

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Received: 30 November 1984.