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A catalogue of Danian gastropods from the Baunekule facies, Faxe Formation, Denmark

Bodil Wesenberg Lauridsen & Kai Ingemann Schnetler

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Cold-water coral mound ecosystem, Danian, gastropods, new taxon, palaeoecology, systematics

Cover illustration
The Faxe limestone quarry on the Stevns peninsula, eastern Denmark, has been worked intermittently since the Middle Ages. Intensive collecting by quarrymen as well as amateur and professional palaeontologists has resulted in rich fossil collections providing a detailed insight into the diversity of life on and around cold-water coral mounds in Danian times (about 63 million years ago). The quarry is viewed towards the north-east from close to the recently-established Geomuseum Faxe.

Frontispiece: facing page
Original drawings of the Danian gastropods from the Faxe quarry were undertaken in the 1960s under the direction of Professor A. Rosenkrantz; these are now stored together with the specimens in the Geological Museum of the University of Copenhagen. This page (Rkz 64) shows four drawings of the tiny gastropod *Cerithiscala tricincta* (Ravn 1933), only a few millimetres in height, which is illustrated in this catalogue in Fig. 73.

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Errata (as of 19 February 2015)
A number of figured specimens in the publication have been labeled with an incorrect institutional affiliation. These have been corrected in this electronic version, but not in the printed version; an errata supplement has been inserted in the printed bulletins.

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Cirsotrema (Cerithiscala) tricincta Ravn.

Genus
Fasc

Nordalk. Faun Lok. . Collection Rasmussen 1933 Fig 64. A.A.C.D.

Turricoala (Cerithiscala) tricincta Ravn 1933. pag. 39. pl. III fig 12a-b.

3.6 × 2.3
× 20

Lok. H. Fig A

4.6 × 2.2
× 20

Lok H. Fig B.

3.4 × 1.9
× 20

Lok. H Fig C.

1.8 × 1.0
× 40

Lok. B Fig D

Fig

Contents

Abstract

Lauridsen, B.W. & Schnetler, K.I. 2014: A catalogue of Danian gastropods from the Baunekule facies, Faxe Formation, Denmark.
Geological Survey of Denmark and Greenland Bulletin 32, 117 pp.

This catalogue of 194 gastropod taxa is based on the collection of Danian gastropods from the Baunekule facies, Faxe Formation in eastern Denmark. The gastropod fauna is extremely rich and well preserved. Most of the gastropods (106 species) are referred to genus level only, 9 morphotypes to even higher taxonomical levels and 79 gastropods are referred to species level. The gastropods are classified following Bouchet & Rocroi (2005) as 4 different clades: Vetigastropoda (represented by 26 species and 10 superfamilies), Caenogastropoda (represented by 142 species and 17 superfamilies), Heterobranchia (represented by 23 species and 5 superfamilies) and Opisthobranchia (represented by 1 species and 1 superfamily). The new species *Zaclys? nuetzeli* n. sp. is introduced.

The Faxe Formation is recognised as a cold-water coral ecosystem with interfingering smaller bryozoan mounds. The Baunekule facies is found in the upper part of the coral mound complex of the Faxe Formation, where it forms isolated lensoidal bodies in the flanks of some of the coral mounds. It is characterised by a high diversity invertebrate fauna that occurs in weakly consolidated coral-dominated floatstone to rudstone. The diagenesis of the Baunekule facies is of special significance because a high proportion of the originally aragonite-shelled fauna is preserved by recrystallisation to calcite during early burial diagenesis. Most of the gastropods are not known from other parts of the Faxe Fm. The fauna is very important for comparative evolutionary studies of fossil and modern gastropods on cold-water coral mounds. Many of the genera have not previously been recorded from Danian strata. None of the gastropod species found in the Baunekule facies are known for certain to range below the Cretaceous–Palaeogene boundary. The fauna is comparable to gastropods found on modern cold-water coral mounds in the North Atlantic.

The gastropod fauna from the Baunekule facies is characterised by a very high diversity of rather small millimetre-sized gastropods with a preference for hard substrates; 63.9% of the taxa belong to the browsing carnivore trophic group, feeding mainly on sedentary animals. Surprisingly, the fauna contains some common occurrences of typically warm-water species. The fauna consists mostly of Cenozoic genera and up to 87% of the species may be endemic to the cold-water coral ecosystem of the Faxe Formation. The diverse and rather unusual gastropod fauna from the Baunekule facies is undoubtedly linked to the evolution of cold-water coral ecosystems.

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Introduction

Fossil gastropods from the Upper Cretaceous to Danian chalk deposits of northern Europe are usually rare due to early diagenetic dissolution of the primarily aragonitic shell. A few gastropods may be found, however, as moulds and casts in cemented hardgrounds reflecting early cementation prior to aragonite dissolution. The presence of gastropods is also indicated indirectly by the common gastropod borings in bivalve or brachiopod shells (Surlyk 1972; Lauridsen & Surlyk 2008; Lauridsen *et al*. 2009; Sørensen & Surlyk 2011; Hansen & Surlyk 2014). Cold-water corals are also comparatively rare in the fossil record (Lauridsen and Bjerager 2014), due both to the low preservation potential of the aragonitic shell material and to the fact that coral ecosystems in deep water are a geologically young development. The rich and well-preserved gastropod fauna in the fossil cold-water coral mound complex of the Faxe Formation is therefore a rarity and highly significant in understanding the evolution and coexistence of gastropods on the cold-water coral mounds. The faunal compositions of modern cold-water coral mounds are not very well studied, but the few studies published indicate a dominance of gastropods among the associated fauna and some of the families represent the top predators on the cnidarians (Reed & Mikkelsen 1987; Freiwald *et al*. 2002; Reed 2002; Mortensen & Fosså 2006; Henry & Roberts 2007; Taviani *et al*. 2009).

This catalogue represents the first attempt to comprehensively present the rich gastropod fauna from the Faxe Formation of eastern Denmark and the aim is thus to produce a visual record of the Danian fauna from Faxe based on unique drafted illustrations and modern photographs and hence to make data on the fauna available for future scientific work. Thus, although the genus names have been revised, introduction of new taxa has been postponed, undescribed species are generally recorded in open nomenclature. The species *Zaclys? selandica* (Ravn 1933) has been revised, however, since the type material of this species contains two different species; the new species *Zaclys? nuetzeli* n. sp. is thus introduced herein.

Material

The material presented here has been collected in the Faxe quarry from weakly consolidated coral-dominated floatstone to rudstone, described as the Baunekule facies of the Faxe Formation by Lauridsen *et al*. (2012). It is characterised by a high diversity invertebrate fauna with preservation of both calcitic and originally aragonite-shelled benthic invertebrates. The gastropods that were drawn in the 1960s and are published here for the first time were collected in the early 20th century by

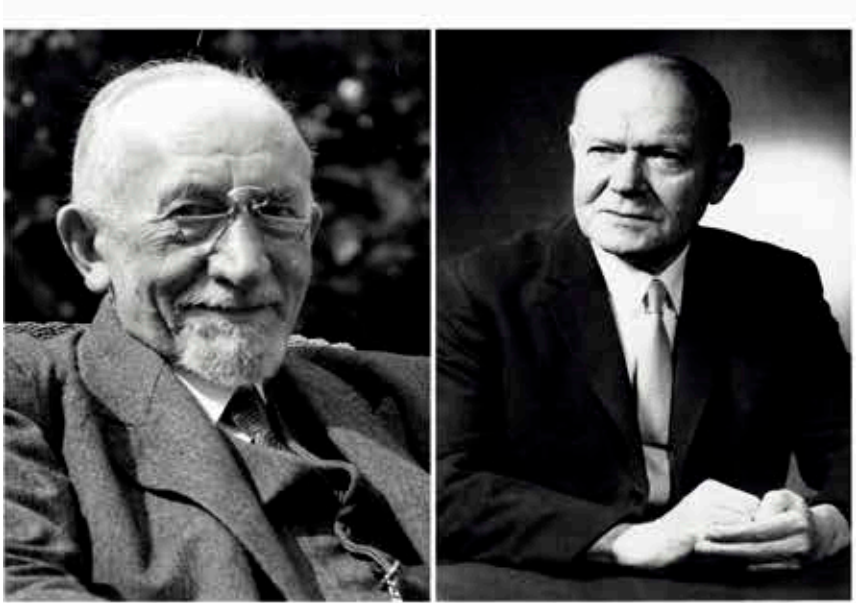


Fig. i. Key figures in the early collection and classification of the Faxe gastropod fauna. Professor J.P.J. Ravn (left) and Professor A. Rosenkrantz (right). Both photographs are used by permission of the Natural History Museum of Denmark.

J.P.J. Ravn, K. Brünnich Nielsen, C. Poulsen and A. Rosenkrantz (Fig. i). Collections were made by Søren Bo Andersen and Sten Lennart Jakobsen in 1972 and later donated to the second author. Mrs Alice Rasmussen and her family from Faxe collected more material in 1994 and invested significant effort into preparing, identifying, compiling and organising the fossils in a database (Fig. ii). Mogens Stentoft Nielsen, Odense and Ronald Janssen (SMF, Frankfurt a. M.) also made collections in 1994 and a collection made by Erik T.S. Christiansen has been donated to Faxe Museum. A small collection was donated to Eivind and Birgitte Palm, Sdr. Sejerslev, by Alice Rasmussen. The material forming the basis for the present catalogue is considerably larger than that used in the monograph published by Ravn (1933).

The authors visited the Geological Museum in Copenhagen in January 2012 and studied the material from the Baunekule facies housed there. The Ravn (1933) material was located together with material collected later by G.V. Olsen, but the type material for the Rosenkrantz drawings was not found. Subsequently this material was located in the Geological Museum by S.L. Jakobsen. During the visit, a hitherto unknown series of specimens accompanied by small sketches was found. These were obviously the basis for Rosencrantz's series of drawings, since according to labels on the boxes specimens had been taken out for drawing; several unknown species were identified in this collection.

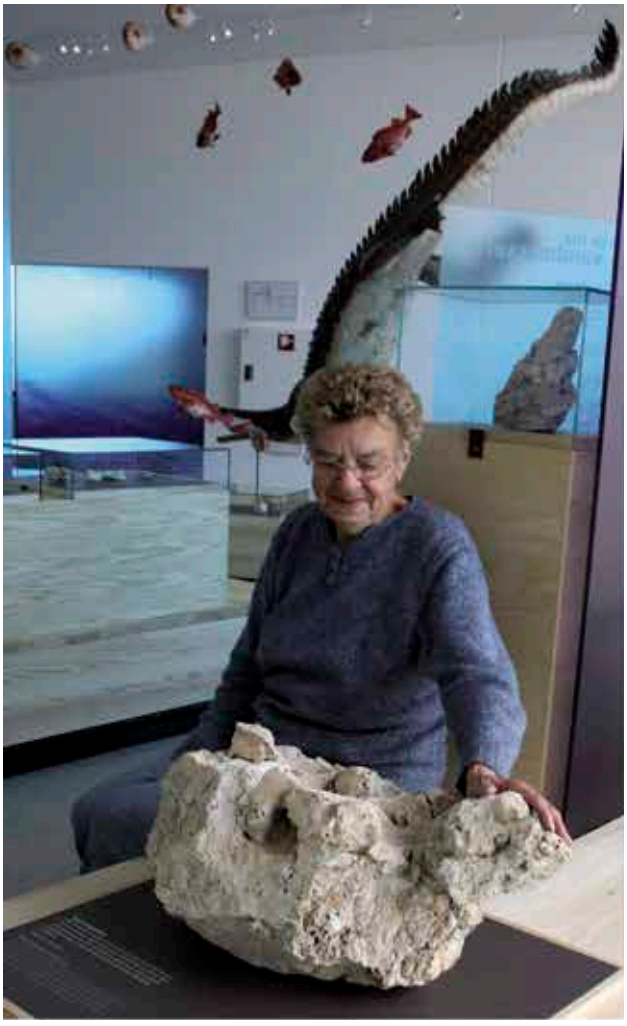


Fig. ii. Alice Rasmussen, an amateur geologist at Geomuseum Faxe, with one of her many discoveries – a block full of nautilids of the species *Hercoglossa danica*.

Previous work on gastropods from the Baunekule facies

Ravn (1902a, b) monographed the molluscs from the Cretaceous of Denmark, including the Danian and the sediments from the Faxe quarry. The bulk of the material from this locality consists of internal moulds and external imprints, but Ravn also mentioned specimens of *Leptomaria niloticiformis* and cypraeids with the shells apparently preserved; clearly, the Baunekule facies was exposed in the quarry at that time. Nielsen (1919) mentioned a gastropod fauna with many small species and compared this fauna with the younger Selandian fauna from Copenhagen. He was the first to isolate the small specimens by washing and sieving the unconsolidated chalk.

Ravn (1933) monographed the molluscs from Faxe and included material from different facies; he described many new species from the Baunekule facies. Rosenkrantz collected from these exposures in the early 1930s but the material was not included in the work of Ravn (1933). In the 1960s, Rosenkrantz obviously intended a publication of this material and a revision of the Ravn (1933) monograph, and, most probably also of the Selandian of Copenhagen and the Paleocene of Nuussuaq, West Greenland. He supervised numerous drawings of molluscs from these localities, made by the illustrators Erna Nordmann, Gunni Jørgensen and Betty Engholm and these drawings along with the serially numbered collections are still housed in the Rosenkrantz files at the Geological Museum of Copenhagen. In the folders Rosenkrantz arranged the Faxe molluscs according to the classification of the time and he used both the

drawings and new photos by Christian Poulsen. He revised some generic names and gave taxonomical remarks on many drawings, in most cases based on Wenz (1938–1944). Some new taxa were also suggested, both at genus and species level, but as they were never published they are all *nomina nuda*. A few of the drawings had sparse details of localities indicating that they were all collected from the same exposures of the Baunekule facies (the locality previously termed 'Ravns Næse'; for more details on the locality see Lauridsen *et al*. 2012).

Rosenkrantz also worked on a series of molluscs, according to the drawings, from the Paleocene of Nuussuaq and in 1970 he published a few of these drawings and introduced a few new species from Greenland. The greater part of the drawings and taxonomic notes of the species from Faxe, Copenhagen and West Greenland, however, were never published by him before his death in 1974. Most of the drawings of Greenlandic species were subsequently published by Kollmann & Peel (1983) and Schnetler & Petit (2010) and some drawings of the species from Faxe were published by Schnetler *et al.* (2001), Schnetler & Petit (2006) and Schnetler (2013). New species from the Baunekule facies have been established by German authors. Bandel & Kowalke (1997) published a new species of the family Pickworthiidae, Bandel (1998) erected a new species of the family Anatomidae and Nützel (1998) established four new species of the family Cerithiopsidae. These authors based their work on small collections of Faxe gastropods made by Søren Bo Andersen and donated by Claus Hedegaard.

Schnetler *et al.* (2001) presented a revision of the Scissurellidae and Anatomidae and established three new species. The family Cancellariidae was revised by Schnetler & Petit (2006) and five new species were established. Schnetler & Lozouet (2012) erected the new genus and species *Faxetrochus problematicus*, and finally Schnetler (2013) introduced the new name *Eoatlanta ravni* for a common gastropod species.

Geological setting

The Danian deposits of Stevns Klint and the Faxe quarry represent the latest stages in cool-water carbonate deposition in northern Europe which started in the late Early Cretaceous and lasted nearly 40 million years (Fig. iii; Thomsen 1995; Surlyk 1997). Northern Europe was situated at palaeolatitudes of 35°N to 50°N during the period (Smith *et al.* 1994) and tropical forms such as reef corals and rudists are generally absent. The nutritional content in the ocean was ideal for the development of enormous blooms of coccolithophoroid algae.

In the Danish area during the Late Cretaceous the deposition of coccolithic ooze took place in the deeper part of the Danish Basin and a specially adapted millimetre-size benthic fauna is associated with this environment (Surlyk 1972). A highly diverse Boreal fauna of bryozoans, bivalves, brachiopods, echinoderms and serpulids thrived in the shallower parts along the margins of the basin (Lauridsen & Surlyk 2008). Fossil gastropods are generally rare in the chalk deposits, probably due to low preservation potential.

In the early Danian, large asymmetric bryozoan mounds were formed and migrated towards the southeast, parallel to the coastline and towards a nutrient-rich current (Thomsen 1976; Surlyk 1997; Surlyk *et al.* 2006; Bjerager & Surlyk 2007a, b; Nielsen *et al.* 2009). The mounded bryozoan limestones are referred to the Stevns Klint Formation and span from the middle part of the early Danian to the boundary between the mid- and late Danian (Surlyk *et al.* 2006). From the mid-Danian, a low diversity but abundant fauna of azooxanthellate corals constructed biogenic mounds along the easternmost rim of the Ringkøbing-Fyn High in the Faxe area (Floris 1980; Bernecker & Weidlich 1990, 2005; Willumsen 1995; Lauridsen *et al*. 2012; Lauridsen & Bjerager 2014). The Faxe Formation is defined as a distinct mappable lithostratigraphic unit of interfingering coral and bryozoan limestone passing laterally into bryozoan limestones of the Stevns Klint Formation (Fig. iv) (Lauridsen *et al*. 2012). The mounds are formed predominantly by the frame-building corals *Dendrophyllia candelabrum,* with minor occurrences of *Oculina becki* and *Faksephyllia faxensis*. The mounds are the result of complex interactions between biological and geological processes (Lauridsen & Bjerager 2014). The mound

Fig. iii. A palaeogeographic reconstruction of the Danian Sea in North Europe. The position of the Faxe quarry is indicated by a star. Modified from Lauridsen & Damholt (2011).

ecosystem consists of numerous individual mounds of 50–100 m in diameter. Smaller bryozoan mounds and intervals with an octocoral-rich facies interfinger with the larger coral mounds (Lauridsen *et al*. 2012). The low diversity of frame-building corals and the lack of algal borings and shallow-water sedimentary structures suggest that the corals grew in relatively deep water below the photic zone. The presence of a diverse and abundant stylasterine fauna on the fossil mounds suggests a stable palaeoenvironment, probably in a bathymetric depth range of 200–400 m (Lauridsen & Bjerager 2014). The Danian cold-water coral mounds show strong similarities to the coral mound ecosystems encountered at high latitudes in the deep waters of the North Atlantic today. The term 'cold-water coral mounds' used for the modern ecosystem is therefore also applied to the coral mounds of the Faxe Formation.

Notes on the locality and the Baunekule facies

A wide range of coral limestone facies has been recorded in the Faxe Formation. The dominant biogenic mound-building facies with essentially in-place fossils mainly comprises coral rudstone to floatstone and bafflestone (Lauridsen *et al.* 2012). Associated facies include a wide range of fine to coarse grainstones, packstones and wackestones. A distinct facies has been recorded from the upper part of the Faxe Formation, composed of a weakly consolidated coral limestone with an unusually well-preserved, high-diversity invertebrate fauna; this is termed the Baunekule facies (see below; Lauridsen *et al.* 2012). The intercalated bryozoan limestone facies consists of rudstone, floatstone, packstone, and wackestone. The degree of diagenesis varies throughout the formation from extensively diagenetically altered to almost pristine coral limestone. Early diagenesis was characterised by dissolution of aragonite skeletons and associated calcite deposition and precipitation of matrix cement, cement

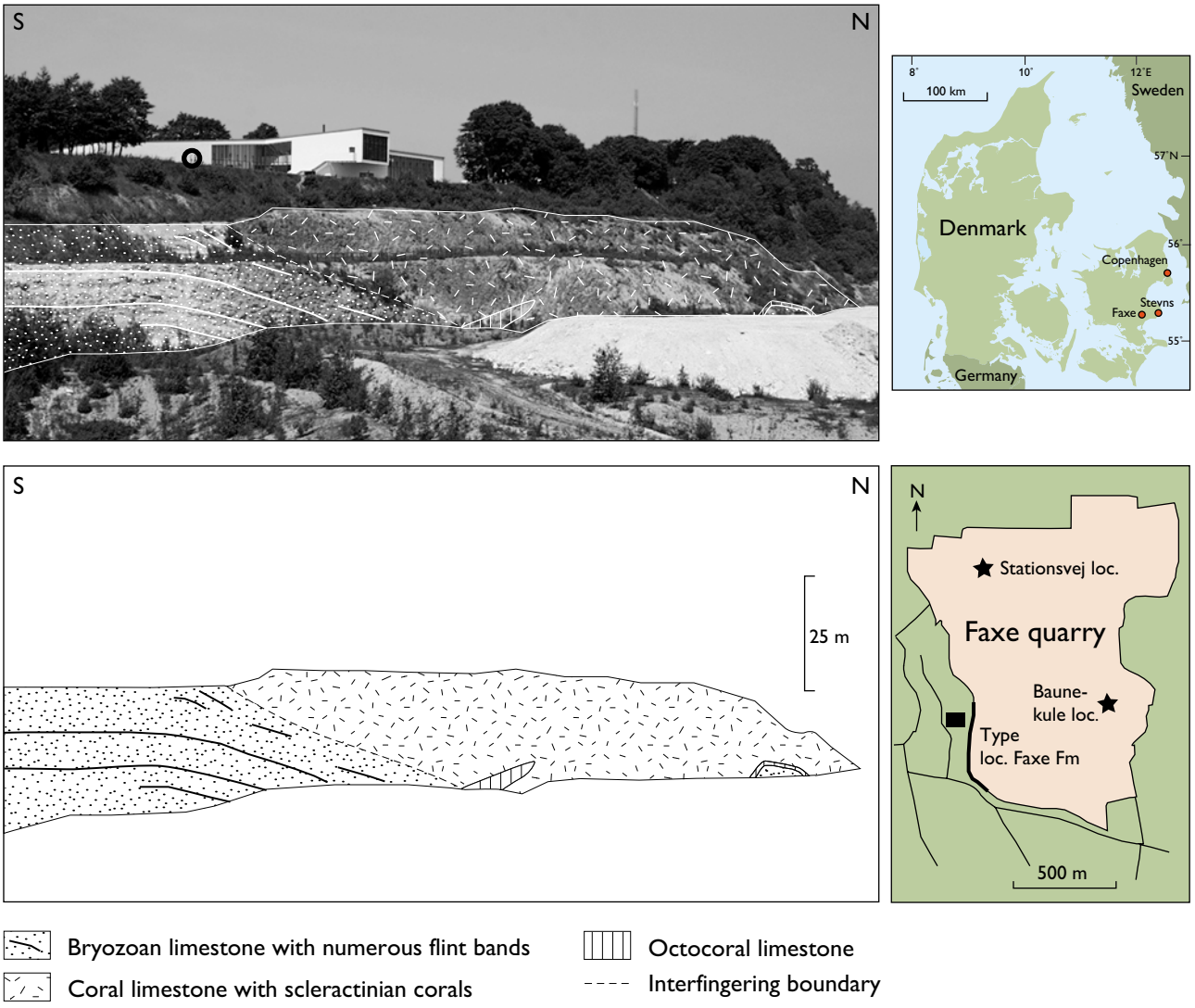


Fig. iv. Photograph and accompanying sketch of coral mounds intercalating with bryozoan mounds in the Faxe quarry at the type locality of the Faxe Formation, close to Geomuseum Faxe (GMF); two persons for scale are encircled in front of the museum. The flint layers in the bryozoan limestone emphasise the original bedding of the mounds. Octocoral limestones are rare in the quarry and are commonly found to have accumulated prior to scleractinian coral growth. The coral limestone at the type locality is predominantly of the species *Dendrophyllia candelabrum* but minor patches of *Faksephyllia faxensis* are also recorded. The two localities (Stationsvej and Baunekule) where the Baunekule facies has been recorded previously are indicated on the accompanying map. Modified from Lauridsen & Bjerager (2014).

rims, and interparticle and intraparticle replacement cements (Bernecker & Weidlich 1990; Willumsen 1995; Bjerager *et al.* 2010). Later diagenesis involved recrystallisation of shells and cementation of the limestones.

The Baunekule facies has been encountered at various times during the progressive expansion of the quarry; two important localities with respect to the collections described here were the Baunekule locality (exposed from around 1900 to the 1930s) and the Stationsvej locality (exposed in the 1970s and 1990s; for more information on the localities, see Lauridsen *et al.* 2012 and Fig. iv). The Rosenkrantz collection on which the drawings are based was collected at the Baunekule locality; all other collections are from the Stationsvej locality (Fig. iv). The Baunekule facies occurs in the upper part of the coral mound complex of the Faxe Formation, where it forms isolated lensoidal bodies within the flanks of some of the coral mounds (Lauridsen *et al.* 2012).

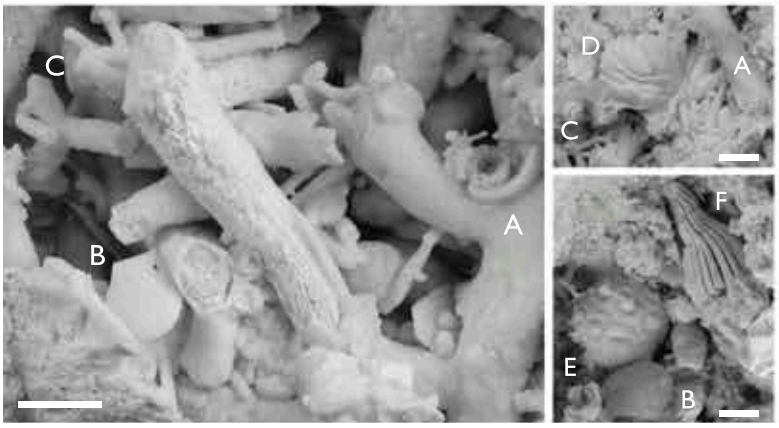


Fig. v. The rich associated fauna of the Faxe Formation is dominated by originally calcitic, shelly invertebrates. **A**: Moulds of the frame-building coral *Dendrophyllia candelabrum*. **B**: Two specimens of the bivalve *Chlamys hennigi* are well hidden between the coral branches. **C**: Bryozoans are also common. **D**: Mould of the decapod *Dromiopsis rugosa* which is common throughout the cold-water coral limestone. **E**: Echinoid plates from a *Cidaris* sp. Small specimens are common, being specially adapted to live in between the coral branches. **F**: Mould of a solitary coral. Scale bar is 10 mm.

The frame-building corals have a bushy growth form and were mound forming. They provided excellent habitats and feeding grounds for a large and diverse benthic invertebrate fauna. Brachiopods, bivalves, echinoids, asteroids, serpulids, solitary corals, octocorals and moulds of decapods and gastropods are recorded everywhere in the Faxe Formation (Fig. v). However, the degree of preservation is extremely variable.

More than 25 000 invertebrate fossils in the Alice Rasmussen collection at Geomuseum Faxe were collected from the Baunekule facies at the Stationsvej locality, representing at least 300 species. The fossils represent a wide range of modes of life and trophic levels being represented by brachiopods, bivalves, serpulids, echinoderms and corals (Lauridsen *et al*. 2012). The corals are dominated by species of the octocoral *Moltkia* and by scleractinian solitary coral species of *Parasmilia*. Originally aragonitic stylasterine hydrocorals are also rather common (Lauridsen & Bjerager 2014).

The high density and diversity of the originally aragonite-shelled fauna provide a rare taphonomic window into the past ecosystem. This is exemplified by the high abundance of millimetre-sized gastropods representing 194 different species. In other parts of the Faxe Formation, the small gastropods are only found as rare moulds or casts and are often very difficult to identify to species or even to genus level (Fig. vi).

Fig. vi. A large specimen of the gastropod genus *Leptomaria* encountered in the coral limestone of the Faxe Formation. Photograph: Jesper Milàn, Geomuseum Faxe.

Remarks on the fauna

Preservation

The diagenesis of the Baunekule facies is of special importance as early burial diagenesis resulted in preservation of many of the aragonitic faunal elements by recrystallisation to calcite prior to the precipitation of high Mg-calcite cement (Lauridsen *et al*. 2012). The carbonate mud matrix is only weakly cemented and the macro- and microfossils are accordingly easy to prepare out, in contrast to the fossils from the lithified part of the Faxe Formation. Many of the more common gastropods are preserved both as gastropod shells and as moulds and imprints. The latter preservation types are comparable to the gastropod material encountered in other parts of the Faxe Formation. Bøggild (1930) studied the structures of mollusc shells and found that the specimens were preserved with the exterior shell and that the primary aragonite was recrystallised into grainy calcite. This preservation allows study of the sculpture and the protoconch. The bulk of the material consists of small species and juvenile specimens of larger species; species larger than 10 mm are almost completely absent.

The collection of specimens from the Baunekule facies has been kept in small labelled glass tubes since the collection of material in the early 1900s. In some cases, however, shells have deteriorated probably as a result of chemical changes linked to the glass tubes or to varying humidity; calcite crystals on the shells or dissolution features can be observed on specimens in the collection.

Number of taxa

J.P.J. Ravn was the first to work systematically with the gastropods from the Faxe Formation. He recorded 56 mollusc species of which 27 were gastropods (Ravn 1902b). Later, Ravn (1933) identified 137 mollusc species, of which 98 species were gastropods. Rosenkrantz classified the gastropods and bivalves from Faxe into taxa labelled 9–267; although Rosenkrantz later revised his early classification, the data were never published. The present study has resulted in the identification of 194 species of gastropods (Table 1); most of the species are in open nomenclature and some cannot be determined even to genus level.

Stratigraphic ranges of the genera

The stratigraphic ranges of the genera encountered in the Baunekule facies are listed in Table 2. The distributions are mainly based on Wenz (1938–44), Rosenkrantz (1960), Knight *et al*. (1960), Pacaud *et al*. (2000) and Kiel (2001).

The present study lists 194 species of gastropods, representing 104 different genera. Many of the genera have not been recorded from Danian strata prior to this study: one genus was previously only known from the Jurassic, one from the Jurassic to Cretaceous, two from the Cretaceous, and three exclusively from Danian strata. Forty genera are known from the Cretaceous to the Cenozoic, spanning the Cretaceous–Palaeogene (K/Pg) boundary, 49 genera were only known from younger Cenozoic strata, and six genera were previously only known from the Recent. None of the gastropod species found in the Baunekule facies is known to range below the K/Pg boundary.

Comparison with other Paleocene gastropod faunas

Comparisons of gastropod species from Faxe with other Lower Paleocene strata are complicated. However, in Table 3 some of the relevant European successions have been compiled and listed. These are the lower Danian Cerithium Limestone Member (Rødvig Formation) from Denmark, the middle to upper Danian of Vigny, France, the Danian deposits of Nuussuaq, West Greenland and the Selandian Lellinge Greensand from the Copenhagen area, Denmark.

It is apparent from these comparisons that only two of the localities have species in common with the Baunekule facies. These are the Cerithium Limestone Member, which predates the Baunekule facies in the Danish basin and the Danian outcrops of Vigny which in part represent a similar palaeoenvironment (a cold-water coral ecosystem).

Table 1. Taxa encountered in the study, listed with frequency and inferred feeding strategies

Fig. no.	Family	Species	Frequency†	Palaeo-ecology§
1	Fissurellidae	*Rimula?* sp.	RC	HR/CB
2	Fissurellidae	*Emarginula coralliora* Lundgren 1867	VC	HR/CB
3	Pleurotomariidae	*Leptomaria niloticiformis* (von Schlotheim 1820)	VC	CB
4	Pleurotomariidae	*Leptomaria* sp.	VR	CB
5	Temnotropidae	*Temnotropis* sp.	R	HR
6	Porcellidae	*Faxetrochus problematicus* Schnetler & Lozouet 2012	VR	CB?
7	Scissurellidae	*Scissurella annulata* Ravn 1933	VC	CB
8	Scissurellidae	*Scissurella* (s. l.) *aliceae* Schnetler, Lozouet & Pacaud 2001	C	CB
9	Scissurellidae	*Scissurella ravni* (Schnetler, Lozouet & Pacaud 2001)	R	CB
10	Anatomidae	*Anatoma hedegaardi* (Bandel 1998)	R	CB
11	Anatomidae	*Anatoma rosenkrantzi* Schnetler, Lozouet & Pacaud 2001	VR	CB
12	Trochidae	*Osilinus carinatus* (Ravn 1933)	A	CB
13	Trochidae	*Jujubinus* sp.	VR	CB
14	Trochidae	*Stomatella* sp.	VR	CB
15	Turbinidae	*Leucorhynchia marginata* Ravn 1933	VR	CB
16	Turbinidae	*Skeneoides* sp.	R	CB
17	Ataphridae	*Ataphrus* sp.	VR	CB
18	Margaritidae	*Margarites bruennichi* (Ravn 1933)	A	CB
19	Angariidae	*Angaria depressa* (Ravn 1933)	VC	CB
20	Colloniidae	*Collonia (Circulopsis) pusilla* (Ravn 1933)	VC	CB
21	Colloniidae	*Vexinia* sp.	VR	CB
22	Eucycloscalidae	*Eucycloscala ultima* (Ravn 1933)	RC	CB
23	Chilodontidae	*Danilia faxensis* (Ravn 1933)	A	HM
24	Chilodontidae	*Danilia quadricordata* (Ravn 1933)	A	HM
25	Chilodontidae	*Danilia fenestrata* (Ravn 1933)	A	HM
26	Chilodontidae	Chilodontinae gen. et sp. indet.	VR	HM
27	Cerithiidae	*Ataxocerithium faxensis* (Ravn 1933)	VC	HP
28	Cerithiidae	*Ataxocerithium* sp. 1	VC	HP
29	Cerithiidae	*Ataxocerithium* sp. 2	VC	HP
30	Cerithiidae	*Bittium transenna* (Bayan 1873)?	RC	HP
31	Metacerithiidae	*Metacerithium?* sp.	VR	HP
32	Campanilidae	*Campanile? pseudotelescopium* (Ravn 1902)	RC	HP
33	Campanilidae	*Campanile? subglabra* (Ravn 1933)	R	HP
34	Campanilidae	*Campanile? sp. 1*	VR	HP
35	Campanilidae	*Campanile? sp. 2*	VR	HP
36	Trypanaxidae	*Trypanaxis faxensis* Ravn 1933	RC	HP
37	Turritellidae	*Mesalia?* sp. 1	R	SU
38	Turritellidae	*Mesalia?* sp. 2	R	SU
39	Turritellidae	*Mesalia?* sp. 3	VR	SU
40	Siliquariidae	*Tenagodus ornatus* (Lundgren 1867)	C	SU
41	Siliquariidae	*Tenagodus* sp.	VR	SU
42	Capulidae	*Trichotropis?* sp.	VR	SU

† **A**: abundant (> 500 specimens). **VC**: very common (100–499 specimens). **C**: common (50–99 specimens). **RC**: rather common (20–49 specimens). **R**: rare (5–19 specimens). **VR**: very rare (1–4 specimens).

§ The palaeoecological classification is adopted from Todd (2000). **CB**: browsing carnivores. **CP**: predatory carnivores. **HM**: herbivores on fine-grained substrates. **HO**: herbivorous omnivores. **HP**: herbivores on algal substrates. **HR**: herbivores on rock, rubble or coral substrates. **SU**: suspension feeders.

Table 1. (continued)

Fig. no.	Family	Species	Frequency†	Palaeo-ecology§
43	Capulidae	Capulidae gen. et sp. indet.	VR	SU?
44	Cypraeidae	*Palaeocypraea spirata* (von Schlotheim 1820)	C	HO
45	Cypraeidae	*Palaeocypraea* sp.	VR	HO
46	Cypraeidae	*Bernaya (Protocypraea) globuliformis* (Ravn 1902)	VR	HO
47	Eocypraeidae	*Eocypraea danica* (Schilder 1928)	RC	HO
48	Littorinidae	*Littoraria (Littorinopsis) faxensis* (Ravn 1933)	R	HR
49	Pickworthiidae	*Sansonia hedegaardi* Bandel & Kowalke 1997	C	HR/SU ?
50	Pickworthiidae	*Sansonia* sp.	R	HR/SU ?
51	Pickworthiidae	*Mareleptopoma?* sp.	R	HR/SU ?
52	Pickworthiidae	*Urceolabrum* sp. 1	VR	HR/SU ?
53	Pickworthiidae	*Urceolabrum* sp. 2	VR	HR/SU ?
54	Pickworthiidae	*Faxia macrostoma* Ravn 1933	C	HR/SU ?
55	Naticidae	Naticidae gen. et sp. indet.	VR	CP
56	Rissoidae	*Zebina* sp. 1	R	HP
57	Rissoidae	*Zebina* sp. 2	VR	HP
58	Rissoidae	*Pseudotaphrus* sp.	VR	HP?
59	Rissoidae	Rissoinidae gen. et sp. indet.	RC	HP
60	Caecidae	*Caecum* sp.	VR	HR/HP
61	Tornidae	*Circulus* sp. 1	VR	HR/HP
62	Tornidae	*Circulus* sp. 2	VR	HR/HP
63	Tornidae	*Teinostoma glaberrimum* Ravn 1933	R	HR/HP
64	Tornidae	*Sigaretornus* sp.	VR	HR/HP
65	Ranellidae	*Ranella faxensis* Ravn 1933	R	CP
66	Ranellidae	*Sassia faxense* (Ravn 1933)	C	CP
67	Ranellidae	*Sassia* sp.	VR	CP
68	Ranellidae	*Cymatium (Monoplex) subglabrum* (Ravn 1902)	R	CP
69	Elachisinidae	*Laeviphitus* sp.	VR	?
70	Hipponicidae	*Hipponix*sp.	R	HR/SU
71	Hipponicidae	*Eoatlanta ravni* Schnetler 2013	VC	HR/SU ?
72	Triviidae	*Johnstrupia faxensis* Ravn 1933	VR	CB
73	Epitoniidae	*Cerithiscala tricincta* (Ravn 1933)	RC	CB
74	Epitoniidae	*Cerithiscala* sp. 1	R	CB
75	Epitoniidae	*Cerithiscala* sp. 2	VR	CB
76	Epitoniidae	*Opalia* sp.	RC	CB
77	Epitoniidae	*Acrilla elegans* (Ravn 1902)	R	CB
78	Epitoniidae	*Acrilla* sp. 1	VR	CB
79	Epitoniidae	*Acrilla* sp. 2	VR	CB
80	Epitoniidae	*Acrilla* sp. 3	VR	CB
81	Epitoniidae	*Acrilla?* sp.	VR	CB
82	Epitoniidae	*Cirsotrema* sp.	VR	CB
83	Eulimidae	*Eulima (Polygireulima) danica* Ravn 1933	RC	CB
84	Eulimidae	*Eulima (Polygireulima)* sp. 1	VR	CB
85	Eulimidae	*Eulima (Polygyreulima)* sp. 2	VR	CB
86	Eulimidae	*Eulima (Polygyireulima)* sp. 3	VR	CB
87	Eulimidae	*Eulima (Polygireulima)* sp. 4	VR	CB
88	Eulimidae	*Eulima (Margineulima?)* sp.	VR	CB
89	Eulimidae	*Melanella* sp.	VR	CB
90	Aclididae	*Graphis danica* (Ravn 1933)	RC	CB

Table 1. (continued)

Fig. no.	Family	Species	Frequency†	Palaeo-ecology§
91	Aclididae	*Graphis* sp. 1	R	CB
92	Aclididae	*Graphis?* sp. 2	VR	CB
93	Aclididae	*Graphis?* sp. 3	VR	CB
94	Triphoridae	*Epetrium? cretacea* (Ravn 1933)	A	CB
95	Triphoridae	*Epetrium? crassigranulata* (Ravn 1933)	RC	CB
96	Triphoridae	*Epetrium? separabilis* (Ravn 1933)	R	CB
97	Triphoridae	*Epetrium?* sp.	VR	CB
98	Triphoridae	*Triphora (Ogivia) faxensis* Ravn 1933	VR	CB
99	Triphoridae	*Triphora (Ogivia)* sp.	R	CB
100	Triphoridae	Triphoridae gen. et sp. indet. 1	VR	CB
101	Triphoridae	Triphoridae gen. et sp. indet. 2	R	CB
102	Cerithiopsidae	*Cerithiopsis unisulcata* Ravn 1933	VC	CB
103	Cerithiopsidae	*Cerithiopsis* aff. *unisulcata* Ravn 1933	VR	CB
104	Cerithiopsidae	*Cerithiopsis rosenkrantzi* (Ravn 1933)	R	CB
105	Cerithiopsidae	*Cerithiopsis bruennichi* Ravn 1933	RC	CB
106	Cerithiopsidae	*Cerithiopsis* sp. 1	VR	CB
107	Cerithiopsidae	*Cerithiopsis* sp. 2	VR	CB
108	Cerithiopsidae	*Cerithiopsis* sp. 3	VR	CB
109	Cerithiopsidae	*Cerithiopsis* sp. 4	R	CB
110	Cerithiopsidae	*Cerithiopsis* sp. 5	VR	CB
111	Cerithiopsidae	*Cerithiopsis* sp. 6	VR	CB
112	Cerithiopsidae	*Cerithiopsis* sp. 7	VR	CB
113	Cerithiopsidae	*Cerithiopsis* sp. 8	R	CB
114	Cerithiopsidae	*Cerithiopsis* sp. 9	VR	CB
115	Cerithiopsidae	*Cerithiopsis* sp. 10	VR	CB
116	Cerithiopsidae	*Zaclys? selandica* (Ravn 1933)	RC	CB
117	Cerithiopsidae	*Zaclys? nuetzeli* n. sp.	R	CB
118	Cerithiopsidae	*Eocolina* sp.	R	CB
119	Cerithiopsidae	*Retilaskeya ravni* Nützel 1998	RC	CB
120	Cerithiopsidae	*Retilaskeya* sp. 1	R	CB
121	Cerithiopsidae	*Retilaskeya* sp. 2	VR	CB
122	Cerithiopsidae	*Krachia* sp.	R	CB
123	Cerithiopsidae	*Specula angustisulcata* (Ravn 1933)	VC	CB
124	Cerithiopsidae	*Cerithiopsidella trinodosa* (Ravn 1933)	R	CB
125	Cerithiopsidae	*Cerithiopsidella* sp.	VR	CB
126	Cerithiopsidae	*Vatopsis metaxiformis* Nützel 1998	C	CB
127	Cerithiopsidae	*Variseila eocostata* Nützel 1998	R	CB
128	Cerithiopsidae	*Variseila fissicosta* (Ravn 1933)	C	CB
129	Cerithiopsidae	*Variseila* sp. 1	VR	CB
130	Cerithiopsidae	*Variseila* sp. 2	VR	CB
131	Cerithiopsidae	*Seila* sp.	VR	CB
132	Cerithiopsidae	*Seila (Notoseila)* sp. 1	RC	CB
133	Cerithiopsidae	*Seila (Notoseila)* sp. 2	VR	CB
134	Cerithiopsidae	*Thereitis tricingulata* (Ravn 1933)	RC	CB
135	Newtoniellidae	*Cerithiella faxensis* (Ravn 1933)	C	CB
136	Newtoniellidae	*Cerithiella fenestrata* (Ravn 1902)	R	CB
137	Newtoniellidae	*Cerithiella* sp.	R	CB
138	Newtoniellidae	*Trituba obliquecostulata* (Ravn 1933)	C	CB

Table 1. (continued)

Fig. no.	Family	Species	Frequency†	Palaeo-ecology§
139	Newtoniellidae	*Eumetula multituberculata* Nützel 1998	RC	CB
140	Newtoniellidae	*Eumetula jenseni* (Ravn 1933)	C	CB
141	Newtoniellidae	*Eumetula* sp. 1	R	CB
142	Newtoniellidae	*Eumetula* sp. 2	VR	CB
143	Newtoniellidae	*Eumetula?* sp. 3	VR	CB
144	Fasciolariidae	*Fusinus* sp. 1	R	CP
145	Fasciolariidae	*Fusinus* sp. 2	VR	CP
146	Fasciolariidae	*Dolicholatirus* sp. 1	R	CP
147	Fasciolariidae	*Dolicholatirus* sp. 2	VR	CP
148	Fasciolariidae	*Conradconfusus parvus* (Ravn 1933)	VC	CP
149	Fasciolariidae	*Conradconfusus subglaber* (Ravn 1933)	VC	CP
150	Fasciolariidae	*Conradconfusus* sp.	RC	CP
151	Muricidae	*Pterynotus (Pterochelus)* sp.	R	CP
152	Costellariidae	*Vexillum* sp.	R	CP
153	Mitridae	*Mitra subglabra* (Ravn 1933)	VC	CP
154	Mitridae	*Mitra glabra* (Ravn 1933)	R	CP
155	Mitridae	*Mitra faxensis* (Ravn 1933)	R	CP
156	Volutidae	*Scaphella faxensis* (Ravn 1902)	VR	CP
157	Volutomitridae	*Conomitra* sp.	R	CP
158	Clavatulidae	*Turricula faxensis* (Ravn 1902)	R	CP
159	Clavatulidae	*Turricula pusilla* (Ravn 1933)	R	CP
160	Cancellariidae	*Plesiotriton steni* Schnetler & Petit 2006	R	CB
161	Cancellariidae	*Unitas anderseni* Schnetler & Petit 2006	R	CB
162	Cancellariidae	*Unitas aliceae* Schnetler & Petit 2006	R	CB
163	Cancellariidae	*Unitas* sp. 1	VR	CB
164	Cancellariidae	*Unitas* sp. 2	R	CB
165	Cancellariidae	*Admetula rosenkrantzi* Schnetler & Petit 2006	VR	CB
166	Cancellariidae	*Admetula faksensis* Schnetler & Petit 2006	R	CB
167	Cancellariidae	*Semitriton biplicatus* (Ravn 1902)	RC	CB
168	Cancellariidae	*Tatara danica* Schnetler & Petit 2006	RC	CB
169	Acteonidae	*Acteon* sp.	R	CP
170	Acteonidae	*Rictaxis? selandica* (Ravn 1933)	C	CP
171	Acteonidae?	Acteonoidea, gen. et sp. indet.	RC	CB
172	Rissoellidae	*Rissoella* sp.	VR	CB?
173	Architectonicidae	*Pseudotorinia faxense* (Ravn 1933)	VC	CB
174	Architectonicidae	*Nipteraxis poulseni* (Ravn 1933)	R	CB
175	Architectonicidae	*Pseudomalaxis* sp.	C	CB
176	Architectonicidae	*Orbitestella* sp.	VR	CB
177	Amphitomariidae	*Neamphitomaria* sp. 1	VR	CB
178	Amphitomariidae	*Neamphitomaria* sp. 2	VR	CB
179	Amphitomariidae	*Neamphitomaria* sp. 3	VR	CB
180	Mathildidae	*Gegania rosenkrantzi* (Ravn 1933)	C	CB
181	Mathildidae	*Mathilda unicarinata* (Ravn 1933)	RC	CB
182	Mathildidae	*Mathilda* sp. 1	VR	CB
183	Mathildidae	*Mathilda* sp. 2	VR	CB
184	Mathildidae	*Acrocoelum?* sp. 1	VR	CB
185	Mathildidae	*Acrocoelum?* sp. 2	VR	CB
186	Mathildidae	*Clathrobaculus?* sp. 1	VR	CB

Table 1. (continued)

Fig. no.	Family	Species	Frequency†	Palaeo-ecology§
187	Mathildidae	*Clathrobaculus?* sp. 2	R	CB
188	Pyramidellidae	*Odostomia* sp. 1	VR	CB
189	Pyramidellidae	*Odostomia* sp. 2	C	CB
190	Amathinidae	*Leucotina* sp.	R	CB
191	Amathinidae	*Puposyrnola* sp.	VR	CB
192	Cylichnidae	*Acteocina* sp.	R	CP
193		Incertae sedis sp. 1	VR	?
194		Incertae sedis sp. 2	VR	?

Palaeoecology

The coral branches on the cold-water coral mounds served as substrate, shelter and food for a rich and diverse associated fauna, many of the species being especially adapted for a life on the coral mounds. The rich and unusual gastropod fauna presented here is ideal for palaeoecological studies. However, an in-depth study is beyond the scope of this paper, so the subject is only discussed briefly below.

The classification of gastropod feeding characteristics used in this study is taken from Todd (2000; Table 1). The functional morphology of gastropod shells is complicated, mainly because the shells of the gastropods are less associated with the substrate compared to bivalves. In Table 1 the frequencies of the species in terms of number of individuals and their presumed diets are listed, and these data are plotted in Figs vii and viii. The six most abundant species represented by more than 500 specimens are: *Margarites bruennichi* (Ravn 1933), *Osilinus carinatus* (Ravn 1933), *Epetrium? cretacea* (Ravn 1933), *Danilia faxensis* (Ravn 1933), *Danilia quadricordata* (Ravn 1933) and *Danilia fenestrata* (Ravn 1933). The dominant trophic group in terms of number of species (Fig. viii) is the browsing carnivores (124 taxa, 63.9% of the gastropod fauna), feeding on sedentary animals such as sponges and corals, followed by the predatory carnivores feeding on mobile macro organisms (21 species, 10.8% of all species). Fourteen species (7.2% of all species) are herbivores whereas 3–4% of all species are herbivores on microalgae or suspension feeders, some living stationary in sponges such as *Tenagodus ornatus* of the Siliquariidae. Three species or genera belong to unknown trophic groups.

It is evident from the preliminary results that the gastropod fauna is dominated by species that had a preference for hard substrates, such as the coral mounds. This is unusual and makes the fauna from Faxe unique among the described Paleocene gastropod faunas which are normally dominated by soft substrate faunas.

The Faxe fauna represents a thanatocoenosis and this could explain the rather common occurrence of herbivores, possibly representing a fauna from shallower water depths. Furthermore, some of the common species, such as members of Cypraidae are traditionally regarded as being typically warm-water species; this is anomalous in this deep and inferred cold-coral ecosystem.

In summary, the fossil gastropod fauna from Baunekule facies is very diverse but is dominated by forms with a preference for hard substrates; 63.9 % of the species belong to the browsing carnivores trophic group. Surprisingly, the fauna contains some common occurrences of typically warm-water species. The fauna consists mainly of Cenozoic genera and up to 87% of the species may be endemic to the cold-water coral ecosystem of the Faxe Formation; substantiation of this point demands more work on the contemporaneous cemented hardgrounds occurring in the bryozoan limestone of the Rødvig Formation.

Table 2. Known stratigraphic ranges of genera recorded from the Baunekule facies, Faxe Formation

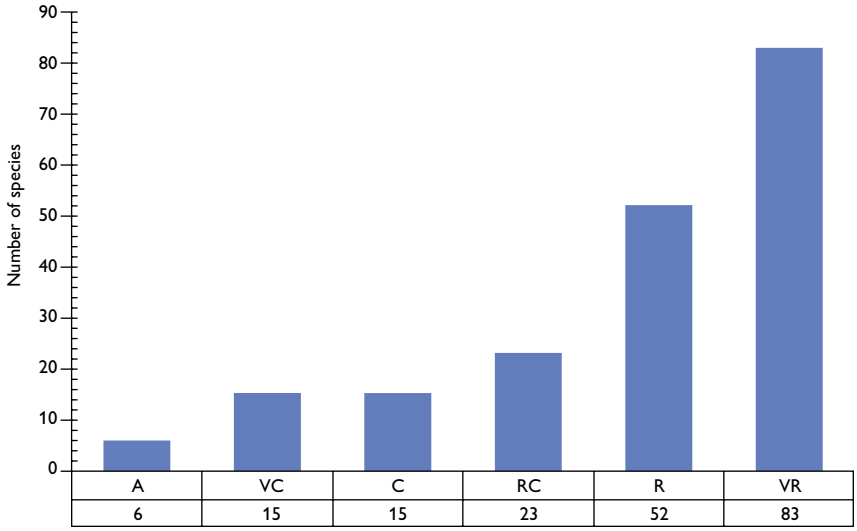
Jurassic	Jurassic to Cretaceous	Jurassic to Recent	Cretaceous	Cretaceous to Cenozoic	Cenozoic	Danian exclusively	Recent
Clathrobaculus	*Temnotropis*	*Trichotropis*	*Ataphrus*	*Acrilla*	*Acrocoelum*	*Faxetrochus*	*Laeviphitus*
			Neamphitomaria	*Acteocina*	*Admetula*	*Faxia*	*Leucotima*
				Acteon	*Anatoma*	*Johnstrupia*	*Orbitestella*
				Angaria	*Bittium*		*Rissoella*
				Ataxocerithium	*Caecum*		*Skeneoides*
				Bernaya (Protocypraea)	*Cerithiopsidella*		*Sigaretornus*
				Campanile	*Cerithiscala*		
				Cerithiella	*Circulus*		
				Cerithiopsis	*Cirsotrema*		
				Collonia	*Conomitra*		
				Conradconfusus	*Cymatium (Monoplex)*		
				Danilia	*Dolicholatirus*		
				Emarginula	*Eoatlanta*		
				Eocypraea	*Eocolina*		
				Eumetula	*Epetrium*		
				Eucycloscala	*Eulima (Polygireulima)*		
				Fusinus	*Eulima (Margineulima)*		
				Gegania	*Graphis*		
				Hipponix	*Krachia*		
				Jujubinus	*Leucorhynchia*		
				Leptomaria	*Mareleptopoma*		
				Littoraria (Littorinopsis)	*Margarites*		
				Mathilda	*Mitra*		
				Mesalia	*Nipteraxis*		
				Notoseila	*Odostomia*		
				Palaeocypraea	*Omalaxis*		
				Pseudomalaxis	*Osilinus*		
				Pseudotorinia	*Plesiotriton*		
				Rimula	*Pliciscala*		
				Seila	*Pseudotaphrus*		
				Surcula	*Pterynotus (Pterochelus)*		
				Teinostoma	*Puposyrnola*		
				Tenagodus	*Ranella*		
				Thereitis	*Retilaskeya*		
				Unitas	*Rictaxis*		
				Urceolabrum	*Sansonia*		
				Variseila	*Scissurella*		
				Vatopsis	*Seila (Notoseila)*		
					Semitriton		
					Specula		
					Stormatella		
					Tatara		
					Trituba		
					Triphora (Ogivia)		
					Trypanaxis		
					Vexillum		
					Vexinia		
					Zaclys		
					Zebina		

Table 3. Comparison of Baunekule species and genera with other Paleocene gastropod faunas

Locality/stratigraphy	Age	Palaeo-environment	No. of species	In common with Baunekule facies		References
				Genera	Species	
Faxe, Denmark (Baunekule facies, Faxe Formation)	Middle Danian	Cold-water coral mounds	194	–	–	This bulletin
Stevns, Denmark (Cerithium Limestone Member, Rødvig Formation)	Early Danian	Open marine carbonate shelf	62	*Admetula* *Anatoma* *Cerithiella* *Cerithiopsis* *Cerithiscala* *Dolicholatirus* *Rissoina* *Tatara* *Thereitis* *Unitas* *Vatopsis* *Vexillum*	*Eulima danica* *Campanile pseudotelescopium* *Leptomaria niloticiformis/ Leptomaria meyeri* *Sassia faxense*	Rosenkrantz (1940) Hansen (*unpublished paper*)
Nuussuaq, West Greenland (Agatdal Formation)	Danian	Cold-water coral thickets	252	*Acrocoelum* *Admetula* *Cerithiella* *Cerithiopsis* *Circulus* *Conomitra* *Eocypraea* *Fusinus* *Gegania* *Leptomaria* *Mathilda* *Odostomia* *Palaeocypraea* *Scissurella* *Teinostoma* *Turricula* *Unitas*	None	Rosenkrantz (1970) Kollmann & Peel (1983) Pacaud & Schnetler (1999) Schnetler & Petit (2010)
Vigny, France (Vigny limestones)	Middle–Late Danian	Open marine, warm shallow-water(?) Possible cold-water corals are present	83		*Emarginula coralliora* *Osilinus carinatus** *Eucycloscala ultima*** *Cerithiopsis bruennichi* *Mitra glabra* *Mitra subglabra*	Pacaud *et al.* (2000) Montenat *et al.* (2002)
Copenhagen, Denmark (Lellinge Greensand)	Selandian	Deep shelf/inlet, low-energy	125	None	None	Koenen (1885) Ravn (1939) Schnetler (2001)

* previously *Boutillieria carinata*
** previously *Urceolabrum ultimum*

Fig. vii. Histogram of the frequencies of different species encountered in the studied material. The six most abundant species are represented by more than 500 specimens whereas 83 very rare species are represented by only 1–4 specimens. **A**: abundant (>500 specimens). **VC**: very common (100–499 specimens). **C**: common (50–99 specimens). **RC**: rather common (20–49 specimens). **R**: rare (5–19 specimens). **VR**: very rare (1–4 specimens).

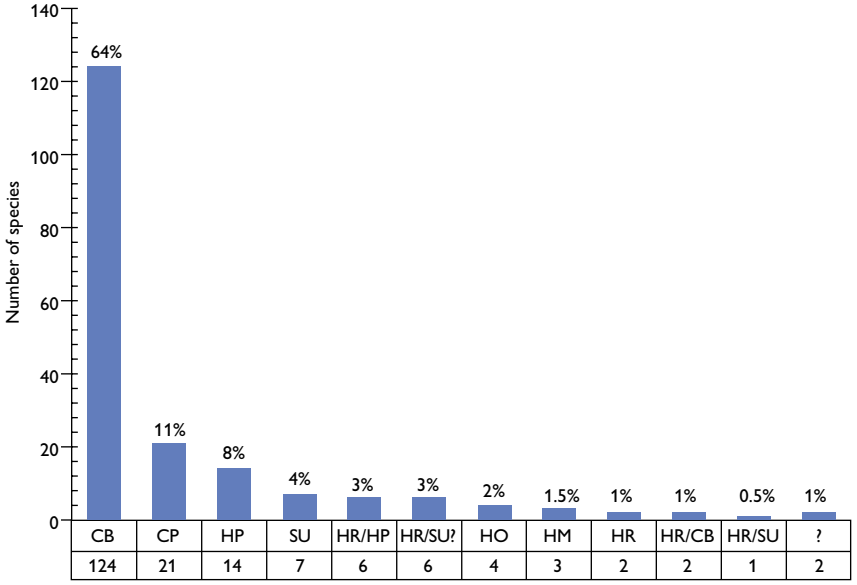


Gastropods on modern cold-water coral mounds

This study suggests that most of the gastropods were endemic to the Danian cold-water coral ecosystem and it is therefore relevant to compare the occurrences with data from modern cold-water coral ecosystems. Data on gastropods from modern cold-water ecosystems, however, are rather limited and only very few studies have worked with the gastropods in any detail (Reed & Mikkelsen 1987 (*Oculina* mounds in offshore Florida); Freiwald *et al.* 2002 (Sula Reef Norwegian Shelf); Reed 2002 (*Oculina* reef in offshore Florida); Mortensen & Fosså 2006 (mid-Norwegian shelf); Henry & Roberts 2007 (Porcupine Seabight, Atlantic Ocean); Taviani *et al.* 2009 (Mediterranean)).

Reed & Mikkelsen (1987) studied the molluscs from the modern actively growing *Oculina* mounds offshore Florida. The coral species *Oculina* is also represented in Faxe but is one of the subordinate frame-building corals. The study lists a total of 230 species-level taxa consisting of 155 gastropods, 68 bivalves, 1 scaphopod, 5 polyplacophorans, and 1 cephalopod. The authors concluded that the carnivorous, mainly coral-eating, molluscs dominated markedly at their deepest locality (around 80 m) where they formed 62.1% of the individuals (Reed & Mikkelsen 1987). This observation is compatible with

Fig. viii. Feeding strategies of the gastropods. Note that the majority of species are carnivorous browsers possibly due to the dominance of sedentary prey. **CB**: browsing carnivores. **CP**: predatory carnivores. **HM**: herbivores on fine-grained substrates. **HO**: herbivorous omnivores. **HP**: herbivores on algal substrates. **HR**: herbivores on rock, rubble or coral substrates. **SU**: suspension feeders.



the dominance of browsing carnivores in the Baunekule facies.

In the study of the recent *Lophelia* mounds in Norway, a total of 361 invertebrate species were recorded of which only 25 are gastropods (Mortensen & Fosså 2006). Henry & Roberts (2007) studied the *Lophelia* and *Madrepora* mounds of the Porcupine Seabight in the Atlantic Ocean and identified 349 invertebrate species of which 47 species are molluscs. The gastropod predators of modern *Lophelia-Madrepora* mounds in the Mediterranean were studied by Taviani *et al*. (2009). Three species from the family Muricidae were identified and one of them was observed attached to the corals, whereas two other species only showed indirect relationships. The Muricidae, *Pterynotus (Pterochelus)* sp., which is represented by a few specimens in the Baunekule facies, probably had a similar feeding strategy to its modern relatives.

At the present day, the gastropod genus *Pedicularia* is commonly symbiotic on stylasterine corals (Zibrowius & Cairns 1992; Braga-Henriques *et al*. 2011). The association between pediculariids and stylasterine corals has been reported in 12 host species (Braga-Henriques *et al*. 2011). Specimens of *Pedicularia* are well adjusted to the morphology of their host and show a high degree of plasticity (Braga-Henriques *et al*. 2011). All large specimens of stylasterine corals from the Baunekule facies have been checked for traces of symbiotic gastropods (Lauridsen & Bjerager 2014). However, no convincing traces were found, though this could be due to poor preservation potential of the traces. In addition, a rich epifauna of serpulids most likely settled after the death of the corals, covering any symbiotic traces. No fossil *Pedicularia* has been found in the Baunekule facies.

Concluding remarks and future studies

The highly diverse gastropod fauna from the Baunekule facies is an unusual fauna and undoubtedly linked to the evolution of cold-water coral ecosystems. The gastropods are specially adapted to life on the coral mounds and are dominated by browsing carnivores that preferred hard substrates. The fauna consists mainly of Cenozoic genera. More work is needed to study the distribution of gastropods on cold-water coral mounds in time and space. Our aim in publishing this first attempt at a modern systematic overview of the gastropod fauna from Faxe is to contribute to this long-term goal.

Acknowledgements

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1998 and *Cerithiopsis rosenkrantzi* at our disposal and helped with photos.

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The manuscript benefited significantly from the constructive comments of the referees J. Alistair Crame (British Antarctic Survey, UK) and Thomas Hansen (Akvaplan-niva, Norway).

Systematic palaeontology

Abbreviations and classification

ARF Alice Rasmussen collection, Faxe, Denmark (now housed in Geomuseum Faxe under Østsjællands Museum, Denmark). Specimens mentioned have the prefix ØSM-10059.

EBP Eivind and Birgitte Palm collection, Sdr. Sejerslev, Denmark.

ECS Erik T.S. Christiansen collection, Svendborg (now housed in Geomuseum Faxe, Denmark). Specimens mentioned have the prefix ØSM 10061.

GF Geomuseum Faxe, Faxe, Denmark

GM Acronym for registered material in the Geological Museum, Copenhagen, Denmark.

GPIuM Geologisch-Paläontologisches Institut und Museum, Hamburg, Germany.

ISL Kai Ingemann Schnetler collection, Langå, Denmark.

JMP Jean-Michel Pacaud collection, Paris, France.

MGUH Geological Museum type collection, Copenhagen, Denmark.

MNHN Muséum National d'Histoire Naturelle, Paris, France.

MNO Mogens Stentoft Nielsen collection, Odense, Denmark.

MGUH Geological Museum type collection, Natural History Museum of Denmark, University of Copenhagen, Denmark.

M.U.H. Museum Universitas Hafniensis (Museum of the University of Copenhagen), unpublished museum names *(nomina nuda)*.

ØSM Østsjællands Museum, Store Heddinge, Denmark

RGM Naturalis Biodiversity Center (Palaeontology Department), Leiden, The Netherlands (formerly Rijksmuseum van Geologie en Mineralogie).

Rkz Acronym for specimens illustrated in the Rosenkrantz files of drawings, in the Geological Museum, Copenhagen, Denmark.

SGPIH Geologisch-Paläontologisch Institut und Museum der Universität Hamburg, Germany.

SMF Forschungsinstitut Senckenberg, Frankfurt am Main, Germany.

The gastropods are arranged in accordance with the family-level classification of Bouchet & Rocroi (2005). Four different clades are represented: Vetigastropoda, Caenogastropoda, Heterobranchia and Opisthobranchia. The clade Caenogastropoda contains the clades Sorbeoconcha and Hypsogastropoda; Littorinimorpha and Neogastropoda are clades within the Hypsogastropoda. The clade Opisthobranchia contains the clade Cephalaspidea. Changes in taxonomy since this classification have also been considered, e.g. Williams *et al*. (2008), Williams *et al*. (2010), Bandel (2006), Fehse (2007) and Geiger (2012). WoRMS Editorial Board (2014), World Register of Marine Species, has been consulted. The frequencies of the species are indicated: Abundant: >500 specimens; Very common: 100–499 specimens; Common: 50–99 specimens; Rather common 20–49 specimens; Rare: 5–19 specimens and Very rare: 1–4 specimens. For rare and very rare species, the depository and numbers of specimens are given.

Phylum Mollusca Linnaeus 1758
Class Gastropoda Cuvier 1795
Clade Vetigastropoda
Superfamily Fissurellioidea Fleming 1822
Family Fissurellidae Fleming 1822
Subfamily Fissurellinae Fleming 1822
Genus *Rimula* Lowe 1852
Type species. Rimula blainvillei Defrance 1827.

***Rimula?* sp.** (Fig. 1)

Additional material. ARF, 8 specimens (ØSM-10059-25116); ISL, 9 specimens; MNO, 3 specimens. The species is rather common.

Remarks. The species is assigned to *Rimula* with some doubt, as this species generally has a long and narrow perforation. Furthermore, no specimen allows examination of the internal characters of the shell to ascertain whether or not there is an internal septum.

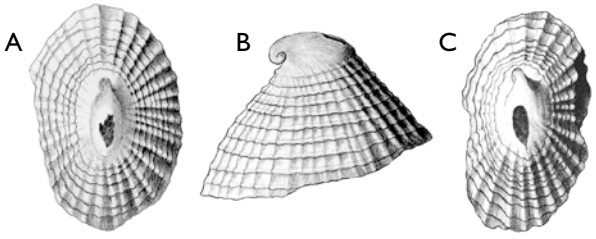

Fig. 1. *Rimula?* sp. , **A**, **B**: MGUH 30963 (ex Rkz 154) 1.6 x 2.5 mm, 2.5 x 1.5 mm. **C**: MGUH 30964 (ex Rkz 154A).

Subfamily Emarginulinae Children 1834
Genus *Emarginula* Lamarck 1801
Type species. Emarginula conica Lamarck 1801.

***Emarginula coralliora* Lundgren 1867** (Fig. 2)

1867 *Emarginula coralliorum* (M.U.H.) Lundgren, p. 19, plate 1, figs 5a, b.
1902 *Emarginula coralliorum* (M.U.H.) Lundgren – Ravn, p. 213, plate 1, figs 1, 2.
1933 *Emarginula coralliorum* (M.U.H.) Lundgren – Ravn, p. 20, plate 1, figs 13a, b.
2004 *Emarginula* (s. s.) *coralliora* Lundgren 1867 – Pacaud, p. 599, fig. 10.

Type material. Holotype LO 180T (Lundgren 1867, fig. 5a), paratype LO 181t (Lundgren 1867, fig. 5b).

Additional material. GM, 10 specimens (Ravn 1933). The species is very common.

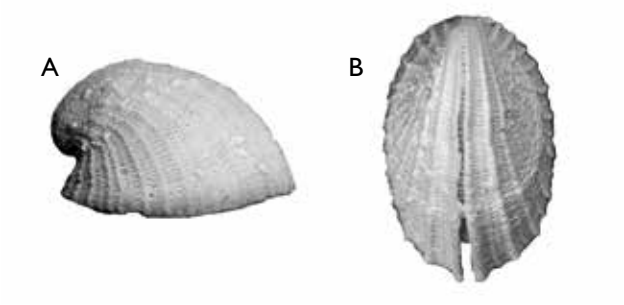

Fig. 2. *Emarginula coralliora* Lundgren 1867. MGUH 3122, height 3.2 mm, length 4.7 mm.

Superfamily Pleuroromarioidea Swainson 1840
Family Pleurotomariidae Swainson 1840
Genus *Leptomaria* Eudes-Deslongchamps 1864
Type species. Pleurotomaria amoena Eudes-Deslongchamps 1849.

***Leptomaria niloticiformis* (von Schlotheim 1820)** (Fig. 3)

1820 *Trochilites niloticiformis* Schlotheim, p. 156.
1902 *Pleurotomaria niloticiformis* (Schlotheim) – Ravn, p. 214, plate 1, fig. 3, fig. 4?
1933 *Pleurotomaria niloticiformis* (Schlotheim) – Ravn, p. 25, plate 1, fig. 10.

Additional material. MGUH 3119. Small specimens are very common, whereas larger complete specimens are rare. The species is very common.

Remarks. Ravn (1902b) described the species on the basis of two specimens with the shell preserved and discussed the variability of the species. Pacaud (2004, p. 619) discussed the validity of the taxon *Pleurotomaria niloticiformis* von Schlotheim 1820. This species was compared with *Trochilites politus* and considered as a new species because of its large size (von Schlotheim 1820). However, neither descriptions nor illustrations of *P. niloticiformis* were given by von Schlotheim (1820).

Ravn (1902b, 1933) and Pacaud (2004) suggested the possibility of several species of *Pleurotomaria* at Faxe. Pacaud described *Leptomaria meyeri* from the Danian of the Paris Basin and stated that this species was also present in the Danian at Faxe. The Danish material from the Baunekule facies differs from the French specimens by having a smaller apical angle (approx. 70° instead of 90°–120°) and almost flat whorls with very weak spiral ornamentation. Further studies of the large *Leptomaria* material from Faxe are necessary, but *Leptomaria meyeri* is probably present.

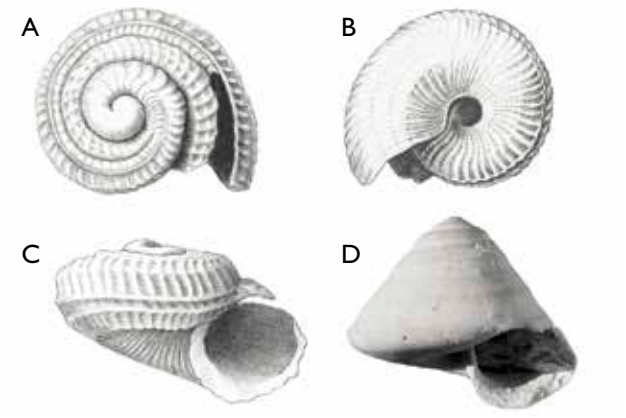

Fig. 3. *Leptomaria niloticiformis* (von Schlotheim 1820). **A–C**: MGUH 30965 (ex Rkz 105), width 1.5 mm, height 1.1 mm. **D**: MGUH 30966 (ex ISL), height 23.0 mm, width 26.2 mm.

***Leptomaria* sp.** (Fig. 4)

Material. Only the illustrated specimen is known.

Description. The specimen consists of the protoconch and 11/4 teleoconch. The nucleus is larger than on the previous species and the juvenile shell has a stronger sculpture.

Remarks. Ravn (1933) noted the possible presence of several species of *Leptomaria*. Pacaud (2004) described the species *Leptomaria penultima* (d'Orbigny 1850), which is also known from the Danian at Limhamn, Sweden. An external impression in ARF shows a similar sculpture and it seems possible that the illustrated juvenile specimen might belong to this species. However, further studies are necessary.

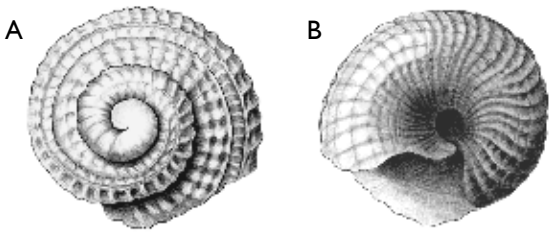

Fig. 4. *Leptomaria* sp. MGUH 30967 (ex Rkz 106), maximum diameter 2.2 mm.

Superfamily Haliotoidea Rafinesque 1815
Family Temnotropidae Cox 1960
Genus *Temnotropis* Laube 1870
Type species. *Temnotropis carinata* (Münster 1841).

***Temnotropis* sp.** (Fig. 5)

Additional material. GM, 3 specimens (GM 1991.4390, GM 1991.4415, GM 1991.4221); ISL, 1 specimen; MNO, 1 specimen. The species is rare.

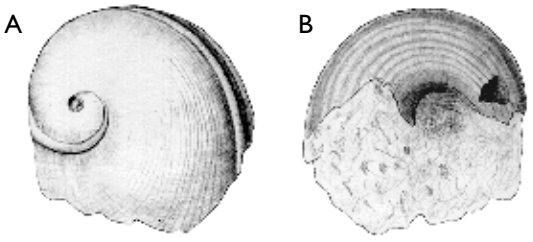

Fig. 5. *Temnotropis* sp. MGUH 30968 (ex Rkz 112), maximum diameter 1.9 mm.

Superfamily Porcellioidea Koken 1895
Family Porcellidae Koken 1895
Genus *Faxetrochus* Schnetler & Lozouet 2012
Type species. *Faxetrochus problematicus* Schnetler & Lozouet 2012.

***Faxetrochus problematicus* Schnetler & Lozouet 2012** (Fig. 6)

2012 *Faxetrochus problematicus* Schnetler & Lozouet, p. 4, plate 1a–f.

Material. Only the holotype (MGUH 29810) is known.

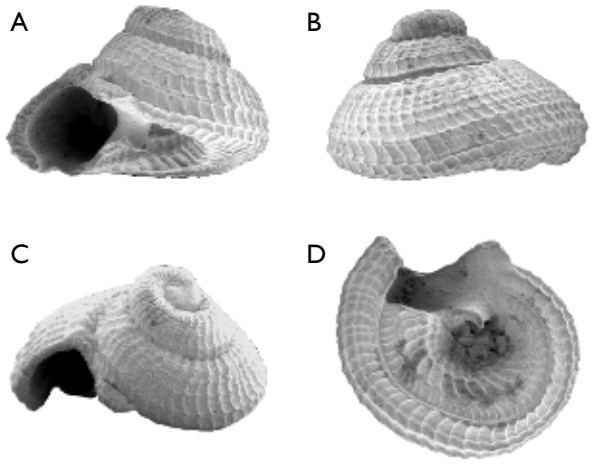

Fig. 6. *Faxetrochus problematicus* Schnetler & Lozouet 2012. MGUH 29810, height 1.8 mm, width 2.8 mm. Photo: Pierre Lozouet, Paris.

Remarks. According to Geiger (2012), *Maxwellella* Bandel 1998 is a junior synonym of *Scissurella* d'Orbigny 1824.

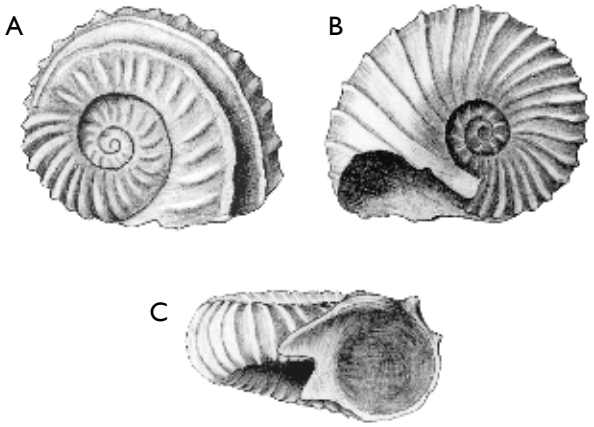

Fig. 7. *Scissurella annulata* Ravn 1933. MGUH 3123, height 0.8 mm, width 1.5 mm.

Superfamily Scissurellioidea Gray 1847a
Family Scissurellidae Gray 1847a
Subfamily Scissurellinae Gray 1847a
Genus *Scissurella* d'Orbigny 1824
Type species. *Scissurella laevigata* d'Orbigny 1824.

***Scissurella annulata* Ravn 1933** (Fig. 7)

1933 *Scissurella annulata* Ravn, p. 25, plate 1, figs 14a–c.
1998 *Maxwellella annulata* (Ravn 1933) – Bandel, p. 19 ; plate 5, figs 4–6.
2001 *Maxwellella annulata* (Ravn 1933) – Schnetler *et al*., p. 86, plate 1, figs 7–9; plate 3, figs 4a–c.

Type material. Holotype MGUH 3123.

Additional material. MGUH 25753; GM 3495, 24 specimens; GM 1991.3499, 1 specimen; GM 1991.4415, 1 specimen; MNHN, 2 specimens; JMP, 2 specimens; SMF, 2 specimens (SMF 321222); ISL, 22 specimens; ARF, 54 specimens; MNO 19 specimens. The species is very common.

***Scissurella* (s. l.) *aliceae* Schnetler, Lozouet & Pacaud 2001** (Fig. 8)

2001 *Scissurella aliceaea* Schnetler *et al*., p. 82, plate 1, figs 1–3; plate 3, figs 1, 2.

Type material. Holotype MGUH 25748; Paratypes MGUH 25749, MGUH 25750, MGUH 25758, MGUH 25759.

Additional material. GM 1991.3496, 6 specimens; GM 1991.4415, 2 specimens; MNHN, 1 specimen (MNHN-LP R63044); SMF, 1 specimen (SMF 321220); ISL, 7 specimens; ARF, 49 specimens (ØSM-10059-21734, 25848 and 25851); MNO, 2 specimens. The species is common, but easily overlooked.

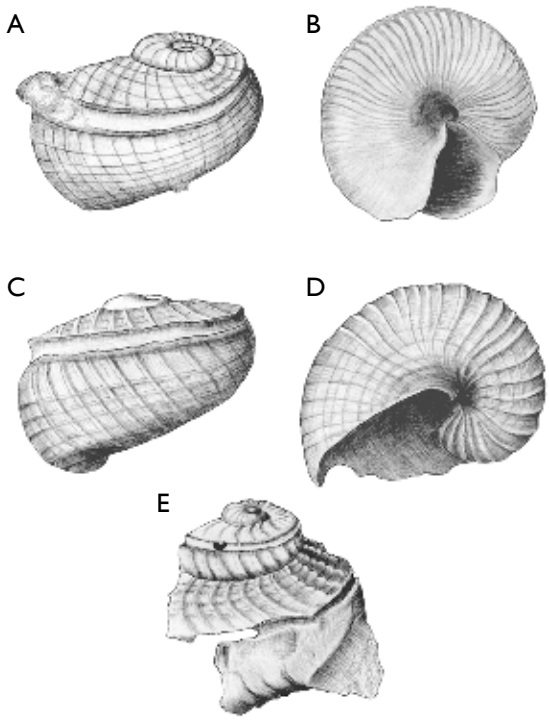

Fig. 8. *Scissurella (s. l.) aliceae* Schnetler, Lozouet & Pacaud 2001. **A**, **B**: MGUH 25759 (ex Rkz 119), width 1.9 mm, height 1.6 mm. **C**, **D**: MGUH 25758 (ex Rkz 120), width 1.8 mm. **E**: MGUH 30969 (ex Rkz 100), height 1.8 mm.

***Scissurella ravni* (Schnetler, Lozouet & Pacaud 2001)** (Fig. 9)

2001 *Praescissurella? ravni* Schnetler *et al*., p. 84, plate 1, figs 4–6; plate 3, figs 5a–c.

Type material. Holotype MGUH 25752. *Paratypes* MGUH 25751, MGUH 25761 (ex Rkz 121).

Additional material. GM 1991.3497, 4 specimens; MNHN, 1 specimen; JMP, 1 specimen (MNHN-LPR63045); SMF, 1 specimen (SMF 321221); ISL, 3 specimens; ARF, 1 specimen (ØSM-10059-25843). The species is rare.

Remarks. According to Geiger (2012), *Praescissurella* Lozouet 1998 is a junior subjective synonym of *Scissurella* d'Orbigny 1824.

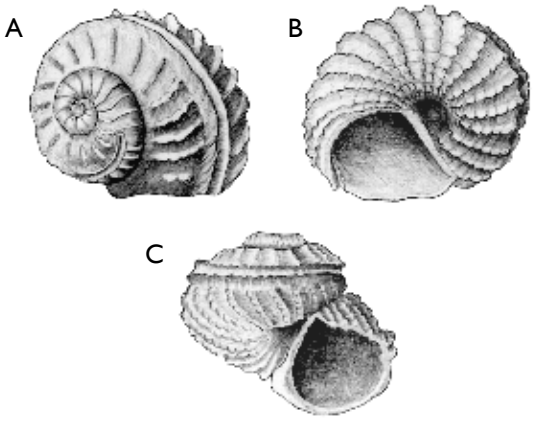

Fig. 9. *Scissurella ravni* (Schnetler, Lozouet & Pacaud 2001). MGUH 25761 (ex Rkz 121), height 1.2 mm, width 1.6 mm.

Family Anatomidae McLean 1989
Genus *Anatoma* Woodward 1859
Type species. *Scissurella crispata* Fleming 1828**.**

***Anatoma hedegaardi* (Bandel 1998)** (Fig. 10)

1998 *Scissurella hedegaardi* n. sp. – Bandel, p. 16, plate 4, figs 3, 4.
2001 *Anatoma hedegaardi* (Bandel 1998) – Schnetler *et al*., p. 86, plate 2, figs 1–3.

Type material. SGPIH Nr. 3872

Additional material. MGUH 25755; GM 1991.4221 and GM1991.4222, 2 specimens (leg. G.V. Olsen); ARF, 3 specimens (ØSM-10059-25850); ISL, 1 specimen. The species is rare.

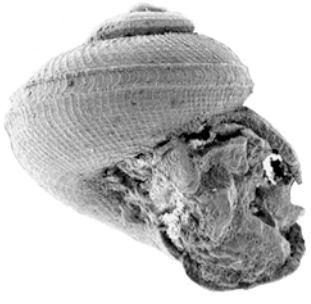

Fig. 10. *Anatoma hedegaardi* (Bandel 1998). MGUH 25755, height 2.1 mm.

***Anatoma rosenkrantzi* Schnetler, Lozouet & Pacaud 2001** (Fig. 11)

2001 *Anatoma rosenkrantzi* Schnetler *et al*., p. 8, plate 2, figs 4–6; plate 3, figs 3a–c.

Type material. Holotype MGUH 25756. Paratypes MGUH 25757 and MGUH 25760.

Material. No further specimens are known. The species is very rare.

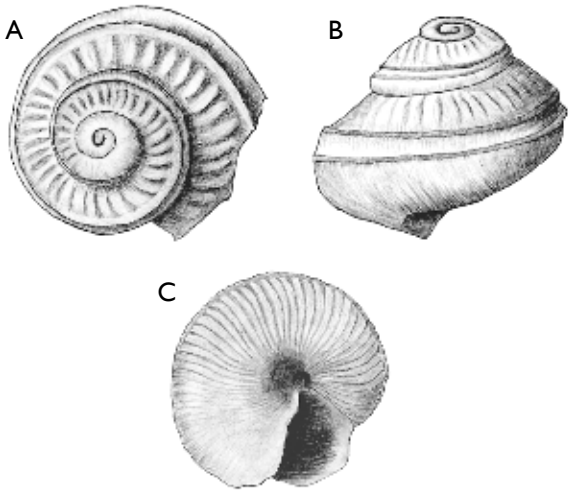

Fig. 11. *Anatoma rosenkrantzi* Schnetler, Lozouet & Pacaud 2001. **A–C**: MGUH 25760 (ex Rkz 118), width 1.5 mm, height 1.1 mm.

Superfamily Trochoidea Rafinesque 1815
Family Trochidae Rafinesque 1815
Subfamily Monodontinae Gray 1857
Genus *Osilinus* Philippi 1847
Type species. Trochus turbinatus Born 1778.

***Osilinus carinatus* (Ravn 1933)** (Fig. 12)

1933 *Monodonta (Osilinus) carinata* Ravn, p. 31, plate 2, figs 6a–d, 7a–d.

Type material. Holotype MGUH 3131, paratype MGUH 3130.

Material. The species is abundant.

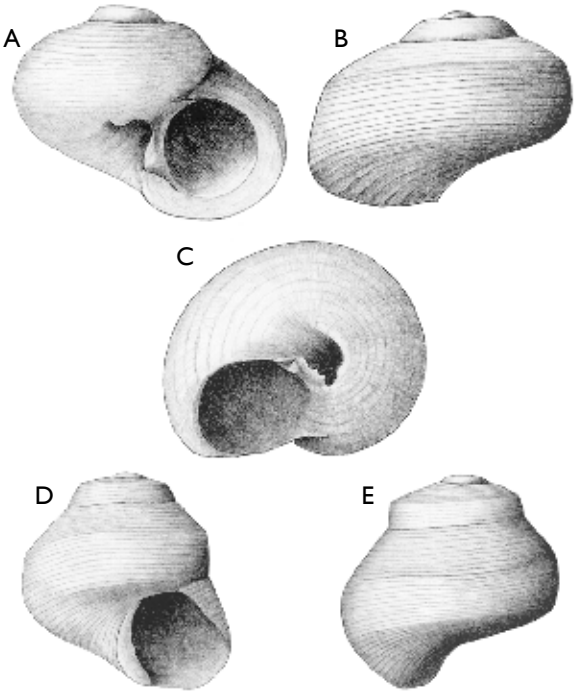

Fig. 12. *Osilinus carinatus* (Ravn 1933). **A–C**: MGUH 3130, height 1.4 mm, width 1.8 mm. **D**, **E**: MGUH 3131, height 2.5 mm, width 2.5 mm.

Genus *Jujubinus* Monterosato 1884
Type species. Trochus matoni Payraudeau 1826

***Jujubinus* sp.** (Fig. 13)

Material. Only the illustrated specimen is known (ex ISL, leg. Alice Rasmussen).

Remarks. The species resembles *Jujubinus hannonicus* (Rutot *in* Cossmann 1915), illustrated by Glibert (1973, plate 1, fig. 18).

Fig. 13. *Jujubinus* sp. MGUH 30970 (ex ISL), height 2.3 mm, width 2.1 mm.

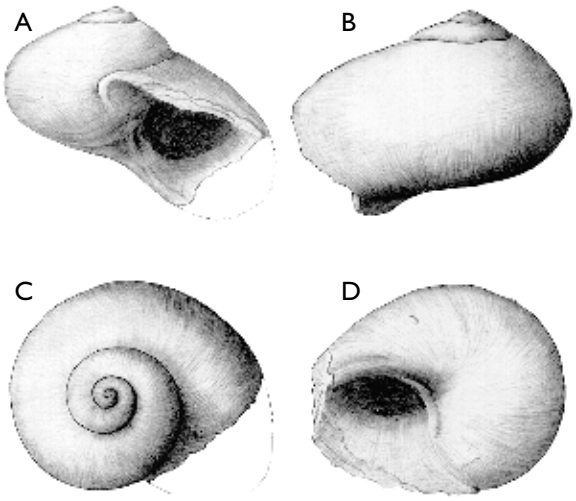

Fig. 14. *Stomatella* sp. MGUH 30971 (ex Rkz 110), height 10.2 mm, width 13.7 mm.

Subfamily Stomatellinae Gray 1840
Genus *Stomatella* Lamarck 1816
Type species. *Stomatella auricula* Lamarck 1816.

***Stomatella* sp.** (Fig. 14)

Material. Only the illustrated specimen is known.

Remarks. The species has slightly convex whorls, a relatively high spire and no umbilicus. The aperture is elongate-ovate. The genus *Stomatolina* (Iredale 1937) has a higher spire. Species of the genus *Stomatia* (Helbling 1779) also have a higher spire and are often strongly sculptured. Rosenkrantz suggested, based on the drawing, that it was a *Natica* sp.

Family Turbinidae Rafinesque 1815
Subfamily Skeneinae Clark 1851
Genus *Leucorhynchia* Crosse 1867
Type species. *Leucorhynchia caledonica* Crosse 1867.

***Leucorhynchia marginata* Ravn 1933** (Fig. 15)

1933 *Leucorhynchia marginata* Ravn, p. 27, plate 2, figs 1a–c.

Type material. Holotype MGUH 3125.

Additional material. MNO, 2 juvenile specimens; ISL, 1 juvenile specimen. The holotype is the only known adult specimen. The species is very rare.

Remarks. The juvenile specimens have a wide umbilicus and fine spirals on the base. Under the adapical suture, the shell has the same spiral as the adult specimen.

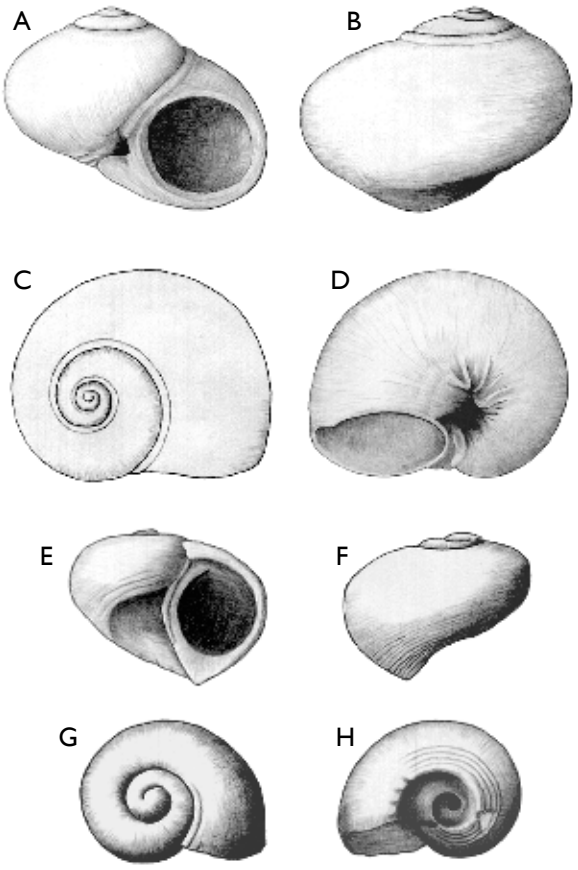

Fig. 15. *Leucorhynchia marginata* Ravn 1933. **A–D**: MGUH 3125, height 4.0 mm, width 5.0 mm. **E–G**: juvenile specimen MGUH 30972 (ex Rkz 102), height 0.95 mm, width 1.4 mm.

Genus *Skeneoides* Warén 1992
Type species. Delphinula exilissima Philippi 1844

***Skeneoides* sp.** (Fig. 16)

Additional material. ARF, 1 specimen; ECS, 1 specimen (ØSM 10061- F 2-20); MNO, 4 specimens; ISL, 1 specimen. The species is rare.

Remarks. The shell is very small and discoidal with a maximum diameter of 0.8 mm. The nucleus is relatively large and the two teleoconch whorls are quickly and regularly increasing in strength. The last whorl is higher than the other whorls and in umbilical view all whorls are visible. The axial sculpture consists of 15 strong orthocline ribs, which are old apertures. The holostomate aperture is subcircular.

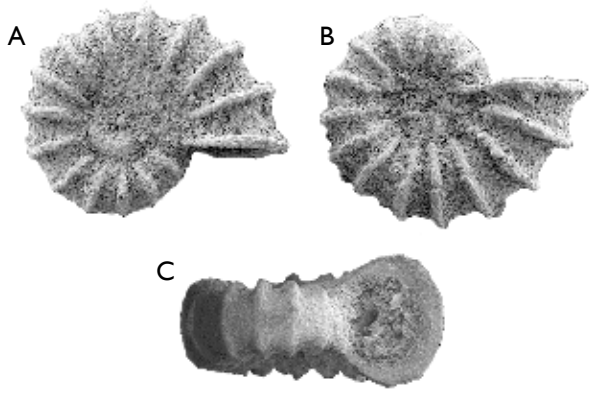

Fig. 16. *Skeneoides* sp. MGUH 30973 (ex MNO), height 0.45 mm, diameter 0.8 mm.

Family Ataphridae Cossmann 1915
Genus *Ataphrus* Gabb 1869
Type species. Ataphrus crassus Gabb 1869

***Ataphrus* sp.** (Fig. 17)

Material. Only the illustrated specimen is known. The species is very rare.

Remarks. The species has convex whorls, a narrow, but deep umbilicus and a subcircular aperture.

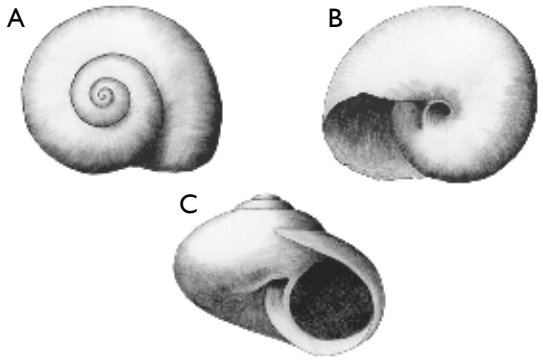

Fig. 17. *Ataphrus* sp. MGUH 30974 (ex Rkz 141), height 3.5 mm, width 5.0 mm.

Subfamily Margaritinae Thiele 1924
Genus *Margarites* Gray 1847a
Type species. *Helix margarita* Montagu 1808.

***Margarites bruennichi* (Ravn 1933)** (Fig. 18)

1933 *Eumargarita brünnichi* Ravn, p. 32, plate 3, figs 11a–c.

Type material. Holotype MGUH 3144.

Additional material. The species is abundant.

Remarks. According to Williams *et al*. (2008), Margaritinae Thiele 1924 has been moved to Turbinidae Rafinesque 1815.

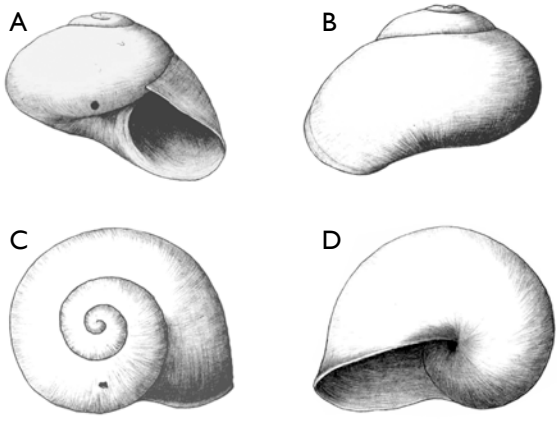

Fig. 18. *Margarites bruennichi* (Ravn 1933). MGUH 3144, height 2.2 mm, width 2.9 mm.

Superfamily Angarioidea Williams *et al*. 2008
Family Angariidae Gray 1857
Subfamily Angariinae Gray 1857
Genus *Angaria* Röding 1798
Type species. *Turbo delphinus* Linnaeus 1758.

***Angaria depressa* (Ravn 1933)** (Fig. 19)

1933 *Delphinula depressa* Ravn, p. 29, plate 2, figs 3a–c.

Type material. Holotype MGUH 3127.

Material. The species is very common. In a few cases the operculum is found *in situ*; isolated opercula are rare.

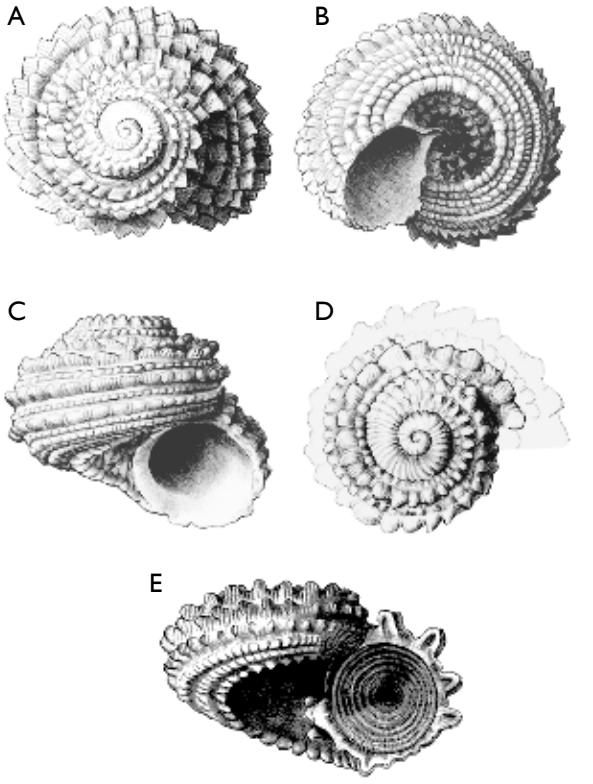

Fig. 19. *Angaria depressa*. **A–D**: MGUH 30975 (ex Rkz 96), height 4.3 mm, width 5.4 mm. **E**: Specimen with operculum *in situ* MGUH 30976 (ex Rkz 122), height 2.2 mm, width 3.2 mm.

Superfamily Phasianelloidea Williams *et al*. 2008
Family Colloniidae Cossmann *in* Cossmann & Peyrot 1917
Subfamily Colloniinae Cossmann *in* Cossmann & Peyrot 1917
Genus *Collonia* J.E. Gray 1850
Type species. *Collonia marginata* (Lamarck 1804).

***Collonia (Circulopsis) pusilla* Ravn 1933** (Fig. 20)

1933 *Collonia pusilla* Ravn, p. 27, plate 1, figs 15a–c.

Type material. Holotype MGUH 3124.

Additional material. The species is very common. A single specimen with the operculum *in situ* has been found in ARF (ØSM-10059-25130).

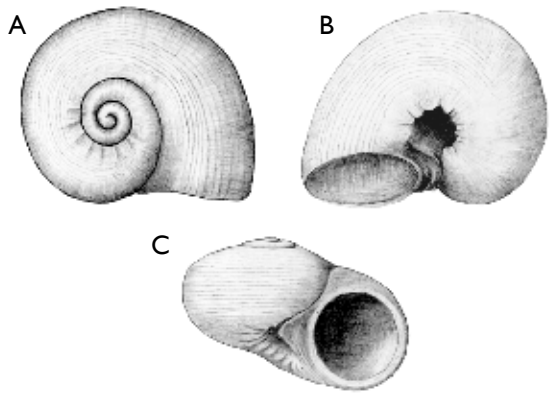

Fig. 20. *Collonia (Circulopsis) pusilla* Ravn 1933. MGUH 3124, height 2.0 mm, width 2.9 mm.

Genus *Vexinia* Cossmann 1918
Type species. Vexinia crassa (Baudon 1853).

***Vexinia* sp.** (Fig. 21)

Additional material. ISL, 3 specimens. The species is very rare.

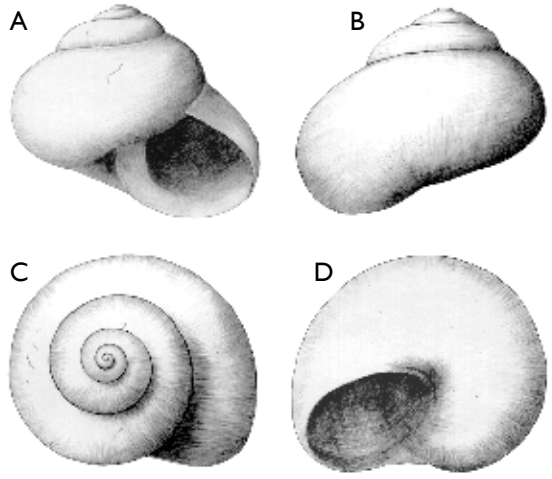

Fig. 21. *Vexinia* sp. MGUH 30977 (ex Rkz 111), height 4.3 mm, width 6.1 mm.

Superfamily Eucycloidea Koken 1897
Family Eucycloscalidae Gründel 2007
Genus *Eucycloscala* Cossmann 1895

Type species. Turbo davoustii d'Orbigny 1850.

***Eucycloscala ultima* Ravn 1933** (Fig. 22)

1933 *Eucycloscala ultima* Ravn, p. 28, plate 2, figs 2a, b.
2010 *Eucycloscala ultima* Ravn 1933 – Bandel, p. 440, figs 2 H, I.

Type material. Holotype MGUH 3126.

Material. The species is rather common.

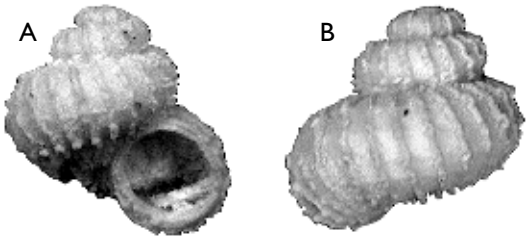

Fig. 22. *Eucycloscala ultima* Ravn 1933. MGUH 3126, height 2.3 mm, width 2.0 mm.

Superfamily Seguenzioidea Verril 1884
Family Chilodontidae Wenz 1938
Genus *Danilia* Brusina 1865
Type species. Danilia otaviana Cantraine 1835.

***Danilia faxensis* (Ravn 1933)** (Fig. 23)

1933 *Monodonta (Danilia) faxensis* Ravn, p. 29, plate 2, figs 4a–c.
2010 *Danilia faxensis* (Ravn 1933) – Bandel, p. 468, figs 12E–G.

Type material. Holotype MGUH 3128.

Material. The species is abundant.

Remarks. Bandel (2010) referred the genus *Danilia* to the family Turcicidae Bandel 2010. Bouchet & Gofas (2014) referred it to the family Chilodontidae Wenz 1938.

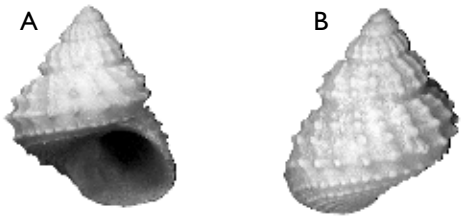

Fig. 23. *Danilia faxensis* (Ravn 1933). MGUH 30978 (ex ISL), height 4.5 mm, width 3.2 mm.

***Danilia quadricordata* (Ravn 1933)** (Fig. 24)

1933 *Monodonta (Danilia) quadricordata* Ravn, p. 30, plate 2, figs 5a–c.
2010 *Danilia quadricordata* (Ravn 1933) – Bandel, p. 468, figs 12A–D.

Type material. MGUH 3129.

Material. The species is abundant.

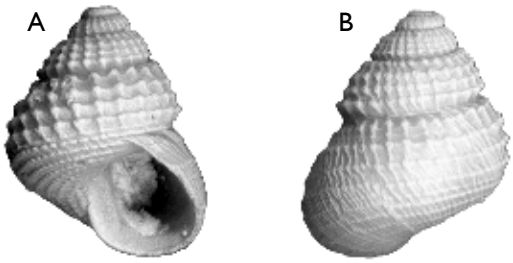

Fig. 24. *Danilia quadricordata* (Ravn 1933). MGUH 3129, height 5.0 mm, width 3.9 mm.

***Danilia fenestrata* (Ravn 1933)** (Fig. 25)

1933 *Monodonta (Danilia) fenestrata* Ravn, p. 31, plate 2, figs 8a–c.
2010 *Danilia fenestrata* (Ravn 1933) – Bandel, p. 468, figs 12H–J.

Type material. MGUH 3132.

Material. The species is abundant.

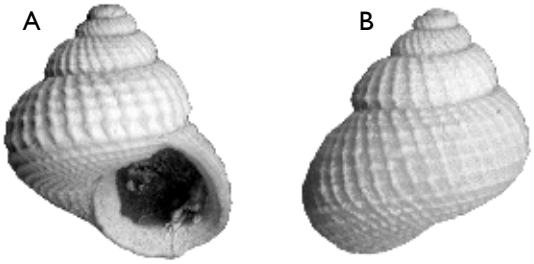

Fig. 25. *Danilia fenestrata* (Ravn 1933). MGUH 3132, height 3.2 mm, width 2.4 mm.

Subfamily Chilodontinae Wenz 1938

Chilodontinae gen. et sp. indet. (Fig. 26)

Additional material. GM 1991.4398, 1 specimen. The species is very rare.

Remarks. Rosenkrantz suggested the genus name *Kangilia* in his files, but never published it. The species resembles Chilodontinae, new genus, species 2 from the Paleocene of Nuussuaq, West Geenland, illustrated by Kollmann & Peel (1983, p. 25, figs 23A, B). Most likely Rosenkrantz proposed the name because of the similarity of the two species. The Faxe species differs by having a much finer sculpture and a base demarcated by an angulation. In general outline and aperture it resembles the species from Nuussuaq. Only the illustrated specimen (Fig. 26B) and one additional specimen (GM 1991.4398) have a rather well preserved aperture. Two specimens are known from the coral limestone in Faxe (Rkz 99, ISL).

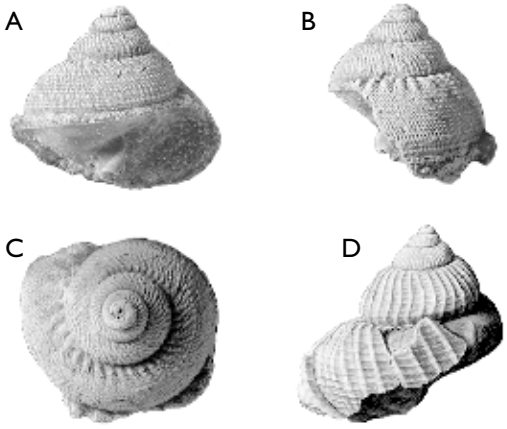

Fig. 26. Chilodontinae gen. et sp. indet. A–C: MGUH 30980 (ex ISL), height 4.5 mm, width 5.4 mm. D: MGUH 30979 (ex Rkz 98), height 10.0 mm, width 11.2 mm.

Clade Caenogastropoda Cox 1960
Clade Sorbeoconcha Ponder & Lindbergh 1997
Superfamily Cerithioidea Fleming 1822
Family Cerithiidae Fleming 1822
Genus *Ataxocerithium* Tate 1894
Type species. Cerithium serotinum A. Adams 1855.

***Ataxocerithium faxensis* (Ravn 1933)** (Fig. 27)

1933 *Cerithiopsis faxensis* Ravn, p. 50, plate 5, figs 6a, b, 7a, b, 8a, b.
1998 *Ataxocerithium faxensis* (Ravn 1933) – Nützel, p. 116, plate 16, figs A, B.

Type material. Holotype MGUH 3169, paratype MGUH 3170.

Additional material. GM (Ravn), 119 specimens; SMF 311 741, 1 specimen. The species is very common.

Remarks. Neither Ravn (1933) nor Nützel (1998) found spiral ornament on the protoconch and on the drawing (Fig. 27) only axial riblets are seen. However, the terminal half protoconch whorl has two very fine spiral riblets above the abapical suture and they increase in strength towards the transition into the teleoconch. Thus the protoconch matches the protoconch of the genus *Ataxocerithium*.

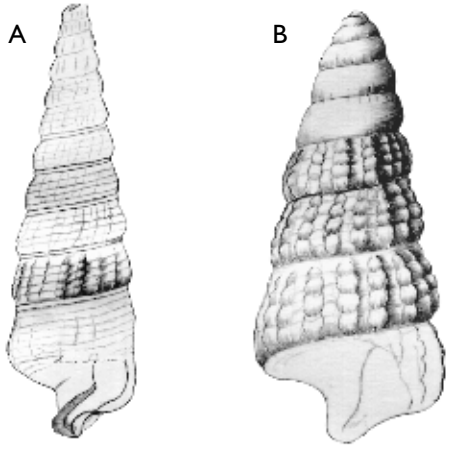

Fig. 27. *Ataxocerithium faxensis* (Ravn 1933). **A**: MGUH 3169, height 5.2 mm, width 1.6 mm. **B**: MGUH 3170, height 2.7 mm, width 1.2 mm.

***Ataxocerithium* sp. 1** (Fig. 28)

Additional material. ARF, 16 specimens (ØSM-10059-25046); GM 1991.4279, 1 badly preserved specimen; ISL, 1 specimen. The species is rare.

Remarks. The species differs from the two preceding species by having opisthocline axial ribs, which are stronger than the spirals. The protoconch has axial riblets.

Fig. 28. *Ataxocerithium* sp. 1. ØSM-10059-25046 (ex ARF), height 3.9 mm, width 1.1 mm.

***Ataxocerithium* sp. 2** (Fig. 29)

Additional material. GM 1991.4204, 1 specimen; GM 1991.4305, 3 specimens. The species is very rare.

Remarks. The protoconch has weak axial ribs and abapically two spiral riblets. The teleoconch whorls have an adapical spiral with strong knobs, a spiral with weak knobs on the middle of the whorl and two abapical spiral furrows. The number of knobs is *c.* 15.

Fig. 29. *Ataxocerithium* sp. 2. MGUH 30982 (ex GM 1991.4205), height 4.1 mm, width 1.4 mm.

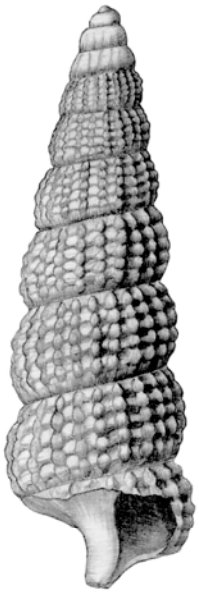

Fig. 30. *Bittium* cf. *transenna* (Bayan 1873). MGUH 3147, height 4.2 mm, width 1.3 mm.

Genus *Bittium* Leach *in* Gray 1847b
Type species. *Bittium reticulatum* Da Costa 1778.

***Bittium* cf. *transenna* (Bayan 1873)** (Fig. 30)

1933 Cf. *Bittium transenna* (Bayan 1873) – Ravn, p. 44, plate 3, figs 14a, b.

Additional material. ARF, 21 specimens (ØSM-10059-25027, 25058, 25059, 25063, 25064, 25094); ISL, 11 specimens. The species is rather common.

Remarks. Ravn (1933) had only one incomplete specimen at hand. Better material is now at our disposal, but comparison with French material is necessary for a secure assignment to the species of Bayan (1873).

Family Metacerithiidae Cossmann 1906
Genus *Metacerithium* Cossmann 1906
Type species. *Cerithium trimonile* Michelin 1838.

***Metacerithium?* sp.** (Fig. 31)

Material. Only the illustrated specimen is known.

Remarks. The species has almost smooth whorls and the aperture is not preserved. However, whorls are characteristic for the genus *Metacerithium*.

Fig. 31. *Metacerithium?* sp. MGUH 30983 (ex Rkz 195), height 4.7 mm.

Superfamily Campaniloidea Douvillé 1904
Family Campanilidae Douvillé 1904
Genus *Campanile* Bayle *in* Fischer 1864
Type species. Cerithium giganteum Lamarck 1804.

***Campanile? pseudotelescopium* (Ravn 1902b)** (Fig. 32)

1902 *Cerithium (Campanile?) pseudotelescopium* (M.U.H.) Ravn, p. 219, plate 1, figs 13, 14.
1933 *Cerithium (Campanile?) pseudotelescopium* (M.U.H.) Ravn, – Ravn, p. 45 (*partim*), *non* plate 4, figs 8a, b.

Type material. Syntypes MGUH 87 and MGUH 88.

Material. Most specimens are incomplete. The species is rather common.

Discussion. Ravn (1933, p. 45) referred the species to Campanile with a query, since no specimens with a well preserved aperture and canal were available. Such specimens have not been found as yet. Ravn referred with some doubt the illustrated juvenile specimen named below as *Campanile*? sp. 1 to this species. This specimen has about 18 axial ribs, while *Campanile? pseudotelescopium* has about 30.

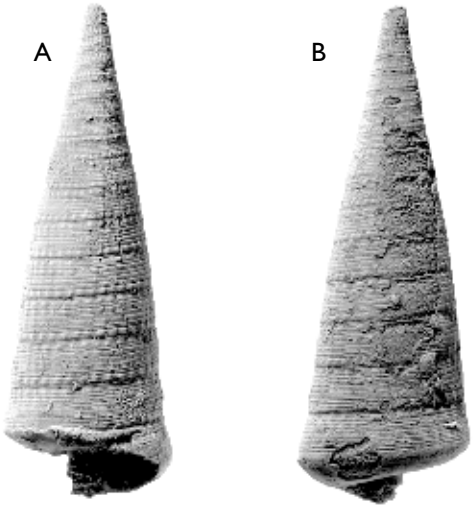

Fig. 32. *Campanile? pseudotelescopium* (Ravn 1902b). MGUH 30984 (ex Rkz 181), height 28.0 mm, width 9.7 mm.

***Campanile? subglabra* (Ravn 1933)** (Fig. 33)

1933 *Newtoniella subglabra* Ravn, p. 47, plate 5, figs 5a, b.

Type material. Holotype MGUH 3167.

Material. The species is rare and only represented by fragments.

Remarks. Ravn referred the species to the genus *Newtonilla*, based on a single fragmentary specimen. The whorls are flat and relatively low, with three fine spirals on the adapical half of the whorl. The species has some resemblance with the genus *Campanile*, but the assignment is questionable, as only fragments are available. The protoconch is unknown.

Fig. 33. *Campanile? subglabra* (Ravn 1933). MGUH 3167, height 6.8 mm, width 2.3 mm.

***Campanile?* sp. 1** (Fig. 34)

1933 *Cerithium (Campanile?) pseudotelescopium* (M.U.H.) Ravn, – Ravn, p. 45 (*partim*), plate 4, figs 8a, b (*non* Ravn).

Material. Only the illustrated specimen is known.

Remarks. The species has been discussed above. The drawing in the Rosenkrantz files is not correct, as the shell is drawn too slender.

Fig. 34. *Campanile?* sp. 1. MGUH 3155, height 7.2 mm, width 2.2 mm.

***Campanile?* sp. 2** (Fig. 35)

Additional material. GM, 1 specimen (1991.4128).

Remarks. The species has a subsutural spiral with *c*. 15 knobs on the first teleoconch whorls. On the later whorls there are two close-set adapical fine spirals under the suture and a spiral furrow a little above the middle of the whorl. The whorls are slightly convex and relatively low and the aperture is rather narrow and rounded rectangular. In general outline and sculpture, the species has some resemblance with *Campanile? subglabra*.

Fig. 35. *Campanile?* sp. 2. MGUH 30985 (ex Rkz 70), height 12.3 mm, width 3.0 mm.

Family Trypanaxidae Gougerot & Le Renard 1987
Genus *Trypanaxis* Cossmann 1889
Type species. *Trypanaxis umbilicata* (Lamarck 1804).

***Trypanaxis faxensis* Ravn 1933** (Fig. 36)

1933 *Trypanaxis? faxensis* Ravn, p. 53, plate 5, figs 18a, b.

Type material. MGUH 3280.

Material. The species is rather common.

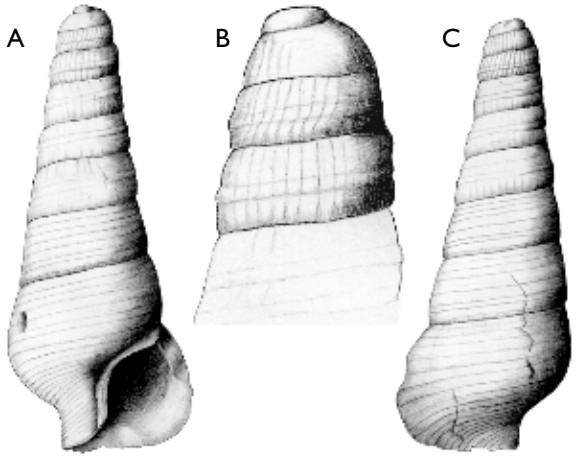

Fig. 36. *Trypanaxis faxensis Ravn* 1933. MGUH 30986 (ex Rkz 67), height 7.2 mm, width 3.0 mm, height of protoconch 2.0 mm.

Fig. 37. *Mesalia?* sp. 1. MGUH 30987 (ex Rkz 71), height 8.1 mm, width 2.8 mm.

Family Turritellidae Lovén 1847
Genus *Mesalia* Gray 1847a
Type species. Cerithium meaal Adanson 1757

***Mesalia?* sp. 1** (Fig. 37)

Additional material. GM, 7 specimens (1991.4092 1991.4094 and 1991.4106); ISL, 7 specimens; MNO, 1 specimen. The species is rare.

Remarks. This and the following two species have a spiral ornament, which resembles the ornament of the *Mesalia* or *Sigmesalia* species. However, they differ from these genera by having a rather well-developed canal. Thus, the assignment to the genus *Mesalia* of this and the next two species is questionable. Rosenkrantz assigned these species to the genus *Orthochetus* Cossmann 1889 in his notes, but this genus has a completely different sculpture. *Mesalia?* sp. 1 is characterised by a rather slender outline and three equidistant spirals of equal strength.

***Mesalia?* sp. 2** (Fig. 38)

Additional material. GM, 2 specimens (1991.4091 and 1991.4093); ISL, 4 specimens; EBP, 1 specimen. The species is rare.

Remarks. This species is less slender and has two spirals on the abapical part of the whorls.

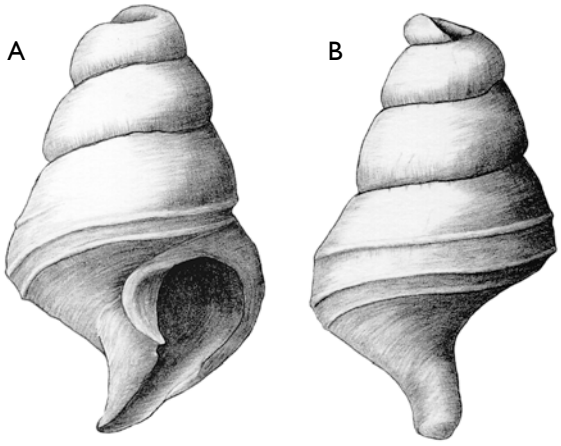

Fig. 38. *Mesalia?* sp. 2. MGUH 30988 (ex Rkz 145), height 2.3 mm, width 1.4 mm.

***Mesalia?* sp. 3** (Fig. 39)

Additional material. GM, 1 specimen (1991. 4095); ISL, 1 specimen. The species is very rare.

Remarks. This species has three spirals of equal strength, but the shell is less slender than *Mesalia?* sp. 1 and the whorls are more convex.

Fig. 39. *Mesalia?* sp. 3. MGUH 30989 (ex Rkz 187), height 3.2 mm, width 1.4 mm.

Family Siliquariidae Anton 1838
Genus *Tenagodus* Guettard 1770
Type species. Serpula anguina Linnaeus 1758.

***Tenagodus ornatus* (Lundgren 1867)** (Fig. 40)

1867 *Siliquaria ornata* (M. U. H.) Lundgren, p. 17, plate 1, fig. 4.
1902 *Siliquaria ornata* (M. U. H.), Lundgren – Ravn, p. 219; plate 1, figs 11, 12.
1933 *Siliquaria ornata* (M. U. H.), Lundgren – Ravn, p. 40.

Material. The species is rare and represented by juvenile specimens.

Fig. 40. *Tenagodus ornatus* (Lundgren 1867). MGUH 30990 (ex Rkz 107), maximum diameter 2.2 mm.

***Tenagodus* sp.** (Fig. 41)

Material. Only the illustrated specimen is known. It differs from the preceeding species by not having disjunct whorls.

Fig. 41. *Tenagodus* sp. MGUH 30991 (ex Rkz 144), height 5.9 mm, width 5.5 mm.

Clade Hypsogastropoda Ponder & Lindberg 1997
Clade Littorinimorpha Golikov & Starobogatov 1975
Superfamily Capuloidea Fleming 1822
Family Capulidae Fleming 1822

Genus *Trichotropis* Broderip & Sowerby 1829
Type species. Turbo bicarinatus Sowerby 1825.

***Trichotropis*? sp.** (Fig. 42)

Material. Only the illustrated specimen is known.

Description. The species has a protoconch with *c.* 2½ whorls, of which the last two have prosocline axial ribs. The teleoconch whorls are medium convex with a flat adapical ramp and separated by a deep suture. They have three sharp primary spirals, separated by deep furrows. Four additional spirals appear on the abapical part of the whorl, decreasing. The base has a similar spiral ornament. The axial ribs are only visible on the terminal half whorl, where they cause weak knobs on the primary spirals. The aperture is ovate and has a weak spout near the columella.

Discussion. The protoconch and teleoconch features suggest that the species could be referred to the genus *Trichotropis* (S. Kiel, personal communication 2014). Kollmann & Peel (1983, p. 59, fig. 116) illustrated a species with a similar spiral ornament as Trichotropinae, new genus.

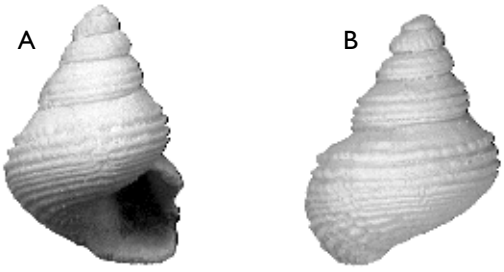

Fig. 42. *Trichotropis*? sp. ØSM-10059-25092 (ex ARF), height 3.7 mm, width 2.4 mm.

Capulidae gen. et sp. indet. (Fig. 43)

Material. Only the illustrated specimen is known.

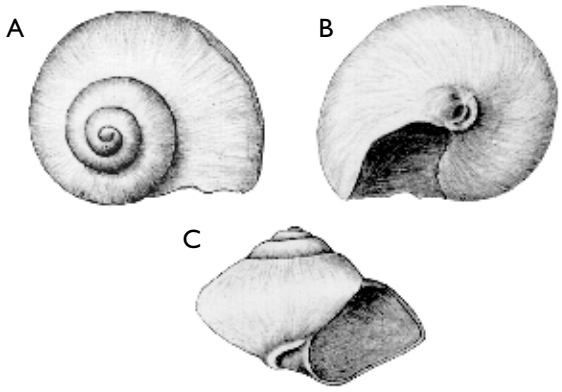

Fig. 43. Capulidae gen. et sp. indet. MGUH 30992 (ex Rkz 109), height 0.9 mm, width 1.3 mm.

Superfamily Cypraeoidea Rafinesque 1815
Family Cypraeidae Rafinesque 1815
Subfamily Gisortiinae Schilder 1927
Genus *Palaeocypraea* Schilder 1928
Type species. Cypraeacites spiratus von Schlotheim 1820.

***Palaeocypraea spirata* (von Schlotheim 1820)** (Fig. 44)

1902 *Cypraea spirata* Schloth. – Ravn, p. 21, plate 2, fig. 2.
1928 *Palaeocypraea spirata* Schloth. – Schilder, p. 19, figs 3–5, 12–14.
1933 *Cypraea* (*Palaeocypraea) spirata* Schloth. – Ravn, p. 57, plate 6, figs 4a,b, 5a, b.

Type material. MGUH 3184, MGUH 3185.

Material. Juvenile specimens are common, but complete adult specimens are rather common.

Remarks. Ravn (1933, p. 57, plate 6, figs 4a, b, 5a, b) described and illustrated juvenile specimens with a well preserved protoconch and he also mentioned intermediate specimens with protoconch and teleoconch whorls preserved. On adult specimens the protoconch is completely hidden.

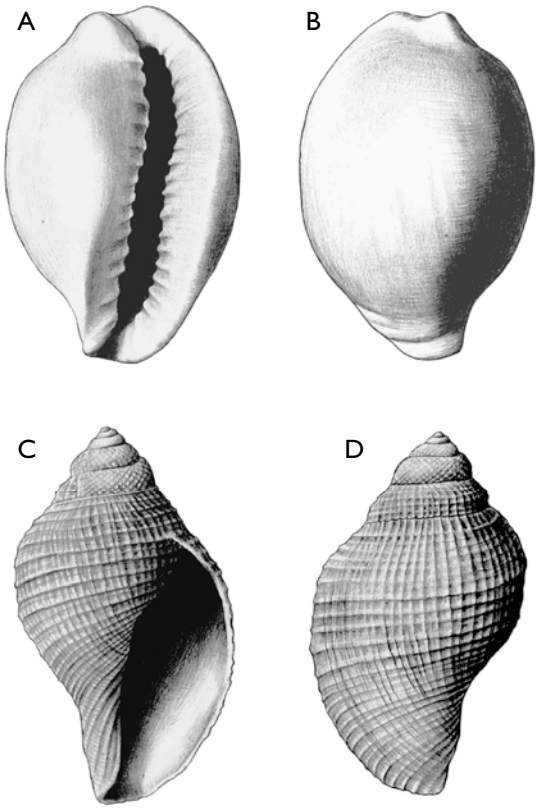

Fig. 44. *Palaeocypraea spirata* (von Schlotheim 1820). **A**, **B**: MGUH 30994 (ex Rkz 33), height 16.7 mm, width 11.2 mm. **C**, **D**: MGUH 3185, height 4.7 mm, width 2.8 mm.

***Palaeocypraea* sp.** (Fig. 45)

Additional material. Rkz 32. The species is very rare.

Remarks. Only two juvenile specimens are known. They differ from *Palaeocypraea spirata* by having a smaller protoconch, a coarser diagonal cancellation of the terminal protoconch whorls and especially by the spiral ornament and axial sculpture of the first teleoconch whorl. This species has two coarse spirals on the whorl and weaker spirals adapically and abapically. In between the strong spirals there are three much weaker spirals. The axial ribs cause knobs on the two strong spirals, about 20 on a whorl. Juvenile *Palaeocypraea spirata* have a larger protoconch with a wider apical angle and a finer sculpture. The spirals are finer and more numerous and the spirals have no knobs. The axial sculpture is much finer. Rosenkrantz in his notes suggested the name *Palaeocypraea poulseni* for the present species, but he never published it.

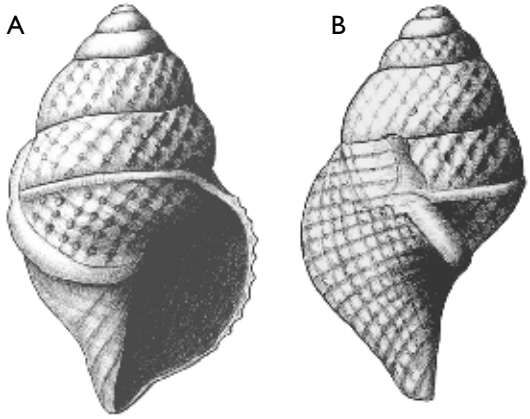

Fig. 45. *Palaeocypraea* sp. MGUH 30995 (ex Rkz 166), height 2.0 mm, width 1.3 mm.

Genus *Bernaya* Jousseaume 1884
Type species. *Cypraea media* Deshayes 1835.
Subgenus *Bernaya (Protocypraea)* Schilder 1927
Type species. *Eocypraea orbignyana* Vredenburg 1920.

***Bernaya (Protocypraea) globuliformis* (Ravn 1902b)** (Fig. 46)

1902 *Cypraea (Protocypraea) globuliformis* Ravn, p. 23, plate 2, fig. 6.
1928 *Protocypraea globuliformis* Ravn – Schilder, p. 23, fig. 15.
1933 *Cypraea (Protocypraea) globuliformis* Ravn – Ravn, p. 58.

Type material. MGUH 103.

Additional material. ARF, 1 specimen (ØSM-10059-21043). The species is very rare.

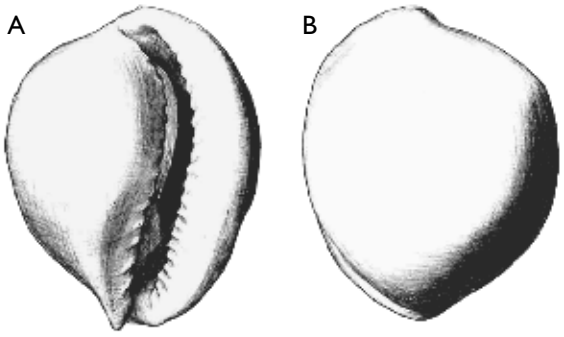

Fig. 46. *Bernaya (Protocypraea) globuliformis* (Ravn 1902b). MGUH 30996 (ex Rkz 264), height 9.8 mm, width 7.8 mm.

Family Eocypraeidae Schilder 1924
Genus *Eocypraea* Cossmann 1903
Type species. Cypraea inflata Lamarck 1802.

***Eocypraea danica* (Schilder 1928)** (Fig. 47)

1902 *Cypraea bullaria* Schloth. – Ravn, p. 22, plate 2, figs 4a–c (*non* Schlotheim).
1928 *Eocypraea danica* Schilder, p. 12, figs 1, 2, 11.
1933 *Cypraea (Eocypraea) danica* Schilder – Ravn, p. 58.

Additional material. ARF, 21 specimens (ØSM-10059-21041). The species is rather common.

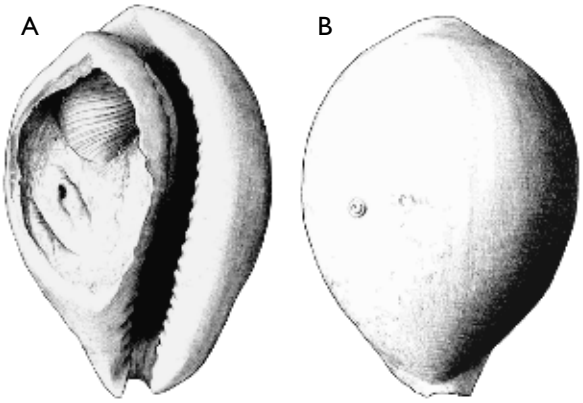

Fig. 47. *Eocypraea danica* (Schilder 1928). MGUH 30997 (ex Rkz 34), height 18.4 mm, width 13.4 mm.

Superfamily Littorinoidea Children 1834
Family Littorinidae Children 1834
Subfamily Littorininae Children 1834
Genus *Littoraria* Gray 1833
Type species. Littorina pulchra Sowerby 1832.
Subgenus *Littoraria (Littorinopsis)* Mörch 1876
Type species. Littorina subangulata Lamarck (error for *Littorina angulifera* (Lamarck 1822)).

***Littoraria (Littorinopsis) faxensis* (Ravn 1933)** (Fig. 48)

1933 *Littorinopsis faxensis* Ravn, p. 35, plate 3, figs 3a, b.

Type material. Holotype MGUH 3136.

Additional material. GM, 3 specimens; MNO, 1 specimen. The species is rare.

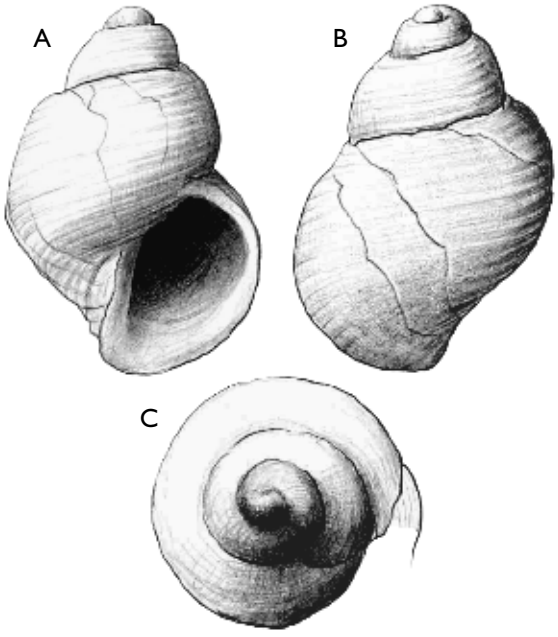

Fig. 48. *Littoraria (Littorinopsis) faxensis* (Ravn 1933). MGUH 3136, height 2.2 mm, width 1.6 mm.

Family Pickworthiidae Iredale 1917
Subfamily Pickworthiinae Iredale 1917
Genus *Sansonia* Jousseaume 1892
Type species. Sansonia tuberculata Watson 1886.

***Sansonia hedegaardi* Bandel & Kowalke 1997**
(Fig. 49)

1997 *Sansonia hedegaardi* Bandel & Kowalke, p. 14, plate 5, figs 2, 5.

Type material. Holotype GPIuM 3768, paratype GPIuM 3769.

Material. The species is common, but easily overlooked.

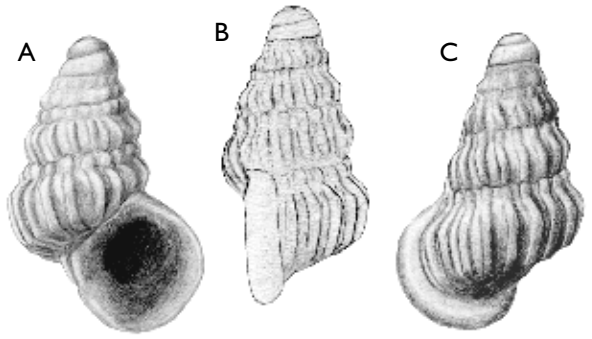

Fig. 49. *Sansonia hedegaardi* Bandel & Kowalke 1997. MGUH 30998 (ex Rkz 160), height 1.5 mm, width 1.0 mm.

***Sansonia* sp.** (Fig. 50)

Additional material. ISL, 2 specimens; MNO, 1 specimen. The species is rare and easily overlooked. It is a little more slender than the preceding species and differs by having a prosocline labrum in lateral view.

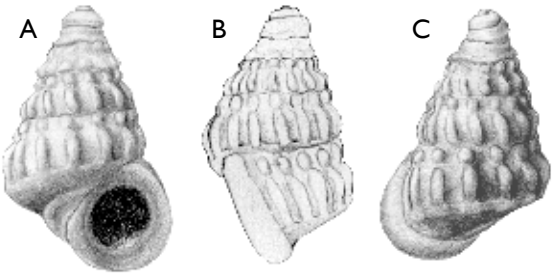

Fig. 50. *Sansonia* sp. MGUH 30999 (ex Rkz 161), height 1.7 mm, width 1.1 mm.

Genus *Mareleptopoma* Moolenbeek & Faber 1984
Type species. Mareleptopoma karpatensis Moolenbeek & Faber 1984.

***Mareleptopoma?* sp.** (Fig. 51)

Additional material. ARF, 3 specimens (ØSM-10059-25756); ISL, 2 specimens. The species is rare and easily overlooked. It is less slender than the two preceding species.

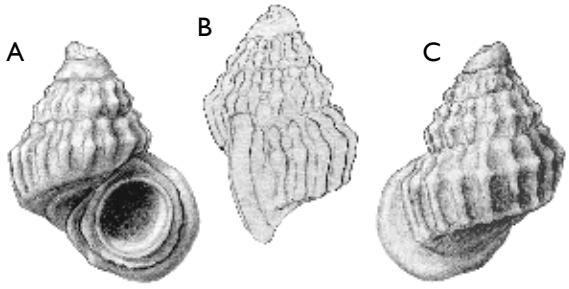

Fig. 51. *Mareleptopoma?* sp. MGUH 31000 (ex Rkz 162), height 1.3 mm, width 1.0 mm.

Genus *Urceolabrum* Wade 1916
Type species. Urceolabrum tuberculatum Wade 1916.

***Urceolabrum* sp. 1** (Fig. 52)

Additional material. ARF, 1 specimen (ØSM-10059-25846); ISL, 2 specimens. The species is very rare.

Remarks. The species has rather strong axial ribs on all whorls.

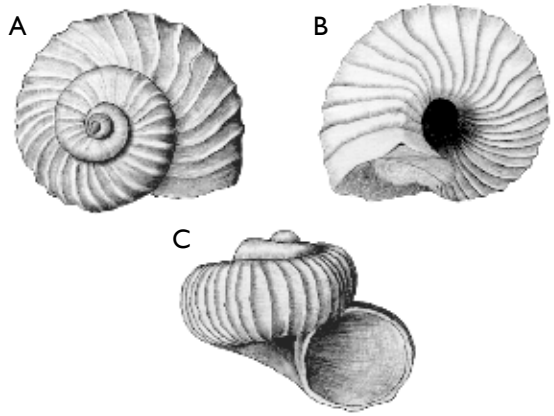

Fig. 52. *Urceolabrum* sp. 1. MGUH 31001 (ex Rkz 114), height 1.5 mm, width 1.8 mm.

***Urceolabrum* sp. 2** (Fig. 53)

Material. Only the illustrated specimen is known.

Remarks. This species differs from *Urceolabrum* sp. 1 in that the axial ribs fade out on the terminal whorls and furthermore by possessing a lower apex.

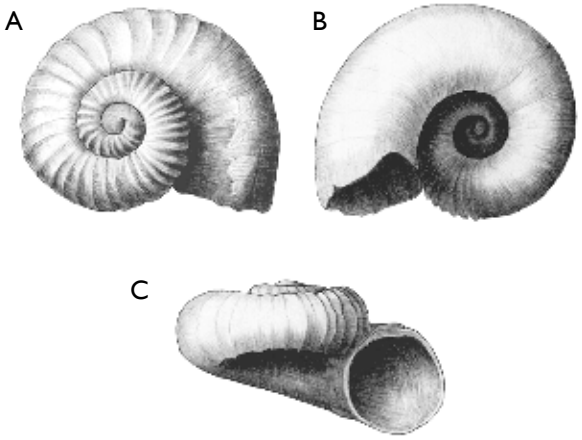

Fig. 53. *Urceolabrum* sp. 2. MGUH 31002 (ex Rkz 104), height 1.3 mm, width 2.2 mm.

Subfamily Sherboniinae Iredale 1917
Genus *Faxia* Ravn 1933
Type species. Faxia macrostoma Ravn 1933.

Faxia macrostoma Ravn 1933 (Fig. 54)

1933 *Faxia macrostoma* Ravn 1933, p. 49, plate 6, figs 9a, b, 10a, b, 11.

Type material. Holotype MGUH 3189, Paratypes MGUH 3190, 3191.

Additional material. Rkz 178. Adult specimens with a complete aperture are rare, whereas juvenile specimens are common.

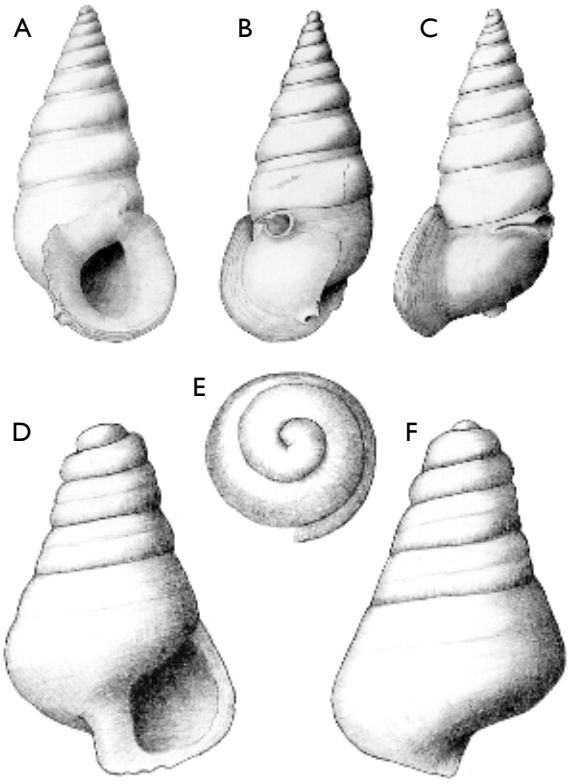

Fig. 54. *Faxia macrostoma* Ravn 1933. **A–C**: MGUH 31003 (ex Rkz 178), height 5.4 mm, width 2.6 mm. **D–F**: MGUH 31004 (ex Rkz 180), height 1.2 mm, width 0.8 mm, diameter of protoconch 0.6 mm.

Superfamily Naticoidea Guilding 1834
Family Naticidae Guilding 1834

Naticidae gen. et sp. indet. (Fig. 55)

Material. Only the illustrated specimen is known.

Remarks. The species has a low spire, a straight columella and an almost semicircular aperture. There is a narrow umbilicus. As naticids are members of the infauna, it is not surprising that this genus is rare in the Baunekule fauna.

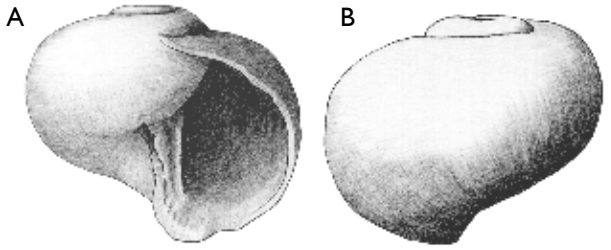

Fig. 55. Naticidae gen. et sp. indet. MGUH 31005 (ex Rkz 103), height 1.7 mm, width 1.9 mm.

Superfamily Rissooidea Gray 1847a
Family Rissoidae Gray 1847a
Subfamily Rissoininae Gray 1847a
Genus *Zebina* H. & A. Adams 1854
Type species. Zebina browniana d'Orbigny 1842.

***Zebina* sp. 1** (Fig. 56)

Additional material. ARF, one specimen (ØSM-10059-25080); ISL, 10 specimens; MNO, 2 specimens. The species is rare.

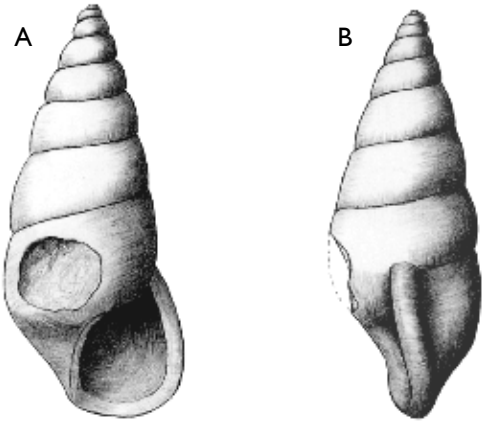

Fig. 56. *Zebina* sp. 1. MGUH 31006 (ex Rkz 143), height 3.5 mm, width 1.5 mm.

***Zebina* sp. 2** (Fig. 57)

Additional material. Rkz 163B.

Remarks. The species differs from *Zebina* sp. 1 in having flatter whorls and a more thickened columella.

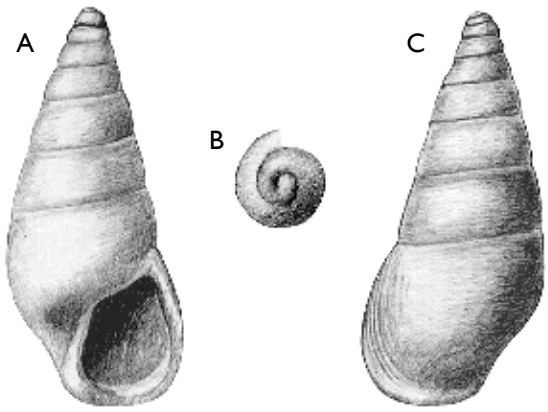

Fig. 57. *Zebina* sp. 2. MGUH 31007 (ex Rkz 163D), height 3.7 mm, width 1.4 mm, diameter of protoconch 0.3 mm.

Genus *Pseudotaphrus* Cossmann 1888
Type species. Bulimus buccinalis Lamarck 1804.

***Pseudotaphrus* sp.** (Fig. 58)

Material. Only the illustrated specimen is known.

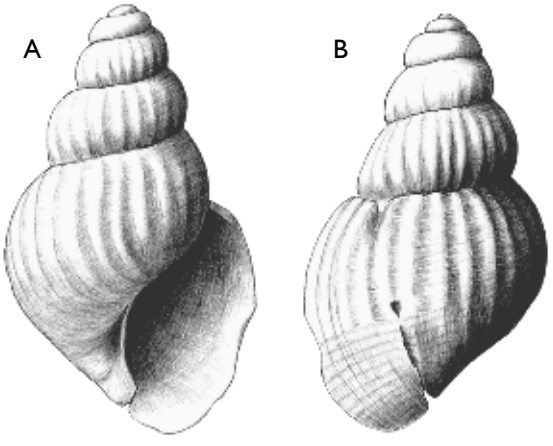

Fig. 58. *Pseudotaphrus* sp. MGUH 31013 (ex Rkz 132), height 2.7 mm, width 1.6 mm.

Rissoininae gen. et sp. indet. (Fig. 59)

Material. The species is rather common.

Remarks. Rosenkrantz suggested *Eulimella (Belonidium)* sp. for this material. However, the protoconch is not heterostrophic as on typical Pyramidellidae. A. Warén (personal communication 2013) suggested that the species was most likely a Rissoininae.

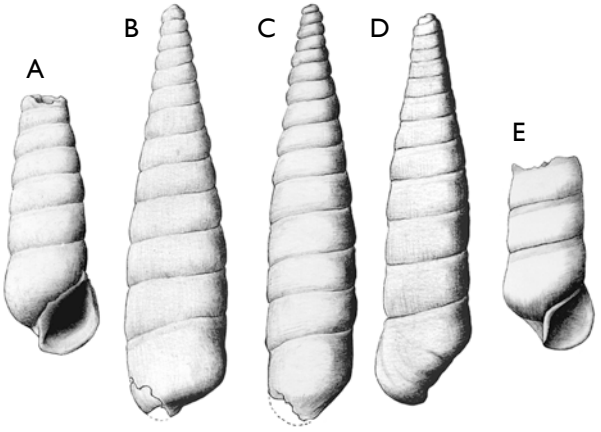

Fig. 59. Rissoininae gen. et sp. indet. **A**: MGUH 31008 (ex Rkz 49A), height 4.5 mm, width 1.6 mm. **B**: MGUH 31009 (ex Rkz 49B), height 5.1 mm, width 1.2 mm. **C**: MGUH 31010 (ex Rkz 49C), height 4.6 mm, width 1.0 mm. **D**: MGUH 31011 (ex Rkz 49D), height 4.0 mm, width 0.9 mm. **E**: MGUH 31012 (ex Rkz 49E), height 4.5 mm, width 0.9 mm.

Family Caecidae Gray 1850
Genus *Caecum* Fleming 1817
Type species. Caecum tracheum Montagu 1803.

***Caecum* sp.** (Fig. 60)

Material. Only the illustrated specimen is known.

Fig. 60. *Caecum* sp. MGUH 31014 (ex Rkz 135), height 2.5 mm.

Family Tornidae Sacco 1896 (1884)
Genus *Circulus* Jeffreys 1865
Type species. Delphinula duminyi Requien 1848.

***Circulus* sp. 1** (Fig. 61)

Material. Only the illustrated specimen is known. The species is very rare.

Remarks. The species has a keel at the periphery and a narrow umbilicus. On the base, five spirals are visible.

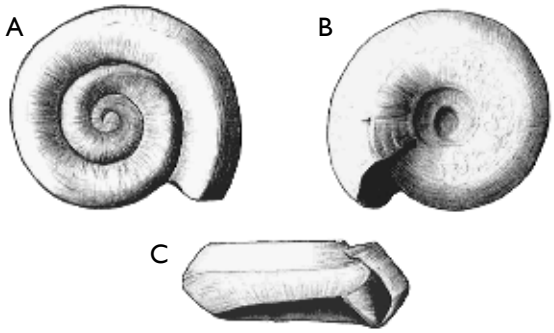

Fig. 61. *Circulus* sp. 1. MGUH 31015 (ex Rkz 130), height 0.5 mm, width 1.2 mm.

***Circulus* sp. 2** (Fig. 62)

Material. Only the illustrated specimen is known.

Remarks. This species has a rather sharp carina on the periphery and a narrow umbilicus and resembles *Circulus* (s. str.) *aurelius* (d'Orbigny, 1850), illustrated as *Circulus laevigatus* (Deshayes 1862) by Gougerot (1970, p. 39, fig. 7).

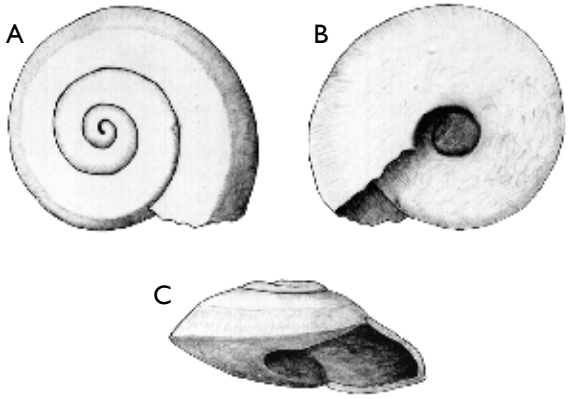

Fig. 62. *Circulus* sp. 2. MGUH 31016 (ex Rkz 117), height 0.9 mm, width 1.8 mm.

Subfamily Teinostomatinae Cossmann *in* Cossmann & Peyrot 1917
Genus *Teinostoma* H. & A. Adams 1853
Type species. *Teinostoma politum* A. Adams *in* H. & A. Adams 1853.

***Teinostoma glaberrimum* Ravn 1933** (Fig. 63)

1933 *Tinostoma glaberrimum* Ravn, p. 33, plate 2, figs 9a–c.

Type material. Holotype MGUH 3133.

Additional material. ARF, 4 specimens (ØSM-10059-21431); ISL, 3 specimens; MNO, 3 specimens. The species is rare.

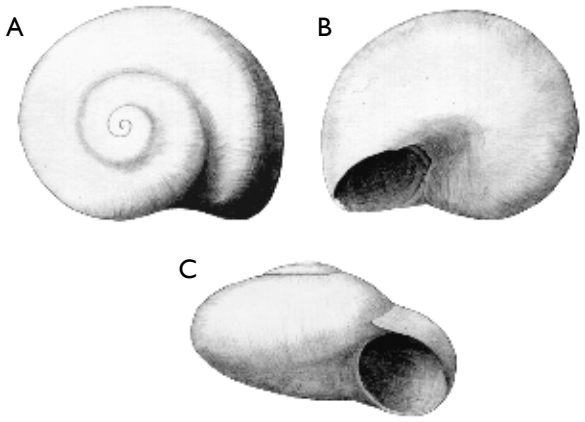

Fig. 63. *Teinostoma glaberrimum* Ravn 1933. MGUH 3133, height 3.4 mm, width 6.1 mm.

Genus *Sigaretornus* Iredale 1936
Type species. *Adeorbis sigaretinus* Pilsbry 1897.

***Sigaretornus* sp.** (Fig. 64)

Material. The illustrated specimens are the only ones known.

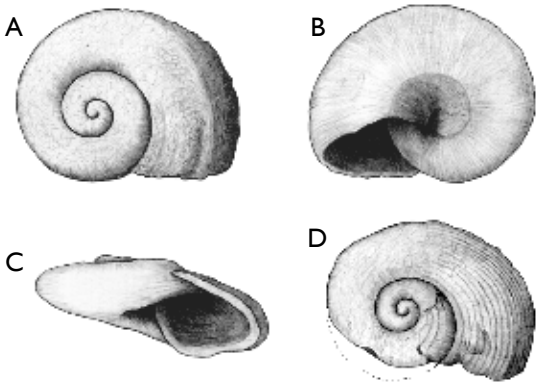

Fig. 64. *Sigaretornus* sp. **A–C**: MGUH 31017 (ex Rkz 116), height 0.6 mm, width 1.7 mm. **D**: MGUH 31018 (ex Rkz 115), diameter 2.0 mm.

Superfamily Tonnoidea Suter 1913 (1825)
Family Ranellidae Gray 1854
Genus *Ranella* Lamarck 1816
Type species. Ranella gigantea Lamarck 1816.

***Ranella faxensis* Ravn 1933** (Fig. 65)

1933 *Ranella faxensis* Ravn, p. 59, plate 6, figs 6a, b.

Type material. Holotype MGUH 3186.

Additional material. GM, 2 specimens; ARF, 11 specimens (ØSM-10059-25002 and ØSM-10059-25819); ISL, 1 specimen. The species is rare.

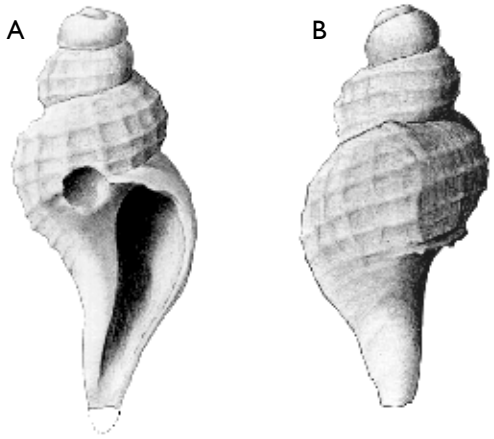

Fig. 65. *Ranella faxensis* Ravn 1933. MGUH 3186, height 4.0 mm, width 1.8 mm.

Subfamily Cymatiinae Iredale 1913 (1854)
Genus *Sassia* Bellardi 1873
Type species. Sassia apenninica (Sasso 1827).

***Sassia faxense* (Ravn 1933)** (Fig. 66)

1902 *Tritonium fenestratum* Ravn, p. 227, plate 2, figs 7, 8 (*non* Vincent 1878).
1933 *Tritonium (Sassia) faxense* Ravn, p. 58, plate 5, figs 16a, b; plate 6, figs 7a, b.

Type material. Syntypes to *Tritonium fenestratum* are MGUH 104 and MGUH 105. Syntypes to *Sassia faxensis* are MGUH 3178 and MGUH 3187.

Material. Juvenile specimens are rather common, adult specimens are rare.

Remarks. The species has a sculpture of rather coarse spirals and radial ribs of almost the same strength, resulting in a pattern of quadrates. On the columella are two or three folds and the labrum is thickened and has knobs internally.

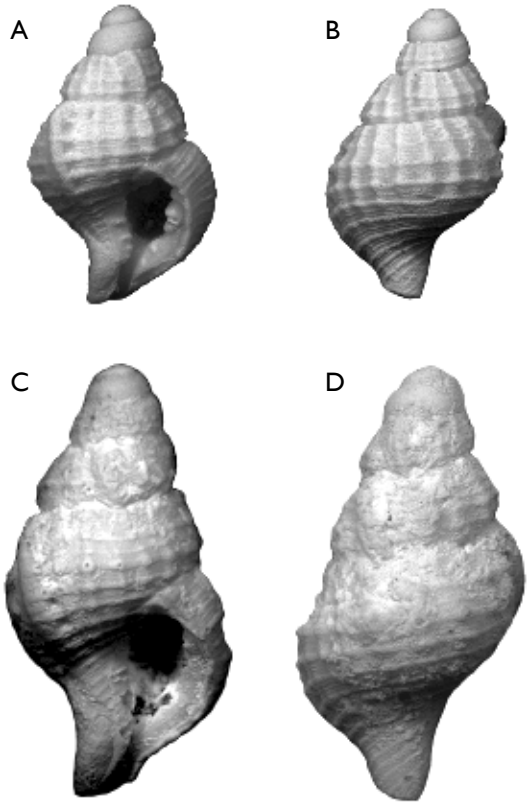

Fig. 66. *Sassia faxense* (Ravn 1933). **A**, **B**: ØSM-10059-21047 (ex ARF), height 5.8 mm, width 3.9 mm. **C**, **D**: MGUH 31020 (ex ISL), height 9.9 mm, width 5.2 mm.

***Sassia* sp.** (Fig. 67)

Additional material. ISL, 3 specimens. The species is very rare.

Remarks. The protoconch is smaller and more slender than *Sassia faxense* and has a sculpture of three fine spiral riblets on the last whorl. On the terminal half whorl, finer secondary spiral riblets are inserted between the

three spirals and in between the abapical spire and the abapical suture. The teleoconch whorls have a sculpture of fine spiral ribs with secondary spirals and fine radial ribs. Fine knobs occur at the intersections. The canal is relatively long.

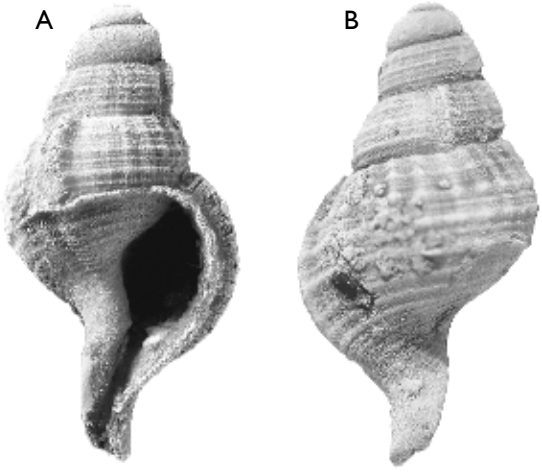

Fig. 67. *Sassia* sp. MGUH 31021 (ex ISL), height 7.6 mm, width 4.0 mm.

Genus *Cymatium* Röding 1798
Type species. *Murex femorale* Linnaeus 1758
Subgenus *Cymatium* (Monoplex) Perry 1811
Type species. *Monoplex australasiae* Perry 1811.

***Cymatium (Monoplex) subglabrum* (Ravn 1902b)**
(Fig. 68)

1902 *Tritonium subglabrum* Ravn, p. 228, plate 2, figs 9, 10.
1933 *Tritonium (Lampusia?) subglabrum* Ravn, p. 59, plate 5, fig. 15.

Type material. Syntypes MGUH 106 and MGUH 107.

Material. The species is rather common. Protoconchs with a fine spiral ornament and more or less defective larger specimens have been found.

Fig. 68. *Cymatium (Monoplex) subglabrum* (Ravn 1902b). MGUH 31022, height 54.0 mm, width 30.1 mm.

Superfamily Truncatelloidea Gray 1840
Family Elachisinidae Ponder 1985
Genus *Laeviphitus* van Aartsen, Bogi & Giusti 1989
Type species. *Laeviphitus verduini* van Aartsen, Bogi & Giusti 1989.

***Laeviphitus* sp.** (Fig. 69)

Material. Only the two illustrated specimens are known.

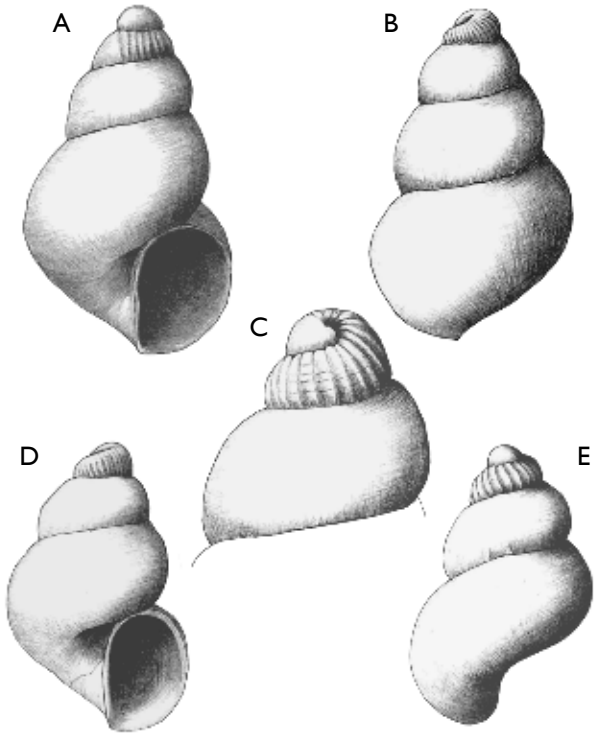

Fig. 69. *Laeviphitus* sp. **A–C**: MGUH 31023 (ex Rkz 137), height 2.2 mm, width 1.4 mm. **D**, **E**: MGUH 31024 (ex Rkz 133), height 2.2 mm, width 1.4 mm.

Superfamily Vanikoroidea Gray 1840
Family Hipponicidae Troschel 1861
Genus *Hipponix* Defrance 1819
Type species. *Hipponix cornucopia* Lamarck 1803.

***Hipponix* sp.** (Fig. 70)

1933 *Hipponyx* sp. (I) – Ravn, p. 36.

Additional material. ARF, 5 specimens (ØSM-10059-25823). The species is rare.

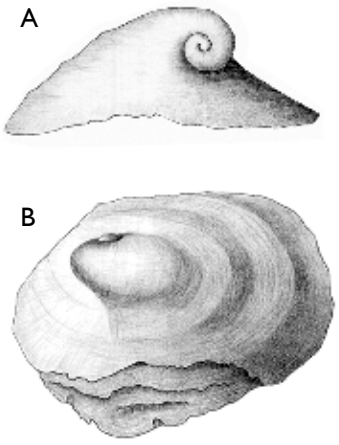

Fig. 70. *Hipponix* sp. MGUH 31025 (ex Rkz 159), height 0.9 mm, width 1.8, length 2.8 mm.

Genus *Eoatlanta* Cossmann 1889
Type species. *Cyclostoma spiruloides* Lamarck 1804.

***Eoatlanta ravni* Schnetler 2013** (Fig. 71)

1933 *Eoatlanta spiruloides* (Lam.) – Ravn, p. 70, plate 7, figs 10a–c, 11 (*non* Lamarck 1804).
2013 *Eoatlanta ravni* Schnetler, p. 4, plate 1, figs 1–8.

Type material. Holotype MGUH 30376 (leg. S.B. Andersen 1972). Illustrated paratypes MGUH 30377 (leg. S.B. Andersen 1972), MGUH 30378 (leg. S.B. Andersen 1972), RGM 794 231 (leg. S.B. Andersen 1972), RGM 794 232 (leg. S.B. Andersen 1972), MGUH 30379 (ex Rkz 108), MGUH 30380 (ex Rkz 158A), MGUH 30381 (ex Rkz 158B).

Additional material. GF 10035-33, 33 specimens; GF 10035-34, 5 specimens; ARF, 191 specimens (ØSM-10059-25124 and ØSM-10059-25125). The species is very common.

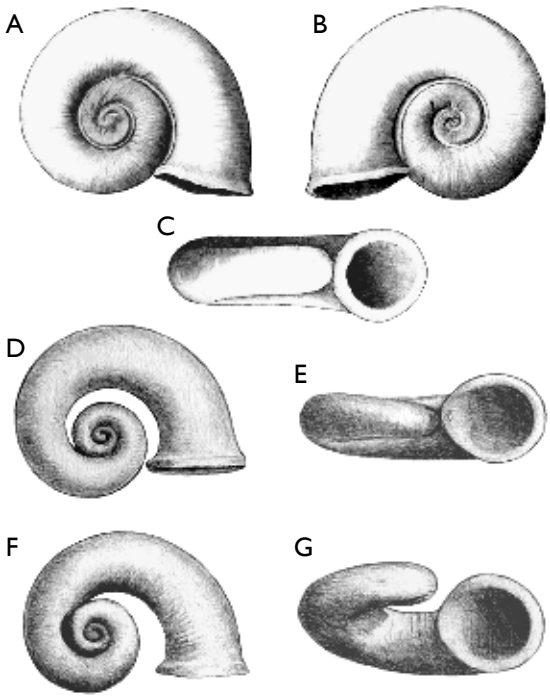

Fig. 71. *Eoatlanta ravni* Schnetler 2013. **A–C**: MGUH 30379 (ex Rkz108), height 0.9 mm, width 2.6 mm. **D**, **E**: MGUH 30380 (ex Rkz 158A), height 0.8 mm, width 2.2 mm. **F**, **G**: MGUH 30381 (ex Rkz 158B), height 0.9 mm, width 2.2 mm.

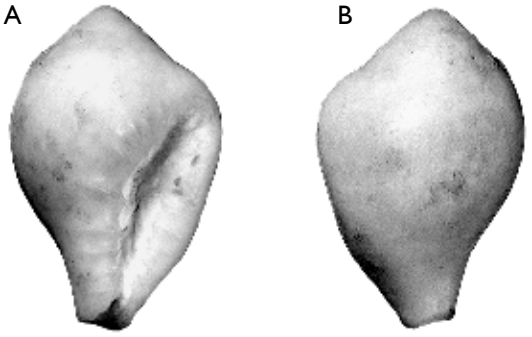

Fig. 72. *Johnstrupia faxensis* Ravn 1933. MGUH 3183, height 9.6 mm, width 6.4 mm.

Superfamily Velutinoidea Gray 1840
Family Triviidae Troschel 1863
Subfamily Eratoinae Gill 1871
Tribe Johnstrupiini Schilder 1939
Genus *Johnstrupia* Ravn 1933
Type species. *Johnstrupia faxensis* Ravn 1933.

***Johnstrupia faxensis* Ravn 1933** (Fig. 72)

1933 *Johnstrupia faxensis* Ravn, p. 61, plate 6, figs 3a, b.

Type material. MGUH 3183.

Additional material. GM, 2 specimens; ISL, 1 specimen. The species is very rare.

Informal Group Ptenoglossa
Superfamily Epitonioidea Berry 1910
Family Epitoniidae Berry 1910
Genus *Cerithiscala* de Boury 1887
Type species. Cerithiscala primula Deshayes 1861.

***Cerithiscala tricincta* (Ravn 1933)** (Fig. 73)

1933 *Tenuiscala (Cerithiscala) tricincta* Ravn, p. 39; plate 3, figs 12a, b.

Material. The species is rather common.

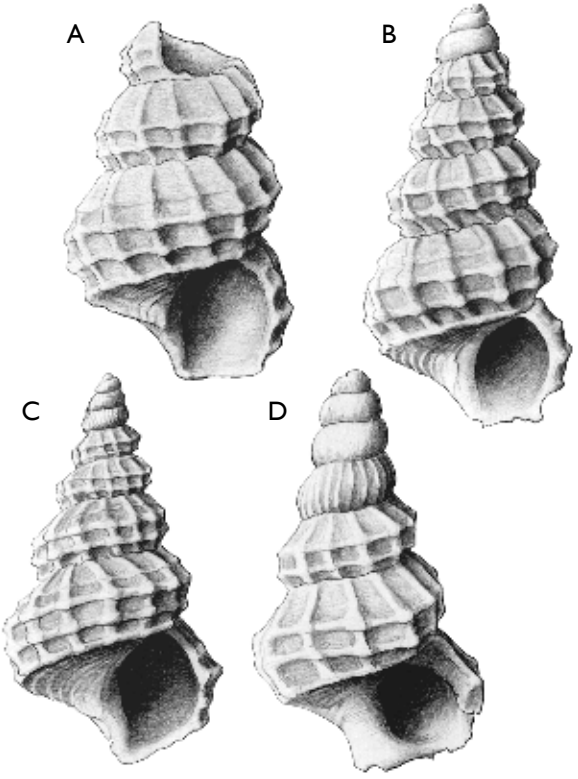

Fig. 73. *Cerithiscala tricincta* (Ravn 1933) **A**: MGUH 31026 (ex Rkz 64A), height 3.6 mm, width 2.3 mm. **B**: MGUH 31027 (ex Rkz 64B), height 4.6 mm, width 2.2 mm. **C**: MGUH 31028 (ex Rkz 64C), height 3.4 mm, width 1.9 mm. **D**: MGUH 31029 (ex Rkz 64D), height 1.8 mm, width 1.0 mm.

***Cerithiscala* sp. 1** (Fig. 74)

Additional material. ISL, 6 specimens. The species is rare.

Remarks. The species is considerably more slender than *C. tricincta* (height/width ratio 3.0 and 1.8 respectively).

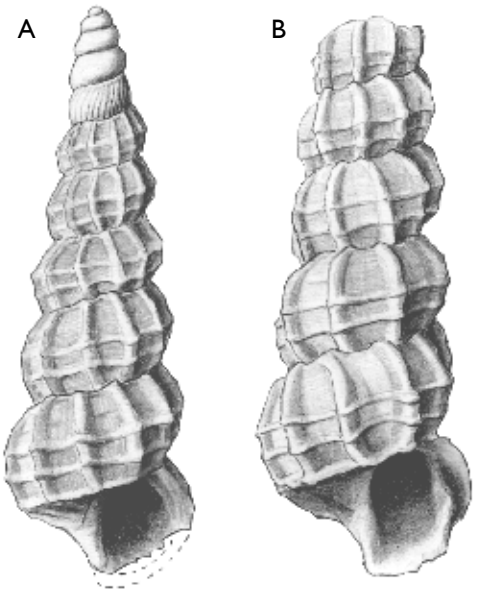

Fig. 74. *Cerithiscala* sp. 1. **A**: MGUH 31030 (ex Rkz 63A), height 3.6 mm, width 1.2 mm. **B**: MGUH 31031 (ex Rkz 63B), height 4.2 mm, width 1.6 mm.

***Cerithiscala* sp. 2** (Fig. 75)

Additional material. GM 1991.4159, 1 specimen; GM 1991.4160, 1 specimen. The species is very rare.

Description. The species is characterised by having a protoconch, consisting of about seven whorls, and carinated whorls with three primary spirals, running over about 14 axial ribs. The adapical spiral is situated between the adapical suture and the medium spiral which is situated at mid-whorl. The abapical spiral is situated immediately above the abapical suture. The medium spiral causes an angulation of the whorl. The slender shell has a height/width ratio of 3.0.

Remarks. The species differs from *Cerithiscala* sp. 1 with respect to its larger protoconch, different spiral ornament and regular convex whorls without a carina. Rosenkrantz referred the species to *Seila* on his drawing, but the ornamentation of the teleoconch and the shape of the aperture preclude this assignment.

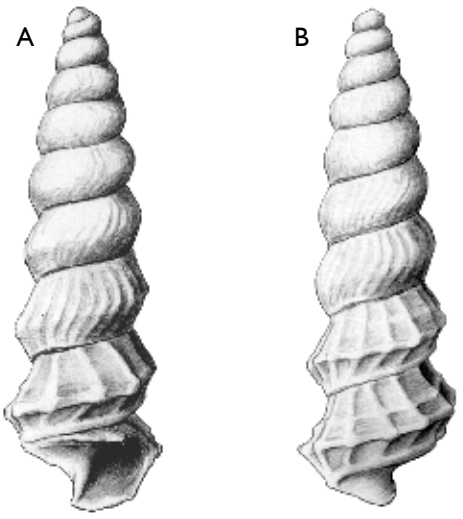

Fig. 75. *Cerithiscala* sp. 2. MGUH 31032 (ex Rkz 68), height 2.3 mm, width 0.8 mm.

Genus *Opalia* H. & A. Adams 1853
Type species. *Scalaria australis* Lamarck 1822.

***Opalia* sp.** (Fig. 76)

Additional material. ARF, 21 specimens (ØSM-10059-25068); ISL, 5 specimens; MNO, 4 specimens. The species is rather common.

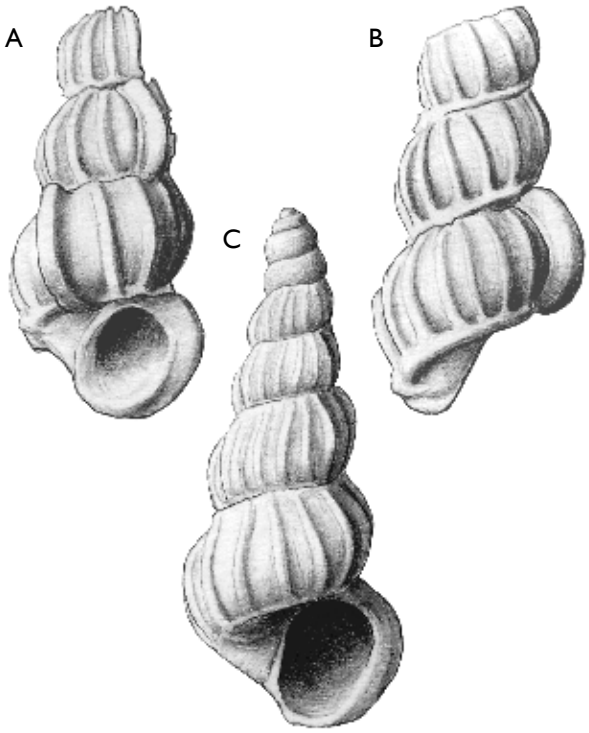

Fig. 76. *Opalia* sp. **A**, **B**: MGUH 31033 (ex Rkz 65A), height 5.1 mm, width 2.6 mm. **C**: MGUH 31034 (ex Rkz 65B), height 3.2 mm, width 1.3 mm.

Genus *Acrilla* H. Adams 1860
Type species. *Scalaria acuminata* Sowerby 1844.

Acrilla elegans (Ravn 1902b) (Fig. 77)

1902 *Scalaria elegans* Ravn, p. 218, plate 1, fig. 10.
1933 *Acrilla elegans* (Ravn) – Ravn, p. 37.

Type material. Holotype MGUH 84.

Additional material. 5 specimens (Ravn 1902b). The species is very rare.

Remarks. Ravn stated that the specimens were found in the coral limestone. On the drawing of the holotype Rosenkrantz has noted "Næsekalk" (now referred to as the Baunekule facies) and this is in accordance with the state of preservation which is typical of the gastropods from the Baunekule facies.

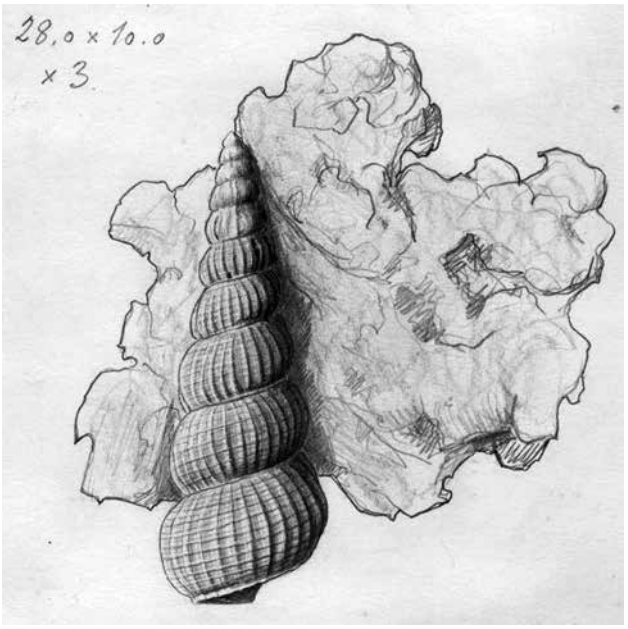

Fig. 77. *Acrilla elegans* (Ravn 1902b). MGUH 84, height 28.0 mm, width 10.0 mm.

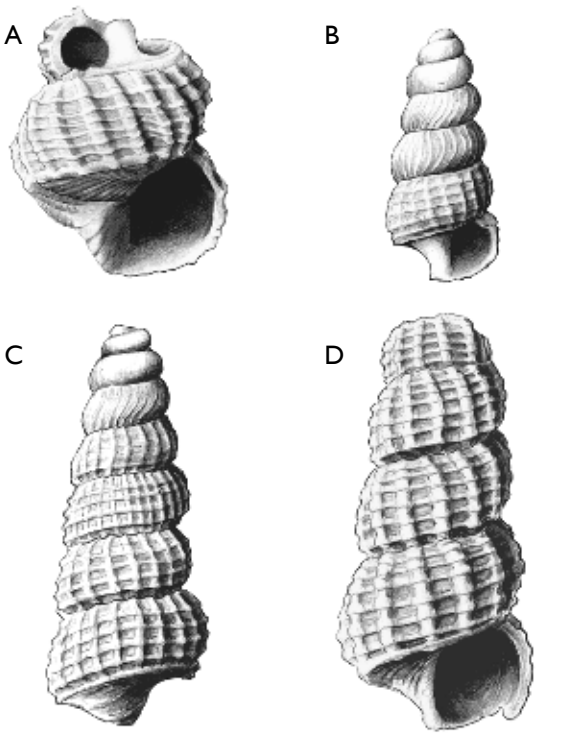

Fig. 78. *Acrilla* sp. 1. **A**: MGUH 31035 (ex Rkz 61A), height 3.9 mm, width 2.8 mm. **B**: MGUH 31036 (ex Rkz 61B), height 2.4 mm, width 1.1 mm. **C**: MGUH 31037 (ex Rkz 61C), height 3.4 mm, width 1.3 mm. **D**: MGUH 31038 (ex Rkz 60), height 3.7 mm, width 1.7 mm.

***Acrilla* sp. 1** (Fig. 78)

Material. Only the illustrated specimens are known.

Remarks. The species has six spirals of almost equal strength and the axial ribs are stronger than the spirals.

***Acrilla* sp. 2** (Fig. 79)

Additional material. MNO, 1 specimen. The species is very rare.

Remarks. The species is more slender than the following species and has three strong spirals and more angular whorls. The axial ribs are stronger than the spirals on the last whorl.

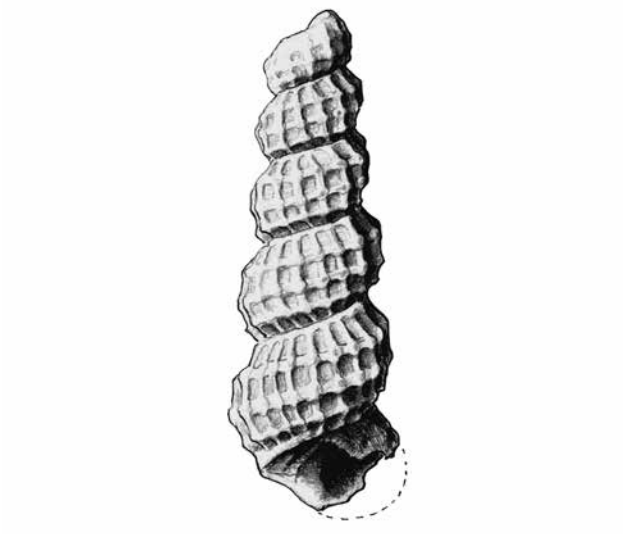

Fig. 79. *Acrilla* sp. 2. MGUH 31039 (ex Rkz 59), height 3.3 mm, width 1.1 mm.

***Acrilla* sp. 3** (Fig. 80)

Additional material. ARF, 1 specimen (ØSM-10059-25060). The species is very rare.

Fig. 80. *Acrilla* sp. 3. ØSM-10059-25061 (ex ARF), height 4.4 mm, width 2.1 mm.

***Acrilla?* sp.** (Fig. 81)

Additional material. EBP, 1 specimen. The species is very rare.

Remarks. The species has a slightly coeloconoid outline, convex whorls, which are relatively low. There are *c*. 10 spirals, which are separated by narrow furrows, and about 12 almost orthocline axial ribs. The aperture is not completely preserved, but it is rather small with a concave columella and a short canal, which is turned to the left. The state of preservation excludes a definitive generic assignment.

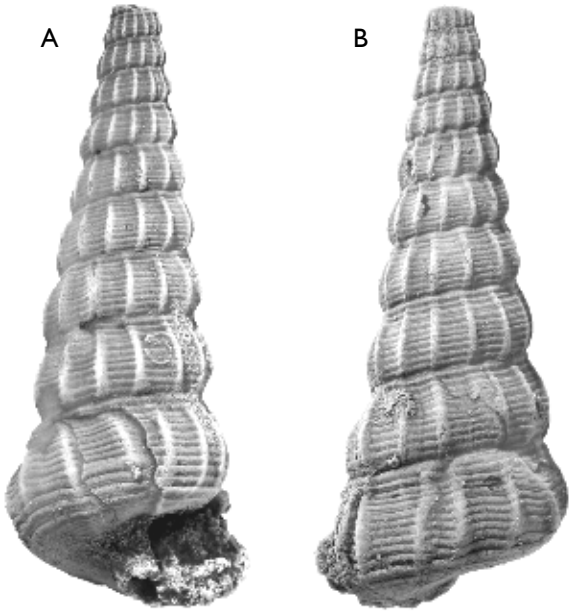

Fig. 81. *Acrilla?* sp. ØSM-10059-25105 (ex ARF), height 11.5 mm, width 4.4 mm.

Genus *Cirsotrema* Mörch 1852
Type species. Scalaria varicosa Lamarck 1822.

***Cirsotrema* sp.** (Fig. 82)

Material. Only the illustrated specimen is known.

Fig. 82. *Cirsotrema* sp. ØSM-10059-25042 (ex ARF), height 5.1 mm, width 1.7 mm.

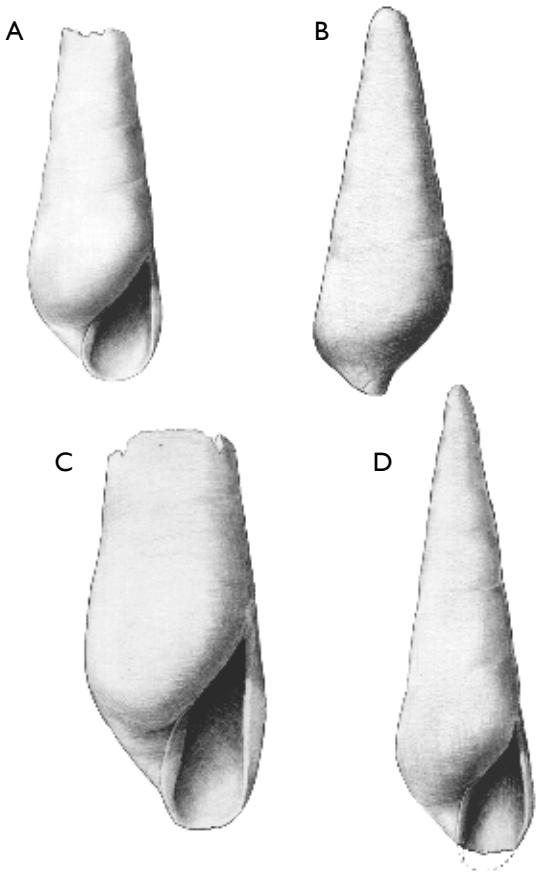

Fig. 83. *Eulima (Polygireulima) danica* Ravn 1933. **A**: MGUH 3148, height 5.7 mm, width 2.0 mm. **B**: MGUH 3149, height 3.5 mm, width 1.2 mm. **C**: MGUH 31043 (ex Rkz 41A), height 3.7 mm, width 1.7 mm. **D**: MGUH 31044 (ex Rkz 41B), height 9.7 mm, width 2.8 mm.

Superfamily Eulimoidea Philippi 1853
Family Eulimoidae Philippi 1853
Genus *Eulima* Risso 1826
Type species. Turbo subulatus Donovan 1803.
Subgenus *Eulima (Polygireulima)* Cossmann 1894
Type species. Melania spina Grateloup 1838.

***Eulima (Polygireulima) danica* Ravn 1933** (Fig. 83)

1933 *Eulima (Polygyreulima) danica* Ravn, p. 41, plate 4, figs 1a, b, 2a, b.

Type material. Holotype MGUH 3149, Paratype MGUH 3148.

Material. The species is rather common.

***Eulima (Polygireulima)* sp. 1** (Fig. 84)

Additional material. ARF, 2 specimens (ØSM-10059-25052 and 25067). The species is very rare.

Remarks. This species is the most slender of the *Eulima* species. The whorls are slightly to medium convex and the aperture has a spout-like thickening anteriorly.

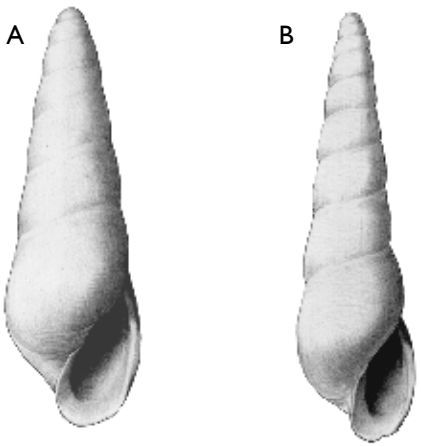

Fig. 84. *Eulima (Polygireulima)* sp. 1. **A**: MGUH 31045 (ex Rkz 42), height 3.0 mm, width 1.0 mm. **B**: MGUH 31046 (ex Rkz 43), height 4.9 mm, width 1.3 mm.

***Eulima (Polygireulima)* sp. 2** (Fig. 85)

Material. Only the illustrated specimen is known.

Remarks. This species has relatively low whorls and a wider aperture, without the anterior spout.

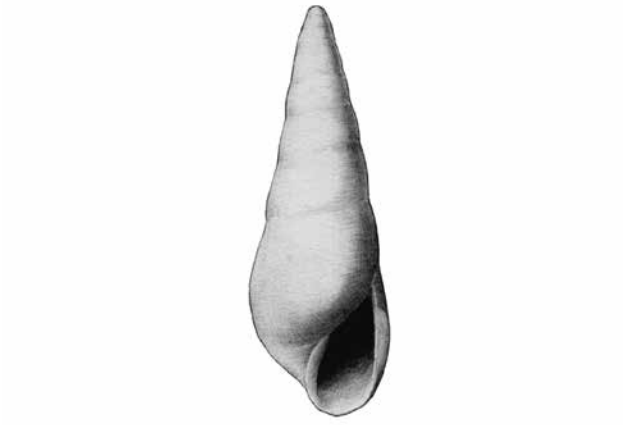

Fig. 85. *Eulima (Polygireulima)* sp. 2. MGUH 31047 (ex Rkz 44), height 4.8 mm, width 1.6 mm.

***Eulima (Polygireulima)* sp. 3** (Fig. 86)

Material. Only the illustrated specimen is known.

Remarks. This species has a very fine spiral ornament and a rather narrow aperture with a posterior narrow spout.

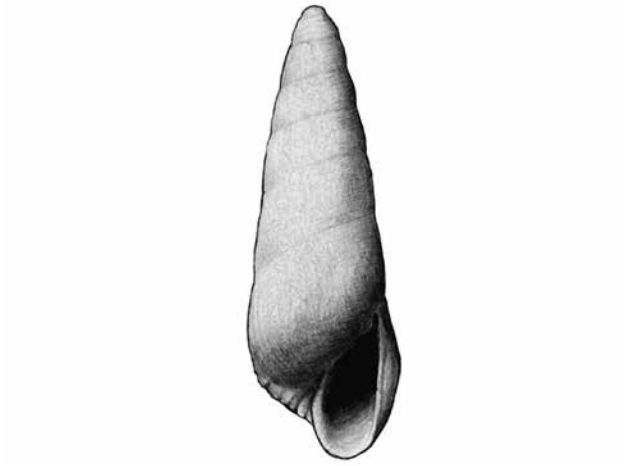

Fig. 86. *Eulima (Polygireulima)* sp. 3. MGUH 31048 (ex Rkz 48), height 4.0 mm, width 1.3 mm.

***Eulima (Polygireulima)* sp. 4** (Fig. 87)

Material. Only the illustrated specimen is known.

Remarks. This species has a very convex last whorl and a thickened columella (pseudoumbilicus?). The aperture has a posterior narrow spout.

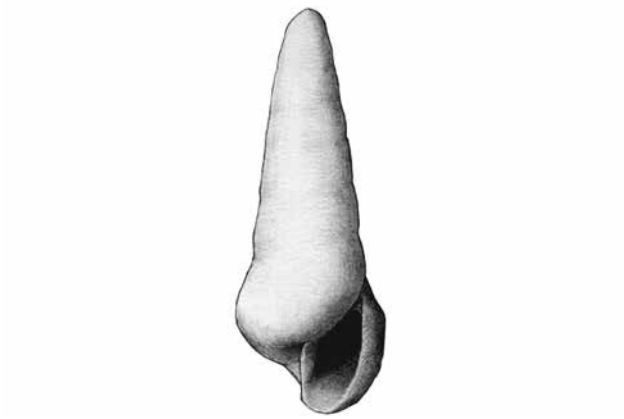

Fig. 87. *Eulima (Polygireulima)* sp. 4. MGUH 31049 (ex Rkz 46), height 4.2 mm, width 1.6 mm.

Subgenus *Eulima (Margineulima)* Cossmann 1888
Type species. Eulima fallax Deshayes 1862.

***Eulima (Margineulima)?* sp.** (Fig. 88)

1933 *Eulima* sp. – Ravn, p. 41.

Material. Only the illustrated specimens are known.

Remarks. Ravn (1933, p. 42) stated that the specimens were rather similar to the subgenus *Margineulima*, but the poor material precludes a precise determination.

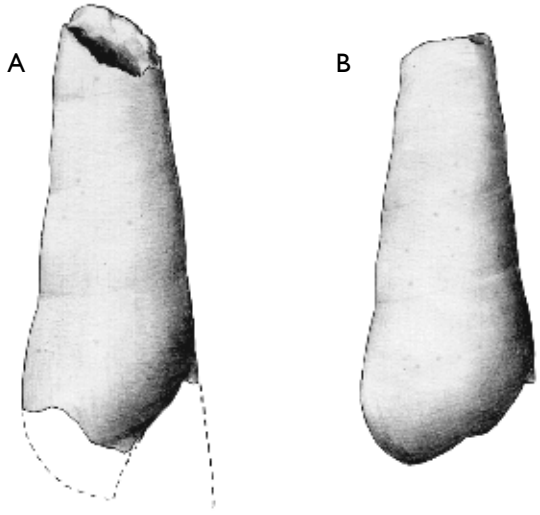

Fig. 88. *Eulima (Margineulima?)* sp. **A**: MGUH 31050 (ex Rkz 45A), height 9.4 mm, width 3.7 mm. **B**: MGUH 31051 (ex Rkz 45B), height 10.4 mm, width 4.2 mm.

Genus *Melanella* Bowdich 1822
Type species. Melanella dufresnii Bowdich 1822

***Melanella* sp.** (Fig. 89)

Material. Only the illustrated specimen is known.

Remark. The species has a relatively low last whorl, a slightly twisted columella and a rather narrow spout anteriorly.

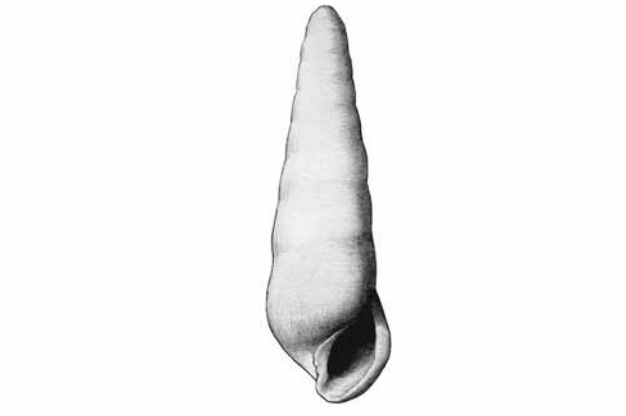

Fig. 89. *Melanella* sp. MGUH 31052 (ex Rkz 47), height 4.7 mm, width 1.5 mm.

Family Aclididae G.O. Sars 1878
Genus *(Graphis)* Jeffreys 1867
Type species. Graphis unicus (Montagu 1803).

***Graphis danica* Ravn 1933** (Fig. 90)

1933 *Aclis (Graphis) danica* Ravn, p. 38, plate 3, figs 6a, b.

Type material. Holotype MGUH 3139.

Material. The species is rather common.

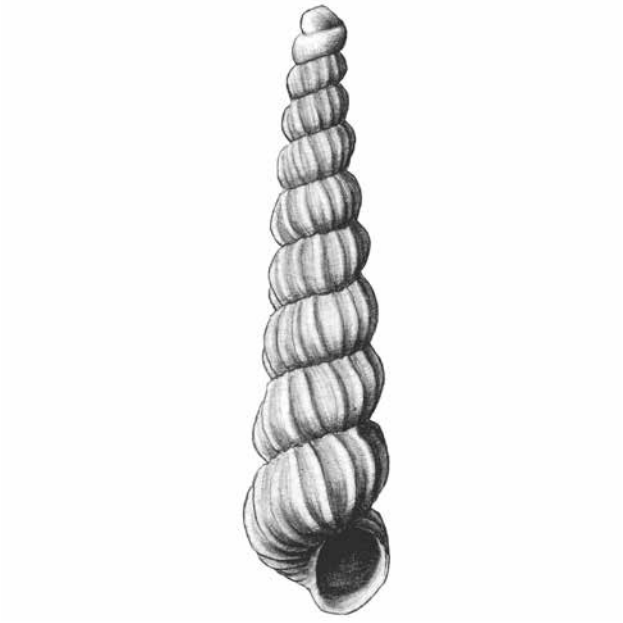

Fig. 90. *Graphis danica* Ravn 1933. MGUH 31053 (ex Rkz 51), height 3.7 mm, width 0.9 mm.

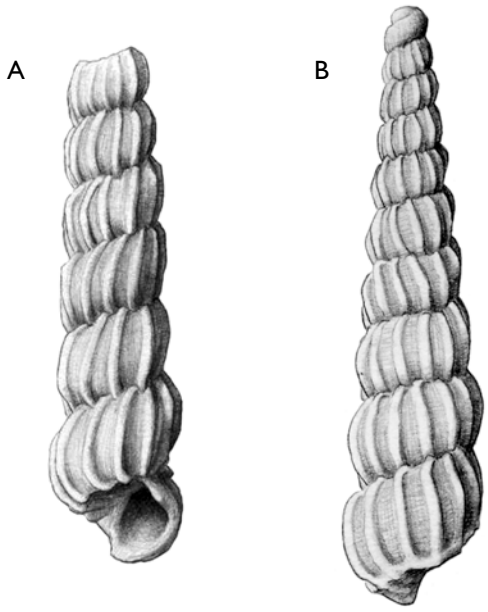

Fig. 91. *Graphis* sp. 1. **A**: MGUH 31054 (ex Rkz 50A), height 4.3 mm, width 1.1 mm. **B**: MGUH 31055 (ex Rkz 50B), height 4.0 mm, width 0.9 mm.

***Graphis* sp. 1** (Fig. 91)

Additional material. ARF, 6 specimens (ØSM-10059-25043); ISL, 1 specimen; MNO, 3 specimens. The species is rare.

Remarks. This species differs from *Graphis danica* in having a distinct undulating suture, caused by the coarser axial ribs. These ribs are more flexuous and on the transition to the base they have an angulation, superficially giving the appearance of a basal disc. Rosenkrantz noted that the species might be a scalarid. However, the species has a protoconch very similar to the preceding species, the same slender outline and no real basal disc and we thus prefer to interpret the species as *Graphis* sp.

***Graphis?* sp. 2** (Fig. 92)

Material. Only the illustrated specimen is known.

Remarks. This and the following species resemble the smooth species from the French Eocene, as illustrated by Gougerot & Le Renard (1987). Unfortunately, the aperture is not preserved.

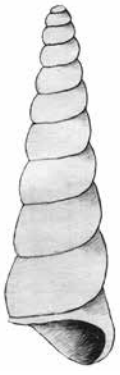

Fig. 92. *Graphis?* sp. 2. MGUH 31055 (ex Rkz 127), height 4.3 mm, width 1.2 mm.

***Graphis?* sp. 3** (Fig. 93)

Material. Only the illustrated specimen is known.

Remarks. The smooth species differs from the previous species by having lower whorls.

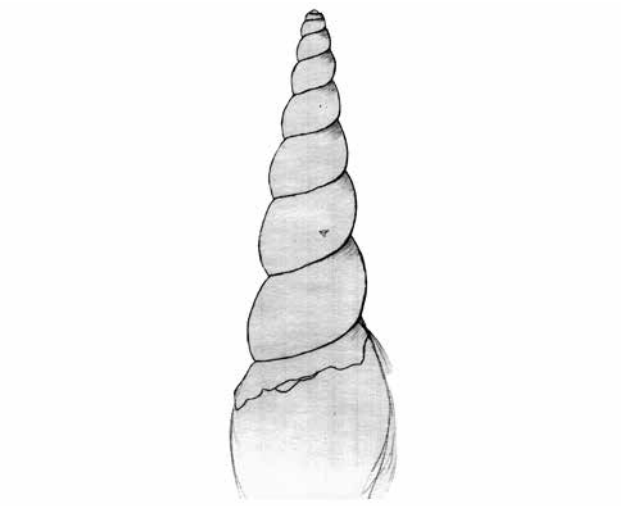

Fig. 93. *Graphis?* sp. 3 MGUH 31057 (ex Rkz 128), height 5.1 mm, width 1.5 mm.

Superfamily Triphoroidea Gray 1847a
Family Triphoridae Gray 1847a
Subfamily Triphorinae Gray 1847a
Genus *Epetrium* Harris & Burrows 1891
Type species. Triforis grignonensis Deshayes 1866.

***Epetrium? cretacea* (Ravn 1933)** (Fig. 94)

1933 *Triforis (Epetrium) cretacea* Ravn, p. 53, plate 5, figs 12a, b, 13a, b.
1998 *Epetrium? cretacea* (Ravn 1933) – Nützel, p. 127, plate 18, figs K–N.

Type material. Holotype MGUH 3174, paratype MGUH 3175.

Additional material. GM, 74 specimens; ARF, 116 specimens; ISL, 706 specimens; MNO, 140 specimens; EBP, 216 specimens. SMF 311770, 344078, 150 specimens. Rkz 238, 239. The species is abundant.

Remarks. The species is characterised by having about 17 knobs on each whorl and three visible spirals. Of these, the adapical is weak. A fourth spiral is covered by the following whorl. Nützel (1998, p. 126) stated that the protoconch of *Triforis grignonensis* Deshayes 1866, the type species of *Epetrium*, is unknown and that several species differing from the type species have been assigned to *Epetrium*. He also stated that *Epetrium? cretacea* has only two knob-bearing spirals and *E.? faxensis* (= *Triphora (Ogivia) faxensis*) has a different teleoconch sculpture. Based on these observations, *E. crassigranulata* and *E. cretacea* were only tentatively referred to the genus *Epetrium*. The study concluded, however, that these two species are the oldest known Triphorinae with a preserved protoconch (Nützel 1998, p. 126).

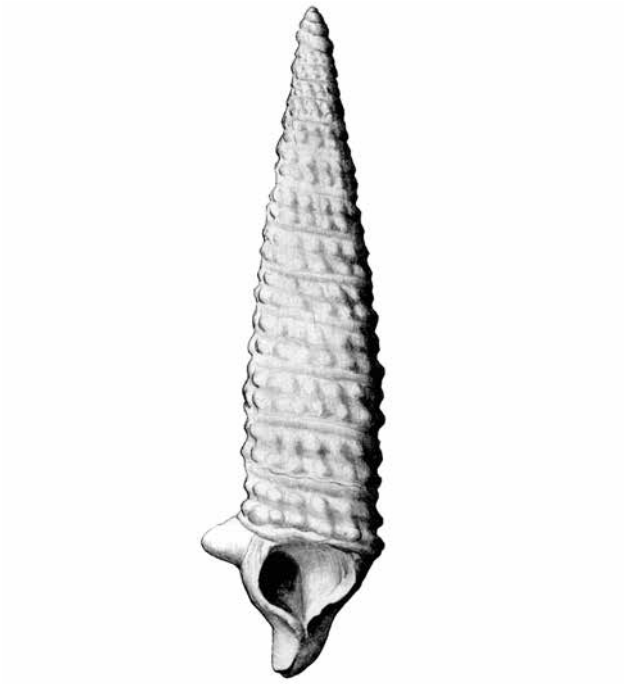

Fig. 94. *Epetrium? cretacea* (Ravn 1933). MGUH 31058 (ex Rkz 238), height 7.8 mm, width 2.1 mm.

***Epetrium? crassigranulata* (Ravn 1933)** (Fig. 95)

1933 *Triforis (Epetrium) crassigranulata* Ravn, p. 54, plate 6, figs 1a, b, 2a, b.
1998 *Epetrium? crassigranulata* ((Ravn 1933) – Nützel, p. 126, plate 18, fig. J.

Type material. Holotype MFUH 3281, paratype MGUH 3282.

Additional material. GM, 12 specimens; ARF, 2 specimens; ISL, 5 specimens; SMF 311 769. The species is rare.

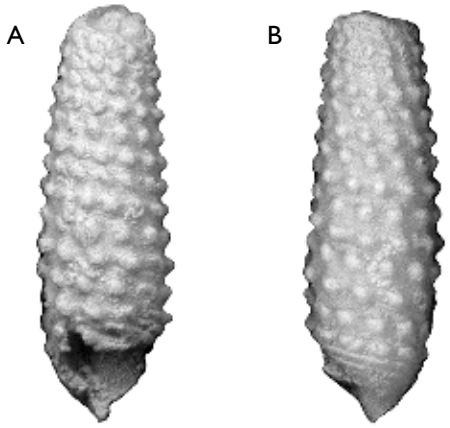

Fig. 95. *Epetrium? crassigranulata* (Ravn 1933). MGUH 31059 (ex ISL), height 5.0 mm, width 1.7 mm.

***Epetrium? separabilis* (Ravn 1933)** (Fig. 96)

1933 *Triforis (Epetrium) separabilis* Ravn, p. 53, plate 5, figs 17a, b.

Type material. Holotype MGUH 3179.

Additional material. ISL, 9 specimens; EBP, one specimen and a fragment; MNO, 1 specimen. The species is rare.

Remarks. This species differs in having four spirals on the teleoconch whorls. The complete specimen Rkz 245 consists of five convex protoconch whorls and about eight almost flat and relatively low teleoconch whorls. The whorls have three knob-bearing spirals which are all rather weak. The number of knobs is about 20. The aperture is rounded rectangular.

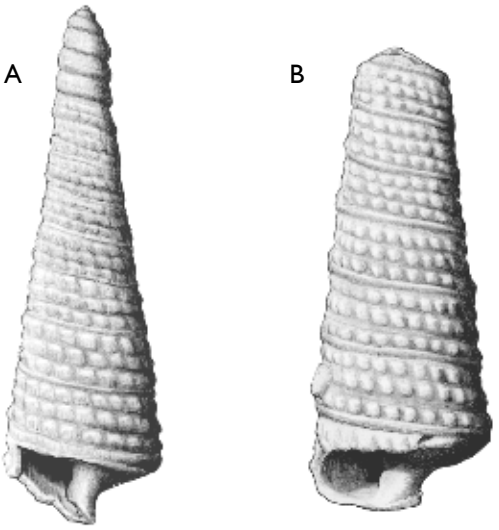

Fig. 96. *Epetrium? separabilis* (Ravn 1933). **A**: MGUH 31060 (ex Rkz 245), height 4.6 mm, width 1.4 mm. **B**: MGUH 31061 (ex Rkz 244), height 4.3 mm, width 1.7 mm.

***Epetrium?* sp.** (Fig. 97)

Additional material. ISL, 3 specimens; SMF 344080, 1 specimen. The species is very rare.

Description. The shell is sinistral and slender conical. No specimens with protoconch preserved have been found. The whorls are flat and separated by a distinct suture. The last whorl equals less than 0.1 of the total shell height and the height/width ratio is more than 5. There are three spiral ribs of almost equal intensity and they are a little raised and prominent in lateral view. The two adapical spiral ribs are close-set and separated by a narrow furrow, whereas spirals number two and three in abapical direction are separated by a wider furrow. The flat and smooth base is demarcated by a fourth rather strong and smooth spiral, which is more or less covered by the following whorl. There are *c.* 18 axial ribs, which are opisthocline. On the three spiral ribs they cause more or less rhomboidal knobs. The aperture is quadrangular with rounded corners and the anterior canal is tubular and closed, slightly turned backwards. The posterior canal has an oblique tube and is situated near the adapical suture. One specimen (Fig. 97B) differs by having almost flat whorls and almost equal and equidistant spiral ribs.

Remarks. The species differs from *Epetrium? cretacea* by having three spiral ribs of equal strength, of which the adapical two spiral ribs are more close-set, flat whorls and a more slender outline. *Epetrium? separabilis* has four spirals with knobs. The knobs are increasing in strength in abapical direction on the three upper spirals, whereas the spiral above the apical suture has much smaller knobs.

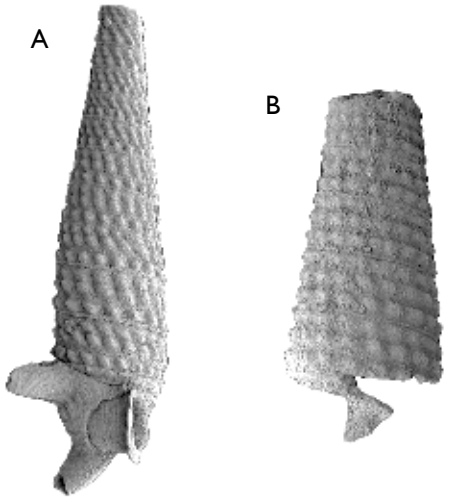

Fig. 97. *Epetrium?* sp. **A**: MGUH 31062 (ex ISL), height 5.2 mm, width 1.7 mm. **B**: MGUH 31063 (ex ISL), height 2.8 mm, width 1.1 mm. Photos: Alexander Nützel, München.

Genus *Triphora* Blainville 1828
Type species. Triphora gemmata Blainville 1828.
Subgenus *Triphora (Ogivia)* Harris & Burrows 1891
Type species. Triphora singularis Deshayes 1864.

***Triphora (Ogivia) faxensis* Ravn 1933** (Fig. 98)

1933 *Triphora (Ogivia) faxensis* Ravn, p. 55, plate 5, figs 14a, b.

Type material. Holotype MGUH 3176.

Additional material. ARF, 1 specimen (ARF 25117); ISL, 1 specimen; SMF 344079, 1 specimen. The species is very rare.

Remarks. This species is characterised by having slightly undulating sutures and a canal turned backwards. The whorls have two spiral furrows, of which the adapical is narrow and the abapical is wider. These furrows separate three spiral ribs, of which the adapical one is weak. The middle spiral is the strongest and the abapical is a little weaker. The axial ribs are slightly prosocline and cause knobs on the spiral ribs, especially on the middle spiral. The number of axial ribs is about 14.

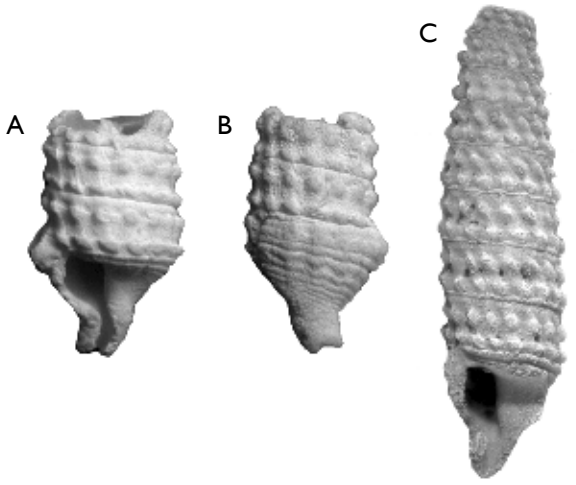

Fig. 98. *Triphora (Ogivia) faxensis* Ravn 1933. **A**, **B**: MGUH 3176, height 4.0 mm, 2.3 mm. **C**: MGUH 31064, height 5.5 mm, width 1.4 mm.

***Triphora (Ogivia)* sp.** (Fig. 99)

1933 *Triphora (Ogivia)* sp. – Ravn, p. 55.

Addtional material. Only one specimen was mentioned by Ravn (MGUH 31075, ex GM 1991.5752); ISL, 7 specimens; MNO, 6 specimens. The species is rare.

Remarks. This species has slightly convex whorls and four spirals. The three upper spirals are increasing in strength abapically, and the third in abapical direction is somewhat stronger than the other spirals. The abapical spiral is much weaker. The number of axial ribs is about 18 and they cause knobs on the spirals, especially on the third spiral, where the knobs are large and oblique.

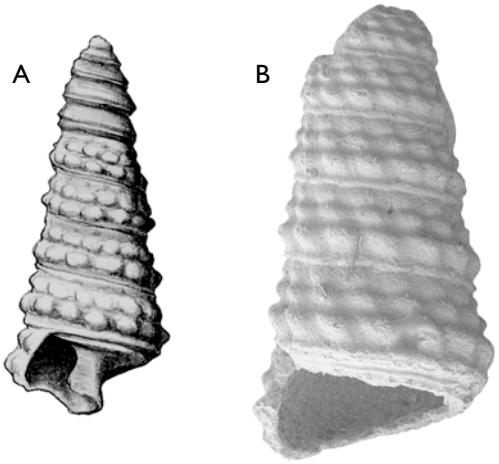

Fig. 99. *Triphora (Ogivia)* sp. **A**: MGUH 31065 (ex Rkz 239), height 2.4 mm, width 1.0 mm. **B**: MGUH 31066 (ex GM 1991.5752), height 2.8 mm, width 1.4 mm.

Triphoridae gen. et sp. indet. 1 (Fig. 100)

Additional material. ISL, 1 specimen. The species is very rare.

Remarks. The fragmentary specimen Rkz 240 consists of the last three teleoconch whorls, which have three spirals with 16–18 rectangular knobs. Of these, the abapical spiral is the strongest. A fourth smooth spiral demarcates the base. The fragmentary specimen Rkz 247 has a little more than one whorl preserved. There are three broad spiral bands, which have about 16 weak rectangular knobs. The axial ribs are prosocline. On the base, six further spirals are present.

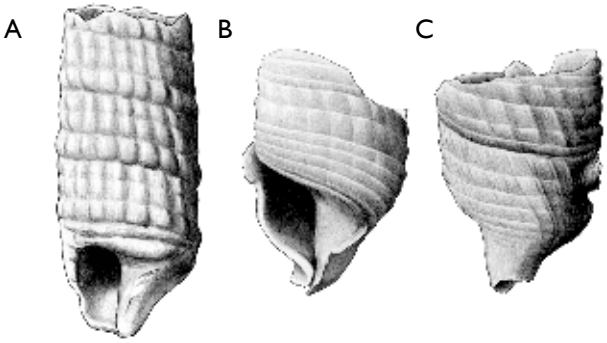

Fig. 100. Triphoridae gen. et sp. indet. 1. **A**: MGUH 31067 (ex Rkz 240), height 3.8 mm, width 1.7 mm. **B**, **C**: MGUH 31068 (ex Rkz 247), height 3.8 mm, width 2.6 mm.

Triphoridae gen. et sp. indet. 2 (Fig. 101)

Additional material. ISL, 9 specimens. The species is rare.

Remarks. The fragmentary specimens have almost smooth and relatively low whorls. Abapically a smooth spiral band is present. The aperture is rather narrow. The fragmentary specimen Rkz 242 consists of about seven almost flat and low whorls, which wear three weak spirals. The spirals wear knobs. A large specimen has been found as an external impression in the coral limestone. It has 20 whorls and the sculpture fades away completely on the younger whorls.

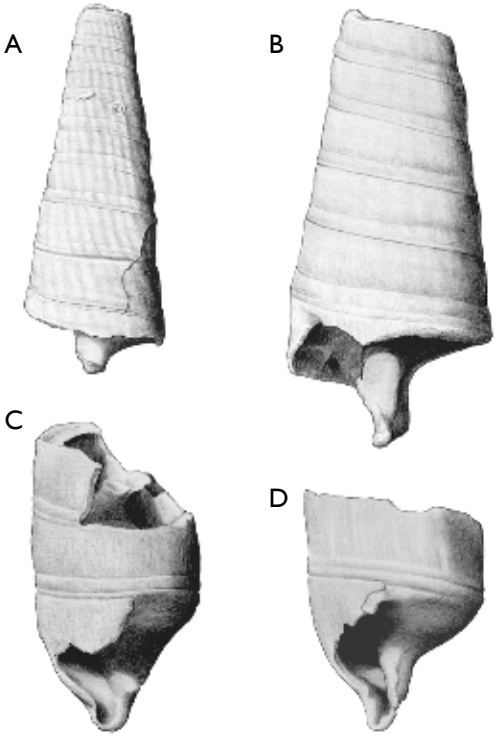

Fig. 101. Triphoridae gen. et sp. indet. 2. **A**: MGUH 31069 (ex Rkz 242), height 10.3 mm, width 4.0 mm. **B**: MGUH 31070 (ex Rkz 243), height 4.8 mm, width 2.2 mm. **C**: MGUH 31071 (ex Rkz 246), height 4.2 mm, width 2.3 mm. **D**: MGUH 31072 (ex Rkz 241), height 4.3 mm, width 3.2 mm.

Family Cerithiopsidae H. & A. Adams 1853
Subfamily Cerithiopsinae H. & A. Adams 1853
Genus *Cerithiopsis* Forbes & Hanley 1851
Type species. Cerithiopsis tubercularis Montagu 1803.

***Cerithiopsis unisulcata* Ravn 1933** (Fig. 102)

1933 *Cerithiopsis unisulcata* Ravn, p. 48, p. 50, plate 5, figs 3a, b, 4a, b.

Type material. Holotype MGUH 3166, paratype MGUH 3165.

Additional material. GM, 53 specimens; SMF 344068, 109 specimens. The species is very common.

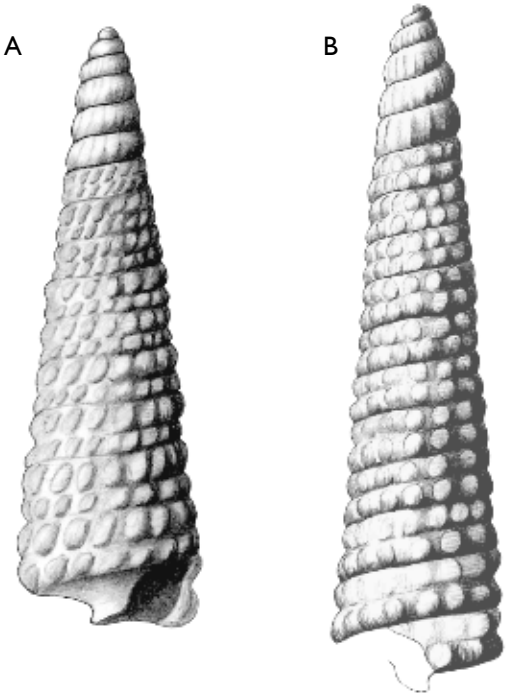

Fig. 102. *Cerithiopsis unisulcata* Ravn 1933. **A**: MGUH 31074 (ex Rkz 195), height 7.3 mm, width 2.2 mm. **B**: MGUH 31075 (ex Rkz 196A), height 6.9 mm, width 1.8 mm.

***Cerithiopsis* aff. *unisulcata* Ravn 1933** (Fig. 103)

Material. The two illustrated specimens are the only specimens known.

Remarks. The species differs from *C. unisulcata* by having the strongest knobs on the abapical spiral instead of on the adapical spiral.

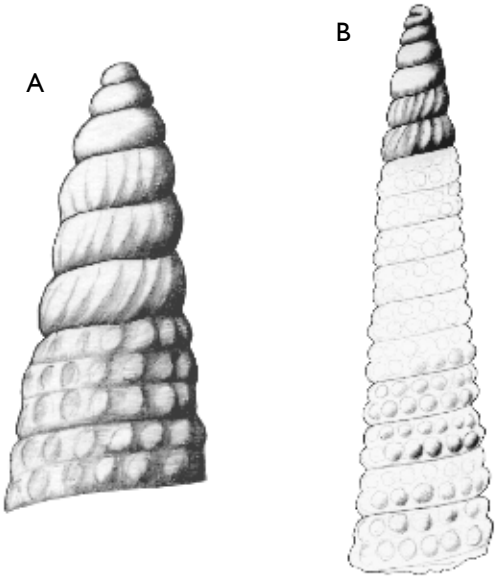

Fig. 103. *Cerithiopsis* aff. *unisulcata* Ravn 1933. **A**: MGUH 31076 (ex Rkz 194), height 1.4 mm, width 0.7 mm. **B**: MGUH 31077 (ex Rkz 212), height 3.5 mm, width 0.9. mm

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***Cerithiopsis rosenkrantzi* (Ravn 1933)** (Fig. 104)

1933 *Tenuiscala rosenkrantzi* Ravn, p. 39 (*partim*), plate 3, figs 8a, b (*non* figs 9a, b, 10a, b = *Vatopsis metaxiformis*).
1998 *Cerithiopsis* cf. *rosenkrantzi* Ravn – Nützel, p. 103, plate 16, fig. P.

Type material. Holotype MGUH 3142.

Additional material. GM, 2 specimens; SMF 311755, 1 specimen; SMF 344074 and 344075, 3 specimens; MNO, 1 specimen. The species is rare.

Remarks. Ravn selected figs 8a–b as holotype, but noted that the specimen on figs 9a–b has a more conoid protoconch. In his description he noted that the teleoconch whorls have three rather strong spirals, crossed by 10–11 strong axial ribs. Nützel (1998, p. 103) described, based on two specimens, the species and stated that the protoconch has six smooth convex whorls and the teleoconch has two spirals. Nützel (1998, p. 111, plate 16, fig. K) established *Vatopsis metaxiformis*, which has a protoconch with spiral ribs and axial ribs. The protoconch whorls are slightly angular at the two abapical spiral ribs. The teleoconch whorls have three strong spiral ribs and *c.* 10

axial ribs. It is obvious that Ravn included this species in *Tenuiscala rosenkrantzi*. A study of the material in GM showed that almost all of the 60 specimens, labelled *Tenuiscala rosenkrantzi*, in fact are *Vatopsis metaxiformis*. Only the holotype and two specimens are genuine *Tenuiscala rosenkrantzi*. Furthermore, the state of conservation of the type material in the type collection of Geological Museum is very poor.

Fig. 104. *Cerithiopsis rosenkrantzi* (Ravn 1933). SMF 311755, height 1.4 mm, width 0.4 mm. Photo: Alexander Nützel, München.

***Cerithiopsis bruennichi* Ravn 1933** (Fig. 105)

1933 *Cerithiopsis brünnichi* Ravn, p. 49, p. 50, plate 4, figs 14a, b, 15a, b.

Type material. Holotype MGUH 3162, paratype MGUH 3161.

Additional material. GM (Ravn), 2 specimens; GM 1991.4159, 3 specimens; GM 1991.4160, 9 specimens; GM 1991.4161, 2 specimens; ARF, 24 specimens (ØSM-10059-25031); ISL, 4 specimens. The species is rather common.

Remarks. The species has 20–22 axial ribs, whereas *Zaclys? selandica* has only *c*. 15 axial ribs. Furthermore, the protoconchs are different.

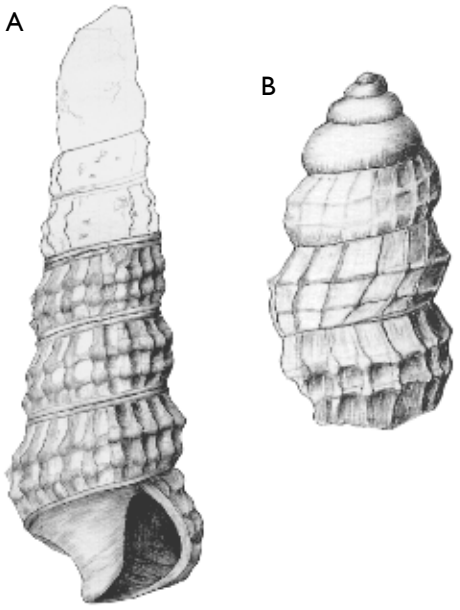

Fig. 105. *Cerithiopsis bruennichi* Ravn 1933. **A**: MGUH 3162, height 5.7 mm, width 1.9 mm. **B**: MGUH 3161, height 0.9 mm, width 0.4 mm.

***Cerithiopsis* sp. 1** (Fig. 106)

Material. Only the illustrated specimen is known (ex ISL).

Remarks. The protoconch has opisthocline axial ribs and a teleoconch with three primary spirals, of which the abapical is weak and situated immediately above the suture. Between the two adapical spirals a secondary spiral is inserted. The spirals run across about 20 slightly opisthocline axial ribs. The aperture is rounded rectangular with a short canal, which is turned to the left.

Fig. 106. *Cerithiopsis* sp. 1. MGUH 31078 (ex ISL), height 2.8 mm, width 1.0 mm.

***Cerithiopsis* sp. 2** (Fig. 107)

Material. Only the illustrated specimen is known.

Remarks. This species has two spirals, crossed by 14 axial ribs. At the intersections, large oblong knobs occur. *Zaclys? selandica* (Nützel 1998, p. 104, plate 16, fig. O) has considerably weaker knobs. *Cerithiopsis* sp. 13 has two spirals, crossed by 16 axial ribs, but differs by having a smooth spiral band under the two knob-bearing spirals.

Fig. 107. *Cerithiopsis* sp. 2. MGUH 31079 (ex Rkz 72), height 3.2 mm, width 0.9 mm.

***Cerithiopsis* sp. 3** (Fig. 108)

Material. Only the illustrated specimen is known.

Remarks. The species has almost flat whorls, bearing three broad spirals of almost the same strength. The axial ribs (about 14 on each whorl) are weaker and divide the spirals into oblong knobs. The protoconch whorls are smooth, but only the last four whorls are preserved.

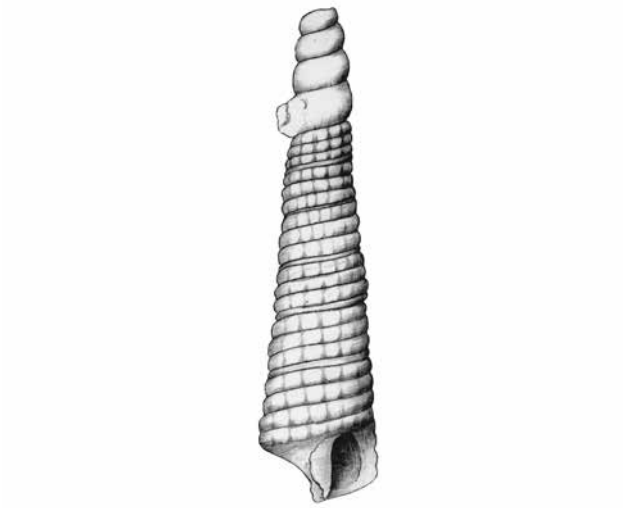

Fig. 108. *Cerithiopsis* sp. 3. MGUH 31080 (ex Rkz 190), height 5.7 mm, width 1.4 mm.

***Cerithiopsis* sp. 4** (Fig. 109)

Additional material. GM 1991.4184, 2 specimens; GM 1991.4197, 2 specimens; GM 1991.4173, 1 specimen; GM 1991.4184, 1 specimen; SMF 344070, 1 specimen. The species is rare.

Remarks. On the first teleoconch whorls there are three spiral bands, each bearing 18–24 knobs. The knobs on the adapical spiral are higher than the other knobs. On a few specimens, the spirals on the last teleoconch whorls are divided into six spirals, probably due to growth errors.

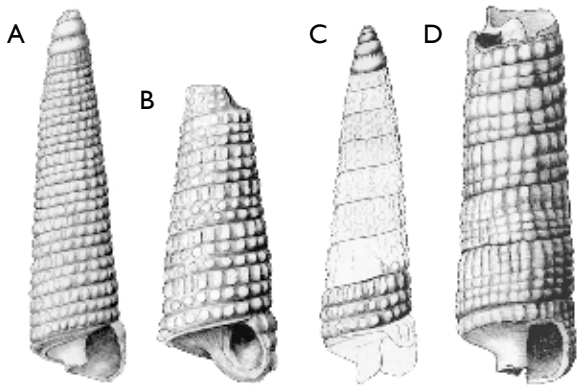

Fig. 109. *Cerithiopsis* sp. 4. **A**: MGUH 31081 (ex Rkz 201A), height 6.7 mm, width 1.8 mm. **B**: MGUH 31082 (ex Rkz 201C), height 4.9 mm, width 1.3 mm. **C**: MGUH 31083 (ex Rkz 201B), height 10.2 mm, width 4.2 mm. **D**: MGUH 31084 (ex Rkz 200), height 4.7 mm, width 1.6 mm.

***Cerithiopsis* sp. 5** (Fig. 110)

Additional material. GM 1991.4185, 3 specimens. The species is very rare.

Remarks. There are three flat spiral bands on the teleoconch, and the adapical is considerably weaker. There are 12–13 flat axial ribs, separated by narrower interspaces.

Fig. 110. *Cerithiopsis* sp. 5. MGUH 31085 (ex Rkz 204), height 4.0 mm, width 0.9 mm.

***Cerithiopsis* sp. 6** (Fig. 111)

Additional material. GM 1991.4184, 1 specimen. The species is very rare.

Remarks. The teleoconch has two spirals and *c*. 14 axial ribs. The smooth, multispiral protoconch has slightly angular whorls. *C. rosenkrantzi* has a rather similar teleoconch, but a smooth protoconch with regularly convex whorls.

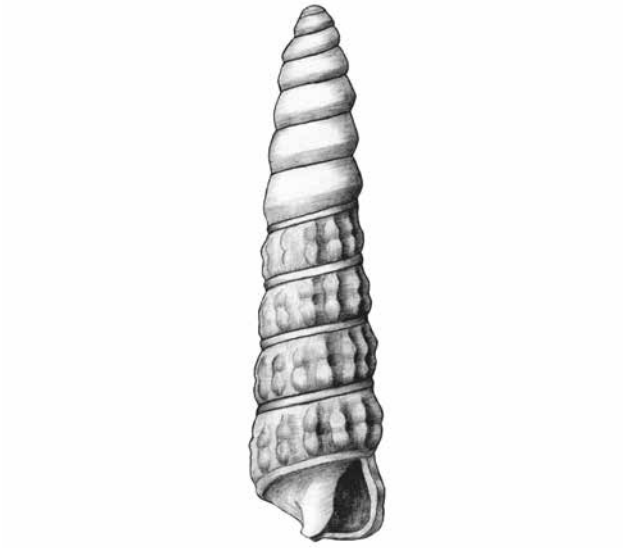

Fig. 111. *Cerithiopsis* sp. 6. MGUH 31086 (ex Rkz 208), height 3.2 mm, width 0.8 mm.

***Cerithiopsis* sp. 7** (Fig. 112)

Additional material. GM 1991.4194, 1 specimen. The species is very rare.

Remarks. The multispiral protoconch has opisthocline axial ribs on the terminal two whorls and no spirals. The teleoconch has slightly convex whorls and three spirals, bearing *c*. 16 knobs on each whorl.

Fig. 112. *Cerithiopsis* sp. 7. MGUH 31087 (ex Rkz 210), height 3.9 mm, width 1.1 mm.

***Cerithiopsis* sp. 8** (Fig. 113)

Additional material. GM 1991.4185, 3 specimens. GM 1991.4201, 3 specimens. The species is rare.

Remarks. The teleoconch has almost flat whorls, bearing about 16 rounded knobs. There is a subsutural smooth band. The base is flat.

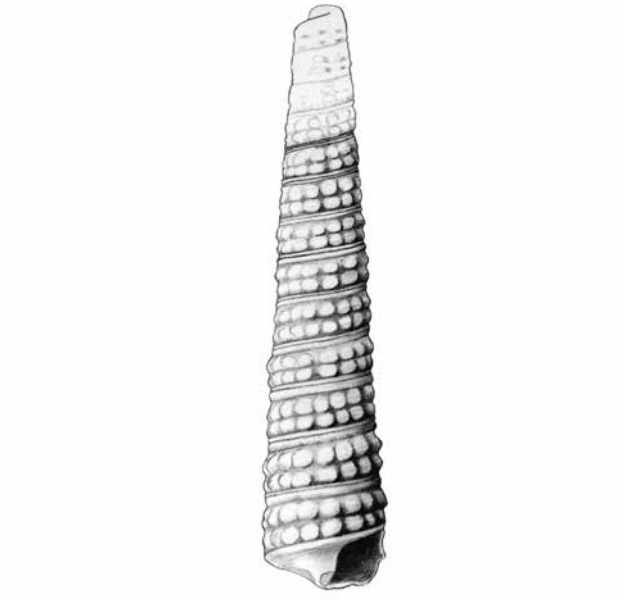

Fig. 113. *Cerithiopsis* sp. 8. MGUH 31088 (ex Rkz 211), height 6.7 mm, width 1.2 mm.

***Cerithiopsis* sp. 9** (Fig. 114)

Additional material. GM 1991.4191, 1 specimen. The species is very rare.

Remarks. The teleoconch has almost flat whorls, bearing 16 coarse knobs. There are three spirals on the last whorls, of which the adapical is much weaker than the two other spirals. The shell is less slender than other species of *Cerithiopsis*.

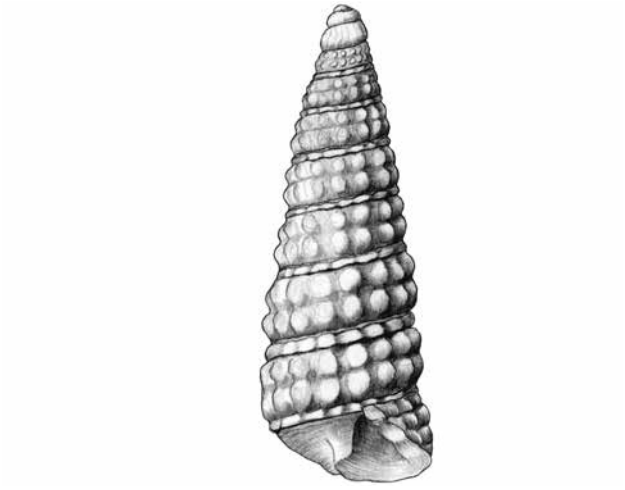

Fig. 114. *Cerithiopsis* sp. 9. MGUH 31089 (ex Rkz 213), height 3.2 mm, width 1.2 mm.

***Cerithiopsis* sp. 10** (Fig. 115)

Additional material. GM 1991.4186, 1 specimen. The species is very rare.

Remarks. The teleoconch has convex whorls, bearing *c.* 16 coarse knobs. Abapically there is a smooth sutural band.

Fig. 115. *Cerithiopsis* sp. 10. MGUH 31090 (ex Rkz 214), height 2.9 mm, width 0.7 mm.

Genus *Zaclys* Finlay 1926
Type species. *Cerithiopsis sarissa* Murdoch 1905.

***Zaclys? selandica* (Ravn 1933)** (Fig. 116)

1933 *Cerithiopsis selandica* Ravn, p. 51, plate 5, figs 10a, b (*partim, non* figs 9a, b = *Zaclys? nuetzeli* n. sp.).
1998 *Zaclys*? sp. – Nützel, p. 103, plate 16, fig. O.

Type material. Holotype MGUH 3171.

Additional material. GM 1991.4159, 3 specimens; GM 1991.4160, 2 specimens; SMF 311753, 2 specimens; SMF 344075, 2 specimens. The species is rare.

Discussion: Ravn (1933) illustrated two specimens, of which the specimen illustrated on plate 5, figs 9a–b (MGUH 3171) was designated as holotype. In the Rosenkrantz files of drawings, the type material is also illustrated. The specimen MGUH 3171 has a protoconch, consisting of *c*. five whorls, of which the terminal has two very fine spiral ribs, causing a slight angulation of the whorl. Adapically fine axial ribs are suggested, but only visible near the adapical suture. The teleoconch of MGUH 3171 has *c*. 15 axial ribs. MGUH 3172 has a considerably larger protoconch with axial ribs suggested and no spiral ribs on the last whorl. The teleoconch has 12 axial ribs on each whorl. Thus, Ravn's description does not match the holotype and it is obvious that Ravn's material contains two species. Of the two illustrated types MGUH 3172 matches the description in Ravn (1933), but according to ICZN (1999, Article 70.3), MGUH 3171 is the holotype. For this reason MGUH 3172 is established as the new species *Zaclys? nuetzeli*.

Remarks. Nützel (1998, p. 103–104, plate 16, figs M, N, O) recognised two *Zaclys?* species in his material and interpreted *Cerithiopsis selandica* in accordance with Ravn's description. The species is rather similar to *Cerithiopsis bruennichi* (for comparison see remarks to this species). Nützel (1998, p. 33 and p. 103) discussed the genus *Zaclys* Finlay 1926 from the Danian of Faxe and concluded that the morphology of the two Danish species were very similar to this genus. However, as the characters of the radula are unknown, he assigned the Danish species to *Zaclys* with a query.

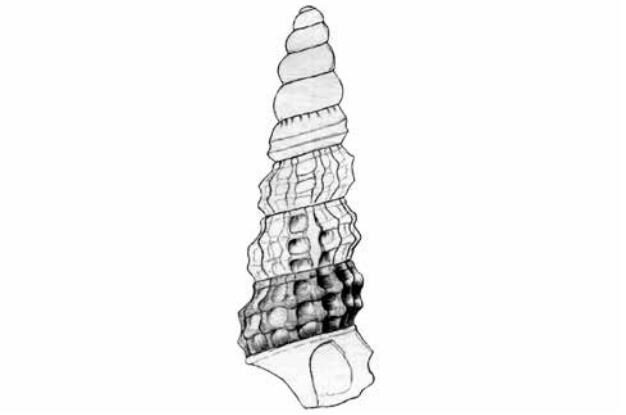

Fig. 116. *Zaclys? selandica* (Ravn 1933). MGUH 3171, height 2.2 mm, width 0.8 mm.

***Zaclys? nuetzeli* n. sp.** (Fig. 117)

1933 *Cerithiopsis selandica* Ravn, p. 51 (*partim, non* figs 9a, b).
1998 *Zaclys? selandica* Ravn – Nützel, p. 104, plate 16, figs M, N (*non* Ravn).

Type locality. Faxe quarry, Sjælland, Denmark.

Type stratum. Faxe Formation, middle Danian, Paleocene.

Type material. Holotype MGUH 3172.

Additional material. SMF 311 754; Rkz 202; ARF, 2 specimens (ØSM-10059-25031 and 25032); ISL, 13 specimens.; GM 1991.4158, 1 specimen; GM 1991.4159, 1 specimen; GM 1991.4160, 10 specimens. The species is rather common.

Derivation of name. The species is named in honour of Alexander Nützel, who first recognised the two *Zaclys?* species in the Faxe material.

Diagnosis. A *Zaclys?* with a protoconch consisting of *c.* five whorls with axial ribs and no spirals on the last whorl. The teleoconch has *c.* 12 axial ribs.

Description. The shell is slender and turriculate with a height/width ratio of *c.* 3.0. The protoconch has six convex whorls, separated by a distinct suture. The first three whorls are smooth and the two terminal whorls have a spiral keel under the middle of the whorl and axial ribs at the adapical suture. The transition into the teleoconch is sharp. The teleoconch whorls are convex and separated by a distinct suture. The spiral ornament consists of four spirals, of which the adapical is weak and situated under the adapical suture. The abapical spiral is weak and situated above the abapical suture and partly covered by the following whorl. The two medium spirals are of almost equal strength and run across 12 axial ribs on each whorl. The knobs on the two spirals are rather weak. The base is smooth. The aperture is rounded rectangular and the canal is short.

Remarks. The differences to *Zaclys? selandica* have been discussed above.

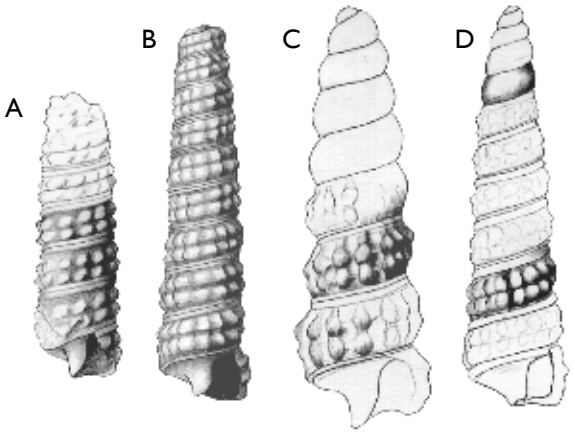

Fig. 117. *Zaclys? nuetzeli* n. sp. **A**: MGUH 31091 (ex Rkz 205), height 3.1 mm, width 0.9 mm. **B**: MGUH 31092 (ex Rkz 202), height 3.9 mm, width 1.0 mm. **C**: MGUH 3172, height 2.5 mm, width 0.8 mm. **D**: MGUH 31093 (ex Rkz 209), height 3.3 mm, width 0.9 mm.

Genus *Eocolina* Chavan 1952

Type species. Cerithium munieri Deshayes 1864.

***Eocolina* sp.** (Fig. 118)

Material. Only the two illustrated specimens are known. The species is very rare.

Remarks. The species differs from the preceding species by having a more slender protoconch instead of a broad conical protoconch, which consists of fewer whorls. The protoconch whorls have very weak spiral riblets. Furthermore, the species has about 30 axial ribs, which are sharper and slightly wavy. The spirals and axial ribs together result in a rectangular cancellation.

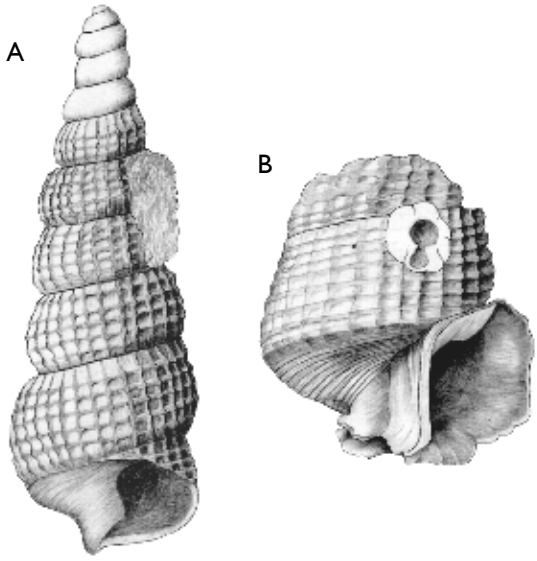

Fig. 118. *Eocolina* sp. **A**: MGUH 31094 (ex Rkz 197), height 4.2 mm, width 1.3 mm. **B**: MGUH 31095 (ex Rkz 215), height 4.6 mm, width 4.0 mm.

Genus *Retilaskeya* Marshall 1978
Type species. *Retilaskeya zelandica* Marshall 1978.

***Retilaskeya ravni* Nützel 1998** (Fig. 119)

1998 *Retilaskeya ravni* Nützel, p. 114, plate 16, figs H, I.

Type material. SMF 311 748.

Additional material. GM 1991.4090, 5 specimens; GM 1991.4121, 1 specimen; GM 1991.4146, 4 specimens and 1 dubious; GM 1991.4158, 5 specimens; GM 1991.4160, 1 specimen; GM 1991.4191, 1 specimen; ARF, 1 specimen (ØSM-10059-25039); ISL, 5 specimens; EBP, 2 specimens. The species is rather common.

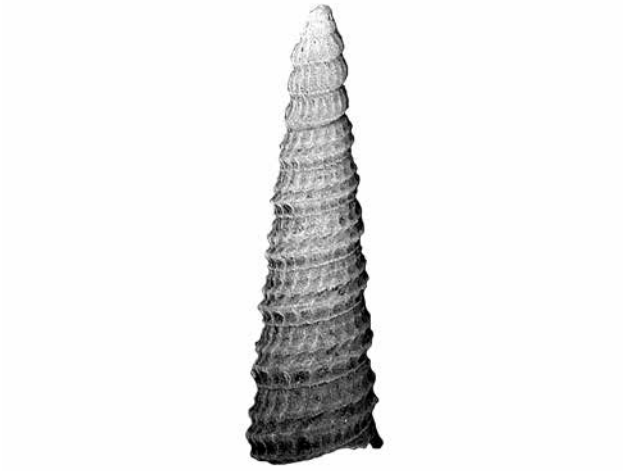

Fig. 119. *Retilaskeya ravni* Nützel 1998. Holotype SMF 311 748, height 2.4 mm, width 0.7 mm. Photo: Alexander Nützel, München.

***Retilaskeya* sp. 1** (Fig. 120)

Additional material. GM 1991.4127, 1 specimen. GM 1991.4163, 2 fragments. The species is very rare.

Remarks. The protoconch is highly conical with opisthocline axial ribs and is similar to the protoconch of Retilaskeya. The teleoconch has two strong spirals with *c*. 14 strong knobs. There is a depression with two furrows between the spirals.

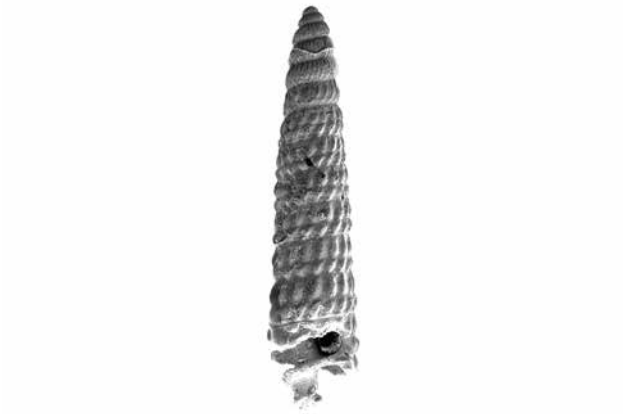

Fig. 120. *Retilaskeya* sp. 1. MGUH 31096 (ex GM 1991.4127), height 3.0 mm, width 0.8 mm.

***Retilaskeya* sp. 2** (Fig. 121)

Additional material. GM 1991.4162, 2 juvenile specimens, 9 fragments. The species is rare.

Remarks. The protoconch has five whorls with opisthocline axial ribs, which is similar to the protoconch of *Retilaskeya*. The teleoconch has two spirals with *c*. 16 knobs, separated by a slight depression. The knobs on the adapical spiral are oblong and orthocline, whereas the abapical knobs are opisthocline.

Fig. 121. *Retilaskeya* sp. 2. MGUH 31097 (ex GM 1991.4162), height 3.1 mm, width 0.9 mm.

Genus *Krachia* Baluk 1975
Type species. *Cerithiopsis (Krachia) korytnicensis* Baluk 1975.

***Krachia* sp.** (Fig. 122)

Material. The species is rather common.

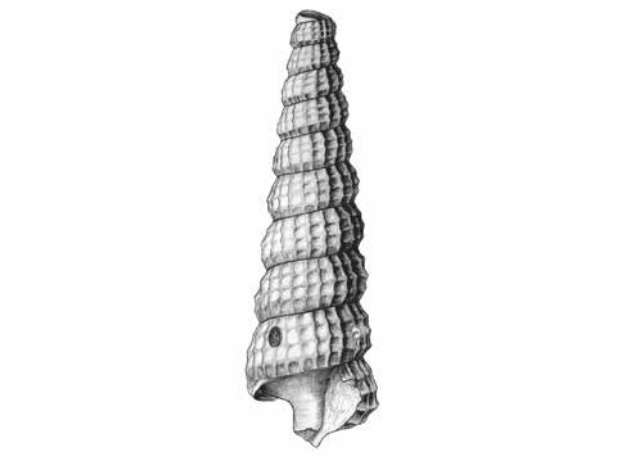

Fig. 122. *Krachia* sp. MGUH 31098. (ex Rkz 206), height 13.7 mm, width 4.3 mm.

Genus *Specula* Finlay 1926
Type species. *Cerithiopsis styliformis* Suter 1908.

***Specula angustisulcata* (Ravn 1933)** (Fig. 123)

1933 *Newtoniella angustisulcata* Ravn, p. 46, plate 5, figs 1a, b, 2a, b.
1998 *Specula? angustisulcata* (Ravn 1933) – Nützel, p. 118, plate 16, figs T–W.

Type material. Holotype MGUH 3163.

Additional material. GM, 158 specimens; SMF 311 759, 311 760. The species is very common.

Fig. 123. *Specula angustisulcata* (Ravn 1933). MGUH 31099 (ex Rkz 198), height 4.3 mm, width 1.1 mm.

Subfamily Aliptinae Marshall 1978
Genus *Cerithiopsidella* Bartsch 1911
Type species. *Cerithiopsis cosmia* Bartsch 1907.

***Cerithiopsidella trinodosa* (Ravn 1933)** (Fig. 124)

1933 *Cerithiopsis trinodosa* Ravn, p. 49, p. 50, plate 4, figs 5a, b.
1998 *Cerithiopsidella trinodosa* (Ravn 1933) – Nützel, p. 109, plate 16, fig. G.

Type material. Holotype MGUH 3152.

Additional material. SMF 311 764; GM, 3 specimens (1991.4191 and 1991.4194); ARF, 2 specimens (ØSM-10059-25024 and 25090); EBP, 1 specimen. The species is rare.

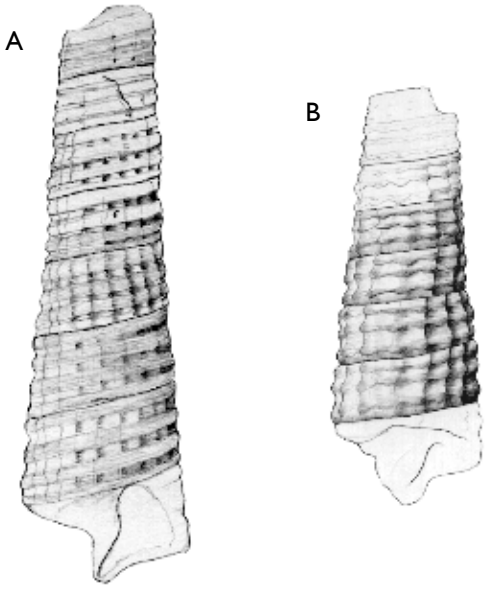

Fig. 124. *Cerithiopsidella trinodosa* (Ravn 1933). **A**: MGUH 31100 (ex Rkz 186), height 4.8 mm, width 1.3 mm. **B**: MGUH 3152, height 5.8 mm, width 2.1 mm.

***Cerithiopsidella* sp.** (Fig. 125)

Additional material. GM 1991.4150, 2 specimens. The species is very rare.

Remarks. The species is very slender and the teleoconch whorls have two spirals with *c*. 14 knobs on each whorl. The knobs on the adapical spiral are considerably stronger than the knobs on the lower spiral. Under the adapical suture there is an almost flat band without sculpture.

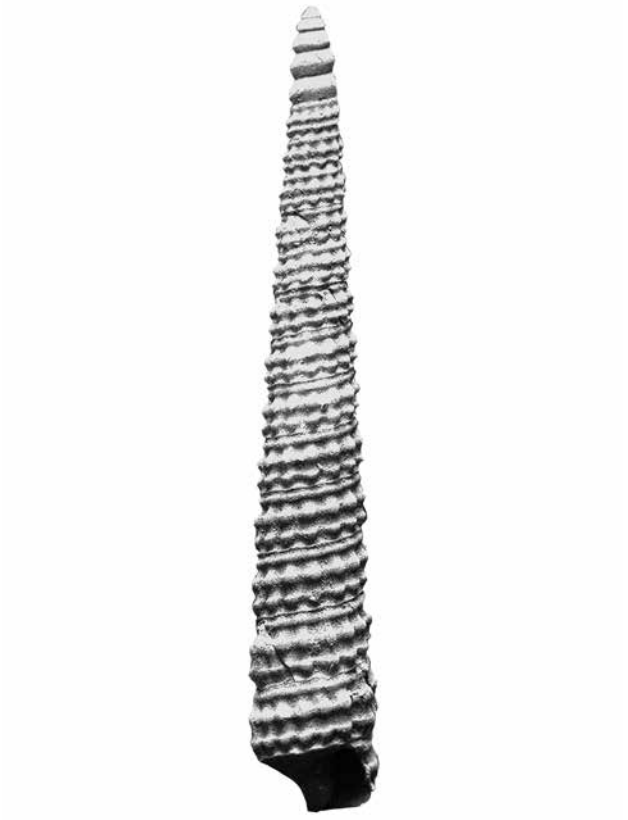

Fig. 125. *Cerithiopsidella* sp. ØSM-10059-25033 (ex ARF), height 6.8 mm, width 1.1 mm

Genus *Vatopsis* Gründel 1980
Type species. *Cerithium bimonilifera* Sandberger 1858.

***Vatopsis metaxiformis* Nützel 1998** (Fig. 126)

1933 *Tenuiscala rosenkrantzi* Ravn, p. 39 (*partim*), plate 3, figs 9a, b (*non* figs 8a, b, 10a, b = *Cerithiopsis rosenkrantzi*)
1998 *Vatopsis metaxiformis* Nützel, p. 111, plate 16, fig. K.

Type material. SMF 311 750, 6 specimens.

Additional material. SMF 344073, 115 specimens; MGUH 3143, Rkz 203.

Remarks. The species is very common.

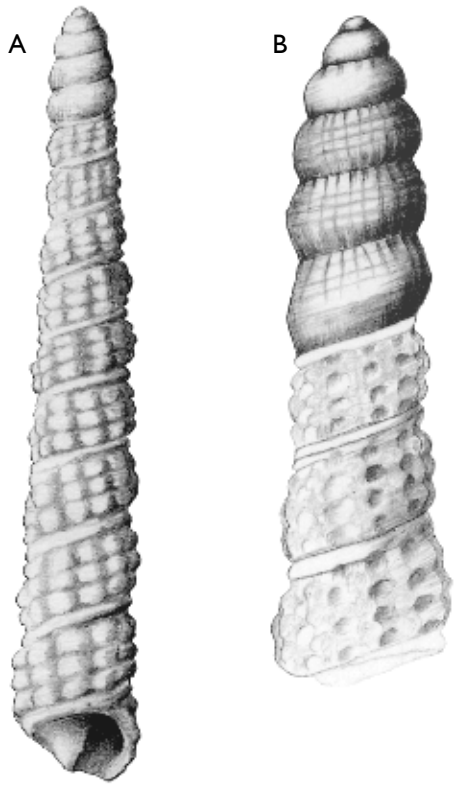

Fig. 126. *Vatopsis metaxiformis* Nützel 1998. **A**: MGUH 31102 (ex Rkz 62), height 2.1 mm, width 0.6 mm. **B**: MGUH 31103 (ex Rkz 203), height 4.8 mm, width 0.8 mm.

Subfamily Seilinae Golikov & Starobogatov 1975
Genus *Variseila* Dockery 1993
Type species. *Cerithiopsis meeki* Wade 1926.

***Variseila eocostata* Nützel 1998** (Fig. 127)

1998 *Variseila eocostata* Nützel, p. 105, plate 16, fig. E.

Type material. SMF 311 744.

Additional material. Rkz 199. GM, 6 specimens (1991.4129 1991.4153 and 1991.4160). The species is rare.

Remarks. The teleoconch of this species is rather similar to *Thereitis tricingulata*, but the protoconchs of the two species are different.

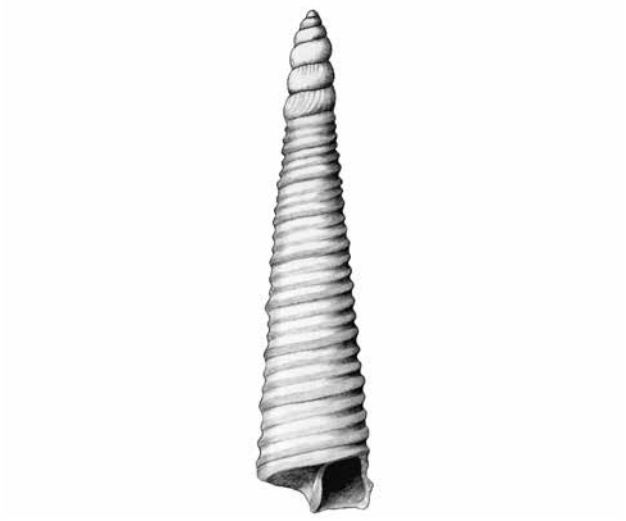

Fig. 127. *Variseila eocostata* Nützel 1998. MGUH 31104 (ex Rkz 199), height 5.1 mm, width 1.2 mm.

***Variseila fissicosta* (Ravn 1933)** (Fig. 128)

1933 *Newtoniella fissicosta* Ravn, p. 48, plate 4, figs 6a, b, 10a, b.

Type material. Holotype MGUH 3153, paratype MGUH 3157.

Additional material. Rkz 69; GM, 2 specimens (1991.4116); ARF, 66 specimens (ØSM-10059-25040 and ØSM-10059-25041); ISL, 5 specimens. The species is common.

Remarks. This species has a characteristic sculpture, consisting of three spirals, of which the abapical is much stronger than the two other spirals and subdivided into three fine spirals.

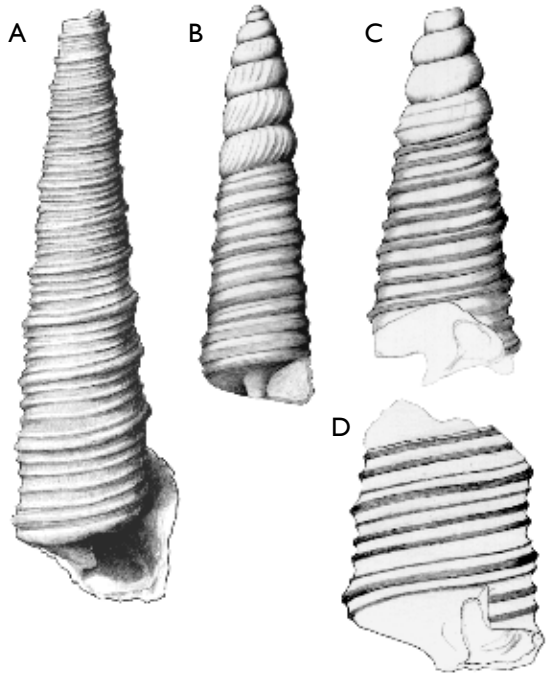

Fig. 128. *Variseila fissicosta* (Ravn 1933). A: MGUH 31105 (ex Rkz 69), height 5.5 mm, width 2.7 mm. B: MGUH 31106 (ex Rkz 189), height 3.0 mm, width 0.8 mm. C: MGUH 3157, height 2.3 mm, width 0.9 mm. D: MGUH 3153, height 2.6 mm, width 2.3 mm.

***Variseila* sp. 1** (Fig. 129)

Additional material. GM, 1 specimen (1991.4099). The species is very rare.

Remarks. This species has slightly convex whorls and five flat spiral bands.

Fig. 129. *Variseila* sp. 1. MGUH 31107 (ex Rkz 191), height 7.3 mm, width 1.6 mm.

***Variseila* sp. 2** (Fig. 130)

Material. One complete specimen and one fragment are known. The species is very rare.

Description. The shell has a height of 3.0 mm and provides about four protoconch whorls and nine teleoconch whorls. The first two protoconch whorls are quickly increasing in diameter, whereas the terminal two are of almost the same diameter. The teleoconch has four spirals of almost equal strength. The aperture is narrow and subcircular, with a short canal.

Fig. 130. *Variseila* sp. 2. MGUH 31108 (ex GM 1991.4111), height 3.0 mm, width 0.6 mm.

Genus *Seila* A. Adams 1861
Type species. *Triphoris dextroversus* A. Adams & Reeve 1850.

***Seila* sp.** (Fig. 131)

Material. Only the illustrated specimen is known.

Remarks. The multispiral protoconch consists of six convex whorls. The teleoconch has three spirals, of which the adapical two are of the same strength and the abapical one is the strongest.

Fig. 131. *Seila* sp. MGUH 31109 (ex GM 1991.4096), height 2.7 mm, width 0.8 mm.

Subgenus *Seila (Notoseila)* Finlay 1926
Type species. *Cerithium terebelloides* Hutton 1873.

***Seila (Notoseila)* sp. 1** (Fig. 132)

Additional material. GM 20 specimens (GM 1991.4122 1991.4123 1991.4124 and 1991.4134); ARF, 1 specimen (ØSM-10059-25028). The species is rather common.

Remarks. This species has completely flat whorls and four flat spiral bands.

Fig. 132. *Seila (Notoseila)* sp. 1. MGUH 31110 (ex Rkz 184), height 5.3 mm, width 0.8 mm.

***Seila (Notoseila)* sp. 2** (Fig. 133)

Material. Only the illustrated specimen is known.

Remarks. This species has a protoconch, consisting of about six convex and smooth whorls. The spiral ornamentation of the teleoconch consists of four spirals, of which the two adapical are weaker than the two abapical spirals.

Fig. 133. *Seila (Notoseila)* sp. 2. MGUH 31111 (ex Rkz 188), height 3.6 mm, width 0.8 mm.

Genus *Thereitis* Le Renard 1997
Type species. *Seila (Notoseila?) angusta* Tembrock 1964.

***Thereitis tricingulata* (Ravn 1933)** (Fig. 134)

1933 *Cerithiopsis tricingulata* Ravn, p. 52, plate 5, figs 11a, b.
1998 *Tembrockia tricingulata* (Ravn 1933) – Nützel, p. 105, plate 16, fig. E.

Type material. Holotype MGUH 3173.

Additional material. GM, 34 specimens (GM 1991.4089 1991.4090 1991. 4134 1991.4135 1991.4151 1941.4152 and 1991.4153); ARF, 2 specimens (ØSM-10059-25040 and 25821); ISL, 1 specimen; SMF 311 745, 1 specimen. The species is rather common.

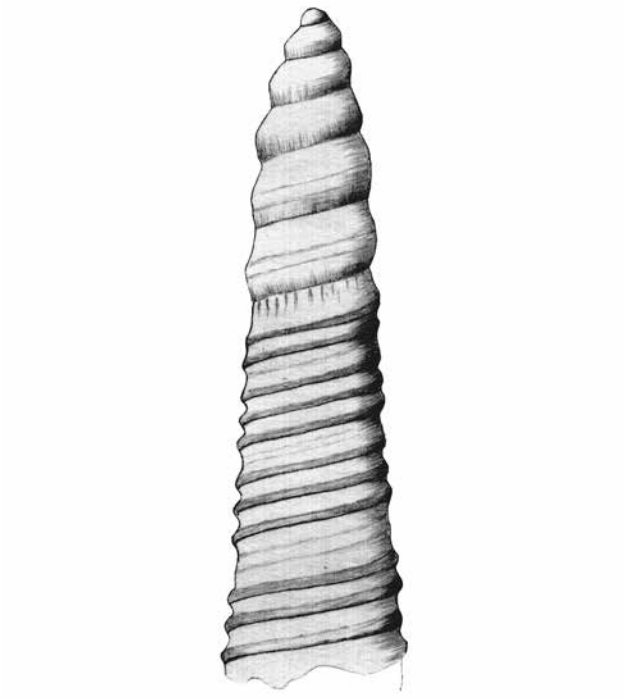

Fig. 134. *Thereitis tricingulata* (Ravn 1933). MGUH 3173, height 5.3 mm, width 0.8 mm.

Family Newtoniellidae Korobkov 1955
Subfamily Newtoniellinae Korobkov 1955
Genus *Cerithiella* Verrill 1882
Type species. *Cerithium metula* Lovén 1846.

***Cerithiella faxensis* (Ravn 1933)** (Fig. 135)

1933 *Newtoniella faxensis* Ravn, p. 48, plate 4, figs 3a, b, 9a, b.

Type material. Holotype MGUH 3156, paratype MGUH 3156.

Additional material. GM (Ravn), 3 specimens; ARF, 77 specimens (ØSM-10059-25062, 25069 and 25099); ISL, 5 specimens. The species is common.

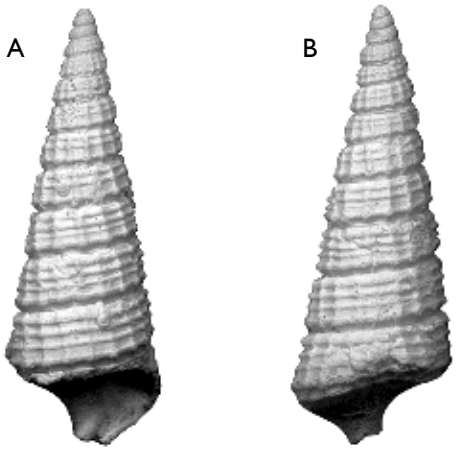

Fig. 135. *Cerithiella faxensis* (Ravn 1933). MGUH 31113 (ex ISL), height 8.8 mm, width 3.1 mm.

***Cerithiella fenestrata* (Ravn 1902b)** (Fig. 136)

1902 *Cerithium fenestratum* Ravn, p. 222, plate 1, figs 20, 21.
1933 *"Cerithium" fenestratum* Ravn, – Ravn, p. 45.

Type material. Syntypes MGUH 94 and MGUH 95.

Material. Specimens of this large species are rather common.

Remarks. Ravn noted that the sculpture was rather similar to the sculpture of the genus *Newtoniella* (= *Cerithiella*), but the large size made an assignment to this genus questionable. However, the general outline and the aperture with the twisted columella are comparable to *Cerithiella*.

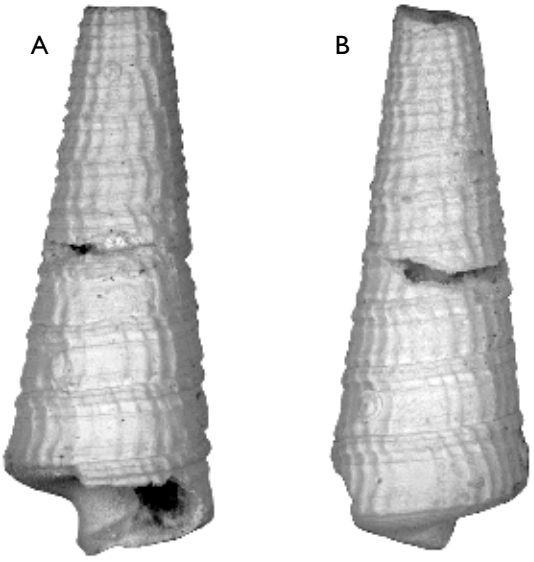

Fig. 136. *Cerithiella fenestrata* (Ravn 1902b). MGUH 31114, height 13.8 mm, width 5.3 mm.

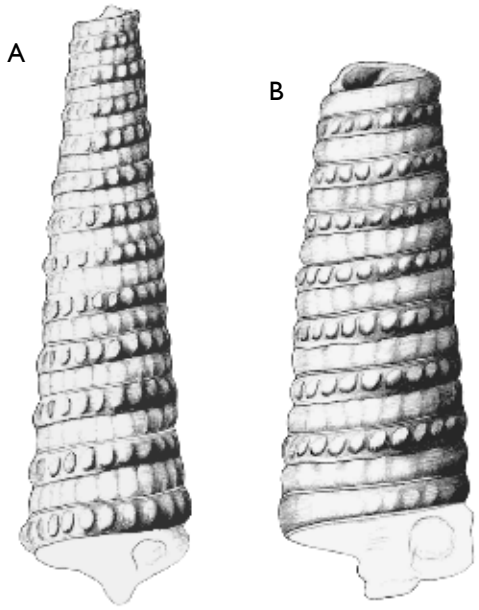

Fig. 137. *Cerithiella* sp. **A**: MGUH 31115 (ex Rkz 196C), height 4.9 mm, width 1.4 mm. **B**: MGUH 31116 (ex Rkz 196B), height 5.2 mm, width 2.0 mm.

***Cerithiella* sp.** (Fig. 137)

Additional material. GM 1991.4149, 12 specimens; SMF 344069, 5 specimens; SMF 344071, 1 specimen; ISL, 1 specimen. The species is rare.

Remarks. The species has two spirals, separated by a depression. The spirals have about 20 rounded knobs, but the knobs on the adapical spiral are larger and indistinct.

Genus *Trituba* Jousseaume 1884
Type species. *Triforis bitubulatus* Baudon 1856.

***Trituba obliquecostulata* (Ravn 1933)** (Fig. 138)

1933 *Cerithiopsis obliquecostulata* Ravn, p. 52, plate 4, figs 12a, b, 13a, b.

Type material. Holotype MGUH 3159, paratype MGUH 3160.

Additional material. GM, 6 specimens; ARF, 36 specimens (ØSM-10059-25034 and 25035); ISL, 22 specimens; MNO, 4 specimens; EBP, 18 specimens. The species is common.

Remarks. The name *Triforis* Deshayes 1834 is now generally considered as a junior synonym of *Triphora* Blainville 1828, as Deshayes misspelled Triphora (Gofas & Rosenberg 2014). Gougerot & Le Renard (1980) and Marshall (1980) used the name *Triforis* for this dextral genus. This dextral species matches with regard to protoconch and teleoconch sculpture and aperture the genus *Trituba* very well. The specimen ØSM-10059-

25044 (Fig. 138C) has a well-preserved aperture, which definitely confirms the assignment to the genus *Trituba*.

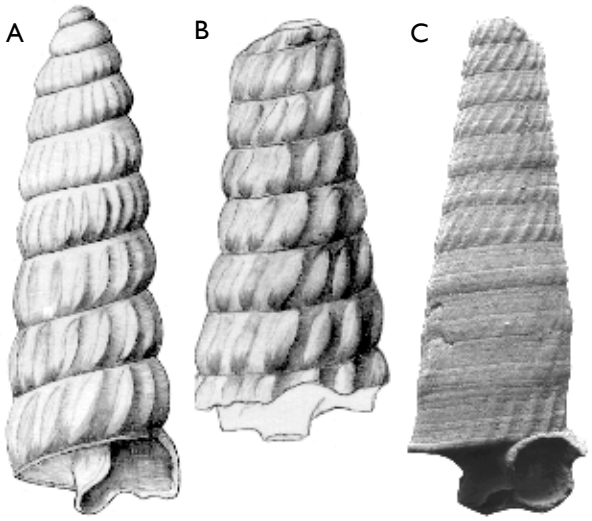

Fig. 138. *Trituba obliquecostulata (Ravn 1933)*. **A**: MGUH 3159, height 2.0 mm, width 0.7 mm. **B**: MGUH 3160, height 2.7 mm, width 1.3 mm. **C**: ØSM-10059-25044 (ex ARF), height 5.2 mm, width 1.8 mm.

Subfamily Eumetulinae Golikov & Starobogatov 1975
Genus *Eumetula* Thiele 1912
Type species. *Eumetula dilecta* Thiele 1912.

***Eumetula multituberculata* Nützel 1998** (Fig. 139)

1998 *Eumetula? multituberculata* Nützel, p. 117, plate 16, figs Q, R.

Type material. SMF 311 756.

Additional material. SMF 344076, 1 specimen; GM 1991.4102, 2 specimens; GM 1991.4107, 3 specimens; GM 1991.4108, 3 specimens; GM 1991.4109, 3 specimens; GM 1991.4145, 1 specimen; GM 1991.4200, 2 specimens; ISL, 5 specimens; MNO, 1 specimen. The species is rather common.

Remarks. The species differs from *Eumetula jenseni* by the protoconch, which has axial ribs.

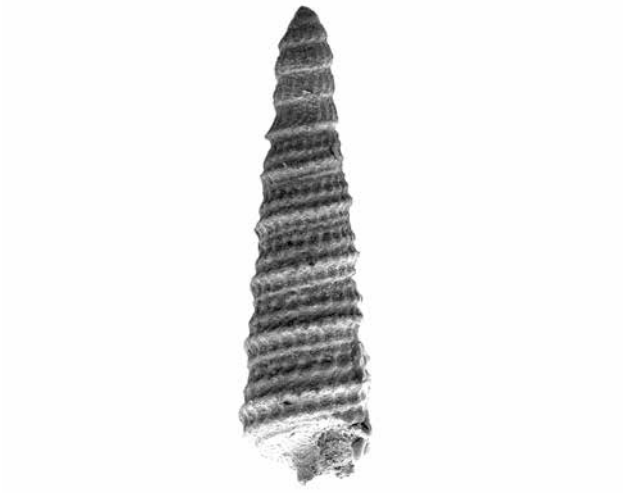

Fig. 139. *Eumetula multituberculata* Nützel 1998. MGUH 31117 (ex GM 1991.4145), height 2.5 mm, width 0.7 mm.

***Eumetula jenseni* (Ravn 1933)** (Fig. 140)

1933 *Cerithiopsis jenseni* Ravn, p. 49, p. 51, plate 4, figs 11a, b.
1998 *Eumetula? jenseni* (Ravn 1933) – Nützel, p. 118, plate 16, fig. S.

Type material. Holotype MGUH 3158.

Additional material. GM (Ravn 1933), 6 specimens; GM 1991.4200, 1 specimen; 1991.4143, 1 specimen; GM 1991.4145, 6 specimens; GM 1991.4146, 48 specimens; GM 1991.4147, 9 specimens; GM 1991.4165, 2 specimens; ARF, 18 specimens (ØSM-10059-25025 and 25055); ISL, 20 specimens; MNO, 10 specimens; SMF 311 758, 2 specimens. The species is common.

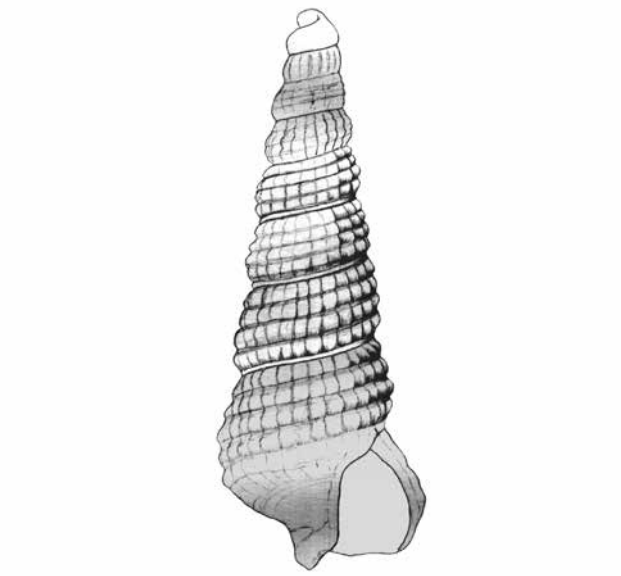

Fig. 140. *Eumetula jenseni* (Ravn 1933). MGUH 3158, height 5.8 mm, width 2.2 mm.

***Eumetula* sp. 1** (Fig. 141)

Additional material. GM 1991.4182, 3 specimens; GM 1991.4180, 10 fragments. The species is rare.

Remarks. The teleoconch has two spirals with about 12 rounded knobs on each whorl. Of these, the abapical is much stronger and protruding than the adapical one, which is situated on a straight part of the whorl. The protoconch is preserved on two specimens and is similar to the protoconch on the genus *Eumetula,* which has axial ribs.

Fig. 141. *Eumetula sp. 1*. MGUH 31118 (ex GM 1991.4182), height 2.1 mm, width 0.7 mm.

***Eumetula* sp. 2** (Fig. 142)

Material. Only the illustrated specimen is known.

Remarks. The species has three spirals with knobs, of which spiral number two is considerably stronger than the two other spirals. The number of knobs is *c.* 12 on each whorl.

Fig. 142. *Eumetula sp. 2*. MGUH 31119 (ex GM 1991.4195), height 3.9 mm, width 1.2 mm.

***Eumetula* sp. 3** (Fig. 143)

Material. Only the illustrated specimen is known.

Remarks. The specimen lacks the first protoconch whorls and is characterised by having four spirals and about 25 axial ribs, which cause rectangular knobs on the spirals. The adapical spiral is weaker than the other spirals. On the last whorl the axial ribs completely disappear. The species *Eumetula jenseni* and *E. multituberculata* have a rather similar teleoconch sculpture, but have a different aperture with a straight columella. As the protoconch is not completely preserved and the columella is concave, the assignment to the genus *Eumetula* is uncertain.

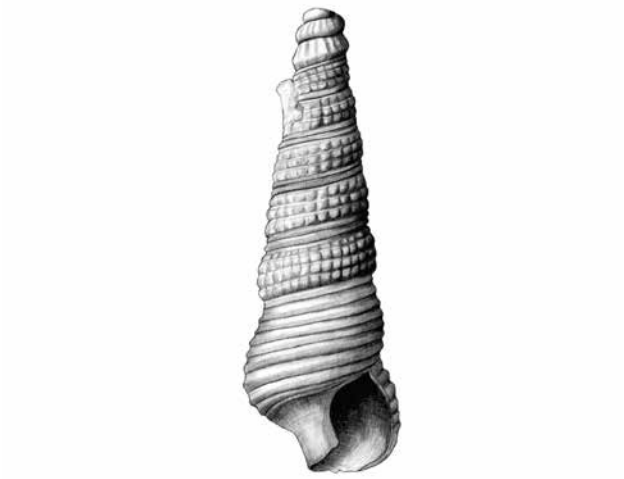

Fig. 143. *Eumetula* sp. 3. MGUH 31120 (ex Rkz 183), height 5.6 mm, width 1.9 mm.

Clade Neogastropoda Cox 1960
Superfamily Buccinoidea Rafinesque 1815
Family Fasciolariidae Gray 1853
Subfamily Fusininae Wrigley 1927
Genus *Fusinus* Rafinesque 1815
Type species. *Murex colus* Linnaeus 1758.

***Fusinus* sp. 1** (Fig. 144)

Additional material. ARF, 5 specimens (ØSM-10059-25144); ISL, 3 specimens. The species is rare.

Remarks. The species has a spiral ornament consisting of 10–11 flat spiral bands, separated by narrow spiral furrows.

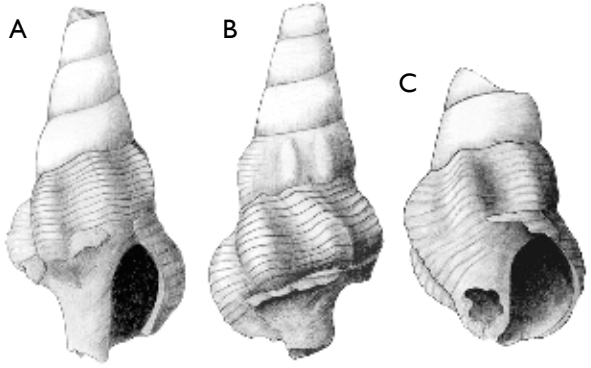

Fig. 144. *Fusinus* sp. 1. **A**, **B**: MGUH 31121 (ex Rkz 155), height 4.6 mm, width 2.4 mm. **C**: MGUH 31122 (ex Rkz 140), height 3.2 mm, width 1.8 mm.

***Fusinus* sp. 2** (Fig. 145)

Material. Only the illustrated specimen is known.

Remarks. The species has only three primary spirals, which are situated on the abapical half of the whorl and separated by furrows of almost the same width. The protoconch whorls are more convex than on *Fusinus* sp. 1.

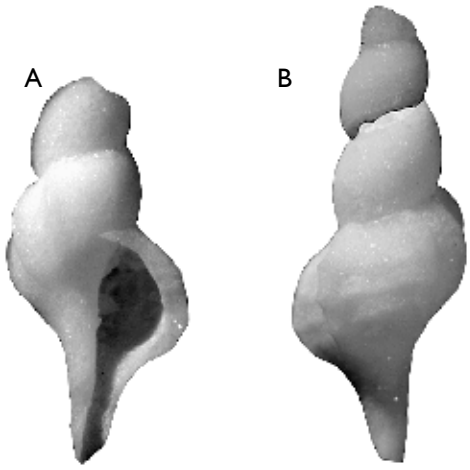

Fig. 145. *Fusinus* sp. 2. ØSM-10059-25073 (ex ARF), height 5.1 mm, width 1.8 mm.

Genus *Dolicholatirus* Bellardi 1886
Type species. Drilluta communis Wade 1916.

***Dolicholatirus* sp. 1** (Fig. 146)

Additional material. Rkz 170; ARF, 1 specimen (ØSM-10059- 25105); ISL, 8 specimens; EBP, 1 specimen. The species is rare.

Remarks. The shell is slender and has a spiral ornament consisting of seven spiral ribs, separated by wider interspaces. The adapical four spiral ribs are weaker and more close-set than the abapical three spirals.

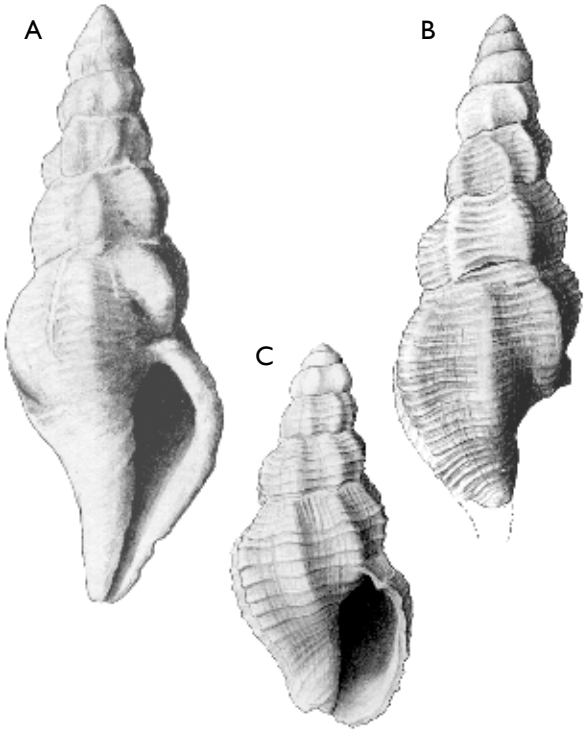

Fig. 146. *Dolicholatirus* sp. 1. **A**: MGUH 31124 (ex Rkz 170B), height 8.5 mm, width 3.0 mm. **B**: MGUH 31125 (ex Rkz 170A), height 8.0 mm, width 3.2 mm. **C**: MGUH 31126 (ex Rkz 170D), height 6.5 mm, width 3.0 mm.

***Dolicholatirus* sp. 2** (Fig. 147)

Additional material. ARF, 1 specimen (ØSM-10059-25114). The species is very rare.

Remarks. The shell is less slender than *Dolicholathyrus* sp. 1 and has a spiral ornament consisting of eight spiral bands, separated by narrow furrows. The axial ribs are strong and the distinct growth lines cause flat knobs on the spiral bands. The specimen has apparently no columellar folds, which may be due to the juvenile stage of it. The juvenile specimen of the proceeding species shows no axial ribs, while a larger specimen has the two columellar folds, which characterise the genus.

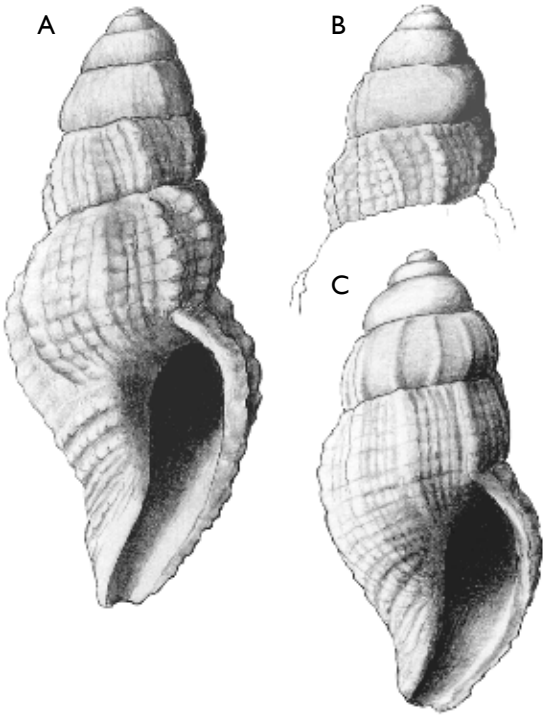

Fig. 147. *Dolicholatirus* sp. 2. A, B: MGUH 31127 (ex Rkz 171C). **A**: Height 4.2 mm, width 1.8 mm. **B**: Height 1.4 mm, width 1.1 mm. **C**: MGUH 31128 (ex Rkz 171E), height 3.0 mm, width 1.5 mm.

Genus *Conradconfusus* Snyder 2002
Type species. *Conradconfusus parilis* (Conrad 1832)

***Conradconfusus parvus* (Ravn 1933)** (Fig. 148)

1933 *Buccinofusus? parvus* Ravn, p. 63, plate 7, figs 1a, b.
2002 *Conradconfusus parvus* (Ravn 1933) – Snyder, p. 245.

Type material. Holotype MGUH 3193.

Material. The species is very common, especially as juvenile specimens.

Remarks. Snyder (2002) introduced the new genus taxon *Conradconfusus*, and subsequently assigned the genus to the subfamily Fusininae Wrigley 1927 of the Fasciolariidae Gray 1853 (Snyder 2003).

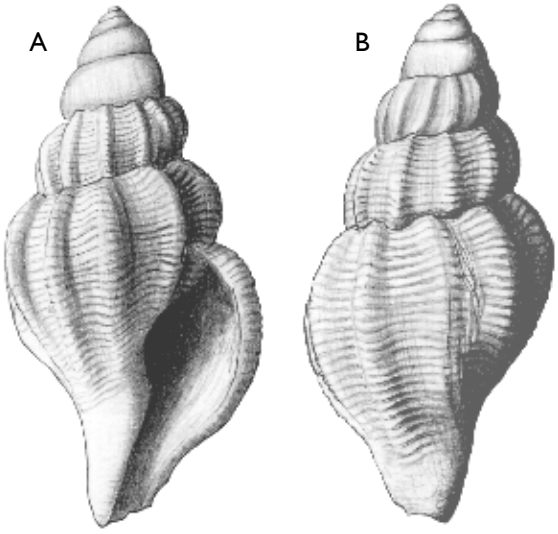

Fig. 148. *Conradconfusus parvus* (Ravn 1933). MGUH 31129 (ex Rkz 250), height 6.3 mm, width 3.0 mm.

***Conradconfusus subglaber* (Ravn 1933)** (Fig. 149)

1933 *Buccinofusus? subglaber* Ravn, p. 63, plate 7, figs 4a, b.
2002 *Conradconfusus subglaber* (Ravn 1933) – Snyder, p. 245.

Type material. Holotype MGUH 3196.

Material. The species is very common, especially as juvenile specimens.

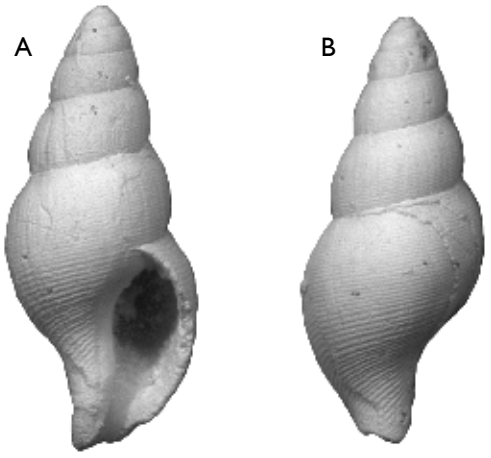

Fig. 149. *Conradconfusus subglaber* (Ravn 1933). MGUH 3196, height 7.4 mm, width 4.0 mm.

***Conradconfusus* sp.** (Fig. 150)

Material. The species is rather common.

Remarks. The species differs by having less convex whorls than *Conradconfusus parvus*, weaker spirals and axial ribs fading out on the younger whorls.

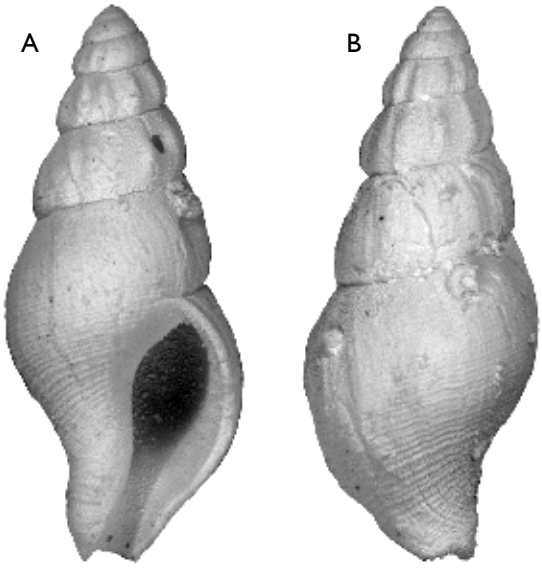

Fig. 150. *Conradconfusus* sp. MGUH 31130 (ex ISL), height 6.3 mm, width 3.0 mm.

Superfamily Muricoidea Rafinesque 1815
Family Muricidae Rafinesque 1815
Genus *Pterynotus* Swainson 1833
Type species. Murex pinnatus Swainson 1822.
Subgenus *Pterynotus (Pterochelus)* Jousseaume 1880
Type species. Murex acanthopterus Lamarck 1816.

***Pterynotus (Pterochelus)* sp.** (Fig. 151)

Additional material. GM (Rkz 25, Rkz 26, Rkz 27); ARF, 11 specimens (ØSM-10059-25077 and 25078); ISL, 1 fragment. The species is rare.

Remarks. Rosenkrantz suggested the species name *danicus* for this species on a drawing, but never published the name.

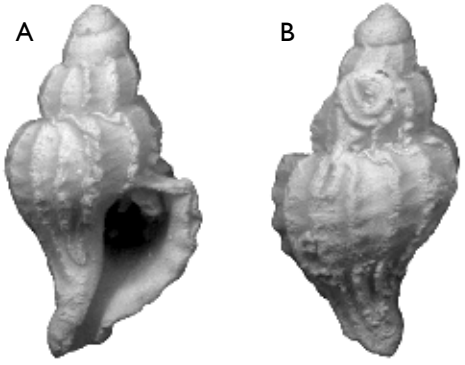

Fig. 151. *Pterynotus (Pterochelus)* sp. ØSM-10059-25078 (ex ARF), height 4.5 mm, width 1.9 mm.

Family Costellariidae MacDonald 1860
Genus *Vexillum* Röding 1798
Type species. Vexillum (Vexillum) plicarium Linnaeus 1758.

***Vexillum?* sp.** (Fig. 152)

1933 *Turricula* sp., Ravn, p. 67, plate 7, figs 9a, b.

Additional material. MGUH 3201; ISL, 1 specimen; EBP, 2 specimens; MNO, 3 specimens. The species is rare.

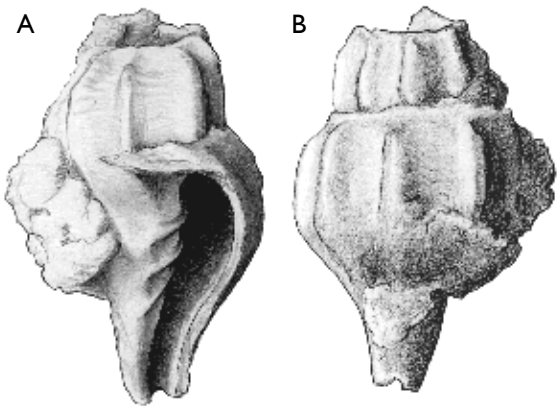

Fig. 152. *Vexillum?* sp. MGUH 3201, height 3.0 mm, width 2.0 mm.

Family Mitridae Swainson 1829
Subfamily Mitrininae Swainson 1829
Genus *Mitra* Lamarck 1798
Type species. *Mitra mitra* Linnaeus 1758.

***Mitra subglabra* (Ravn 1933)** (Fig. 153)

1933 *Turricula (Fusimitra) subglabra* Ravn, p. 65, plate 6, figs 5a, b.

Type material. MGUH 3188.

Additional material. GM, 13 specimens; ARF, 95 specimens (ØSM-10059-21426); ISL, 12 specimens; MNO. The species is very common.

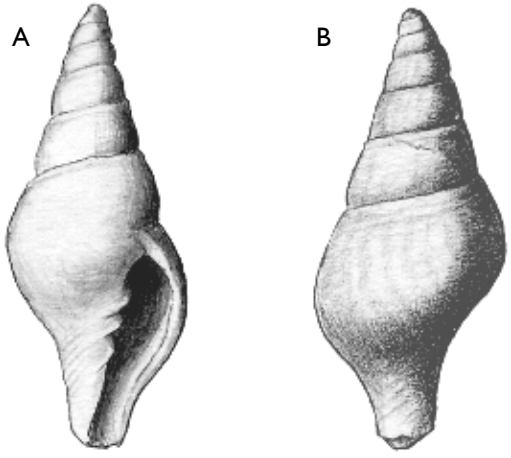

Fig. 153. *Mitra subglabra* (Ravn 1933). MGUH 3188, height 8.4 mm, width 3.3 mm.

***Mitra glabra* (Ravn 1933)** (Fig. 154)

1933 *Turricula (Fusimitra) glabra* Ravn, p. 65, plate 7, figs 8a, b.

Type material. MGUH 3197.

Additional material. GM, 8 specimens; ARF, 3 specimens; ISL, 3 specimens; MNO. The species is rare.

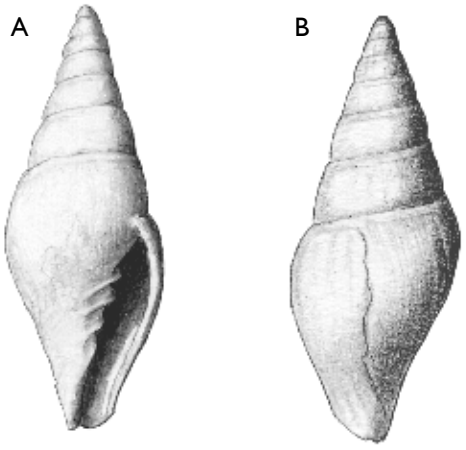

Fig. 154. *Mitra glabra* (Ravn 1933). MGUH 3197, height 10.3 mm, width 3.7 mm.

***Mitra faxensis* (Ravn 1933)** (Fig. 155)

1933 *Turricula (Fusimitra) faxensis* Ravn, p. 66, plate 7, figs 6a, b.

Type material. MGUH 3198.

Additional material. GM, 5 specimens; ARF, 2 specimens (ØSM-10059-25147); ISL, 1 specimen. The species is rare.

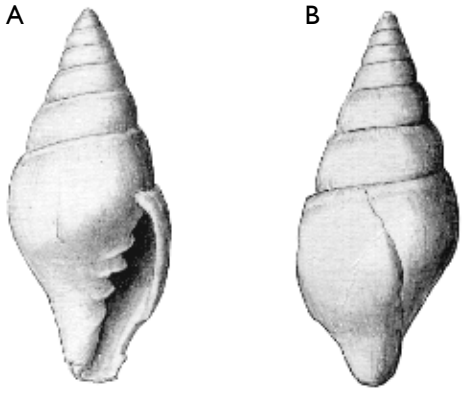

Fig. 155. *Mitra faxensis* (Ravn 1933). MGUH 3198, height 8.9 mm, width 3.8 mm.

Family Volutidae Rafinesque 1815
Subfamily Scaphellinae Gray 1857
Genus *Scaphella* Swainson 1832
Type species. Voluta junonia Lamarck 1804.

***Scaphella faxensis* (Ravn 1902b)** (Fig. 156)

1902 *Voluta faxensis* Ravn, p. 233, plate 3, figs 1–3.
1919 *Voluta faxensis* Ravn – Nielsen, p. 31.
1933 *Scaphella faxensis* (Ravn) – Ravn, p. 68.

Remarks. The species was mentioned by Nielsen (1919), but the original material has not been found in the collections of the Geological Museum, Copenhagen. In MNO a single internal mould of a juvenile specimen has been found. In general outline, it matches the species well. The species is very rare.

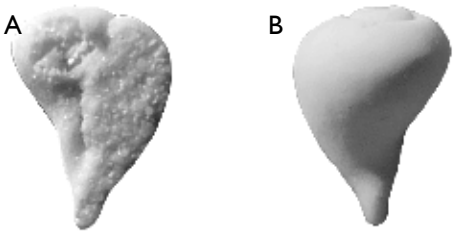

Fig. 156. *Scaphella faxensis* (Ravn 1902b). MGUH 31132 (ex MNO), height 7.5 mm, width 3.9 mm.

Family Volutomitridae Gray 1854
Genus *Conomitra* Conrad 1865
Type species. Mitra fusioides Lea 1833.

***Conomitra* sp.** (Fig. 157)

1933 *Conomitra* sp. Ravn, p. 64, plate 7, figs 3a, b.

Material. MGUH 3195; GM, 2 specimens; ARF, 4 specimens (ØSM-10059-25086, 25093, 25097 and 25146); ISL, 1 specimen; MNO, 4 specimens. The species is rare.

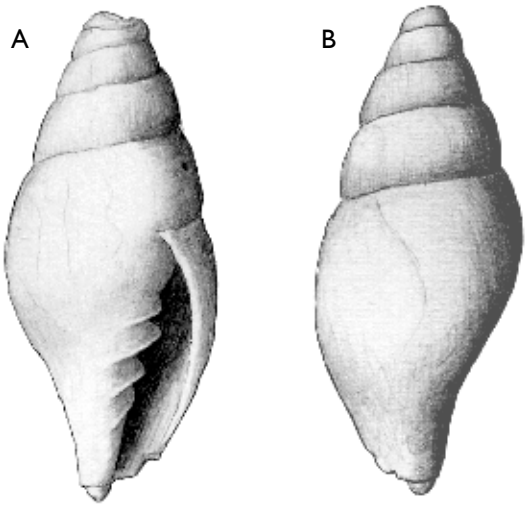

Fig. 157. *Conomitra* sp. MGUH 3195, height 11.5 mm, width 4.8 mm.

Superfamily Conoidea Fleming 1822
Family Clavatulidae Gray 1853

Genus *Turricula* Schumacher 1817
Type species. *Turricula flammea* Schumacher 1817.

***Turricula faxensis* (Ravn 1902b)** (Fig. 158)

1902 *Pleurotoma faxensis* Ravn, p. 235, plate 3, figs 8, 10.
1933 *Surcula faxensis* Ravn, p. 69, plate 7, figs 8a, b.

Type material. Syntypes MGUH 127 and MGUH 129; MGUH 3200.

Additional material. ARF, 11 specimens (ØSM-10059-25101); ISL, 1 specimen; EBP, 1 specimen. The species is rare.

Remarks. The species is very rare in the Baunekule facies. In the coral limestone from other parts of the Faxe Formation specimens up to 90 mm are found, but the species is rare.

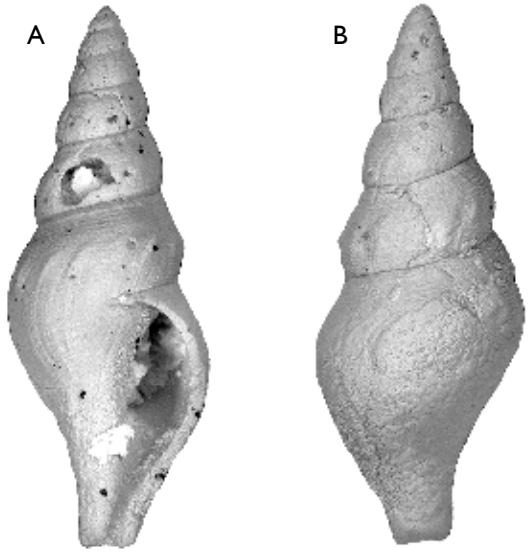

Fig. 158. *Turricula faxensis* (Ravn 1902b). ØSM-10059-21049 (ex ARF), height 9.5 mm, width 3.3mm.

***Turricula pusilla* (Ravn 1933)** (Fig. 159)

1933 *Surcula? pusilla* Ravn, p. 70, plate 7, figs 12a, b.

Type material. Holotype MGUH 3204.

Additional material. GM, 3 specimens; ARF, 2 specimens; ISL, 2 specimens; EBP, 5 specimens; MNO, 1 specimen. The species is rare.

Remarks. On the legend to plate 7, figs 12a, b, Ravn misspelled the species name as *pussilla*.

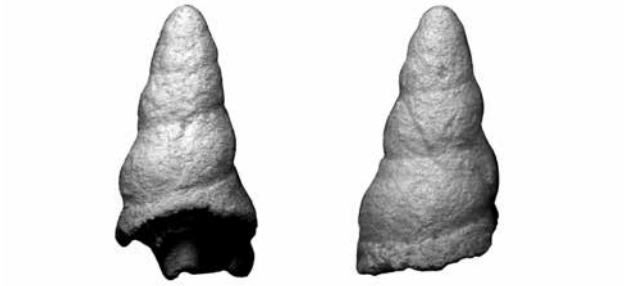

Fig. 159. *Turricula pusilla* (Ravn 1933). MGUH 31135 (ex ISL), height 4.0 mm, width 2.1 mm.

Superfamily Cancellarioidea Forbes & Hanley 1851
Family Cancellariidae Forbes & Hanley 1851
Subfamily Plesiotritoninae Beu & Maxwell 1987
Genus *Plesiotriton* Fischer 1884
Type species. *Cancellaria volutella* Lamarck 1803.

***Plesiotriton steni* Schnetler & Petit 2006** (Fig. 160)

2006 *Plesiotriton steni* Schnetler & Petit, p. 99, plate 1, fig. 3; plate 2, fig. 1.

Type material. Holotype MGUH 27344, paratype MGUH 27345.

Additional material. ARF, 1 juvenile specimen (ØSM-10059-25086); ISL, 1 fragment; ECS, 1 juvenile specimen (ØSM 10061-F 2-46). The species is very rare.

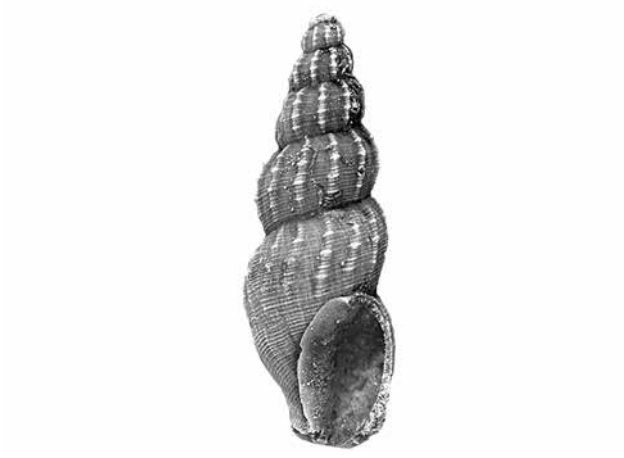

Fig. 160. *Plesiotriton steni* Schnetler & Petit 2006. MGUH 27344, height 15.0 mm, width 5.0 mm.

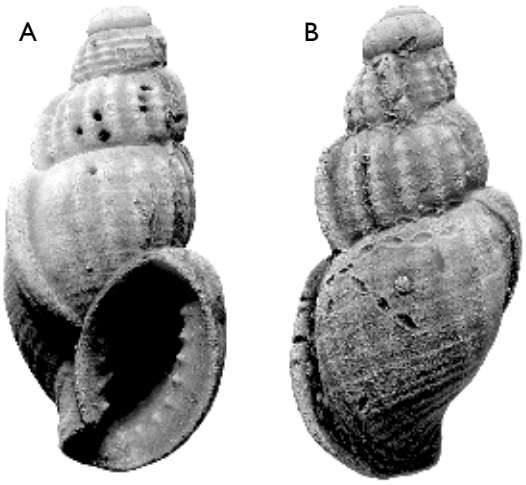

Fig. 161. *Unitas anderseni* Schnetler & Petit 2006. MGUH 27346, height 7.5 mm, width 3.9 mm.

Subfamily Cancellariinae Forbes & Hanley 1851
Genus *Unitas* Palmer 1947
Type species. Cancellaria costulata Lamarck 1803.

***Unitas anderseni* Schnetler & Petit 2006** (Fig. 161)

2006 *Unitas anderseni* Schnetler & Petit, plate 1, figs 1a, b; plate 2, figs 2, 7.

Type material. Holotype MGUH 27346, paratypes MGUH 27347 and MGUH 27348.

Additional material. ISL, 2 juvenile specimens; ARF, 7 juvenile specimens (ØSM-10059-25852); ECS, 1 juvenile specimen (ØSM 10061- F 2-91); MNO, 1 specimen. The species is rare.

***Unitas aliceae* Schnetler & Petit 2006** (Fig. 162)

1933 *Admete? biplicata* (Ravn) – Ravn, p. 68, plate 6, figs 12a, b.
2006 *Unitas aliceae* Schnetler & Petit, p. 103, figs 3a, b, 13, 14.

Type material. Holotype MGUH 27349, paratypes MGUH 27350; MGUH 3121, illustrated by Ravn (1933, plate 6, figs 12a–b) as *Admete ? biplicata* (Ravn).

Additional material. 2 juvenile specimens, mentioned by Ravn (1933, p. 68); ARF, 5 specimens (ØSM-10059-25075); MNO, 3 specimens; EBP, 1 specimen. The species is rare.

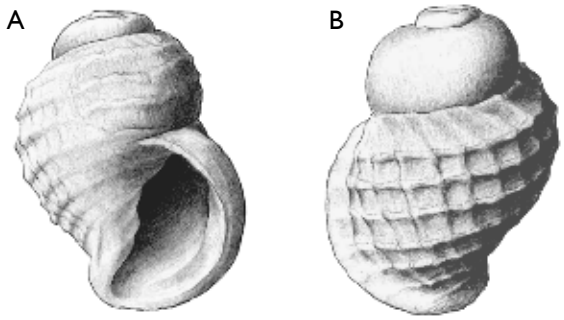

Fig. 162. *Unitas aliceae* Schnetler & Petit 2006. MGUH 3121, height 2.6 mm, width 1.8 mm.

***Unitas* sp. 1** (Fig. 163)

1933 *Admete (Bonellitia)* sp. – Ravn, p. 68, plate 6, figs 12a, b.
2006 *Unitas* sp. – Schnetler & Petit, p. 104, figs 15a, b.

Material. Only the illustrated specimen is known.

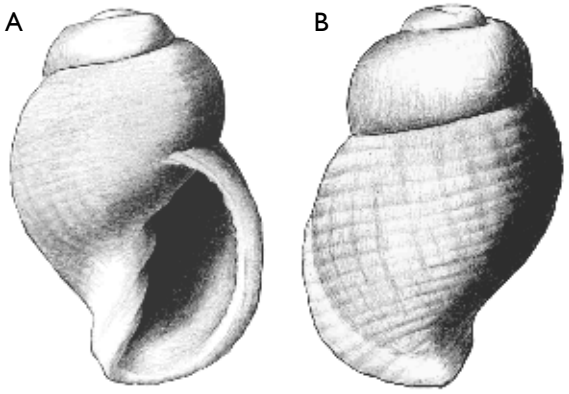

Fig. 163. *Unitas* sp. 1. MGUH 3192, height 3.2 mm, width 2.1 mm.

***Unitas* sp. 2** (Fig. 164)

Additional material. Two specimens, GM 1991.4892; ARF, 7 specimens (ØSM-10059-25760, 25854 and 25854); MNO, 1 specimen. The species is rare.

Remarks. It differs from the preceding species by having an umbilicus and almost invisible folds on the columella.

Fig. 164. *Unitas* sp. 2. MGUH 31136 (ex GM 1991.4892), height 1.4 mm, width 1.0 mm.

Genus *Admetula* Cossmann 1889
Type species. Buccinum evulsum Solander 1766.

***Admetula rosenkrantzi* Schnetler & Petit 2006** (Fig. 165)

2006 *Admetula rosenkrantzi* Schnetler & Petit, p. 104, figs 6a, b.

Type material. Holotype MGUH 27351.

Additional material. GM 1977.1375, 1 adult specimen. The species is very rare.

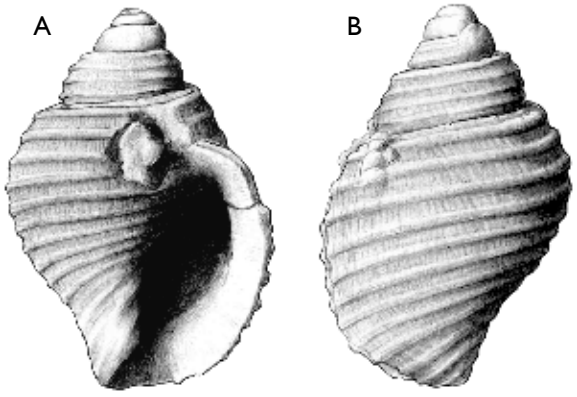

Fig. 165. *Admetula rosenkrantzi* Schnetler & Petit 2006. MGUH 31112 (ex Rkz 11), height 7.3 mm, width 5.1 mm.

***Admetula faksensis* Schnetler & Petit 2006** (Fig. 166)

2006 *Admetula faksensis* Schnetler & Petit, p. 104, figs 7a, b.

Type material. Holotype MGUH 27356.

Additional material. ARF, 1 juvenile specimen (ØSM-10059-25855); ARF, 1 specimen (ØSM-10059-25851); ARF, 2 juvenile specimens (ØSM-10059-25004 and 25111); ISL, 2 fragmented specimens. The species is rare.

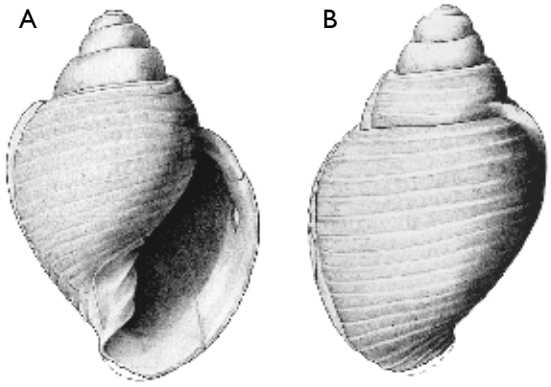

Fig. 166. *Admetula faksensis* Schnetler & Petit 2006. MGUH 27356 (ex Rkz 12), height 10.0 mm, width 6.8 mm.

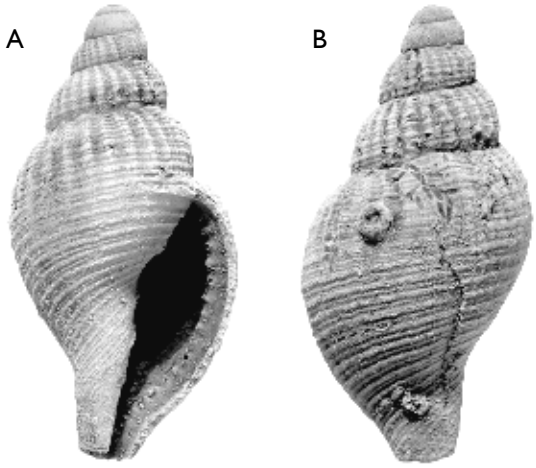

Fig. 167. *Semitriton biplicatus* (Ravn 1902b) MGUH 27352, height 9.8 mm, width 2.8 mm.

Genus *Semitriton* Cossmann 1903
Type species. *Plesiotriton dennanti* Tate 1898.

***Semitriton biplicatus* (Ravn 1902b)** (Fig. 167)

1902 *Tritonium biplicatum* (M.U.H.) n. sp. – Ravn, p. 228 (24), plate 2, figs 11–13.
1933 *Admete (?) biplicata* (Ravn) – Ravn, p. 68, plate 1, figs 12a, b. (*partim*, *non* plate 1, figs 12a, b = *Unitas aliceae*).
2006 *Semitriton biplicatus* (Ravn 1902b) – Schnetler & Petit, p. 105, figs 5, 8, 17a, b.

Type material. Lectotype MGUH 108 (= Ravn 1902b, plate 2, fig. 11); MGUH 109 (= Ravn 1902b, plate 2, fig. 12); MGUH 110 (= Ravn 1902b, plate 2, fig. 13).

Additional material. MGUH 27353; ISL, 10 juvenile specimens; AFR, 24 juvenile specimens (ØSM-10059-25849). The species is rather common.

Genus *Tatara* Fleming 1950
Type species. *Cymatium pahiense* Marshall & Murdoch 1921.

***Tatara danica* Schnetler & Petit 2006** (Fig. 168)

2006 *Tatara danica* Schnetler & Petit, p. 106, figs 9, 10a, b, 18, 19a, b.

Type material. Holotype MGUH 27354, paratypes MGUH 27355, MGUH 27357, MGUH 27358.

Additional material. GM1977.1373 and 1977.1374, 2 specimens; ISL, 17 juvenile specimens; ARF, 1 adult and 2 juvenile specimens (ØSM-10059-21429 and 25081). The species is rather common.

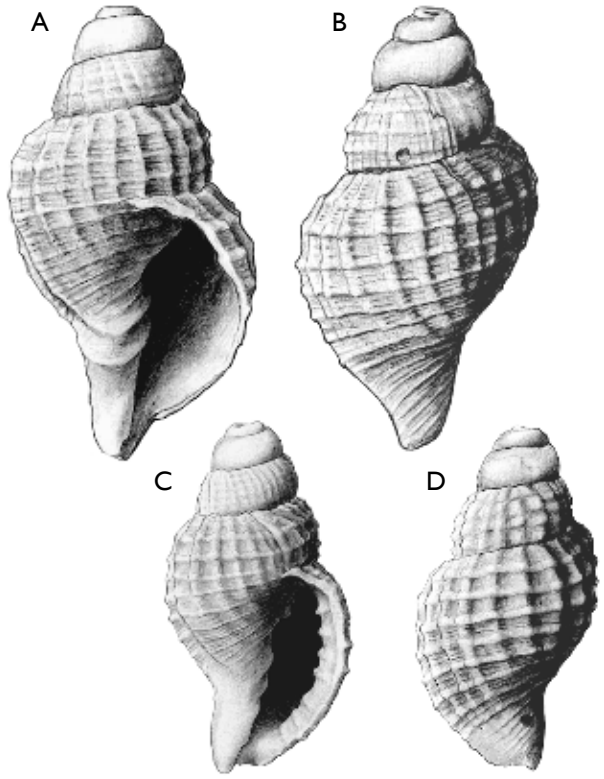

Fig. 168. *Tatara danica* Schnetler & Petit 2006. **A**, **B**: MGUH 31137 (ex Rkz 9), height 5.8 mm, width 3.1 mm. **C**, **D**: MGUH 31138 (ex Rkz 10), height 5.3 mm, width 2.8 mm.

Clade Heterobranchia
Informal Group Lower Heterobranchia
Superfamily Acteonoidea d'Orbigny 1843
Family Acteonidae d'Orbigny 1843
Subfamily Acteoninae d'Orbigny 1843
Genus *Acteon* Montfort 1810
Type species. *Acteon tornatilis* Linnaeus 1758.

***Acteon* sp.** (Fig. 169)

Additional material. MNO, 4 specimens. The species is rare.

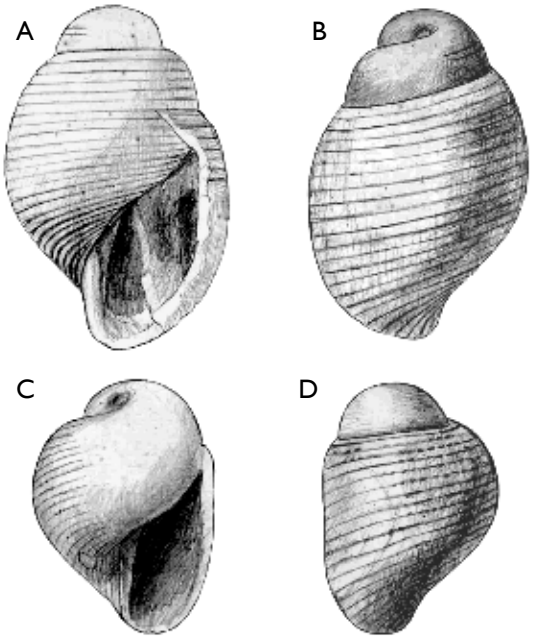

Fig. 169. *Acteon* sp. **A**, **B**: MGUH 31139 (ex Rkz 253), eight 1.9 mm, width 1.3 mm. **C**, **D**: MGUH 31140 (ex Rkz 254), height 1.4 mm, width 1.0 mm.

Genus *Rictaxis* Dall 1871
Type species. *Rictaxis punctocaelatus* (Carpenter 1864).

***Rictaxis? selandica* (Ravn 1933)** (Fig. 170)

1933 *Odostomia? selandica* Ravn, p. 40, plate 3, figs 13a, b.

Type material. Holotype MGUH 3146.

Additional material. Rkz 255, Rkz 256. The species is common.

Remarks. Ravn (1933, p. 41) questioned the assignment to *Odostomia*. Kollmann & Peel (1983, p. 105, fig. 243; p. 106, fig. 244) illustrated two related species from Nuussuaq, *sub nomine* new genus cf. *Rictaxis* Dall, species 1 and 2. The Faxe species has a similar protoconch, apex and spiral ornament as cf. *Rictaxis* sp. 2, but the columellar plait is less distinct. On drawing Rkz 257, however, the columellar plait could be observed on a defective specimen and it matches the cf. *Rictaxis* sp. 2 very well. For these reasons we tentatively assign the Faxe species to *Rictaxis*.

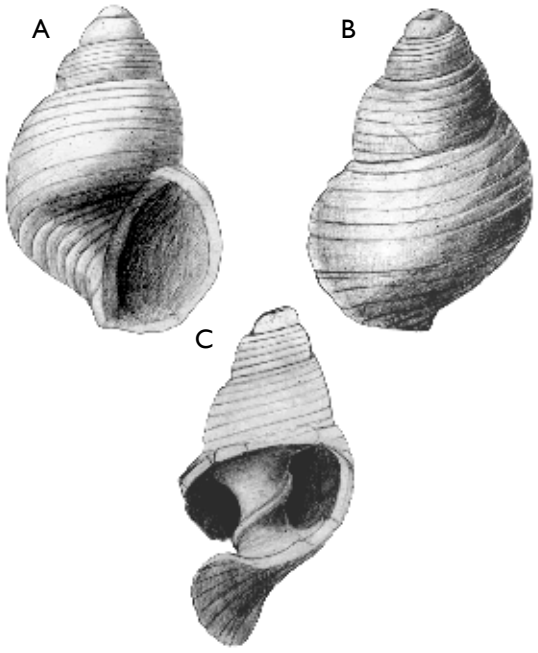

Fig. 170. *Rictaxis? selandica* (Ravn 1933).**A**, **B**: MGUH 31141 (ex Rkz 256B), height 3.4 mm, width 2.2 mm. **C**: MGUH 31142 (ex Rkz 257C), height 2.9 mm, width 1.5 mm.

Acteonoidea gen. et sp. indet. (Fig. 171)

Additional material. GM (ex Rkz 153); ARF, 21 specimens (ØSM-10059-25093); ISL, 2 specimens; EBP, 2 specimens. The species is rather common.

Remarks. The genus name *Palaeocrenilabium* was indicated by Rosenkrantz on a drawing, but never published.

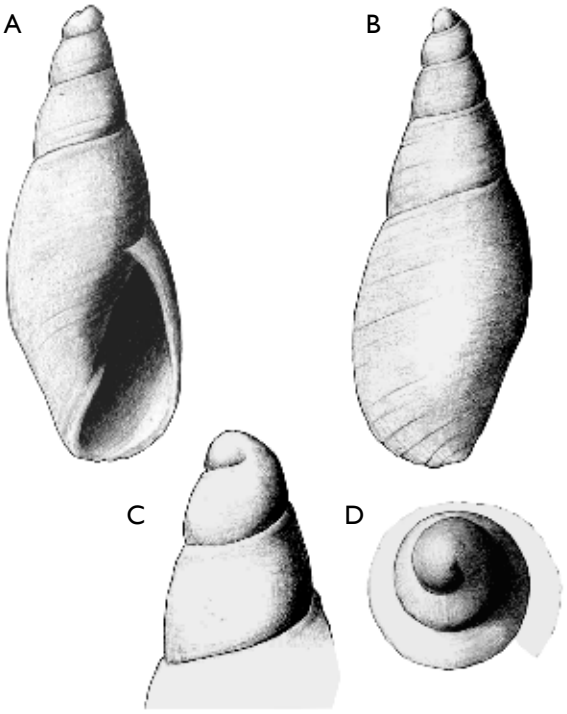

Fig. 171. Acteonoidea gen. et sp. indet. **A**, **B**: MGUH 31143 (ex Rkz 231B), height 4.0 mm, width 1.5 mm. **C**, **D**: MGUH 31144 (ex Rkz 231A), diameter of protoconch 0.7 mm.

Superfamily Rissoelloidea Gray 1850
Family Rissoellidae Gray 1850
Genus *Rissoella* Gray 1847a
Type species. *Rissoa? glaber* Alder = *Rissoella glaber* (err. pro *glabra*) J.E. Gray 1847a; = *Rissoa? diaphana* Alder 1848; = *Rissoa albella* (Alder 1844).

***Rissoella*? sp.** (Fig. 172)

Material. Only the illustrated specimen is known.

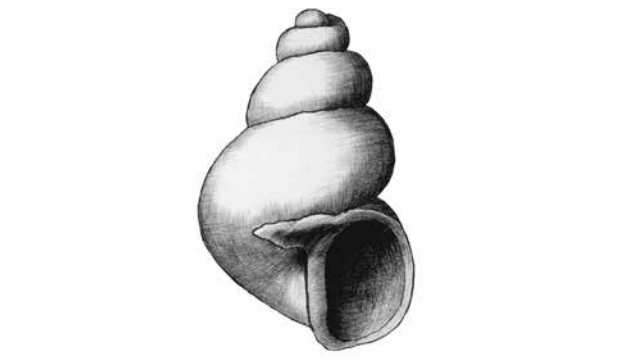

Fig. 172. *Rissoella?* sp. MGUH 31145 (ex Rkz 146), height 2.2 mm, width 1.4 mm.

Superfamily Architectonicoidea Gray 1850
Family Architectonicidae Gray 1850
Genus *Pseudotorinia* Sacco 1892
Type species. *Solarium obtusum* Bronn 1831.

***Pseudotorinia faxense* (Ravn 1933)** (Fig. 173)

1933 *Solarium faxense* Ravn, p. 34, plate 3, figs 1a–c, 2a–c.

Type material. Holotype MGUH 3135.

Material. The species is very common.

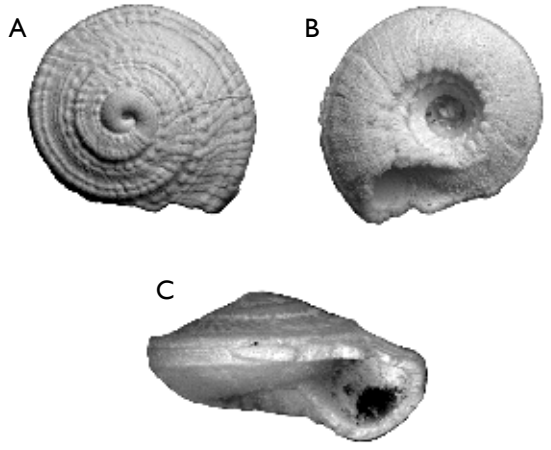

Fig. 173. *Pseudotorinia faxense* (Ravn 1933). MGUH 3134, height 2.9 mm, width 5.3 mm, diameter of umbilicus 2.3 mm.

Genus *Nipteraxis* Cossmann 1916
Type species. *Solarium plicatum* Lamarck 1804.

***Nipteraxis poulseni* (Ravn 1933)** (Fig. 174)

1933 *Solarium poulseni* Ravn, p. 35, plate 3, figs 5a–c.

Type material. Holotype MGUH 3138.

Additional material. ARF, 7 specimens. The species is rare.

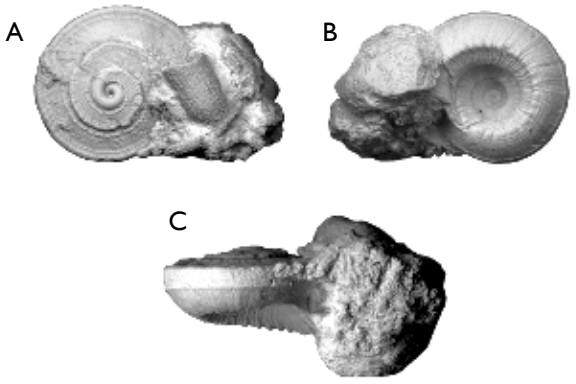

Fig. 174. *Nipteraxis poulseni* (Ravn 1933). MGUH 3138, height 2.6 mm, width 6.0 mm, diameter of umbilicus 3.5 mm.

Genus *Pseudomalaxis* Fischer 1885
Type species. *Bifrontia zanclea* Philippi 1844.

***Pseudomalaxis* sp.** (Fig. 175)

Material. The species is rather common, but almost all specimens are very small.

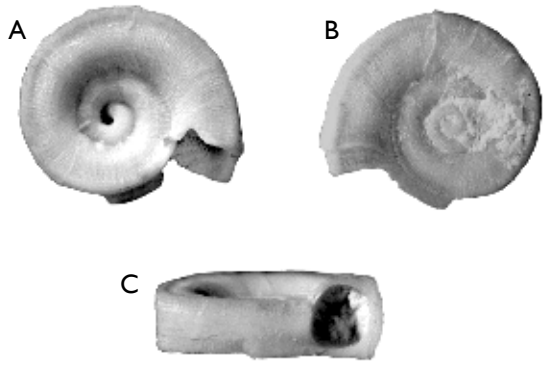

Fig. 175. *Pseudomalaxis* sp. ØSM-10059-25127 (ex ARF), height 1.6 mm, width 4.2 mm. Photo: Leif Rasmussen, Faxe, Denmark.

Family Orbitestellidae Iredale 1917
Genus *Orbitestella* Iredale 1917
Type species. Orbitestella bastowi Gatliff 1906

***Orbitestella* sp.** (Fig. 176)

Material. Only the illustrated specimen is known.

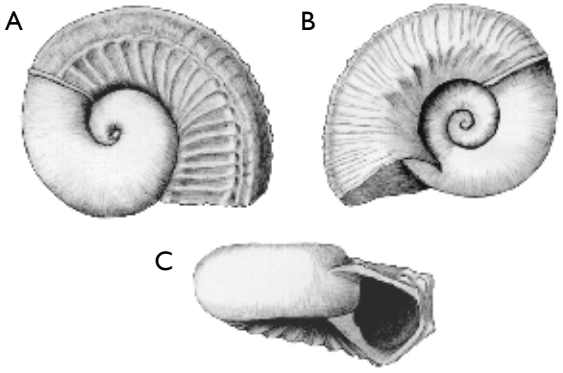

Fig. 176. *Orbitestella* sp. MGUH 31147 (ex Rkz 101), height 1.8 mm, width 2.1 mm.

Family Amphitomariidae Bandel 1996
Genus *Neamphitomaria* Bandel 1988
Type species. Pseudomalaxis stantoni Sohl 1960.

***Neamphitomaria* sp. 1** (Fig. 177)

Additional material. One specimen, Rkz 126.

Remarks. Rosenkrantz suggested in his notes that these specimens belonged to the genus *Omalaxis* Deshayes 1832.

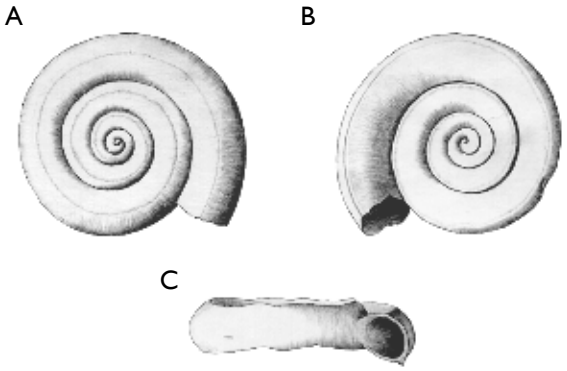

Fig. 177. *Neamphitomaria* sp. 1. MGUH 31148 (ex Rkz 125), height 0.8 mm, width 2.8 mm.

***Neamphitomaria* sp. 2** (Fig. 178)

Material. Only the illustrated specimen is known.

Remarks. The species has a keel on the highest part of the whorl and another keel at the transition to the base. The aperture is ovate.

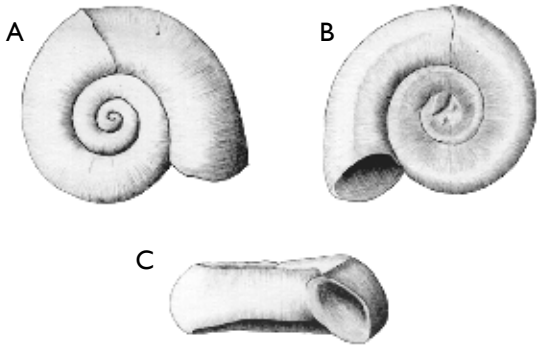

Fig. 178. *Neamphitomaria* sp. 2. MGUH 31149 (ex Rkz 113), height 0.6 mm, width 1.7 mm.

***Neamphitomaria* sp. 3** (Fig. 179)

Additional material. MNO, 1 specimen. The species is very rare.

Remarks. The species has no keel at the periphery and a higher apex. The aperture is subcircular.

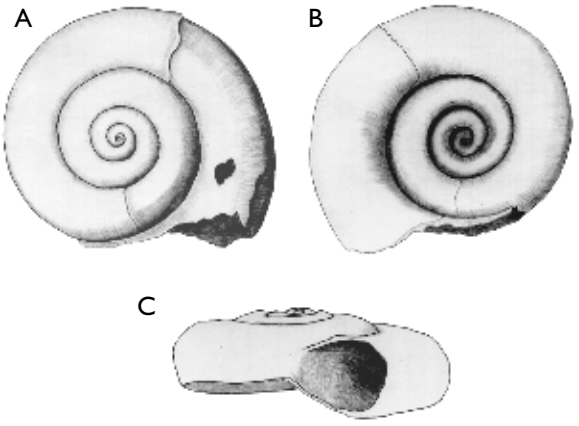

Fig. 179. *Neamphitomaria* sp. 3. MGUH 31150 (ex Rkz 124), height 1.2 mm, width 2.6 mm.

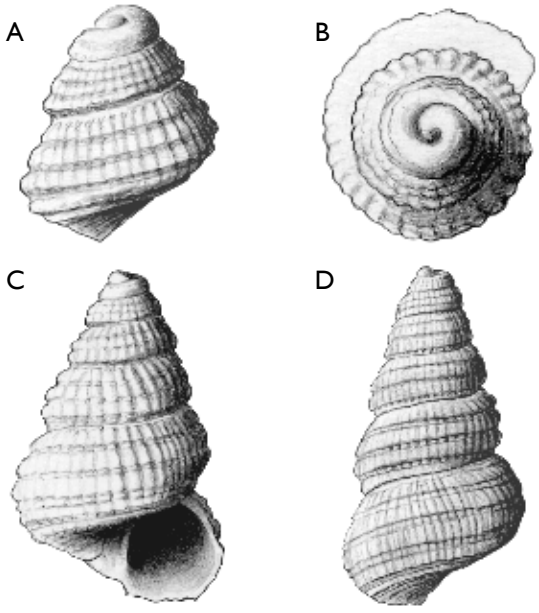

Fig. 180. *Gegania rosenkrantzi* (Ravn 1933). **A**, **B**: MGUH 31151 (ex Rkz 85A). A: height 1.6 mm, width 1.3 mm. B: diameter 1.4 mm. **C**: MGUH 31152 (ex Rkz 85C), height 5.3 mm, width 3.4 mm. **D**: MGUH 31153 (ex Rkz 85B), height 7.1 mm, width 3.9 mm.

Superfamily Mathildoidea Dall 1889
Family Mathildidae Dall 1889
Genus *Gegania* Jeffreys 1884
Type species. Gegania pinguis Jeffreys 1884.

***Gegania rosenkrantzi* (Ravn 1933)** (Fig. 180)

1933 *Mathildia rosenkrantzi* Ravn, p. 44, plate 4, figs 7a, b.
1933 *Basilissa? tricincta* Ravn, p. 32, plate 3, figs 4a, b.

Type material. Holotype MGUH 3154.

Material. The species is common.

Remarks. Ravn (1933) established the species *Basilissa? tricincta*, based on a rather badly preserved specimen. This specimen is here refered to *Gegania rosenkrantzi*, in accordance with the suggestion by Rosenkrantz.

Genus *Mathilda* Semper 1865
Type species. Cerithium fimbriatum Michelotti 1847.

***Mathilda unicarinata* (Ravn 1933)** (Fig. 181)

1933 *Mathildia unicarinata* Ravn, p. 43, plate 4, figs 4a, b.

Type material. Holotype MGUH 3151.

Material. The species is rather common.

Remarks. The species is characterised by the distinct carina, situated near the adapical suture. There are three weak spirals over the carina and one below. The number of axial ribs is 60–70.

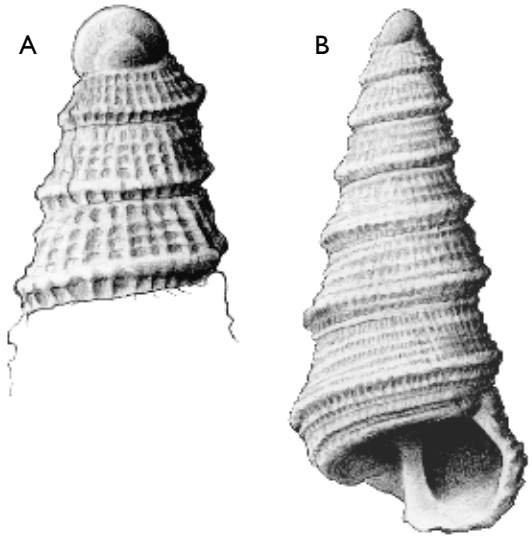

Fig. 181. *Mathilda unicarinata* (Ravn 1933). **A**: MGUH 31154 (ex Rkz 93A), height 1.8, width 1.3 mm. **B**: MGUH 31155 (ex Rkz 93B), height 5.7 mm, width 2.6 mm.

***Mathilda* sp. 1** (Fig. 182)

Material. Only the illustrated specimens are known.

Remarks. The species has two almost equal spiral ribs and four spiral ribs adapically, resulting in an almost reticulate sculpture. The number of axial ribs is 35–45.

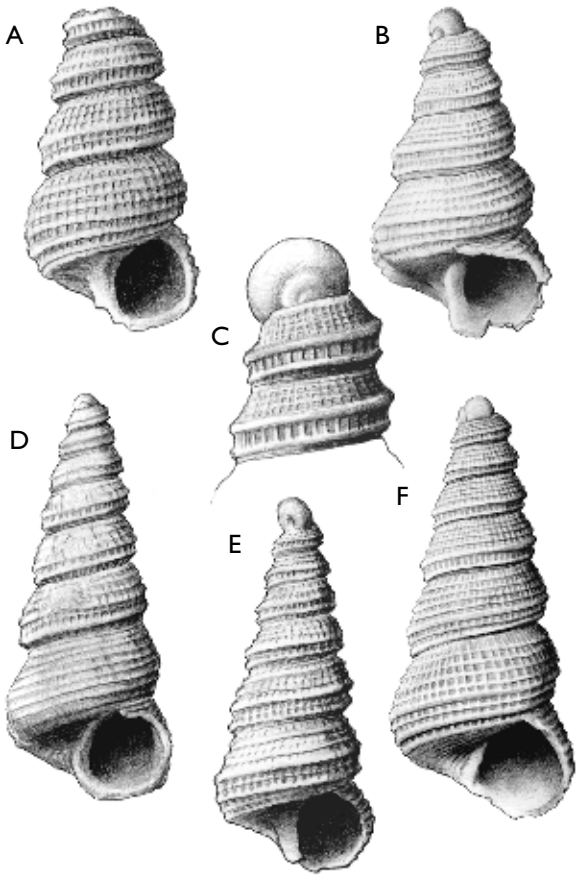

Fig. 182. *Mathilda* sp. 1. **A**: MGUH 31156 (ex Rkz 89A), height 2.2 mm, width 1.1 mm. **B**: MGUH 31157 (ex Rkz 90C), height 3.8 mm, width 2.0 mm. **C**: MGUH 31158 (ex Rkz 90B), height 2.2 mm, width 1.3 mm. **D**: MGUH 31159 (ex Rkz 89B), height 3.5 mm, width 1.4 mm. **E**: MGUH 31160 (ex Rkz 91), height 2.6 mm, width 1.1 mm. **F**: MGUH 31161 (ex Rkz 90A), height 5.3 mm, width 2.3 mm.

***Mathilda* sp. 2** (Fig. 183)

Additional material. ISL, 3 specimens. The species is very rare.

Remarks. The species has four spiral ribs, which on the last whorl are almost equal in strength. They are distinct, also on the spirals, and their number is 40–45.

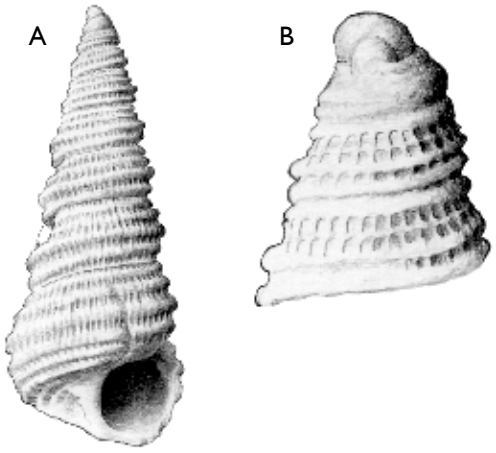

Fig. 183. *Mathilda* sp. 2. MGUH 31162 (ex Rkz 92A), height 9.5 mm, width 3.9 mm, height of protoconch 1.7 mm.

Genus *Acrocoelum* Cossmann 1888
Type species. *Mathilda bouryi* Cossmann 1888.

***Acrocoelum?* sp. 1** (Fig. 184)

Additional material. MNO, 2 specimens. The species is very rare.

Remarks. This species has four spirals and about 30 axial ribs, which cause a reticulate pattern.

Fig. 184. *Acrocoelum?* sp. 1. MGUH 31163 (ex Rkz 86), height 1.9 mm, width 0.8 mm.

***Acrocoelum* sp. 2** (Fig. 185)

Additional material. ISL, 1 specimen; MNO, 2 specimens. The species is very rare.

Remarks. This species has relatively high whorls with eight spiral bands and very weak axial ribs. *Mathilda lemchei* Ravn 1939 (p. 68, plate 2, figs 16a, b) has only six spiral bands, but resembles the species in general outline.

Fig. 185. *Acrocoelum* sp. 2. ØSM-10059-25098 (ex ARF), height 6.8 mm, width 2.0 mm.

Genus *Clathrobaculus* Cossmann 1912
Type species. *Cerithium ziczac* Eudes-Deslongchamps 1842.

***Clathrobaculus?* sp. 1** (Fig. 186)

Additional material. ISL, 1 specimen. The species is very rare.

Remarks. This species has six spiral bands, of which the abapical two are the strongest.

Fig. 186. *Clathrobaculus?* sp. 1. MGUH 31165 (ex Rkz 95), height 4.7 mm, width 1.8 mm.

***Clathrobaculus?* sp. 2** (Fig. 187)

Additional material. ISL, 10 specimens. The species is rare.

Remarks. This species has four spiral bands of almost equal strength, with secondary weaker spirals inserted on the younger whorls. The protoconch is unknown.

Fig. 187. *Clathrobaculus?* sp. 2. MGUH 31166 (ex Rkz 185), height 5.8 mm, width 1.4 mm.

Superfamily Pyramidelloidea Gray 1840
Family Pyramidellidae Gray 1840
Genus *Odostomia* Fleming 1813
Type species. Odostomia plicata (Montagu 1803).

***Odostomia* sp. 1** (Fig. 188)

Material. Only the illustrated specimen is known.

Remarks. The species has a rather high apex and very convex whorls. The columellar tooth is situated higher than the middle of the columella. There is no umbilicus.

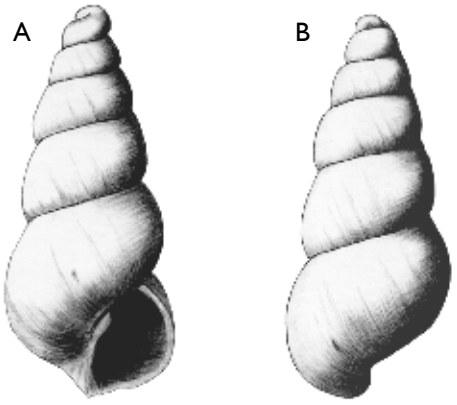

Fig. 188. *Odostomia* sp. 1. MGUH 31167 (ex Rkz 134), height 2.8 mm, width 1.2 mm.

***Odostomia* sp. 2** (Fig. 189)

Additional material. ARF, 58 specimens (ØSM-10059-25045, 25071 and 25821). The species is common.

Remarks. The species is smaller than the preceding species and has less convex whorls, separated by a less deep suture. Furthermore, it has a distinct umbilicus.

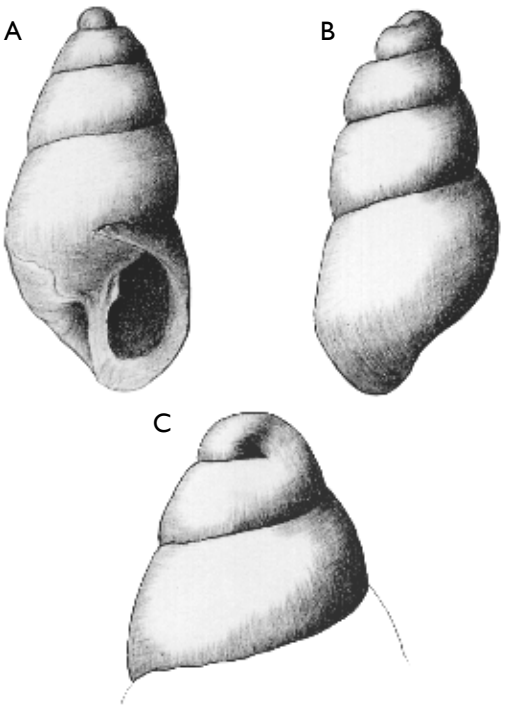

Fig. 189. *Odostomia* sp. 2. MGUH 31168 (ex Rkz 152), height 1.5 mm, width 0.7 mm, height of protoconch 0.2 mm.

Family Amathinidae Ponder 1987
Genus *Leucotina* A. Adams 1860
Type species. *Leucotina dianae* A. Adams *in* H. Adams & A. Adams 1854.

***Leucotina* sp.** (Fig. 190)

Additional material. ISL, 4 specimens; MNO, 2 specimens. The species is rare.

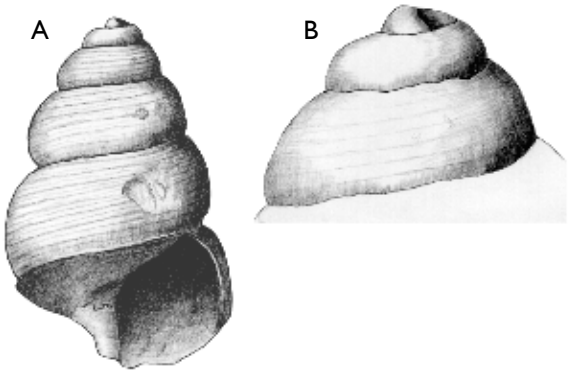

Fig. 190. *Leucotina* sp. MGUH 31169 (ex Rkz 147), height 3.5 mm, width 2.2 mm, height of protoconch 0.7 mm.

Subfamily Syrnolinae Saurin 1958
Genus *Puposyrnola* Cossmann 1921
Type species. *Auricula acicula* Lamarck 1804.

***Puposyrnola* sp.** (Fig. 191)

Material. The illustrated specimen is the only known example.

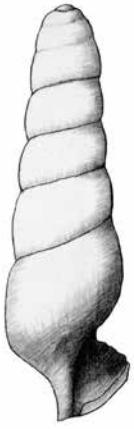

Fig. 191. *Puposyrnola* sp. MGUH 31170 (ex Rkz 142), height 3.1 mm, width 0.8 mm.

Clade Opisthobranchia
Informal Group Opisthobranchia
Clade Cephalaspidea
Superfamily Philinoidea Gray 1850 (1815)
Family Cylichnidae H. & A. Adams 1854
Genus *Acteocina* Gray 1847a
Type species. Bulla voluta Quoy & Gaimard 1833.

***Acteocina* sp.** (Fig. 192)

Additional material. Rkz 259; ARF, 7 specimens; ISL, 1 specimen. The species is rare.

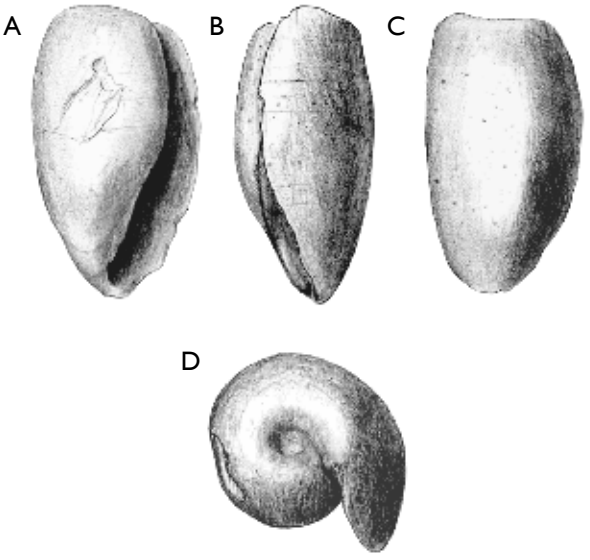

Fig. 192. *Acteocina* sp. MGUH 31171 (ex Rkz 259), height 1.9 mm, width 1.1 mm.

Incertae sedis

Incertae sedis sp. 1 (Fig. 193)

Additional material. GM 1991.4246, 2 specimens. The species is very rare.

Description: The species is slender with almost flat whorls, separated by a rather distinct suture. There is a rounded carina a little above the middle of the whorl. The shell is smooth, without spirals and axial sculpture, and the aperture is small and subcircular with a concave columella and a very short canal.

Fig. 193. Incertae sedis sp. 1. MGUH 31172 (ex GM 1991.4246), height 2.8 mm, width 0.9 mm.

Incertae sedis sp. 2 (Fig. 194)

Additional material. GM 1991.4247a, 1 specimen. The species is very rare.

Description: The species has convex whorls, separated by a deep suture, with no visible spiral ornament.
On the first teleoconch whorls there are weak opisthocline axial ribs but they fade out on the younger whorls. The aperture is subelliptical.

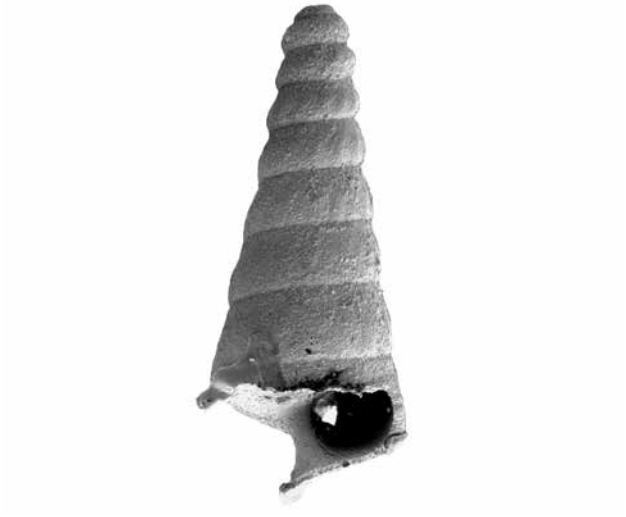

Fig. 194. Incertae sedis sp. 2. MGUH 31173 (ex GM 1991.4247a), height 2.3 mm, width 0.9 mm.

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