# NEW AND LITTLE KNOWN MOLLUSCA FROM ICELAND AND SCANDINAVIA

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This paper is a continuation of WARÉN's article '*New and little known Mollusca from Iceland*' in *Sarsia* volume 74.

A new family name, Pendromidae (based on the genus *Pendroma* DALL, 1927, previously classified in the Fossaridae), is introduced to replace Trachysmatidae, which was based on an erroneously identified genus. The family is redefined. *Adeorbis fragilis* G.O. SARS, 1878 = *Trachysma sarsianum* THIELE, 1912 is transferred to *Rugulina* PALAZZI, 1988 (previously in Cyclostremellidae) and the genus is included in the Pendromidae (Archaeogastropoda).

A new family, Tjaernoeidae, is established for *Tjaernoeia* WARÉN & BOUCHET, 1988 (previously in Pyramidellidae) based on new morphological information, and a new species, *T. boucheti* is described from deep water in the northeastern Atlantic. The known species of the family are reviewed (Gastropoda, Heterobranchia).

*Pilus* gen.n. is described for *Cocculina conica* VERRILL, 1884 (Archaeogastropoda, Cocculiniformia, family uncertain). The type species is redescribed, based on specimens from Iceland.

*Palazzia* gen.n. is described for *Omalogyra ausonia* (PALAZZI, 1988), which is redescribed. *Lippistes planorbis* DALL, 1927, from off Florida (previously in Omalogyridae) is included. The European species of *Adeuomphalus* SEGUENZA, 1876, are reviewed, *A. densicostata* (JEFFREYS, 1884) and *A. ammoniformis* SEGUENZA, 1876 are considered synonyms. *Eudaronia* COTTON, 1945 is discussed and the genus is used for *Omalogyra aperta* SYKES, 1925 (all in Archaeogastropoda, uncertain family).

*Amaura* MÖLLER, 1842 (not GEYER, 1837) is replaced by *Aartsenia* nom.n. since it is preoccupied (Pyramidellidae).

The following new species are described: *Skenea laevigata* AUCTT. non FRIELE is described as *S. ossiansarsi; Skenea ferruginea* (provisionally in *Skenea*) (Skeneidae); *Liostomia afzelii, Liostomia hansgei, Chrysallida brattstroemi, C. hoeisaeteri, C. bjoernsoni, Eulimella ataktos* (Pyramidellidae).

*Chrysllida sarsi* NORDSIECK, 1972 is compared with *Chrysallida juliae* (DE FOLIN, 1872), considered distinct, and recorded from southwestern Scandinavia. Neotypes are selected of *Turbo interstinctus* J. ADAMS, 1797 and *Jamina obtusa* BROWN, 1827, to stabilize the use of the name *Chrysallida interstincta* (J. ADAMS, 1797); for *Turbo divisus* (J. ADAMS, 1797) to stabilize the use of the name *Ondina divisa* (J. ADAMS, 1797); and for *Rissoa eburnea* STIMPSON, 1851 (all in Pyramidellidae).

The mytilid genus *Idas* JEFFREYS, 1876 is discussed. Two species occur off northern Europe, and it is concluded that *Idas* is the correct name of the genus, being older than *Idasola* IREDALE, 1915 and *Adipicola* DAUTZENBERG, 1927, and not preoccupied by *Idas* MULSANT, 1876.

The following species, previously known from Norway are reported as new for Iceland: *Fissurisepta granulosa* (JEFFREYS, 1883) (Fissurellidae), *Skenea areolata* (G.O. SARS, 1878), *S. trochoides* (FRIELE, 1876) (Skeneidae), *Rugulina fragilis* G.O. SARS, 1878) (Pendromidae), *Curveulima macrophthalmica* (WARÉN, 1972) (Eulimidae), and *Dacrydium ockelmanni* MATTSON & WARÉN, 1977 (Mytilidae).

The following species are reported as new for Scandinavia and Iceland: *Fissurisepta profundi* (JEFFREYS, 1877), *Cranopsis asturiana* (P. FISHER, 1882) (Fissurellidae); *Calliotropis ottoi* (PHILLIPI, 1844) (Trochidae); *Basilissa costulata* (WATSON, 1879) (Seguenziidae); *Palazzia ausonia* (PALAZZI, 1988), *Eudaronia aperta* (SYKES, 1925) (Archaeogastropoda, family uncertain); *Coccopigya spinigera* (JEFFREYS, 1883) (Cocculinidae); *Copulabyssia corrugata* (JEFFREYS, 1883) (Pseudococculinidae); *Cerithiella cossmanni* (DAUTZENBERG & FISHER, 1896) (Cerithiellidae); *Melanella myriotrochi* (BOUCHET & WARÉN, 1986) (Eulimidae); *Iphinopsis alba* BOUCHET & WARÉN, 1986 (Cancellariidae).

The following little known species are recorded: *Skenea trochoides* (FRIELE, 1876) (Skeneidae, synonymized with *S. laevigata* (FRIELE, 1876)); *Trichotropis bicarinata* BRODERIP & SOWERBY, 1829 and subspecies *tenuis* SMITH, 1877 (Trichotropidae, variation is described); *Halielloides nitida* (VERRILL, 1884) (Eulimidae, synonymized with *H. ingolfinana* BOUCHET & WARÉN, 1986); *Melanella orphanensis* CLARKE (Eulimidae); *Mohnia glyptus* (VERRILL, 1882) (Buccinidae); *Metzgeria alba* (JEFFREYS, 1873) (Turbinellidae); *Oenopota ovalis* (FRIELE, 1877), *Typhlomangelia nivalis* (LOVÉN, 1846), *Taranis moerchi* (MALM, 1861) (Turridae).

A part of the arctic and Scandinavian pyramidellid fauna is reviewed, namely the genera *Aartsenia* nom.n. (1 species); *Menestho* Möller, 1842 (2 species.), *Chrysallida* Carpenter, 1856 (9 species); *Ondina* De Folin, 1870 (4 species); *Liostomia* G.O. Sars, 1878 (5 species); *Eulimella* Forbes & Macandrew, 1846 (4 species).

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CONTENTS



## INTRODUCTION

This paper is a continuation of Warén (1989) and an enumeration of some further little known species new to the Icelandic fauna or incompletely known from there, supplemented with discussions of the taxonomy and nomenclature of the species. I also describe some new species and higher taxa from Iceland and Scandinavia.

Most of the Icelandic material has been obtained from amateur collectors. These were enumerated and a map of the localities was given in my first paper (Warén 1989).

The material is kept in the collections in SMNH, unless otherwise stated.

I have included generic headings only when there is a discussion of the systematics of the genus, or when the species recently has changed generic position.

References to the original description, type locality, etc., are given except when a species recently has been revised. Then I give that reference and relevant additional references.

The distribution given under each species is usually based on personal examination of actual specimens; when this is not the case, references are quoted.

### *Abbreviations*

(Other abbreviations will be found in Warén (1989).

BIOFAR — Internordic program for exploration of the fauna of the Faroes

BIOGAS — French deep sea biology program for the exploration of the Bay of Biscay

E00–00 — Biological Station, Espegrend, reference number to collecting operation

INCAL — French expedition to the Rockall Trough and the northern part of the Bay of Biscay

NORBI — French–Swedish expedition to the Norwegian Sea, 1975, see Bouchet & Warén (1979)

RAMME — Royal Albert Memorial Museum, Exeter

*Thalassa* — French Fishery Research vessel. Was during 1970–1973 used for cruises in the Bay of Biscay, under the direction of Dr. L. Cabioch, Roscoff

USFC — U.S. Fisheries Commission

Stn(s) — Station(s)

## Class GASTROPODA

### Subclass Prosobranchia

### Family Fissurellidae

### Genus *Fissurisepta* Seguenza, 1863

Type species. *F. papillosa* Seguenza, 1863, subsequent designation Woodring 1928:454 (Italian Pleistocene).

Remarks. *Fissurisepta* has often been considered a subgenus of *Puncturella*, and I do not question that they are closely related. Conchologically the species of *Fissurisepta* differ from *Puncturella* by not having the apical perforation drawn out into a slit. In this aspect the species resemble *Fisurella*, but the whorls of the protoconch are not planispiral as in that genus. Some species of *Fissurisepta*, for example *F. profundi*, show a superficial resemblance to *Puncturella* in keeping the protoconch, also when adult. The demarcation from *Puncturella* is, however, not very clear.

#### *Fissurisepta granulosa* Jeffreys, 1883
(Fig. 1C)

*Fissurisepta granulosa* sp.n. — Jeffreys 1883a:675.
*Fissurisepta granulosa*: Warén 1972:17.

New records. Southwestern Iceland: Reykjanesridge, from pieces of trawled coral, 300–380 m, 200–400 m, several shs, HL. — Southeastern Iceland: Skeidarardypi, 1981, 1 sh, JHB. — 63°36′ N, 15°58′ W, 7 Apr 1979, 180 m, coral, 2 ex, JB.

Distribution. Southwestern Iceland to western Norway and southwards to off Portugal, and in the Mediterranean (Taviani 1974; Ghisotti & Giannini 1983). Depth range 100–2000 m.

Remarks. Icelandic specimens agree well with Norwegian ones. Living specimens and recently

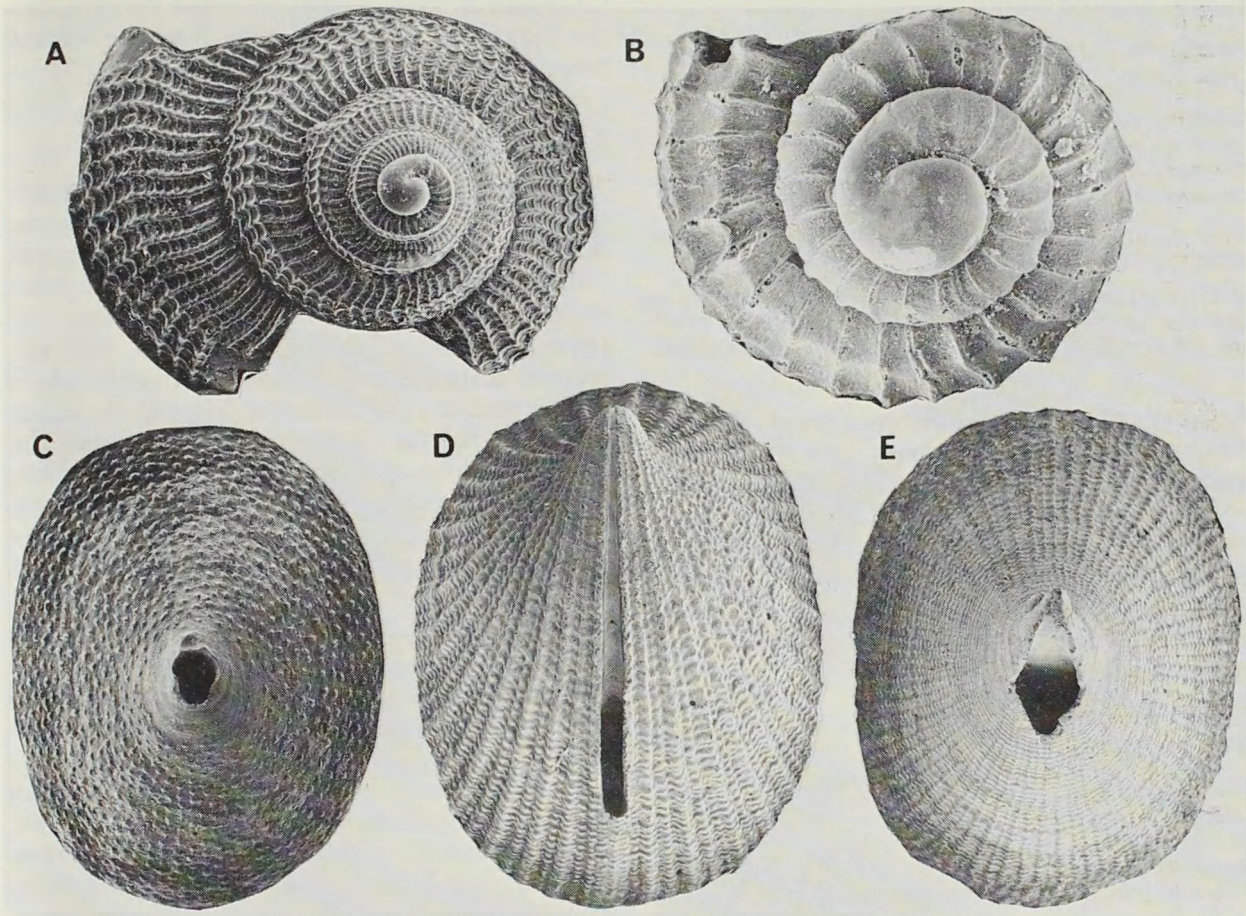


Fig. 1. A. *Ancistrobasis reticulata* (PHILIPPI), 62°58′ N, 25°36′ W, 22 Apr 1980, 970 m, coll. JB, 2.7 mm. B. *Calliotropis ottoi* (PHILIPPI), 62°58′ N, 25°36′ W, 22 Apr 1980, 970 m, coll. JB, 1.30 mm. C. *Fissurisepta granulosa* (JEFFREYS), 63°36′ N, 15°58′ W, 7 Apr 1979, 180 m, coll. JB, 3.20 mm. D. *Cranopsis asturiana* (P. FISCHER), 62°51′ N, 25°18′ W, 27 Apr 1980, 508–478 m, coll. JB, 8.6 mm. E. *Fissurisepta profundi* (JEFFREYS), 62°58′ N, 25°36′ W, 22 Apr 1980, 970 m, coll. JB, 4.1 mm. All measurements are maximum diameters.

dead shells have a fairly dark, warm brown periostracum.

*Fissurisepta profundi* (JEFFREYS, 1877)
(Fig. 1E)

*Puncturella profundi* sp.n. — JEFFREYS 1877:232.
*Puncturella profundi*: JEFFREYS 1883a:675.
*Puncturella (Puncturella) profundi*: FARFANTE 1947:129.

New records. Southwestern Iceland: 62°58′ N, 25°58′ W, 22 Apr 1980, 970 m, coral, 9 ex, JB.

Distribution. Along the North Atlantic continental slope, from the Lesser Antilles north to off southern Greenland and south to southern Portugal (FARFANTE 1947). Depth range 530–2600 m.

Remarks. I have placed *Puncturella profundi* in *Fissurisepta* because of its large and broad apical perforation, but this placing is still provisional. Knowledge about radulae and soft parts will be needed to confirm this.

Icelandic specimens closely resemble those from Portugal, but the Caribbean records mentioned by FARFANTE (1947) may be questioned.

*Cranopsis asturiana* (P. FISCHER, 1882)
(Fig. 1D)

*Rimula asturiana* sp.n. — P. FISCHER 1882:51.
*Puncturella* (*Cranopsis*) *asturiana*: WATSON 1886:45.
*Puncturella* (*Cranopsis*) *asturiana*: FARFANTE 1947:118.

New Records. Southwestern Iceland: 62°51′ N, 25°18′ W, 27 Apr 1980, 508–478 m, 1 sh, JB.

Distribution. Along the North Atlantic continental slopes, from the Lesser Antilles, north to Iceland and south to southern Portugal (FARFANTE 1947). Depth range 200–2000 m.

Remarks. I follow a recommendation by McLean (pers. commn.) to use *Cranopsis* as a full genus. His view on this was presented in MCLEAN (1968).

## Family Seguenziidae

*Ancistrobasis reticulata* (PHILLIPPI, 1844)
(Fig. 1A)

*Solarium reticulatum* sp.n. — PHILLIPPI 1844:149.
*?Basilissa costulata* sp.n. — WATSON 1879:600.
*?Basilissa costulata:* WATSON 1886:103, plate 7, fig. 11.
*Ancistrobasis reticulata:* QUINN 1983:729.

New records. Southwestern Iceland: 22 Sept 1980, 62°58′ N, 25°36′ W, 970 m, JB.

Distribution. From the Caribbean (QUINN 1979) to southern Georgia, southwest of Iceland (CLARKE 1974), and off Portugal (WATSON 1886). Depth range 700–2000 m.

Remarks. Only a fragment was found. Whether PHILIPPI'S AND WATSON'S names refer to the same species in uncertain. QUINN (1979, 1983) listed them as different species without comments. B.A. MARSHALL (1983) and QUINN (1983) considered *Ancistrobasis* worth generic distinction, a view I share.

## Family Trochidae

*Calliotropis ottoi* (PHILIPPI, 1844)
(Fig. 1B)

*Trochus ottoi* sp.n. — PHILIPPI 1844:227.
*?Margarita regalis* sp.n. — VERRIL & SMITH, in VERRILL 1880:397.
*Margarita* (*Solariella*) *ottoi:* BUSH 1893:217.
*Solariella infundibulum:* ODHNER 1912:19 (not WATSON, 1879).

New records. Southwest of the Faroes: BIOFAR Stn 305, 60°11′ N, 09°40′ W, 1078 m, 1 sh.

Southwestern Iceland: 62°58′ N, 25°36′ W, 22 Apr 1980, 970 m, JB.

New Foundland Banks: 46°0′6 N, 52°03′ W, 85 m, 1 sh, SMNH.

Distribution. From (the West Indies?, ABBOTT 1974) New Foundland to Iceland and the Faroes (SIMPSON 1910), and south to the Mediterranean. Depth range 85 to at least 1000 m. The southern and lower bathymetric ranges of distribution are uncertain due to confusion with other species.

Remarks. *Calliotropis ottoi* and *C. regalis* have been considered distinct (REHDER & LADD 1973; QUINN 1979), but I am not prepared to accept or deny this. More work remains to be done on this genus of which there are several species in the seas off western Europe.

The specimens reported here are small and fragmentary and do not help in solving this problem more than suggesting a continuous distribution of the species across the northern part of the Atlantic.

Examination of the specimen of *Solariella infundibulum* recorded by ODHNER (1912) showed that it belongs to the present species (-complex?).

COLMAN & TYLER (1988) described the reproductive biology of *Calliotropis ottoi* from the Rockall Basin.

## Family Skeneidae

The northeastern Atlantic species of this family were discussed by HØISÆTER (1968a, b.). He divided them into two main groups, *Dikoleps* HØISÆTER, 1968 (type species *Margarita pusilla* JEFFREYS, 1847, original designation) and *Skenea* FLEMING, 1825 (type species *Helix serpuloides* MONTAGU, 1808, subsequent designation GRAY 1847), which he placed in the Trochidae and Skeneidae respectively. Examination of radulae of all the species, discussed by HØISÆTER, shows that there is no reason for placing them in different families. The reason for HØISÆTER'S decision seems to be his interpretation of the radula of *Dikoleps pusilla* (JEFFREYS, 1847), which is too small to be examined by light microscopy, as HØISÆTER attempted. The placement of *Dikoleps* in Trochidae was questioned also by FRETTER & GRAHAM (1977) and is furthermore contradicted by the absence of a nacreous inner shell layer in *Dikoleps*.

It should here be pointed out that VAN AARTSEN & al. (1984) considered *Dikoleps nitens* (PHILIPPI, 1844) distinct from *Dikoleps pusilla* (JEFFREYS, 1847), a view I share. This means that the latter name is the correct one for Scandinavian specimens, which are characterized by having the basal spiral sculpture restricted to the umbilicus, while it covers about half the basal surface in *D. nitens*.

The European shallow-water skeneids, about seven in number, can from shell morphology be grouped in *Dikoleps* and *Skenea* and I figure the shell (Fig. 2 A–D) and radula (Fig. 8C–F) of the type species of each, since there are no good pictures of the radulae and few ones of the shells. The conchological difference is that the outer lip of *Dikoleps* is curved, that of *Skena* straight.

The classification of the deep-water species is more difficult, and requires a broader base than the few species discussed here. Conchologically *Skenea peterseni* is intermediate between *Skenea* and *Dikoleps*. I have therefore, following old practice, placed all these species in *Skenea*, awaiting a more thorough revision of this group. There is one exception, *Cyclostrema millepunctata* FRIELE, 1886, for which I earlier (1989) made the genus *Retigyra*, of unknown archaeogastropod affinity.

*Lissospira* BUSH, 1897 was used as a subgenus for several of the deep-water species classified in *Skenea* by HØISÆTER 1968b and as a genus by BOUCHET & WARÉN (1979) for *S. profunda, turgida,* and *basi-*

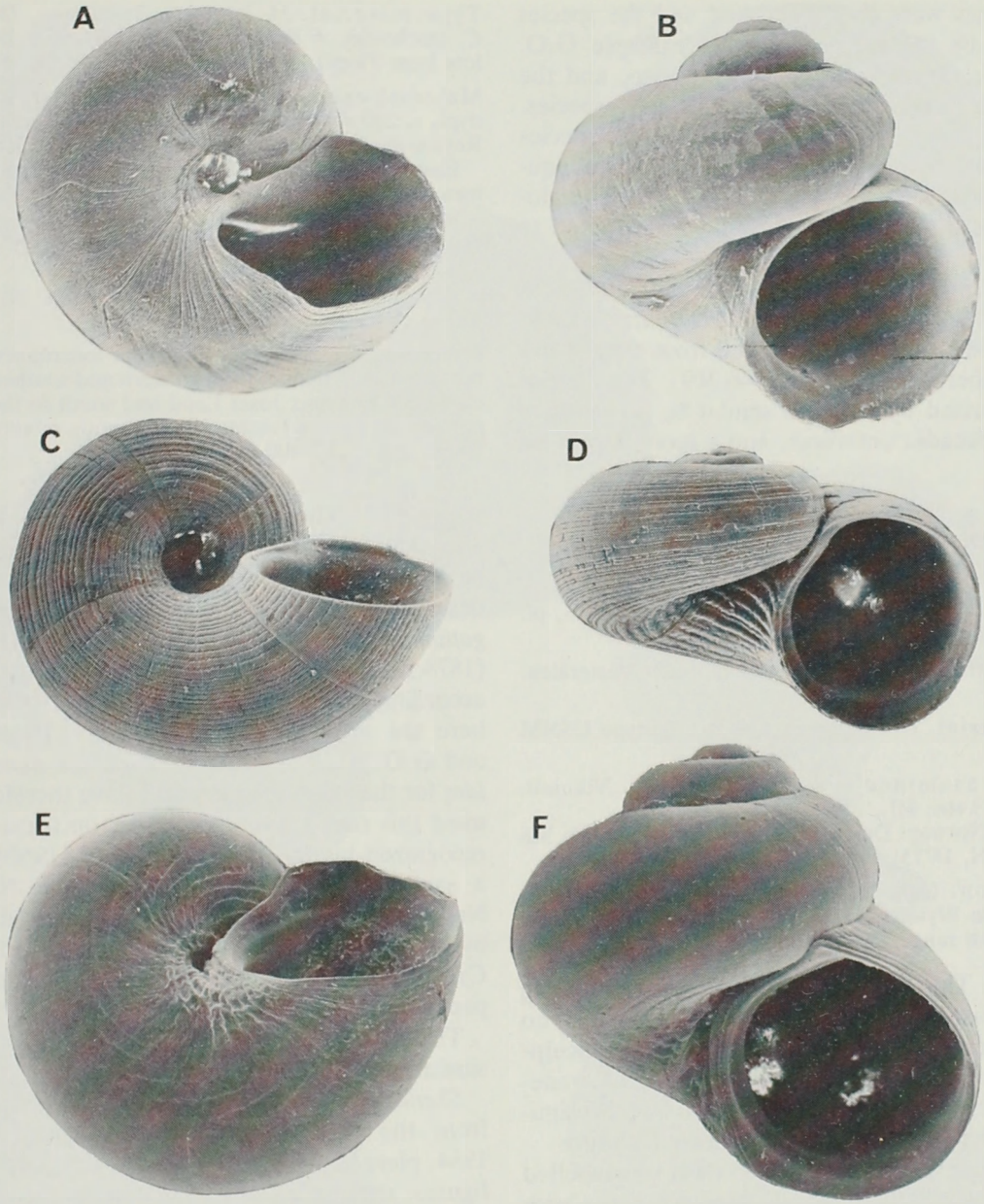


Fig. 2. A–B. *Dikoleps pusilla* JEFFREYS), Scotland, Arran, Lamlash Bay, SMNH, diameter 0.9 and 1.1 mm. C–D. *Skenea serpuloides* (MONTAGU), British Channel, Guernsey, 1.35 mm diameter. E–F. *S. trochoides* (FRIELE), western Norway, northwest of Marsteinen, Korsfjorden, 310–360 m (E19–73), diameter 2.13 and 1.81 mm.

*striata*. The three last mentioned species have virtually identical radulae and similar shape of the shell, and the sculpture consists of variations of the same kind of spiral striation. They are very similar to *Cyclostrema proxima* TRYON, 1888, type species of *Lissospira*, which can be used as a subgenus. However, since there presently are no names available for a subgeneric classification of the other species of *Skenea* discussed here, I have preferred to stay away from a subgeneric classification.

Genus *Skenea* FLEMING, 1825

Type species. *Helix serpuloides* MONTAGU, 1808 (Fig. 2C, D 8C, D), subsequent designation by GRAY 1847:152. (Western Europe, shallow water.)

Remarks. A good deal of confusion of the names of the species discussed here can be found in the literature. This is mainly a result of misidentifications by JEFFREYS, who returned specimens sent to him for identification, with his manuscript names.

These names were then published and the species illustrated by various authors, for example G.O. Sars, Friele, Seguenza, and Monterosato, and the same name was employed for different species. Another reason for the confusion is that the species are small and difficult to study with the optical equipment available in the late 19th century. The globular shape of the species certainly contributed to this.

I have not been able to examine any specimens that can be referred to *Ganesa bujnitzkii* Gorbunov, 1946, which was described from deep water north of Siberia (Gorbunov 1946:309). This species is characterized by a shape similar to *S. peterseni* but has a broader umbilicus, and a more depressed shape.

*Skenea areolata* (G.O. Sars, 1878)
(Fig. 3A, type; B–C)

*Cyclostrema areolatum* sp.n. — G.O. Sars 1878:345, pl. 34, figs 6a–d.

Type locality. Northern Norway, off Vesterålen, 146–182 m.

Type material. Not found in ZMO; 1 syntype USNM 181433.

Material examined. Western Iceland: Vikurall, 260–300 m. 3 shs, HL.

Northern Norway: Den norske Nordhavsexpedition Stn 192, 69°46′ N, 16°15′ E, 1187 m, 2 shs, ZMB 20997.

Distribution. Only known from Norway and Iceland, and from the Wyville-Thomson Ridge, 310 m (Jeffreys 1883c). Depth range 150–1200 m.

Remarks. This species is easy to recognize among the northeastern Atlantic skeneids. There is no other species known with a similar, reticulate sculpture north of the Bay of Biscay. In the Mediterranean, there are two or three additional species, similar to *S. areolata*, but with even coarser sculpture.

The syntype of *S. areolata* in USNM was labelled 'Finnmark, G.O. Sars' which does not agree with the locality given by G.O. Sars (1878) (Vesterålen, north of Lofoten), but as Finnmark by non-Scandinavian authors often has been used indiscriminatingly for 'Northern Norway', I do not question that the specimen has type status.

*Skenea trochoides* (Friele, 1876)
(Figs 2E–F; 3D, G, types; 6E, larval shell; 8B, radula)

*Mølleria laevigata* Jeffreys MS, sp.n. — Friele 1876:60.
*Cyclostrema trochoides* Jeffreys MS, sp.n. — Friele 1876:60.

Type localities. *M. laevigata*, Kvarven and Florø, western Norway; *C. trochoides*, Bergen and Florø, western Norway.

Type material. *M. laevigata*, 2 syntypes, ZMB 28467; *C. trochoides*, 4 syntypes ZMB 28468 and 28469 (both lots from Florø).

Material examined. Southeastern Iceland: Skeidarardypi, c. 200 shs and spms, HL. — Southwestern Iceland: Reykjanesridge, 260–400 m, c. 30 shs and spms, HL.

East of Franz Josef Land: 8 samples with 61 specimens, 54–360 m, leg. Gorbunov, SMNH.

Western Norway: In and off Korsfjorden, north to Herdlafjorden, 49 samples with about 2000 specimens, 120–600 m.

Bay of Biscay: *Thalassa* Stn Z424, 48°28′ N, 09°44′ W, 475 m, 1 fossil-looking shell, MNHN.

Distribution. Uncertain, but here ascertained from the northeastern Atlantic, from western and southern Iceland, eastwards to Franz Josef Land and south to the northern part of the Bay of Biscay, usually sandy or silty bottoms. Depth range 200–400 m.

Remarks. The synonymy above was recognized already by Friele (1886:33), but for some reason he considered the specimens used for the original descriptions to be identical with *Cyclostrema laevigatum* as illustrated and described by G.O. Sars (1878:130, tab. 21, fig. 2a–b). This is not the case according to my examination of the types, which here are shown in Fig. 3D and G. Friele (1876) and G.O. Sars (1878) both used the name *trochoides* for the same species and I have therefore continued this use. Friele, however, on some occasion recognized his mistake, because in USNM there is a sample (USNM 181428, from the Norwegian North Atlantic Expedition, no station data) sent by Friele with the MS name '*sarsi*' attached to it. *Cyclostrema laevigatum* Auctt. is in the present paper described as *ossiansarsi*.

The differences from *S. peterseni*, which is very similar, are outlined under that species.

*Skenea laevigata* ( = *trochides*) has been recorded from the Mediterranean (for example Grecchi 1984, plate 2, fig. 19, 20), but in this case the good figures show the determination to be erroneus, since the specimen has 0.8 teleoconch whorls and still is of the same size as the protoconch of the real *S. laevigata*. The illustrated shell actually is a heteropod protoconch. I have seen no Mediterranean specimens, neither in the classical sense (referring to *S. ossiansarsi*), or as used here.

*Skenea laevigata* was recorded from northeastern Greenland by Schiötte (1989), but his figure is more similar to *S. peterseni* (Friele).

*Skenea ossiansarsi* sp.n.
Figs 4C–D; 6F, larval shell; 9C–D, radula)

*Cyclostrema laevigatum* G.O. Sars 1878:130, 344, tab. 21, fig 2a–b (not Friele, 1876).

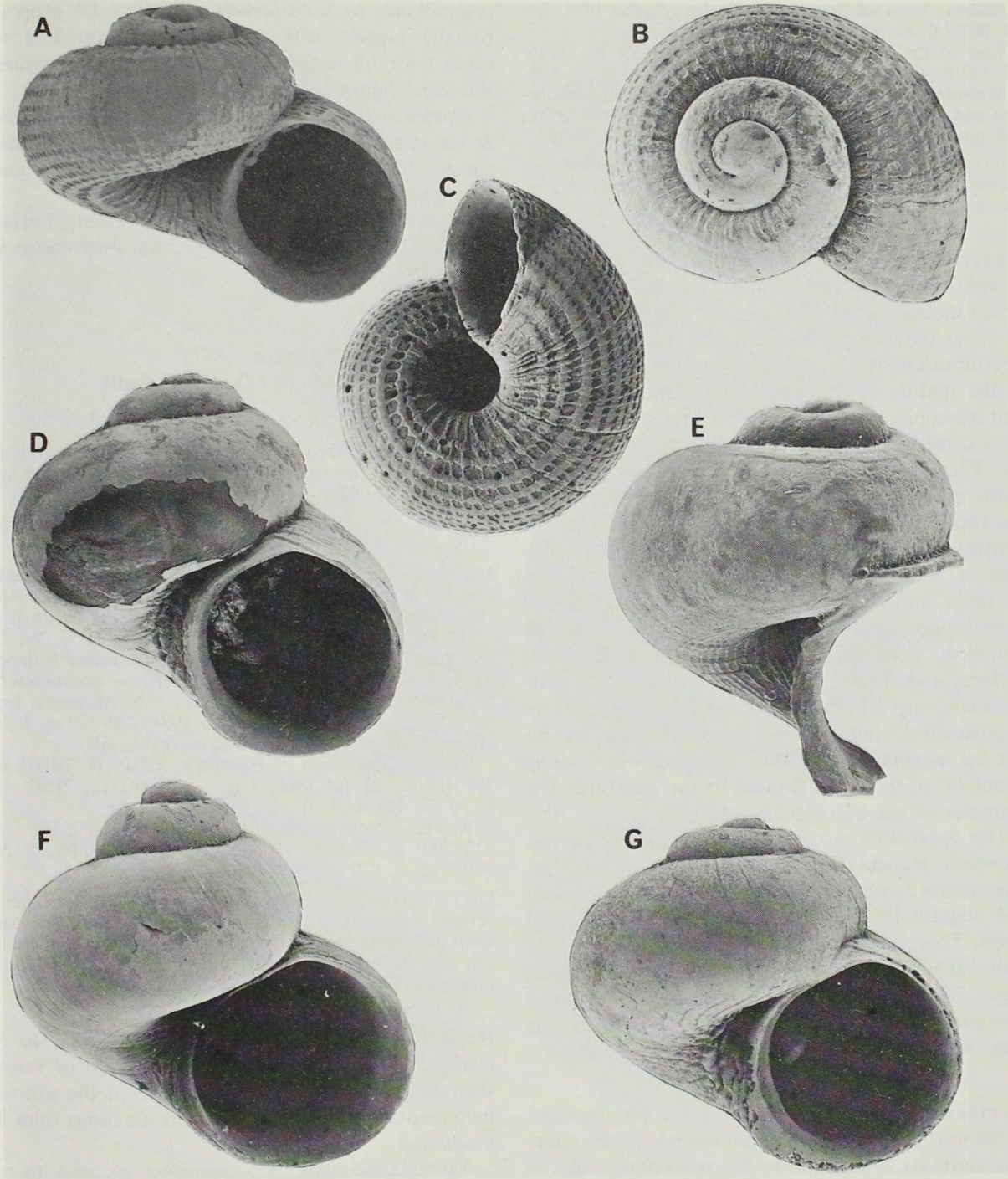


Fig. 3. A. *Skenea areolata* (G.O. Sars), syntype, USNM 181433, Finnmarken, diameter 1.69 mm. B–C. *S. areolata* ZMB 20997, off northern Norway, 69°46′ N, 16°15′ E, 1187 m, diameter 1.27 mm. D. *S. trochoides* (Friele), syntype, ZMB 28468, diameter 2.15 mm. E. *S. rugulosa* (G.O. Sars), syntype, ZMO D591, diameter 1.2 mm. F. *S. peterseni* (Friele), syntype, ZMB 20986, 2.32 mm diameter. G. *S. trochoides* (syntype of *C. laevigata*), ZMB 28467, diameter 1.78 mm.

Type locality. Western Norway, off Korsfjorden, 60°08′30″ N, 04°52′35″ E, 255 m (E82–73).

Type material. Holotype SMNH 4101, paratypes, BMNH 1989136, SMNH 4102, MNHN, USNM 860475, ZMB 66418.

Material examined. Southeastern Iceland. Skeidarardypi, c. 40 shs and spms. HL. — 63°20′ N, 16°52′ W, 7 Jul 1975, 245 m, black sand, 1 sh, JB — Southwestern Iceland: Reykjanesridge, 260–400 m, c. 50 shs and spms, HL.

Siberia: West of Severnaya Zemlya, *Sadko* 1935, Stn 44, 80°58.0′ N, 80°26′ E, 74 m, 1 sh.

East of the Faroes: Biofar Stn 098, 60°54′ N, 06°15′ W, 150 m, 1 sh.

Western Norway: Off and in Korsfjorden, Raunefjorden and north to Hjeltefjorden, 30 samples with about 310 spms, usually in 50–350 m, rarely down to 500 m.

Distribution. Southwestern and southern Iceland, Severnaya Zemlya, to northern and western Norway and the Faroes. Depth range 50–500 m.

Description. The shell (Fig. 4C–D) is skeneimorph, depressed, fairly solid, colour-less, with a broad umbilicus. The larval shell (Fig. 6F) consists of about 0.8 whorls, diameter about 0.33 mm, and is sculptured with two indistinct spiral cords, one at the middle of the whorl and a more indistinct and incomplete one close to the first suture. These lines consist of aligned, long, and irregular tubercles. There are also more irregular, small tubercles scattered over the protoconch and a zone between the two lines where these tubercles occur in higher density. The teleconch is well demarcated and consists of about two whorls. The sculpture consists of fairly straight, irregular and widely scattered growth lines; about six strong spiral ribs inside the umbilicus, confined to the central 2/7 of the basal surface, and strong, radial and curved incised furrows covering 2/3 of the basal surface. The aperture is prosocline, almost radial, almost circular; the inner lip is connected to the preceding whorl along about 35° of the circle formed by the aperture. The diameter of the holotype is 1.46 mm.

The operculum is corneous, densely multispiral, brownish. Radula (Fig. 9C–D), n − 4 − 1 − 4 − n. The central tooth is wide and membranaceous, with one slightly larger central and 3–6 small lateral cusps. There are four strongly curved lateral teeth with broad, thin shafts and hand-shaped cutting edges. There are more than 25 marginals, the outer ones partly fused, equipped with a fairly broad cutting edge, which on more lateral teeth becomes smaller.

Remarks. *Skenea ossiansarsi* is the only species of the northern members of *Skenea* where the aperture starts its connection to the preceding whorl at the widest point of the whorl. In the other species it starts either below this level and their shells are consequently less depressed, or as in *S. serpuloides*, well above this point and the shell becomes more planispiral. *Skenea serpuloides* can also be distinguished by having a fine spiral sculpture all over the shell, stronger in the umbilical region, but it does not have as strong umbilical ribs as *ossiansarsi* and it lacks totally the radiating, basal furrows.

Young specimens of *S. trochoides* bear a strong resemblance to *S. ossiansarsi*, but they are proportionally higher, with a height corresponding to more than 0.8 of the width, while in *S. ossiansarsi* the same figure is below 0.75.

*Skenea ossiansarsi* resembles *S. pelagia* Nofroni & Valenti, 1987, from the Mediterranean, but that species has a much finer umbilical sculpture and was found in shallow water, 0.5–2 m.

*Skenea ossiansarsi* is named after Georg Ossian Sars, as already Friele had intended (see under *S. trochoides*).

*Skenea peterseni* (Friele, 1877)
(Figs 3F, type; 4A–B, 6D, larval shell)

*Cyclostrema peterseni* sp.n. — Friele 1877a:3.

Type locality. Den norske Nordhavsexpedition, Stn 31, off northern Norway, 63°10′ N, 05°00′ E, 928 m, and Stn 87, 64°02′ N, 05°35′ E, 911.

Type material. One syntype, ZMB 20986, 1 syntype ZMO D 4424.

Material examined. Western Iceland: Jökultunga, 260–300 m, many shs, HL. — 62°58′ N, 25°36′ W, 22 Apr 1980, 970 m, 3 shs, JB. — 62°56′ N, 24°40′ W, 26 Apr 1978, 450–475 m, 1 sh, JB. — 63°03′ N, 23°57′ W, 21 Apr 1980, 492–502 m, 1 sh, JB. — Southwestern Iceland: Reykjanesridge, 260–400 m, 50 shs, HL. — Southeastern Iceland: Skeidarardypi, 50 shs, HL. – Northeastern Iceland: 66°15′ N, 14°07′ W, 18 Mar 1984, 270–310 m, 1 sh, JB. — 67°16′ N, 19°14′ W, 540 m, 3 shs, JB.

Barents Sea: South of Bjørnøya, 72°10′ N, 20°37′ E, 360–415 m, 21 Jul 1868, 1 sh. — Bjørnøya, 73°03′ N, 18°30′ E, 410 m, 1 sh.

Western Norway: Off Korsfjorden, 60°08′08″ N, 05°00′00″ E, 315 m (E3–73), 1 sh. — 60°06′50″ N, 04°53′32″ E, 270 m (E79–73), 1 sh.

Distribution. Insufficiently known, but has here been verified from western Iceland to the Barents Sea and western Norway. Possibly also northeastern Greenland in 170 m Schiötte 1989, as *S. laevigata* (Friele)). Depth range 260–970 m.

Remarks. *Skenea peterseni* is very similar to *S. trochoides*, but does not have any trace of radial sculpture around the umbilicus, except the normal incremental lines, which are more flexuous than in *trochoides*.

Young specimens of *S. peterseni* are easy to recognize but difficult to determine because they look very different from adult specimens. The spiral sculpture consists of a single, very conspicuous spiral ridge encircling the umbilicus plus three very small ribs inside the umbilicus. The ridge becomes more obsolete in half-grown specimens and is hardly visible in adult ones. *Skenea trochoides* has three or four spiral ribs of equal strength inside the umbilicus which hardly change their strength during the ontogeny.

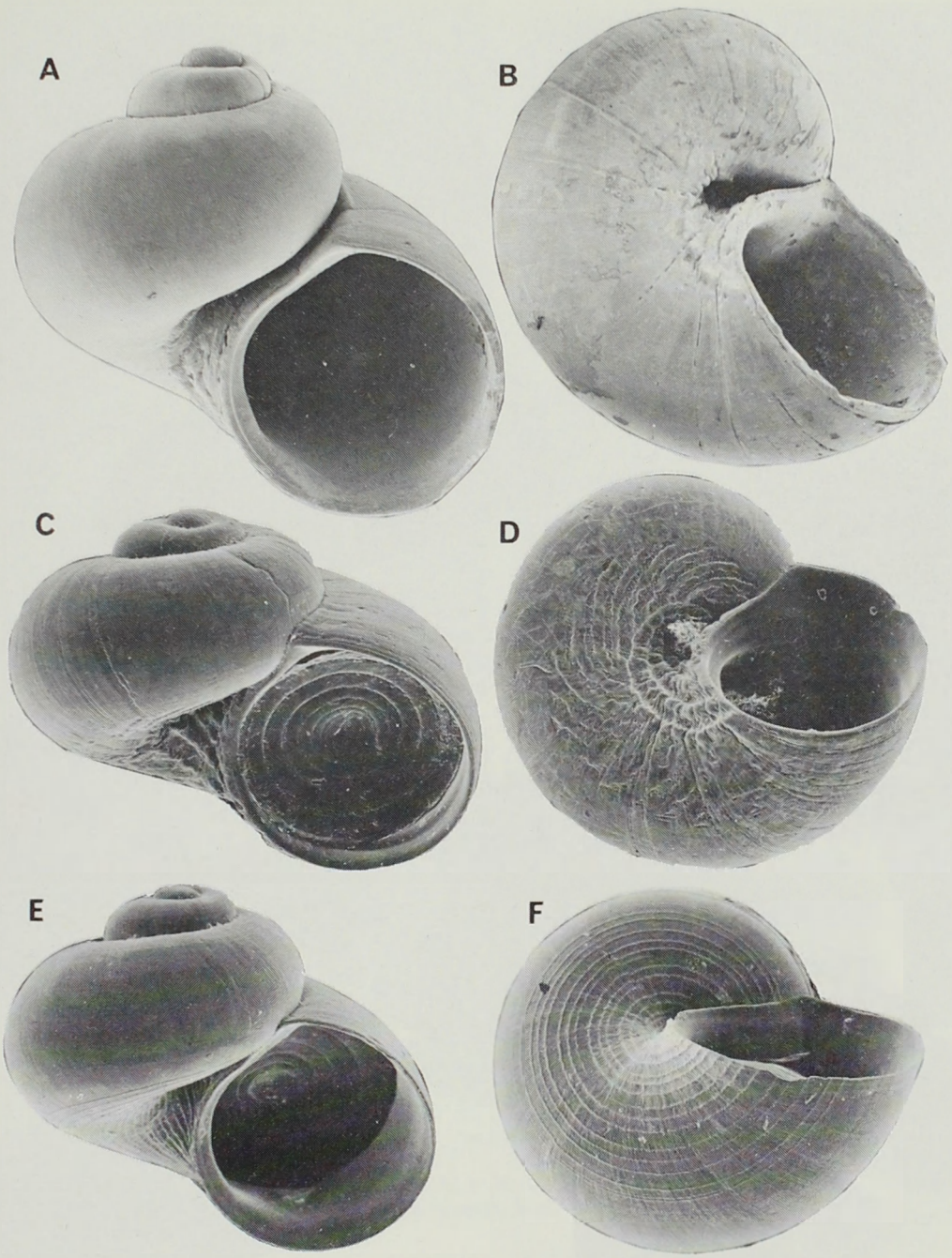


Fig. 4. A–B. *Skenea peterseni* (FRIELE). A. Southeastern Iceland, Skeidarardypi, diameter 1.98 mm. B. Northeastern Iceland, 67°16′ N, 19°14′ W, 540 m, coll. JB, diameter 1.87 mm. C–D. *S. ossiansarsi* sp.n., western Norway, off Korsfjorden, 60°08.5′ N, 04°52.5′ E, 260–255 m (E82–73), diameter 1.45 and 1.45 mm. E–F. *S. rugulosa* (G.O. SARS), western Norway, off Korsfjorden, 60°08.1′ N, 05°00′ E, 300–330 m (E03–73), diameter 1.45 and 1.37 mm.

G.O. SARS (1878:344) considered *peterseni* a variety of *'Cyclostrema trochoides'*, differing by having a more developed umbilicus. This is not the case; the development of the umbilicus is variable in both species.

In the original description FRIELE stated that *S. peterseni* originated from Den norske Nordhavsexpedition, Stn 33. Later he did not list that station, but only Stn 31, which I assume to be correct since also the labels of the types give that station number.

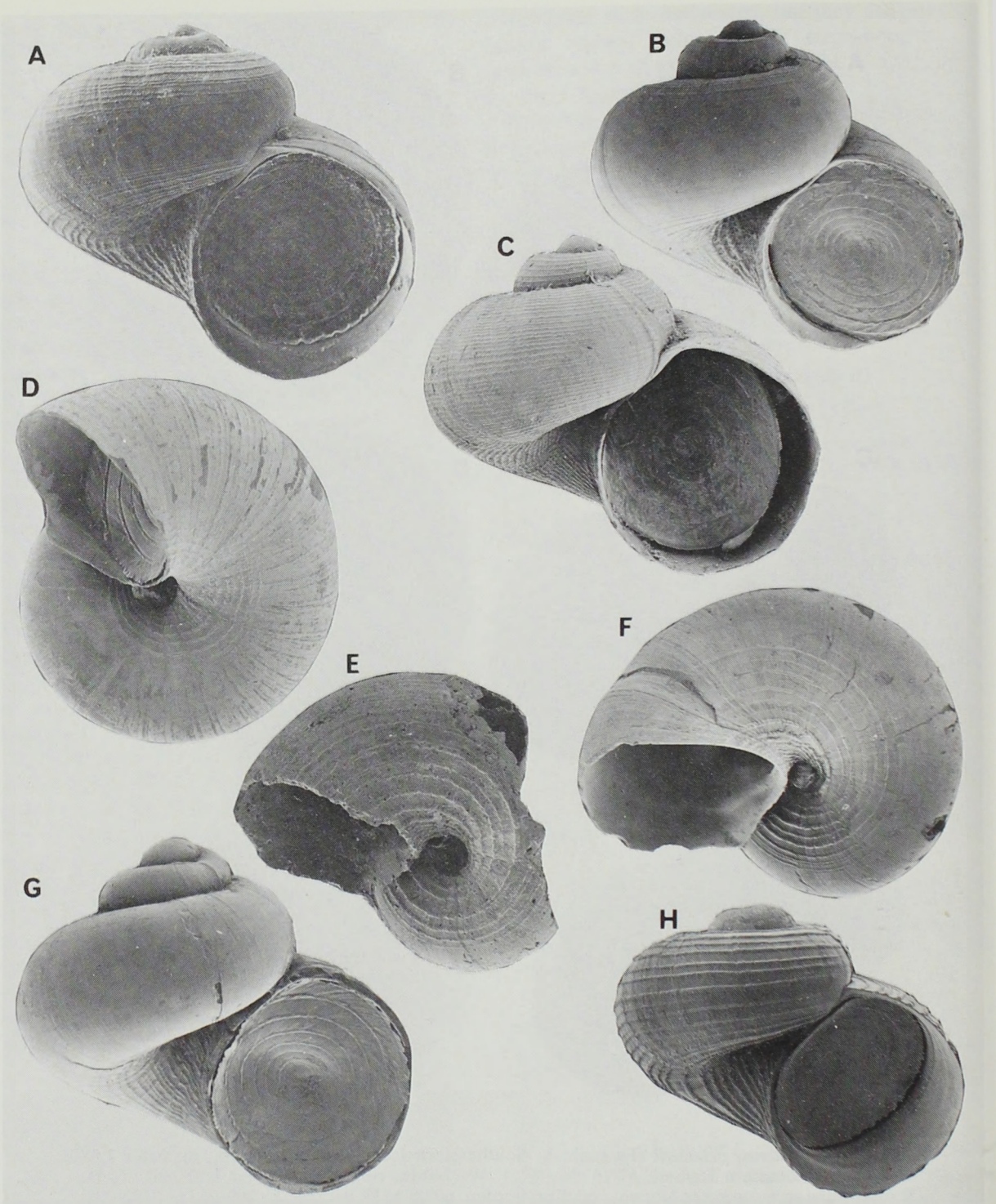


Fig. 5. A. *Skenea basistriata* (JEFFREYS), western Norway, Raunefjorden, 60°23.1′ N. 05°09.5′ E, 100–75 m (E486–69), diameter 2.0 mm. B. *S. basistriata,* western Norway, off Korsfjorden, 60°08.1′ N 05°00′ E, 300–330 m (E03–73), 2.4 mm. C. *S. profunda* (FRIELE), syntype, ZMB 20999, diameter 3.21 mm. D. *S. turgida* (ODHNER), between Iceland and western Norway, 65°28.7′ N, 00°02.4′ E, 3016 m (NORBI DS04), 1.70 mm. E. *S. basistriata,* syntype of *C. willei* FRIELE, ZMB 20990, diameter 1.61 mm. F. *S. basistriata,* western Norway, northwest of Marsteinen, Korsfjorden, 60°08.1′ N, 05°00.5′ E, 320–290 mm (E24–73), 2.5 mm. G. *S. turgida,* between Iceland and western Norway, 65°28.7′ N, 00°02.4′ E, 3016 m, (NORBI DS04), 1.9 mm. H. *S. basistriata,* western Norway, Hjeltefjorden 60°24.1′ N, 05°07.7′ E, 130–60 m (E21–71), 1.36 mm.

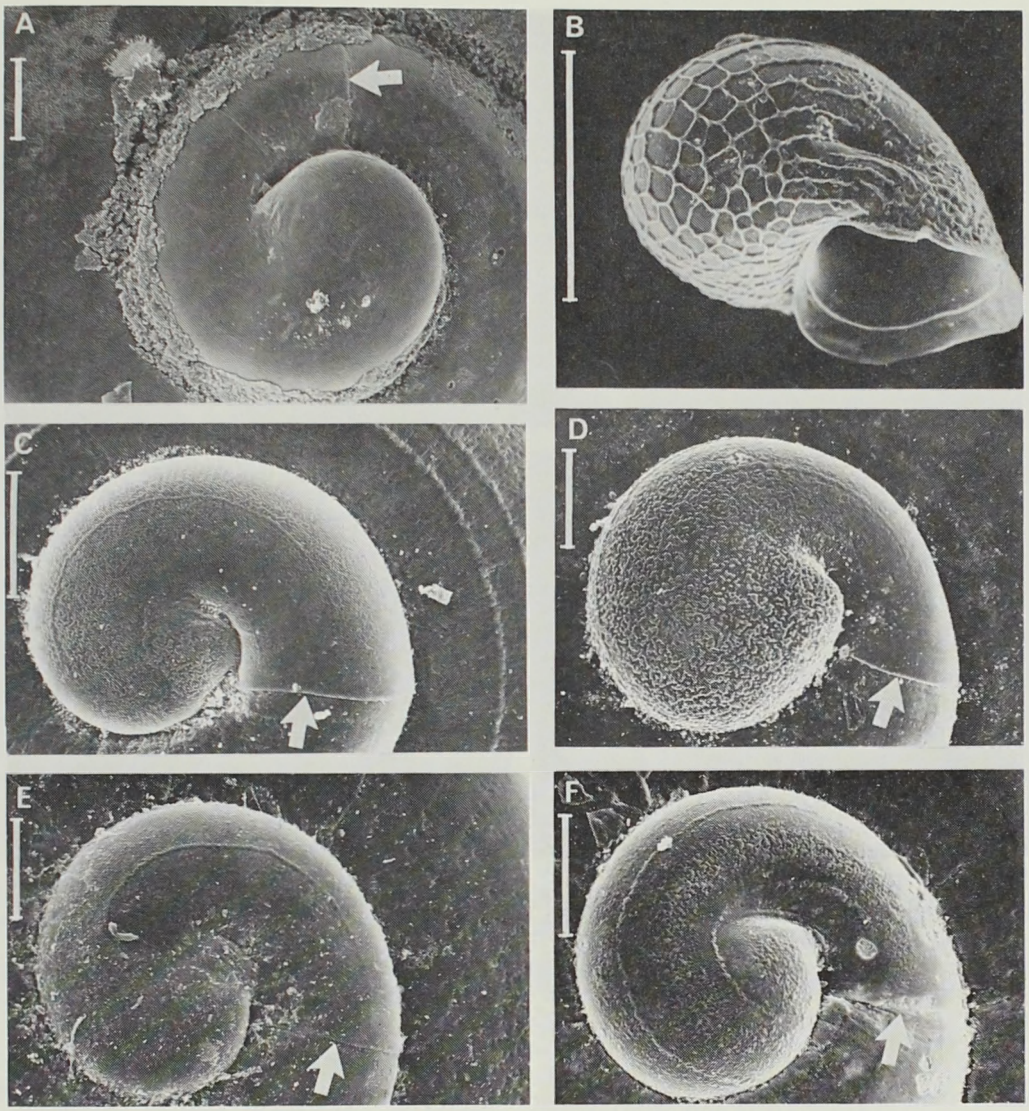


Fig. 6. Larval shells A. *Skenea ferruginea* sp.n., paratype. *B. Lepetella* sp., south of Portugal, 345 m, from a tube of the polychete *Hyalinoecia* sp. C. *Skenea rugulosa* (G.O. Sars), western Norway, off Korsfjorden, 60°08.1′ N, 05°00′ E, 300–330 m (E03–73). D. *S. peterseni* (Friele), Reykjanesridge, diameter 0.39 mm. E. *S. trochoides* (Friele), western Norway, northwest of Marsteinen, Korsfjorden, 60°08.7′ N, 05°00.5′ E, 360–310 m, (E19–73). F. *S. ossiansarsi* sp.n., western Norway, west of Korsfjorden, 60°08.5′ N, 04°52.5′ E, 260–250 m (E82–73). — White arrows indicate the border larval shell-teleoconch. Scale lines 0.1 mm.

*Skenea rugulosa* (G.O. Sars , 1878)
(Figs 3E, type; 4E–F; 6C, larval shell; 9F, radula)

*Cyclostrema rugulosum* sp.n. — G.O. Sars 1878:129, tab. 21, figs a–b.

Type locality. Northern Norway, Lofoten, Vesterålen, 140–180 m.

Type material. 1 syntype, ZMO D591.

Material examined. Southwestern Iceland: Reykjanesridge and Jøkultunga 260–400 m, 4 shs, HL, SMNH. — 63°03′ N, 23°57′ W, 480 m, 1 sh, JB.

Western Norway: In and off Korsfjorden, Raunefjorden, and north to Herdlafjorden, 34 samples with about 500 spms, in 100–500 m.

Distribution. Uncertain, but here verified for the area from southwestern Iceland, to northern and southern Norway. Depth range usually 150–400 m.

Remarks. *Skenea rugulosa* is the smallest of the northern deep water species of the Skeneidae, of a diameter not exceeding 1.6 mm. The surface is covered by a fine spiral striation, much finer than in the other spirally striated species, *S. basistriata, S. turgida,* and *S. profunda.* Also the larval shell is

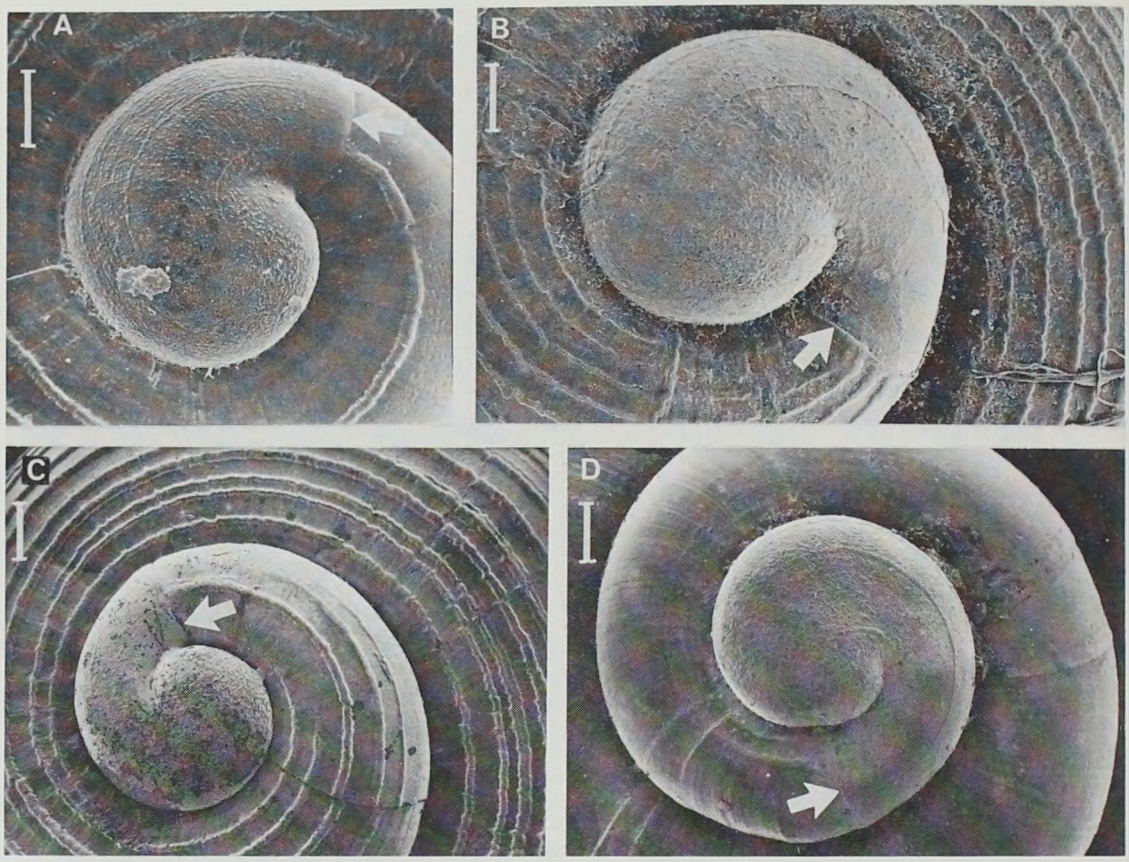


Fig. 7. Larval shells. A. *Skenea basistriata* (Jeffreys), western Norway, Raunefjorden, 60°23.1′ N, 05°09.5′ E, 100–75 m (E486–69). B. *S. profunda* (Friele), syntype ZMB 20999. C. *S. basistriata,* western Norway, Hjeltefjorden, 60°24.1′ N, 05°07.7′ E, 130–60 m (E21–71). D. *S. turgida* (Odhner), between Iceland and western Norway 65°28.7′ N, 00°02.4′ E, 3016 m (NORBI DS04). — White arrows indicate the border larval shell-teleoconch. Scale lines 0.1 mm.

much smaller than in these three species, about 0.32 mm in *rugulosa* and 0.38–0.58 mm in *basistriata, turgida,* and *profunda.*

*Skenea basistriata* (Jeffreys, 1877)
(Figs. 5A–B; 5E, type; 5F, H; 7A, C, larval shell; 9B. radula)

*Cyclostrema basistriatum* nom. nud. — Weinkauff 1873:38.
*Cyclostrema basistriata* nom. nud. — Friele 1874:303.
*Cyclostrema basistriatum* sp.n. — Jeffreys 1877:234.
*Cyclostrema basistriatum* Jeffreys MS: Friele 1877b:307 (radula).
*Cyclostrema basistriatum* Jeffreys: Brugnone 1877:38.
*Cyclostrema willei* sp.n. — Friele 1886:34.

Type localities. *C. basistriata,* Northern Norway, Lofoten; *C. willei,* Den norske Nordhavsexpedition, Stn 192, 69°46′ N, 16°15′ E, 1187 m and Stn 173b, northern Norway, north of Lofoten, 540 m.

Type material. *C. basistriata,* lectotype and 8 paralectotypes, USNM 181414 and 766599 (Warén 1980b); *C. willei,* syntype ZMB 20990 (Stn 192).

Material examined. Eastern Greenland: 62°29′ N, 40°42′ W, 22 Sept 1976, 156 m, 1 sh, JB.

Northern Iceland: 67°10.4′ N, 17°19′ W, 23 Mar 1983, 400 m, 1 spm, JB. — 66°37′ N, 20°20′ W, 7 Nov 1982, 140–150 m, 1 spm, JB. — 66°21′ N, 23°32′ W, 9 Apr 1980, 180–130 m, 1 spm, JB. — 66°54′ N, 24°05′ W, 8 Jul 1980, 197–207 m, 1 spm, JB. — Western Iceland: Vikurall, 200 m. 1 spm. HL. — Southwestern Iceland: Reykjanesridge, 260–400 m, HL, 1 sh.

Spitsbergen: Isfjorden, off Tundrabukten, 147–141 m, 21 Aug 1908, 1 sh.

Northwestern Norway: Lofoten, 364–546 m, 11 spms, ZMO 573, 574. — NORBI Stn CP11, off Tromsø, 350 m, 1 spm.

Western Norway: In and off Korsfjorden, Raunefjorden, and north to Herdlafjorden, 25 samples with about 1000 specimens, usually muddy bottom 200–700 m. — 'Mosterhavn, Utne', 1 spm, ZMO D592.

Off the British Isles: INCAL Stn DS05, 56°28′ N, 11°12′ W, 2503 m, 1 spm, MNHN.

Distribution. Incompletely known, but from southwestern Iceland to Spitsbergen and northern Norway and south to the British Isles. Depth range 75–2500 m can here be verified.

Remarks. The three species *S. basistriata*, *S. turgida*, and *S. profunda* are not always easy to distinguish because they resemble each other and because *S. basistriata* is quite variable.

*Skenea basistriata* has a highly variable sculpture. The sculpture of the teleoconch starts with a single strong spiral rib, but already after 1/5 of a whorl, additional, smaller ribs are added (Fig. 7A, C). The first 1–2 apical whorls usually have numerous spiral lines of variable size, all over the shell. Later the lines around the periphery, sometimes also those on the top of the whorls, fade away, so only the lines around the umbilicus remain and the rest of the body-whorl is perfectly smooth.

*Skenea turgida* differs from *S. basistriata* in having more slowly increasing diameter of the whorls, a higher spire, a smoother surface, more convex whorls, and almost smooth initial part of the teleoconch.

*Skenea profunda* differs from *S. basistriata* in having the initial part of the teleoconch equipped with several strong spiral cords, which start directly after the larval shell. The sculpture of adult specimens consists of numerous, very uniform spiral lines, evenly distributed all over the shell.

The only remaining syntype of *C. willei*, from Stn 192, is badly broken, but fits FRIELE's description well. The apex is lost, but the basal sculpture clearly shows it to be identical with *basistriata* (Fig. 5E, compare with 5F, H). It is a young specimen, and FRIELE may have been misled by the proportionally more depressed shape and unusually strong sculpture.

BRUGNONE (1876) used the name *Cyclostrema (Moelleria) basistriata* for a distinct species from Pleistocene deposits at Ficarazzi, Italy. In 1877, however, he changed this name to *Moelleria curvistriata*, to avoid homonymy with JEFFREYS' name, which for some years had been a well known manuscript name of JEFFREYS (cf. WEINKAUFF 1873; FRIELE 1874, 1877b; VERKRÜZEN 1875). These suggestions by BRUGNONE have since been universally followed (for example HØISÆTER 1968b), an I can see no reason to upset this.

The northeast American *Skenea proxima* (TRYON, 1888) (= *Cyclostrema affine* VERRILL, 1884, not JEFFREYS, 1883; type species of *Lissospira* BUSCH, 1897) is very similar to *S. basistriata* and differs in having a more polished shell and finer spiral sculpture, almost as fine as in *S. rugulosa*. It can be separated from *S. rugulosa* by having a large larval shell, diameter 0.50 mm, as in *basistriata* (holotype, USNM 38443 examined). *Skenea diaphana* (VERRILL, 1884) is probably a synonym of *S. proxima*, and will then be the valid name of this species.

*Skenea basistriata* has several times been recorded from the Mediterranean, most lately by SALAZAR (1987), who also figured a specimen. His specimen is, however, too small to be *S. basistriata* and has the wrong shape. It is probably a species of *Dikoleps*, but the angle of the photo does not allow any conclusions about its identity.

I have examined specimens from deep water in the Bay of Biscay, which from shell characters hardly can be distinguished from *S. basistriata*, but they differ in having a larger and more prominent cutting edge on the central radular tooth and in having stronger denticles on the innermost marginal teeth. I therefore prefer to wait until more material is available, before deciding whether to include these specimens under the name *basistriata*.

*Skenea turgida* (ODHNER, 1912)
(Figs 5D, G; 7D, larval shell; 9A, radula)

*Cyclostrema turgidum* sp.n. — ODHNER 1912:79.
*Lissospira turgida*: BOUCHET & WARÉN 1979:221.

Type locality. *C. turgidum*, west of Spitsbergen, 78°19′ N, 08°41′ E, 2700 m.

Type material. *C. turgidum*, 1 syntype SMNH 3689.

New records. Northern Norway: NORBI Stn CP11, off Tromsø, 350 m, 1 spm, MNHN.

Distribution. Only known from the deep parts of the Norwegian Sea (BOUCHET & WARÉN 1979).

Remarks. See *S. profunda*.

*Skenea profunda* (FRIELE, 1879)
(Figs 5C, types; 7B, larval shell; 9E, radula)

*Cyclostrema profundum* sp.n. — FRIELE 1879:272.
*Cyclostrema profundum*: FRIELE 1886:34.

Type locality. Den norske Nordhavsexpedition, Stn 353, 77°58′ N, 05°10′ E, 2438 m, and Stn 357, 78°03′ N, 11°18′ E, 229 m.

Type material. Syntypes, ZMB 20999 (Stn 353), ZMB 21000 (Stn 357), and ZMO D4423.

Material examined. See BOUCHET & WARÉN 1979.

Distribution. The abyssal parts of the area between Greenland, Iceland, and Norway.

Remarks. GALKIN (1955:124) synonymized *Skenea profunda* with *S. basistriata* and *C. turgida*, while BOUCHET & WARÉN (1979) maintained all three as different species.

*Skenea profunda* differs from *S. turgida* by having a fine and uniform spiral sculpture all over the shell; in *S. turgida* large parts of the shell are smooth.

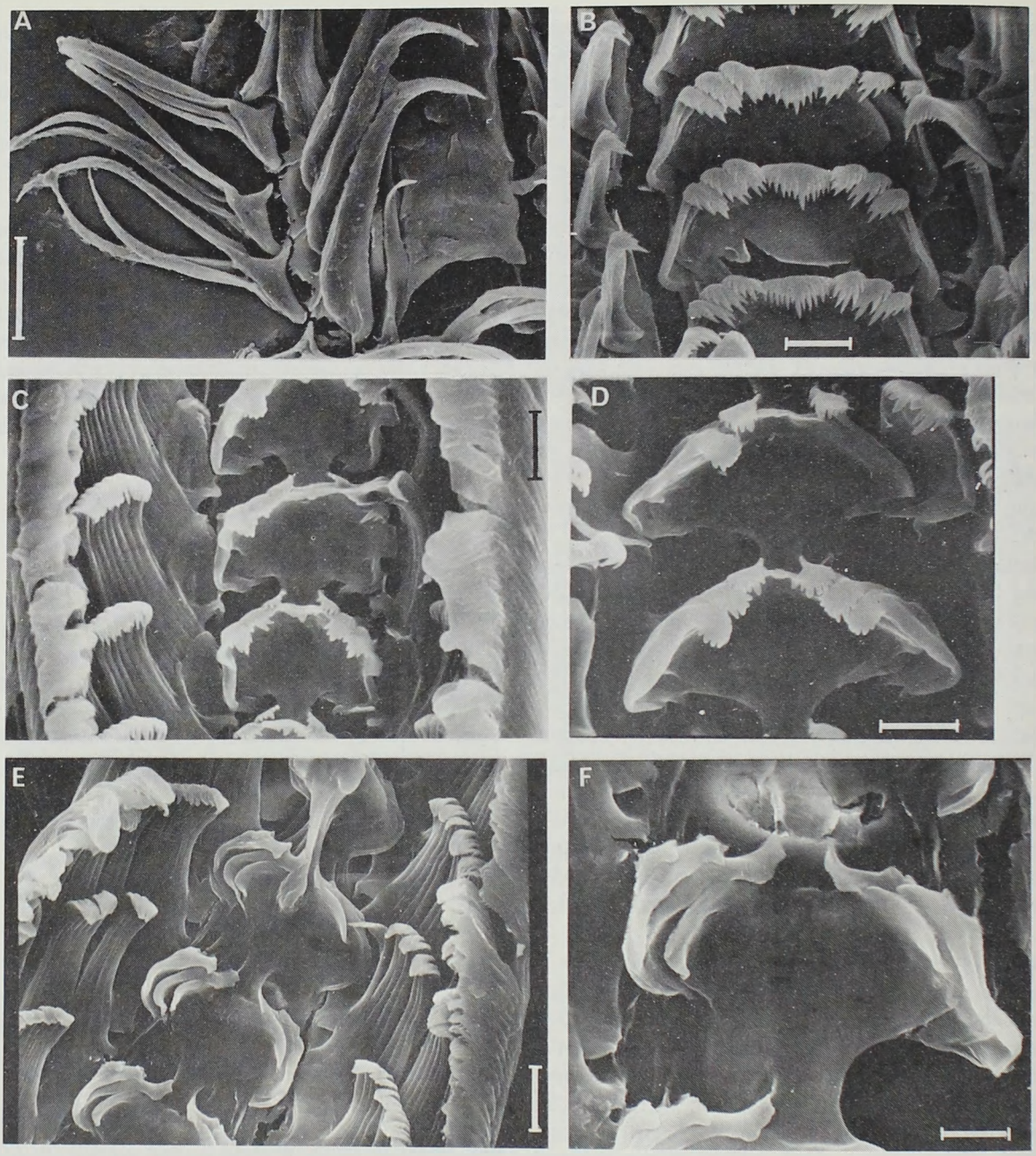


Fig 8. Skeneid radulae. A. *Eudaronia biconcava* (THIELE), off Reunion Island, MD32/DS78, 21°13′ S, 55°04′ E, 1175–1200 m. B. *Skenea trochoides* (FRIELE), western Norway. C–D. *S. serpuloides* (MONTAGU), western France, Roscoff. E–F. *Dikoleps pusilla* (JEFFREYS), western France, Roscoff. — Scale lines A–C, 0.01 mm; D–E, 0.005 mm; F, 0.0025 mm.

*Skenea ferruginea* sp.n.
(Figs 6A, larval shell; 10A–C)

Type locality. Southwestern Iceland, Reykjanesridge, 260–400 m, leg. HL.

Type material. Holotype SMNH 4103, 5 syntypes, SMNH 4104, 4105 and coll. HL.

Material examined. Eastern Greenland: 62°29′ N, 40°42′ W, 22 Sept 1976, 156 m, 17 ex, JB. — 64°57′ N, 36°08′ W, 24 Sept 1976, 164–185 m, 2 ex, JB — 65°51′ N, 30°04′ W, 18 Sept 1976, 370–400 m, 1 ex, JB. — 64°39′ N, 34°57′ W, 26 Feb 1981, 900 m, 4 ex, JB. — 63°28′ N, 38°35′ W, 27 Feb 1981, 815 m, 4 ex, JB.

Western Iceland: 64°09′ N, 26°58′ W, 1 Jul 1975, 610–620 m, 6 ex, JB — 62°58′ N, 25°36′ W, 22 Apr 1980, 970 m, 1 ex, JB. — 63°46′ N, 26°28′ W, 15 Apr 1983, 545 m, 8 ex, JB.

Distribution. Only known from the material examined from western Iceland and eastern Greenland. Depth range 150–1000 m.

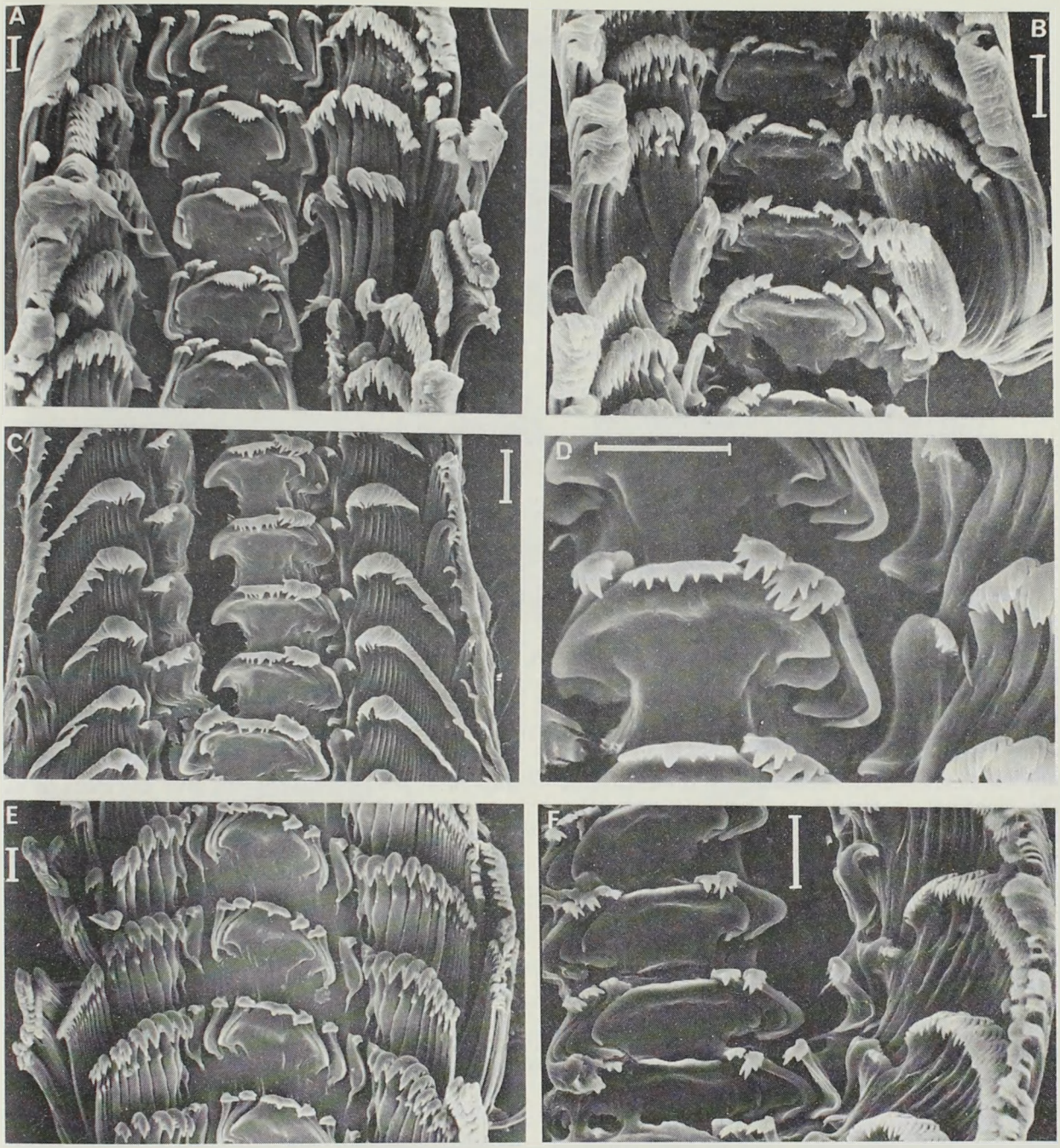


Fig. 9. Radulae. A. *Skenea turgida* (Odhner), Between Norway and Iceland (NORBI DS04). B. *S. basistriata* (Jeffreys), western Norway, Korsfjorden. C–D. *S. ossiansarsi* sp.n., western Norway, off Korsfjorden, 250–325 m. E. *S. profunda* (Friele), between Spitsbergen and Greenland, F. *S. rugulosa* (G.O. Sars), western Norway, off Korsfjorden, 250–325 m. — Scale lines 0.01 mm.

Description. The shell is small, fairly solid, planorbiform with a very slightly raised spire and the whorls covered by ferrugineous deposits (Fig. 10A–C). The larval shell consists of half a whorl, is perfectly smooth and has a diameter of 0.32 mm. The holotype has 1.7 teleoconch whorls, without sculpture except some irregular and indistinct incremental lines (Fig. 6A). The whorls have a polygonal cross section, caused by five revolving angulations which are slightly less distinct towards the aperture. They are simple angulations of the shell and not caused by a thickening of the shell. The whorls are cemented to the ferrugineous cover of the preceding whorl, resulting in a disjunct coiling,

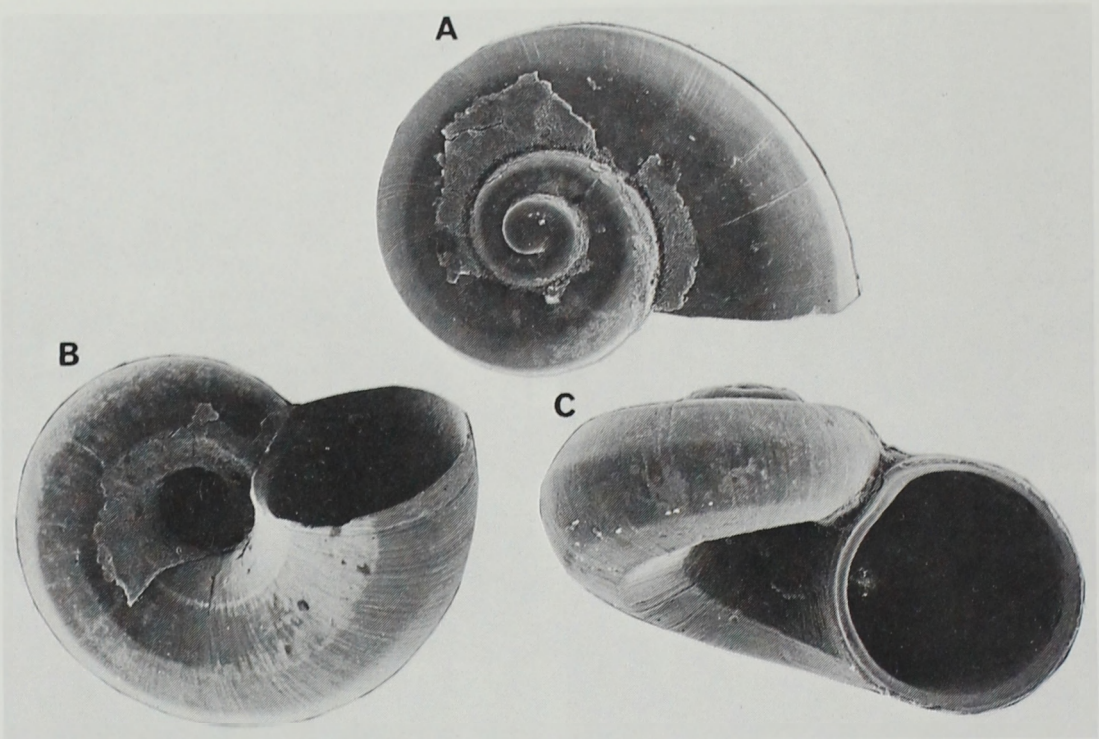


Fig. 10A–C. *Skenea ferruginea* sp.n., paratypes. A. 1.71 mm, top view. B. 1.53 mm, basal view. C. 1.62 mm, front view.

when the crust is removed. The umbilicus is wide and leaves most of the preceding whorl uncovered. The aperture is almost perfectly round, radial, slightly prosocline. The shell is covered by a thin, periostracum-like ferrugineous, rust-brown coating, which easily peels off except close to the suture. Diameter of holotype 1.66 mm.

Remarks. Despite having few characters useful for higher classification, this is a very distinct little shell characterized by the rust-deposits, slightly pentagonal whorls, and absence of sculpture, even on the larval shell.

Rust-covered shells are rare among archaeogastropods (except in specimens from hydrothermal vents and similar biotopes). They are more common among mesogastropods, especially adeorbids and iravadiids, which often live associated with burrowing animals or under rocks (own unpublished observations). The rust deposits originate from $Fe^{2+}$ dissolved in oxygen-free interstitial water, which becomes oxidized to less soluble $Fe^{3+}$ when it encounters water rich in oxygen, pumped down into the burrow by its inhabitant. The $Fe^{3+}$ then precipitates as rust deposits on the walls of the ducts and shells of molluscs living there (see WARÉN & BOUCHET 1989 for references).

These are not very satisfactory characters on which to base a classification, but the feature-less shell of *S. ferruginea* does not give any clues to its systematic position. I do, however, find it still more unsatisfactory to introduce a new genus, and place the species provisionally in *Skenea*.

*Skenea ferruginea* has got its specific name from the ferrugineous deposits covering the shell.

## Family Pendromidae fam.n.

Synonym. Trachysmatidae fam.n. THIELE 1925b, based on an erroneously identified genus.

Diagnosis. Small (1–5 mm) archaeogastropods with the first part of the teleoconch covered by irregular net-sculpture, later also with axial or spiral sculpture, or both, but still there are some traces left of the net-sculpture, visible under a good stereo microscope. The shell is thin and fragile. The lower, outer part of the aperture is drawn out sidewards and anteriorly. The umbilicus is always large and wide. The animal has a huge, cylindrical snout; cylindrical, short, cephalic tentacles, on left side with one, on right side two much smaller outer accessory tentacles. There is a well developed epipodial membrane which is drawn out into numerous flat, small, sometimes bifurcated tentacles of varying size. There is no radula and the buccal mass is transformed into a strongly muscular cylinder, which fills

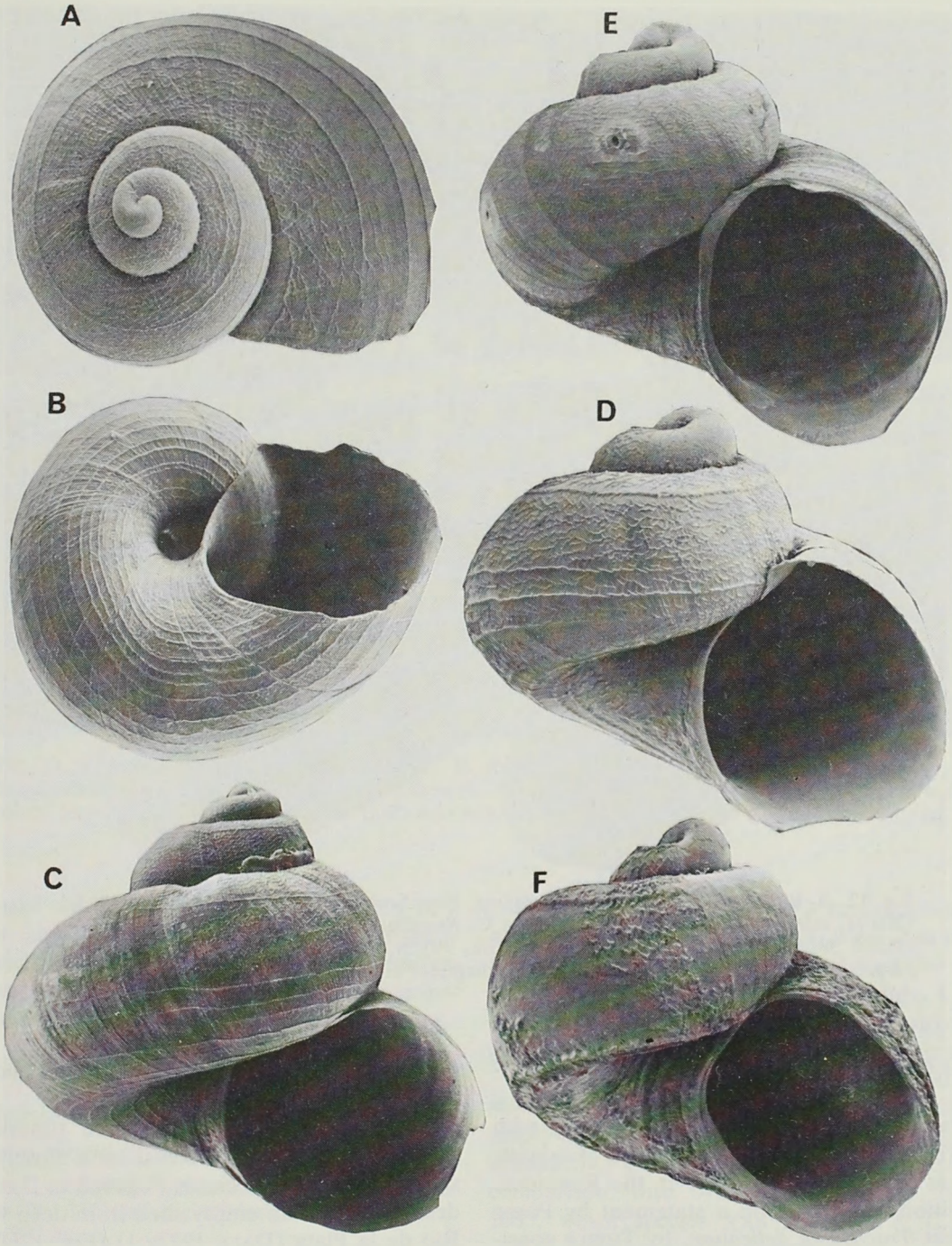


Fig. 11. A–D. *Rugulina fragilis* (G.O. Sars), western Norway, northwest of Marsteinen, off Korsfjorden, 60°08.1′ N, 05°00.5′ E, 320–290 m (E24–73). A. Apical view, diameter 2.7 mm. B. Basal view, 2.7 mm. C. Front view 3.0 mm diameter. D. Front view of young specimen, 1.1 mm. E. *R. fragilis*, western Iceland, 1.5 mm, coll. HL. F. *R. monterosatoi* (Van Aartsen & Bogi), Corsica, Baie de Calvi, 90–120 m, 0.82 mm.

out the snout. The female has a large receptaculum seminis in the posterior, left part of the pallial cavity.

Remarks. Thiele (1925b) erected Trachysmatidae, a new family of Mesogastropoda, and placed it in the Rissoacea. This decision was evidently based on his experience from 1912, when he discussed the genus *Trachysma* 'G.O. Sars, 1878', in a report on antarctic molluscs. It was evidently Thiele's intention to make a new family for «*Adeorbis*»

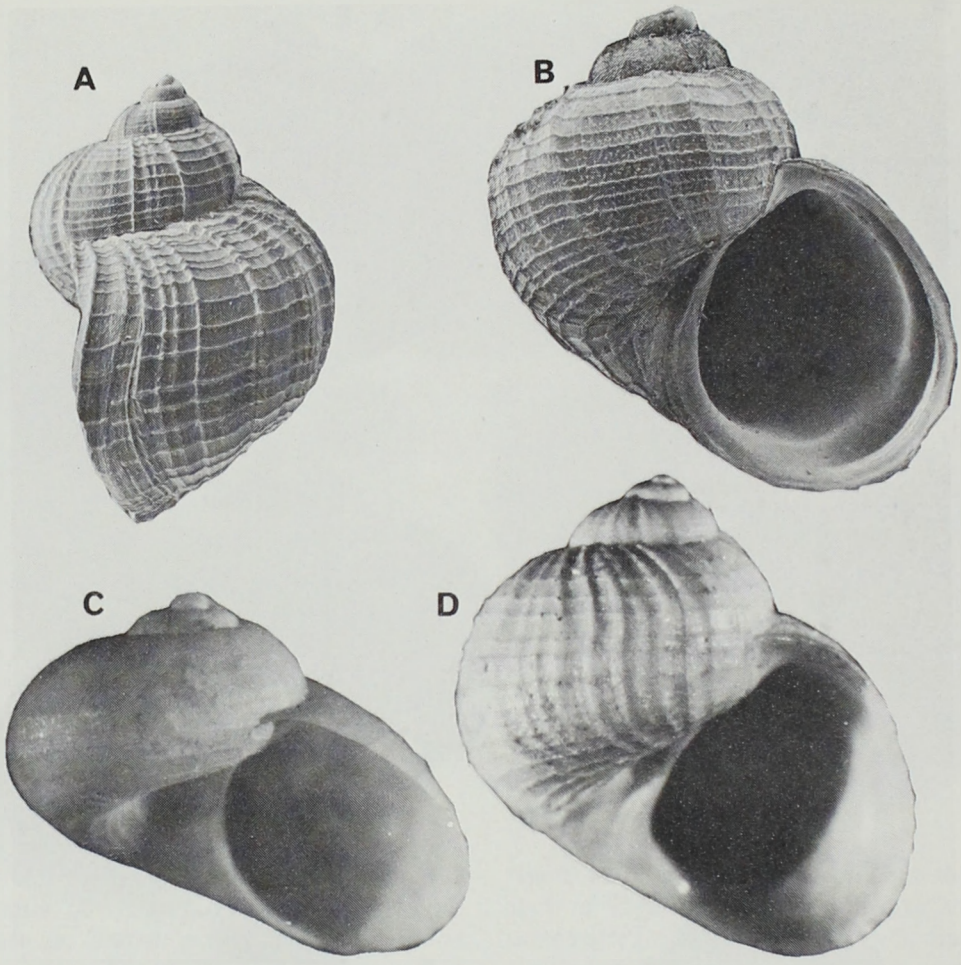


Fig. 12. A–B. *Pendroma* sp., off Wollongong, New South Wales, 34°27.5′ S, 154°27′ E, 1200 m, AMS C 146458, 3.1 and 1.5 mm. C. *Rugulina cingulatum* (Verrill), holotype, USNM 38100, USFC Stn 2048, off New York, 995 m, diameter 2.2 mm. D. *Pendroma perplexa* (Dall), holotype, USNM 330840, diameter 2.40 mm.

*fragilis* G.O. Sars, 1878 and a related antarctic species.

The family Trachysmatidae has, starting with Thiele (1925b), been placed among the Mesogastropoda, as a questionable family in the Rissoidea. This position was based on a statement by Poppe (1883) that *Trachysma delicatum,* by Thiele considered closely related to *A. fragilis,* has a taenioglossate radula (see *Rugulina fragilis,* paragraph 7). Golikov & Starobogatov (1975) even raised Trachysmatidae to a superfamily, without presenting any background for their decision, and apparently without having seen a specimen.

I have examined *Adeorbis fragilis* alive and I have also studied the anatomy from several sectioned specimens, and there is no doubt that it is an archaeogastropod, despite that it lacks a radula. A detailed report on this and certain other archaeogastropoda is presently being prepared and will be published elsewhere.

There exists at least one more generic name, *Pendroma* Dall, 1927, based on a closely related species. The type species is *P. perplexa* Dall, 1927, described from an empty shell from deep water off Río de la Plata (Dall 1927a:1) (Fig. 12D). It has until now been classified in the Fossaridae (Thiele 1929). I have examined the soft parts of a very similar, possibly conspecific species from eastern Australia (Figs. 12A–B, 13C–D), and the external morphology of the soft parts agrees well with *Adeorbis fragilis.* I failed to find a radula in this Australian species of *Pendroma,* and consider *Pendroma* closely related to *Adeorbis fragilis.* The two genera together form a group differing from all other known archaeogastropods in the lack of a radula and in the peculiar sculpture. To emphasize their

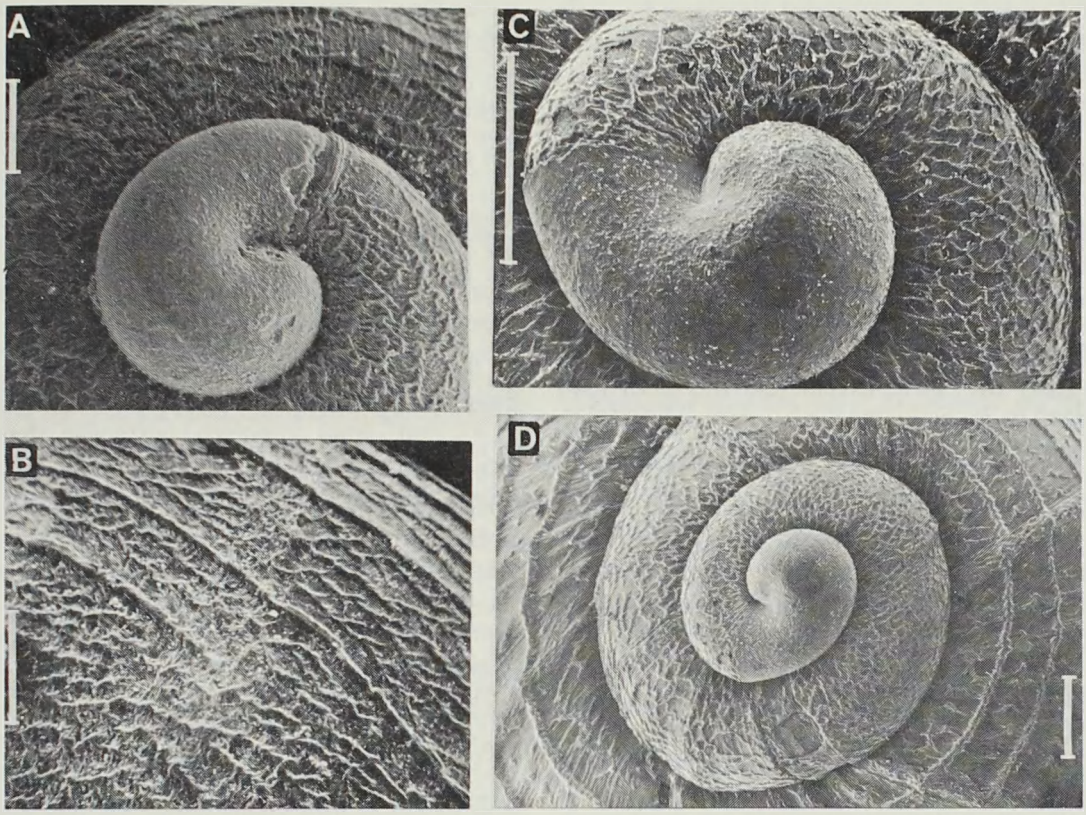


Fig. 13. *Rugulina* and *Pendroma*, details. A, B. *Rugulina fragilis* (G.O. Sars), western Norway, off Korsfjorden, 60°07.8′ N, 04°55.3′ E, 240–250 m (E77–73). A. Protoconch. B. Sculpture. C–D. *Pendroma* sp. (see Fig. 12A), AMS C 146458. C. Protoconch, D. Same specimen, apex. — Scale lines 0.1 mm.

unusual and shared characters, I introduce a new family for them. Because of problems with the identity of the type species, of *Rugulina*. I have preferred to base this new family on the genus *Pendroma*, and the family name thus will be Pendromidae.

Genus *Rugulina* Palazzi, 1988

*Trachysma* of various authors, not Jeffreys, 1874.

Type species. *Daronia monterosatoi* Van Aartsen & Bogi, 1986 (Fig. 11F), by original designation. Mediterranean, 100–200 m.

Remarks. The name *Trachysma* Jeffreys, 1874 is, as will be shown in the discussion of *Rugulina fragilis* (G.O. Sars, 1878), based on larval shells of *Torellia vestita* Jeffreys, 1867 (Trichotropidae) and has in all literature before 1912 been used in that sense. In more recent literature and the treatises by Thiele (1929–35) and Wenz (1938–44), *Trachysma* has been used for *Adeorbis fragilis* and a related antarctic species, *T. tenue* Thiele, 1912. This is untenable and *Trachysma* must be considered a junior synonym of *Torellia* Jeffreys, 1867.

*Rugulina* Palazzi, 1988 is a generic name available for *Adeorbis fragilis* and *T. tenue*, but since the description of the type species of *Rugulina* was based on very poorly preserved shells only, I have to recapitulate the history of the names involved to give some support for and explain my opinion.

Van Aartsen & Bogi (1986) described '*Daronia*' *monterosatoi*, based on a few, very small (0.8 mm) empty shells. They had problems in classifying the species, but placed it in the genus *Daronia*, after comparison with *Adeorbis exquisitus* Jeffreys, 1883, which species Van Aartsen & Carrozza (1984) had classified in *Daronia*.

Warén & Bouchet (1988) showed that the genus *Daronia* actually is based on a South American terrestrial prosobranch. They introduced the generic name *Tjaernoeia* for *Adeorbis exquisitus*, and classified it provisionally in the Pyramidellidae, based on observations of living animals. (See also discussion of *Tjaernoeia*.) At the same time Warén & Bouchet suggested that *D. monterosatoi* could be related to *Granigyra* Dall, 1889.

Palazzi (1988b) disagreed with Van Aartsen & Bogi regarding the relations between *Daronia mon-*

*terosatoi* and *D. exquisitus* and introduced a new generic name, *Rugulina*, for *Daronia monterosatoi*. PALAZZI classified this genus together with *Tjaernoeia* in the family Cyclostremellidae (Pyramidelloidea).

Examination of additional shells of *Rugulina monterosatoi* has shown that this species most likely is either a very small species closely related to, or the young of *Adeorbis fragilis* G.O. SARS, 1878. I figure *Rugulina monterosatoi* (Fig. 11F) and a young specimen of *Adeorbis fragilis* of the same size (Fig. 11D) for comparison. The sculpture and the shape are virtually the same, except that the basal cord is stronger in *R. monterosatoi*.

No specimens of *Rugulina monterosatoi* exceeding a size of 0.85 mm are known, while the normal size of *fragilis* is 2–3 mm. Therefore, and because of the basal keel in *monterosatoi*, I presently favour the idea that they are different species.

Beside the three species of *Rugulina* discussed here (*fragilis* G.O. SARS, *monterosatoi* VAN AARTSEN & BOGI, and *tenue* THIELE), I am aware of a single described species belonging to *Rugulina*, *R. verrilli* (TRYON, 1888) (= *Cyclostrema cingulatum* VERRILL, 1884), from deep water off the North American east coast. The last-mentioned species differs from *R. fragilis* in having a more depressed spire and weaker sculpture (holotype, USNM 38100 examined, Fig. 12C).

*Rugulina fragilis* (G.O. SARS, 1878)
(Figs 11A–E; 13A, larval shell; 13B, sculpture)

*Adeorbis fragilis* sp.n. — G.O. SARS 1878:213, Tab. 22, fig. 19a–c.

Type locality. Norway, 100–346 m.

Type material. 2 syntypes, ZMO 1130 and 1131 (badly corroded, Lofoten and Ålesund respectively), 1 syntype USNM 181355 (western Norway, 255–346 m).

Material examined. Eastern Greenland: 64°57′ N, 36°08′ W, 164–185 m, 24 Sept 1976, 1 ex, JB. — 62°29′ N, 40°42′ W, 156 m, 22 Sept 1976, 4 ex, JB. — 65°51′ N, 35°07′ W, 264 m, 10 Sept 1980, 1 ex, JB.

Northwestern Iceland: Vikurall, 100–150 m, 1 spm in haddock stomach, JB. — Djupall, Isafjardardjup, 20 Jan 1969, 100–200 m, 1 spm in haddock stomach, JB. — Kögurgrunn, 140 m, 3 shs, HL. — 63°48′ N, 26°34′ W, 640–580 m, 4 Jul 1975, 1 ex, JB. — Western Iceland: Jökultunga, 260–400 m, 3 shs, HL. — 62°56′ N, 24°40′ W, 450–475 m, 26 Apr 1978, 1 ex, JB. — 63°09′ N, 21°41′ W, 570–528 m, 27 Jul 1978, 5 ex, JB. — 62°58′ N, 25°36′ W, 970 m, 22 Apr 1980, 2 ex, JB. — 63°47′ N, 26°28′ W, 545 m, 15 Apr 1983, 5 ex, JB. — 65°06′ N, 26°42′ W, 241 m, 6 Sept 1983, 2 ex, JB. — 64°58′ N, 27°44′ W, 800 m, Feb 1987, 1 ex, JB. — Southern Iceland: South of Vestmannaeyjar, several shs, HL. — Southeastern Iceland: Skeidarardypi, 2 shs, HL. — 63°20′ N, 16°51′ W, 255 m, 5 Apr 1978, 2 ex, JB.

The Faroes: BIOFAR, Stn 019, 62°12′ N, 04°25′ W, 276 m, 1 sh. — BIOFAR Stn 092, 60°39′ N, 05°52′ W, 615 m, 1 sh. — BIOFAR Stn 354, 62°44′ N, 06°12′ W, 317 m, 1 sh.

Western Norway: In the outermost part of and off Korsfjorden, about 13 samples with 50 shs and spms, usually in 200–325 m, on sandy bottoms.

Distribution. From eastern Greenland, western and southern Iceland and the Faroes, to Norway, from Lofoten to the Bergen area. Depth range 60–970 m.

Remarks. Considerable confusion exists about the identity of this species:

1. PHILIPPI (1844) described *Cyclostoma delicata*, based on several specimens of a rather large shell, c. 13 mm, from Pliocene-Pleistocene deposits in Sicily, with a sublittoral to upper bathyal fauna. It is probably based on *Torellia vestita* JEFFREYS, 1867.

2. SEGUENZA (1867:19) transferred *Cyclostoma delicata* PHILIPPI to *Ianthina*. He also figured the species, a good and unquestionable figure of *Torellia vestita* JEFFREYS. The figure is very similar to but larger and better than the one given by PHILIPPI (1844).

3. JEFFREYS (1874:116) listed '*Trachysma delicatum* Ph [ilippi, 1844] (*Cyclostoma*)' as a fossil from Sicily and recent from the Atlantic. This is the first publication of the name *Trachysma*, and has to be considered a valid introduction of the generic name *Trachysma* JEFFREYS, with *Cyclostoma delicatum* PHILIPPI, 1844 as type species by monotypy.

4. SEGUENZA (1876:182) listed '*Trachysma delicatum* JEFFREYS' with a reference to *Cyclostoma delicatum* PHILIPPI. SEGUENZA was a very careful worker and his determinations are almost always reliable (my opinion), and I therefore assume that SEGUENZA used the name in the same sence as in his paper from (1867).

5. G.O. SARS (1878:212) used the name *Trachysma delicatum* (PHILIPPI, 1844), adviced by JEFFREYS. One of G.O. SARS' two specimens had a more expanded aperture and was called var. *expansa*. I have examined SARS' specimens (ZMO 1133), which had been stored in an acidic glass tube, and only crumbles remained. It was, however, possible to see that they were larval shells of *Torellia vestita* JEFFREYS, 1867, in the case of var. *expansa*, with traces of postlarval growth. This interpretation agrees with G.O. SARS' figures.

G.O. SARS also mentioned that JEFFREYS considered *Architea catenularia* A. COSTA, 1869 a synonym of *Trachysma delicatum*. That species, which is the type of *Architea* A. COSTA, 1869 by monotypy, was discussed by BIELER (1985), who considered it a *nomen dubium*, not belonging to the Architectonic-

idae. Neither can it be a synonym of *Torellia vestita* since it was said to have a multispiral operculum (not coiled in *Torellia*).

6. G.O. Sars (1878) also described *Adeorbis fragilis* which he placed directly after *T. delicatum*, perhaps implying relationship. I have examined the syntypes, and can confirm their identity with the species in Fig. 11A–E and called *Rugulina fragilis*.

7. Poppe (1883:364–365) recorded '*Trachysma delicatum* Phil.' from the German North Sea coast, Weddewardener Siel and Jade, Helgoländer Bucht. He also reported the radula to be taenioglossate. In SMNH there are specimens determined '*Trachysma delicatum*' from the mouth of the Weser, a similar locality, and originating from a contemporary German collection. They are very young specimens of *Hydrobia* sp. and show a very superficial similarity to Sars' figures. The mention of a taenioglossate radula makes it still more likely that Poppe actually had misidentified such youngs.

8. Jeffreys (1885) recorded and figured *Torellia? delicata* from off Portugal, 1095 fms. This shell is in BMNH (number 1885.11.5.2651), together with 5 shells in the Sykes collection. All belong to *Torellia vestita* and are larval shells with traces of post-larval growth. Jeffreys had evidently not been able to connect the larval stage for which he used *delicata* with the adult state of *Torellia vestita*, presumably because of the lack of 'the velvety epidermis', although he suspected relations.

Jeffreys (1885) also recorded *Adeorbis fragilis* G.O. Sars from the *Porcupine* Expedition 1870, Stns 16 and 27, off the Iberian Peninsula. These specimens are in BMNH, 1 shell and 1 fragment respectively. They are also young shells of *Torellia vestita*.

9. Watson (1886) recorded *Trachysma delicatum* from the *Challenger* Expedition, Stns 75 and 78 (from the Azores). These shells, also in BMNH, are now totally disintegrated and unidentifiable.

10. Iredale (1911) discussed the generic name *Trachysma* G.O. Sars, 1878 and concluded that *delicatum* as used by Philippi and G.O. Sars must refer to different species.

11. Thiele (1912:197) discussed '*Trachysma delicatum* G.O. Sars' and concluded that Sars' description and figure are not based on the species described by Philippi. He therefore introduced the name *T. sarsianum* for 'the typical form described by Sars'. He considered *Adeorbis fragilis* G.O. Sars to be a synonym. Thiele also described two new species of *Trachysma* from the Antarctic. Of these *T. tenue* is closely related to *Adeorbis fragilis*, and was reported by Hain (1990) as 'Opisthobranchia sp. 3' from the Weddell Sea. Thiele failed to find a radula in *T. tenue*. This observation was confirmed by Hain (1990:77).

12. Nordsieck (1971) recorded what he called *Trachysma exquisitum* (Jeffreys) from the strait between Corsica and Sardinia (Bocche di Bonifacio). This record is based on a larval shell of a species of Cypraeidae, judging from the figure, and has no relations whatsoever with *Adeorbis fragilis*.

13. Warén (1980:12) agreed with Thiele's (1912) interpretation of the name *Trachysma* and his introduction of the name *T. sarsianum*. This was done under the impression that *Adeorbis fragilis* and *T. delicatum* G.O. Sars were congeneric and distinct from *C. delicata* Philippi.

To summarize 1–13. The generic name *Trachysma* Jeffreys and the specific names *delicatum* (sensu Jeffreys, probably also Philippi) and *sarsianum* Thiele, have nothing to do with *Adeorbis fragilis* G.O. Sars. Instead they will enter the synonymy of the trichotropid genus *Torellia* and its type species, species, *T. vestita*.

*Torellia vestita* has recently been reported as a fossil from the Mediterranean (Bouchet & Taviani 1989). The now proved occurrence there substantiates my identification.

*Adeorbis fragilis* is a distinct species characterized by its thin fragile shell with a wide umbilicus, distinct spiral sculpture, and a much finer sculpture of irregular, branching lines.

14. Palazzi (1988b) discussed the name *Trachysma* and *T. delicatum* in some detail, and arrived at partly the same conclusions as I have done, except that he overlooked Jeffreys' introduction of *Trachysma* (1874) and assumed *Adeorbis fragilis* to belong to the family Tornidae (Mesogastropoda). The latter is understandable since his discussion was solely based on the literature. Furthermore, as mentioned under the generic heading, Palazzi introduced a new name, *Rugulina*, with *Daronia monterosatoi* as type species, but failed to see the close relations between *A. fragilis* and *D. monterosatoi*, which he classified in the Tornidae and the Cyclostremellidae respectively.

To summarize: *Rugulina* contains four species; two in Europe, *Adeorbis fragilis* and *Daronia monterosatoi;* one in the western Atlantic, *Cyclostrema verrilli* Tryon; and one in the Antarctic, *Trachysma tenue* Thiele.

Archaeogastropoda, family uncertain

Here I have placed *Adeuomphalus* SEGUENZA, 1876, *Eudaronia* COTTON, 1945, and *Palazzia* gen.n., three genera of small, planispiral gastropods. *Adeuomphalus* has been suggested to belong to the Omalogyridae, the Orbitestellidae or the Architectonicidae and *Eudaronia* has been classified in the Skeneidae. The radula is only known from one of these genera, *Eudaronia*, but from shell characters I suspect them all to be archaeogastropods.

Due to the superficial similarity of *Adeuomphalus* to *Eudaronia* and *Palazzia*, I will review *Adeuomphalus*, though no species of this genus are known from Scandinavia and Iceland.

For those who want to list *Adeuomphalus*, *Eudaronia*, and *Palazzia* under a family heading, I suggest to place them in Skeneidae, which is a normal place to look for such genera, and which family still contains numerous genera of totally unknown affinity.

Genus *Adeuomphalus* SEGUENZA, 1876

Type species. *Adeuomphalus ammoniformis* SEGUENZA, 1876, by monotypy. Upper Pliocene-Lower Pleistocene, Sicily.

Synonym. *Transhomalogyra* gen.n. PALLAZZI & GAGLINI 1979. Type species (tentative) *Ammonicerina simplex* sensu PALAZZI & GAGLINI 1979, not O.G. COSTA, 1861 (= *Adeuomphalus ammoniformis* SEGUENZA, 1876).

Remarks. The type species of *Adeuomphalus* was described from the Pliocene of Messina, very briefly, quite ambiguously, and it was never figured by SEGUENZA (neither are there any types left). From the same deposits were also recorded numerous other species characteristic of the deeper parts of the Recent continental shelf of the Mediterranean. Therefore, it did not come as a great surprise when *A. ammoniformis* was reported by NOFRONI & SCIUBBA (1985) from 300–900 m depth off southern Sardinia, by CECALUPO (1986) from 480–600 m depth off southeastern Sardinia, and by SMRIGLIO & al. (1988) from the Tyrrhenian Sea in 400–600 m. I agree with their identification which is supported by SEGUENZA's characterization of the aperture, 'apertura quadrangolare', a shape of the aperture that is quite rare among planispiral gastropods. To argue against this identification will only cause unnecessary confusion.

*Omalgyra densicostata* JEFFREYS, 1884 (Figs 14F, 15, 18E), was described from deep water (1000–2000 m) off Portugal. The two syntypes in BMNH (Fig. 15A–B) are badly broken and glued to a piece of black cardboard, which has kept the fragments together. I have compared them, side by side, with 3 broken shells of *A. ammoniformis*, kindly sent on loan by Palazzi. The first 1.5–2.0 teleoconch whorls closely resemble and correspond in size to *A. ammoniformis*, which is known only from very small specimens. When reaching a larger size *densicostata* loses the strong axial ribs, and the cross-section of the whorls becomes more round. I can see no reason for keeping them separate and SEGUENZA's name is older and should be used. PALAZZI (1990) selected the shell shown in Fig. 15A as lectotype of *Omalogyra densicostata* JEFFREYS.

PALAZZI & GAGLINI (1979) introduced a new generic name, *Transhomalogyra*, with *Ammonicerina simplex* O.G. COSTA, 1861 as type species. At the same time they gave a figure of a specimen they had identified as *Ammonicerina simplex* (1979, pl. 2, fig. 1.). I consider COSTA's name to be based on a species of *Omalogyra*, similar to or identical with *O. atomus* (PHILIPPI, 1841), and PALAZZI (1988a) maintained it as a distinct species of *Omalogyra*. The figure given by PALAZZI & GAGLINI is obviously not based on a species of *Omalogyra*, but on *Adeuomphalus ammoniformis* SEGUENZA (PALAZZI 1988a:103, 1990, and pers. commn). PALAZZI (1988a, 1990) did not discuss the implications of this change for the name *Transhomalogyra*.

As *Transhomalogyra* is based on an erroneously identified type species, the case should have to be considered by the ICZN. I can, however, not see any current need for this, since it will end up as a junior synonym of either *Adeuomphalus* SEGUENZA, 1876 or *Omalogyra* JEFFREYS, 1860. Supported by PALAZZI (pers. commn) I have chosen to place it under *Adeuomphalus*.

There is at least one more related genus which needs to be compared, *Eudaronia* COTTON, 1945. It differs from *Adeuomphalus* in lacking the axial ribs, but has the characteristic shape of the aperture. It is possible that *Eudaronia* should be considered a subgenus, but lacking knowledge about the radula of *Adeuomphalus* I have used both names as genera.

The systematical position of *Adeuomphalus* was briefly discussed by NOFRONI & SCIUBBA, who did not accept a position in the Architectonicidae, where SEGUENZA had placed *Adeuomphalus*, but instead suggested that it should be placed in Omalogyridae or Orbitestellidae. PALAZZI & GAGLINI (1979) placed *Transhomalogyra* in the Omalogyridae.

Because of the similarity in shell shape and protoconch sculpture to *Eudaronia*, which has an atypical but unquestionably rhipidoglossate radula, I have placed also *Adeuomphalus* in the Archaeogastropoda.

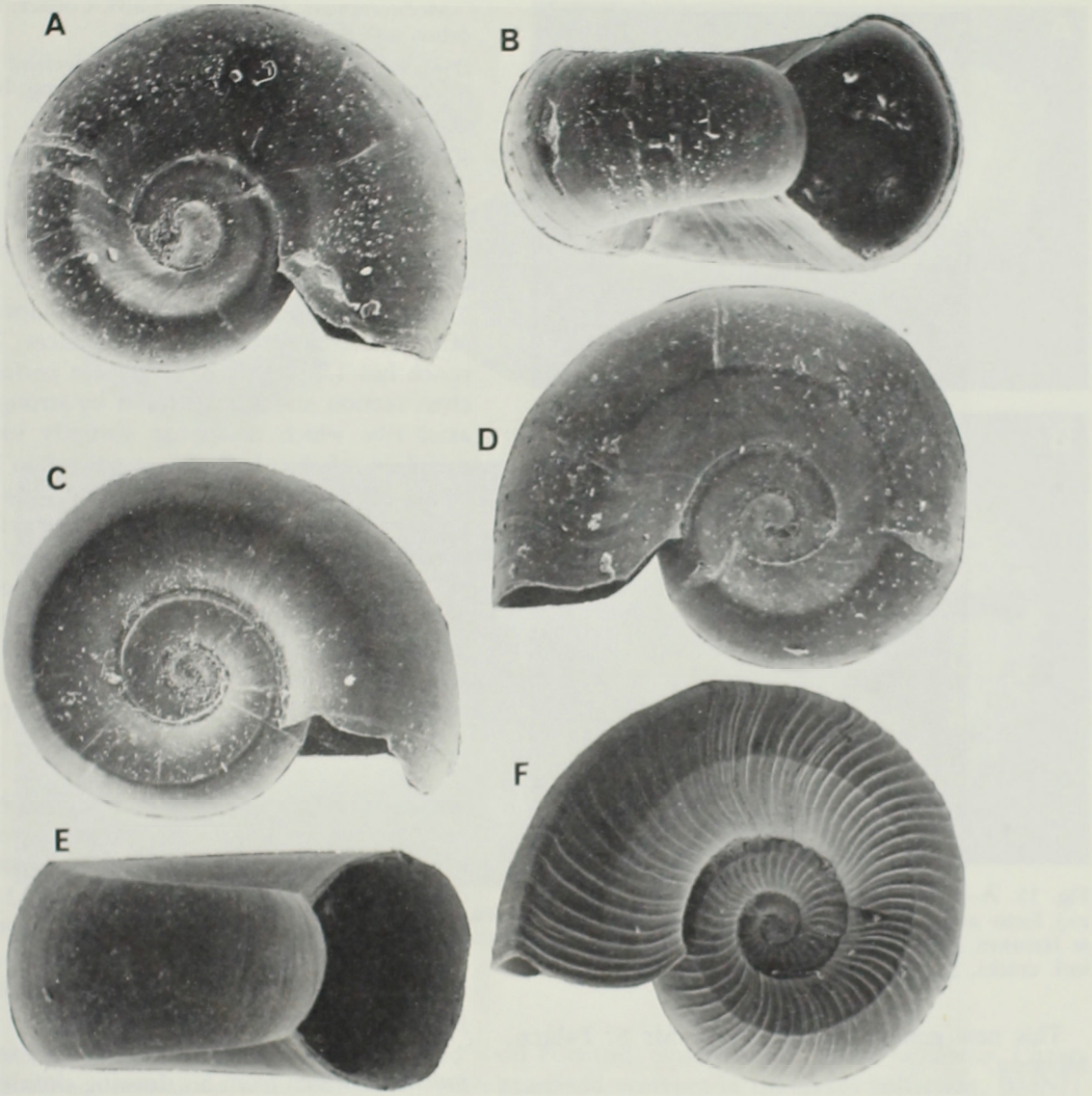


Fig. 14. A–B, D. *Eudaronia jaffaensis* (VERCO), AMS C 138316, 34°05′ S, 151°43.6′ E, 750 m. A. Top view, 1.05 mm. B. Front view, 1.00 mm. D. Basal view, 1.09 mm. C, E. *Eudaronia aperta* (MARSHALL), southwest of Ireland, 50°14.8′ N, 13°10.9′ W, 2634 m (INCAL OS01). C. Apical view 1.25 mm. E. Front view 1.03 mm. F. *Adeuomphalus ammoniformis* (SEGUENZA), northwest of Ireland, J. Gage Stn ES218, 57°22′ N, 10°24′ W, 2175 m, 1.44 mm.

Genus *Palazzia* gen.n.

Type species. *Omalogyra ausonia* PALAZZIA, 1988, deep water, Mediterranean.

Diagnosis. Very small planispiral gastropods, resembling omalogyrids, but without a trace of heterostrophy in the larval shell. The teleoconch has a sculpture of strong axial ribs, sometimes with an imperfectly formed spiral rib on each side of the shell. The axial ribs are sometimes branching. The cross section of the whorls is perfectly round, not indented by the preceding whorl. The teleoconch surface is finely and irregularly pitted.

Remarks. I have examined dried soft part of two specimens of *P. ausonia*, but did not succeed in finding a radula, or any details in the soft parts, which could aid in the classification.

Species of *Palazzia* are confusingly similar to *Ammonicera* (Omalogyridae), especially in photos, but the species of *Ammonicera* always have a strongly sculptured protoconch with spiral ribs and ridges and an indistinctly hyperstrophic initial whorl (Fig. 18F, see also SLEURS 1985a, b, c). Furthermore, *Ammonicera* never has the microscopic pits present in *Palazzia*.

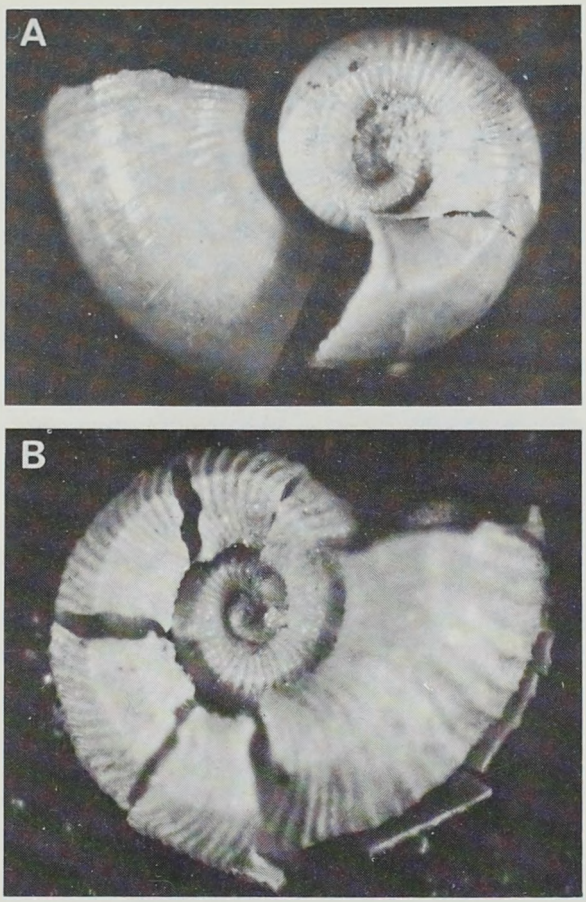


Fig. 15. A–B. *Adeuomphalus ammoniformis* (Seguenza), lecto- and paralectotype of *Homalogyra densicostata* Jeffreys, BMNH 1885.11.5.1922–23. Total diameter incl. cracks, 2.25 mm (A.) and 1.33 mm (B).

This new genus is named after Mr S. Palazzi, Modena.

*Palazzia ausonia* (Palazzi, 1988)
Figs 17A–G; 18A, C, larval shell)

*Omalogyra ausonia* sp.n. — Palazzi 1988a:103.

Type locality. Mediterranean, off Capraia, Liguria, Italy, 500 m.

Type material. Holotype in Malacological Laboratory of the University of Bologna, no. 007054; paratype in 'coll. Lugli' (examined).

Material examined. Western Iceland: 65°06′ N, 26°42′ W, 241 m, 5 Sept 1983, a few ex, JB. — Dormbarnki (between Iceland and Greenland), 23 Sept 1979, a few ex, JB. — Western and southwestern Iceland: Jökultunga and Reykjanesridge, from trawled coral, 200–400 m, many shs, HL. — 62°58′ N, 25°36′ W, 970 m, 22 Apr 1980, 1 sh (0.9 mm), JB.

Western Norway: 60°08′08″ N, 05°00′00″ E, 300–330 m, 1 spm (0.52 mm, E3–73). — 60°07′25″ N, 04°53′00″ E, 296 m, 1 spm (0.66 mm, E66–73). — 60°08′15″ N, 04°52′10″ E, 285 m, 1 spm (0.64 mm, E83–73).

Mediterranean: Off Baie de Calvi, Corsica, 120 m, shell debris and *Posidonia* fibres, 5 shs.

Distribution. From southwestern Iceland to western Norway and the Mediterranean. Depth range 100–970 m.

Redescription. The shell resembles a colourless *Amonicera* with rounded, irregular axial ribs. The larval shell consists of about half a whorl, diameter about 0.17 mm, bilaterally symetrical and distinctly demarcated from the teleoconch. It is sculptured by small, irregular, somewhat star-shaped granules often interconnected by protuberances. The teleoconch has 1.7 whorls of an almost perfectly round cross section and is sculptured by strong, rounded axial ribs which disappear abruptly towards the periphery of the shell. These ribs often have a tubercle 2/5 from the periphery, a tubercle that often is drawn out laterally and joins the corresponding tubercle of next rib. The whole surface is covered by numerous, crowded pores, diameter about 0.0005 mm. The aperture is perfectly orthocline and radial. Maximum diameter 0.89 mm, diameter of aperture 0.39 mm.

Operculum. Thin, circular and multispiral.

Radula. Absent?

Remarks. This species was described by Palazzi (1988a), but his description is partly erroneous (for example the aperture was said to be kidney-shaped, diameter of protoconch said to be 0.12 mm, shell said to be smooth except the ribs). I have therefore redescribed it after discussion with Palazzi and after having examined additional specimens and a juvenile paratype in poor condition.

O.G. Costa (1861:71) described *Ammonicerina pulchella*. which from his drawing closely resembles *Palazzia ausonia* but the colour was described as 'rosso vivace quasi sanguigno' (strong red, almost blood-coloured). This clearly indicates that it is a typical *Ammonicera*. This conclusion was also reached by Palazzi & Gaglini (1979) who discussed several species of minute planispiral shells described by O.G. Costa (1861).

There is one additional species, *Palazzia planorbis* (Dall, 1927), very similar to *P. ausonia*, in deep water off the European west coast. The specimen in Fig. 16A, B, from the Rockall Trough constitutes the first record from the East Atlantic. The species was described as *Lippistes planorbis* by Dall (1927b) (in the Trichotropidae), from deep water off the southeastern United States. Moore (1971) transferred it to *Omalogyra* and considered two West Atlantic records of '*Omalogyra densicostata*' ( = *Adeuomphalus ammoniformis*) (Jeffreys 1884; Watson 1886) to belong to that species.

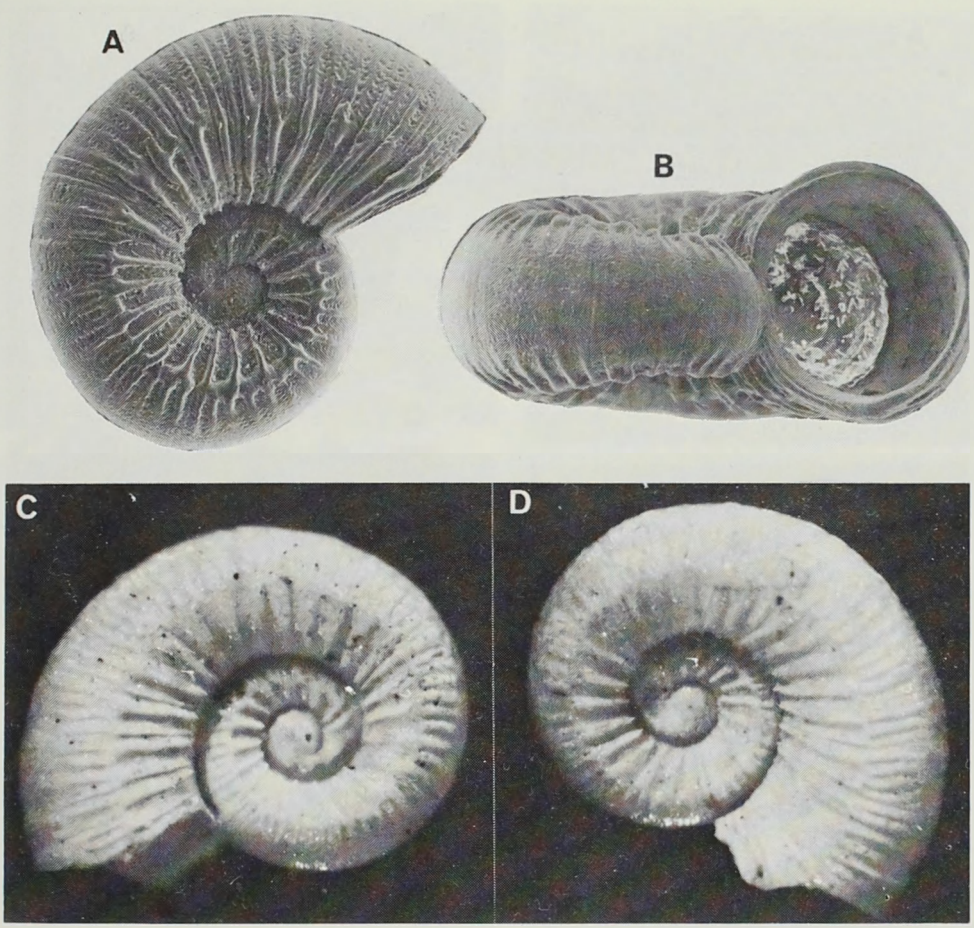


Fig. 16. A–B. *Palazzia planorbis* (DALL), northwest of Ireland, 55°00.4′ N, 12°30.2′ W, 2884 m (INCAL CP05), front and top view diameter 1.34 mm. C–D. *P. planorbis*, holotype, USNM 108091, diameter 1.28 mm.

I have examined both DALL's (Fig. 16C, D) and JEFFREYS' specimens and agree with MOORE.

Young specimens of *P. planorbis* resemble *P. ausonia*, but differ in having a larger protoconch, diameter about 0.21 mm, and by having a higher shell. In a specimen of *planorbis* of 0.94 mm diameter, the diameter of the aperture is 0.46 mm. The start to get bifurcated at a size of about 2/3 of a teleoconch whorl, while in *ausonia* they remain simple.

*Eudaronia* COTTON, 1945

Type species. *Cyclostrema* (*Daronia*) *jaffaensis* VERCO, 1909 (Fig. 14A–B, D), deep water, South Australia.

Remarks. The type species has not been reported since the original description and the generic name has not been used for any other species. I figure a specimen from deep water off New South Wales.

*Omalogyra aperta* SYKES, 1925 from deep water off Portugal, closely resembles *E. jaffaensis*. I have examined syntypes in the Sykes collection, BMNH (but Fig. 14C, E is from a fresh specimen from deep water off Ireland). I have scanned the radula of a very similar, or conspecific specimen from the Indian Ocean (Fig. 8A), *E. biconcavus* (THIELE, 1925), formerly (THIELE 1925a:83) in *Lyocyclus*, a genus described in the Trichotropidae, now classified in the Vanikoridae (WARÉN 1989).

The radula (of *E. biconcavus*) has the formula 3 – 2 – 1 – 2 – 3. All teeth are very thin and simple and have no extra cusps or denticles. The central tooth has a rather broad, triangular, but extremely thin and membranaceous base, with a single large median cusp, also that one very thin. The first lateral tooth is thin, narrow and simple, with a broad, trianguar basal plate. The second lateral tooth is about twice as long as the first one, of similar shape, but more narrow base. The three marginal teeth are fused basally, simple and membranaceous.

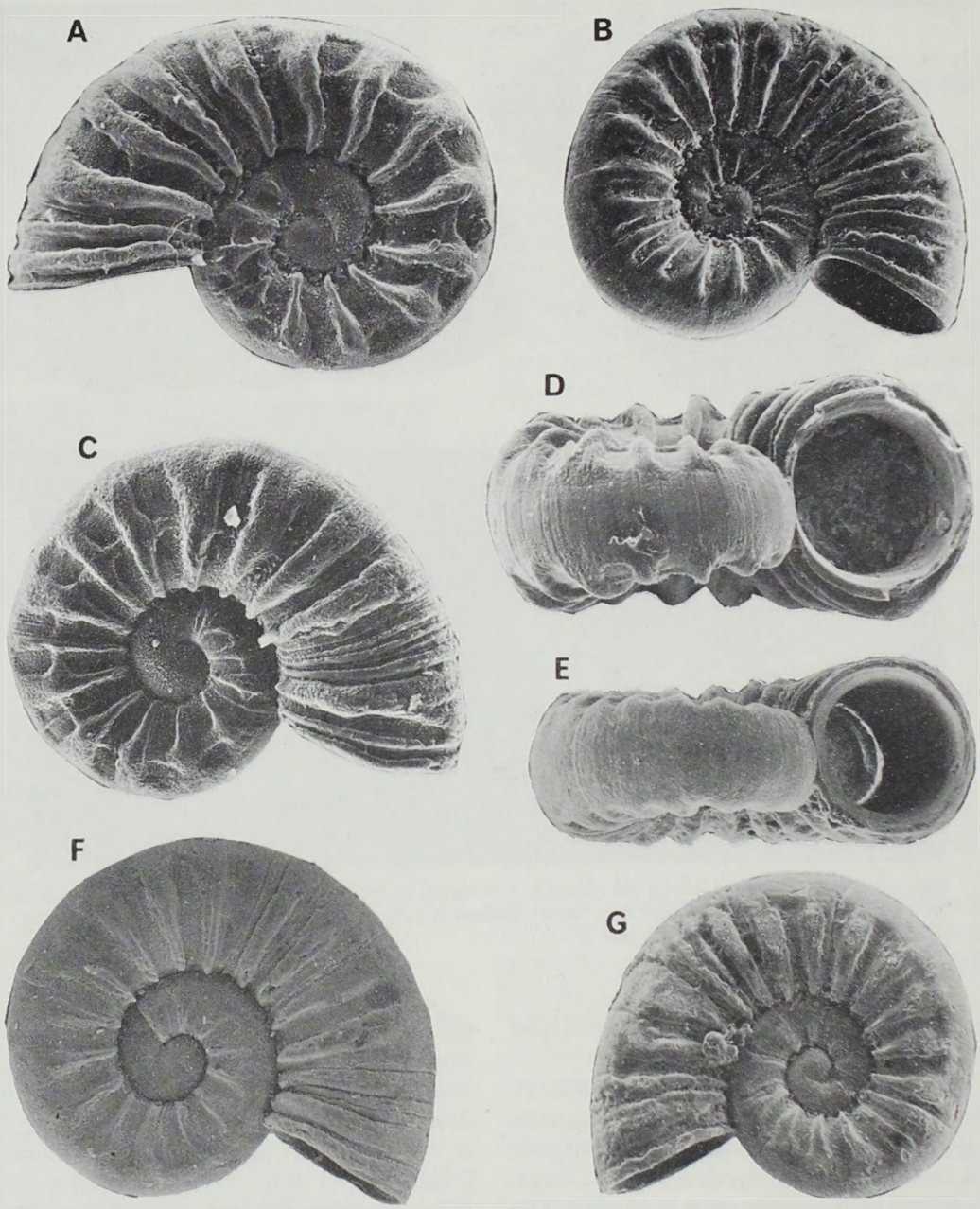


Fig. 17. *Palazzia*, A, C, D. *P. ausonia* (PALAZZI), Corsica, off Baie de Calvi, 90–120 m. A. Basal view, 0.71 mm. C. Top view, 0.69 mm. D. Front view, 0.69 mm. B, E, G. *P. ausonia*, western Norway, off Korsfjorden, 60°07.1′ N, 04°55.9′ E, 270–250 m (E76–73). E. Front view, 0.87 mm. B. Top view, 0.94 mm. G. Basal view, 0.94 mm. F. *P. ausonia*, 62°58′ N, 25°36′ W, 970 m, 22 Apr 1980, leg. JB, SMNH, diameter 0.83 mm.

Due to the small size of *E. biconcavus*, no details of taxonomic interest were found in the soft parts. SEM examination of the larval shells revealed an almost smooth, characteristic protoconch and indicates a position in the Archaeogastropoda.

There are not known any archeaogastropods with a similar radula, although there are some species of Seguenziidae, which approach *Eudaronia* in radular morphology (B.A. MARSHALL 1983). It is, however, obvious from the very membranaceous teeth, that both groups have rather reduced radulae and the similarity may be due to convergence during the process of simplifying the teeth. Among the Seguenziidae there are also species with more solid

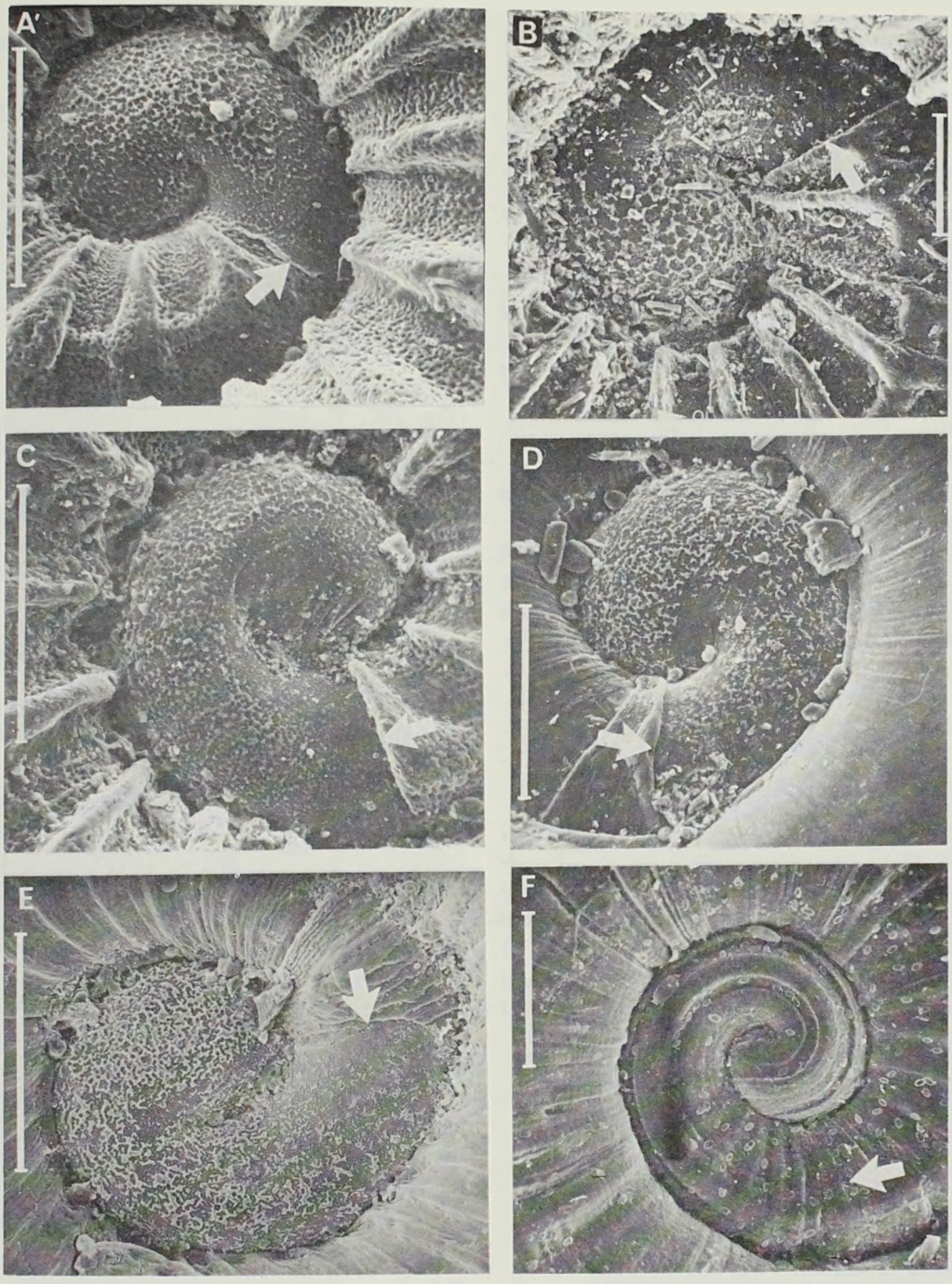


Fig. 18. A, C. *Palazzia ausonia* (PALAZZI), Corsica, off Baie de Calvi, 90–120 m. B. *Palazzia planorbis* (DALL), northwest of Ireland, 55°00.4′ N, 12°30.2′ W, 2884 m (INCAL CP05). D. *Eudaronia aperta* (MARSHALL), Bay of Biscay, 48°39.8′ N, 09°56.4′ W, 1210 m, *Thalassa* Z 436. E. *Adeuomphalus ammoniformis* (SEGUENZA), northwest of Ireland, J. Gage Stn ES218, 57°22′ N, 10°24′ W, 2175 m. F. *Ammonicera rota* (FORBES & HANLEY), Corsica, Baie de Calvi, 5–30 m. — White arrows indicate the border larval shell-teleoconch. Scale lines 0.1 mm.

and normal-looking teeth, for example *Seguenzia compta* (B.A. MARSHALL 1983, fig. 8D–F) and *Ancistrobasis reticulata* (WARÉN unpublished observation).

I therefore refrain from attempts to classify the three genera *Adeuomphalus, Eudaronia,* and *Palazzia* in a family.

*Eudaronia aperta* (SYKES, 1925)
(Figs. 14 C, D; 18E larval shell)

*Omalogyra aperta* sp.n. — SYKES 1925:192.
*Adeuomphalus laevis* sp.n. — RINDONE 1990:289.

Type localities. *O. aperta*, *Porcupine* Expedition 1870, Stn 17, off Portugal, 39°42′ N, 09°43′ W, 1930 m; *A. laevis*, Archi, Reggio Calabria, Italy, Lower Pleistocene (Sicilian).

Type material. *O. aperta*, 5 syntypes, coll. Sykes, BMNH; *A. laevis*, holotype in the Natural History Museum of Bologna, not seen.

Material examined. Western Norway: West of Korsfjorden, 60°07′56″ N, 04°56′20″ E, 270–250 m, 13 Feb 1973, 1 sh.

Distribution. From Western Norway to Portugal. Depth range 250–2000 m.

Remarks. This single Scandinavian shell agrees in all detail with more southern specimens.

When RINDONE described *A. laevis*, it was not compared with *Omalogyra aperta* and I assume that RINDONE was not aware of that species. Both his description and figure agree well with SYKES' description and the fauna of the type locality of *A. laevis* is a fairly normal Recent deep-water fauna.

## Family Cocculinidae

The family Cocculinidae has together with several of the other small archaeogastropod limpets, usually placed in Cocculinoidea or Lepetelloidea, recently been studied by McLean, Haszprunar, and B.A. Marshall in several papers. HASZPRUNAR (1988a, b) reviewed present knowledge on the groups. Several new suprageneric taxa have been erected, based mainly on anatomical characters.

### Genus *Coccopigya* B.A. MARSHALL, 1986

*Coccopigya spinigera* (JEFFREYS, 1883)
(Fig. 19A–B, D, F, H)

*Cocculina spinigera* nom. nud. — JEFFREYS 1883a:683.
*Cocculina spinigera* sp.n. — JEFFREYS 1883c.393.
*Coccopigya spinigera:* B.A. MARSHALL 1986:510
Not *Cocculina spinigera:* BANDEL 1982, plate 8, figs 3–6, 8, or ABBOTT 1974; fig 198.

Type locality. Shetland-Faroe Channel, 59°40′ N, c. 07°17′ W, c. 900 m.

Type material. See WARÉN 1980b.

New records. Western and soutwestern Iceland, especially Selvogsdypet, 200–400 m, from pieces of sunken wood recovered by fishing boats, leg. HL, numerous shs and spms, SMNH.

Distribution. Off the northeastern United States, USFC Stns 997 (off Virginia, 610 m) and 2115 (off North Carolina, 1534 m), in submersed wood bored by shipworms, associated with *Copulabyssia leptalea* (VERRILL) (DALL 1889:248), to western and southern Iceland, and to north of the Hebrides (JEFFREYS 1883c).

Remarks. This species has also been found on parts of whale skeletons.

*Coccopigya spinigera* is very variable, some specimens being low and depressed, others strongly convex, as shown by the figures (Fig. 19A–B, D, F, H).

## Family Pseudococculinidae

### Genus *Copulabyssia* HASZPRUNAR, 1988

*Copulabyssia corrugata* (JEFFREYS, 1883)
(Fig. 19C, E, G)

*Cocculina corrugata* sp.n. — JEFFREYS 1883c:394.
*Copulabyssia corrugata:* HASZPRUNAR 1988a:177.

Type locality. Shetland–Faroe Channel, 59°40′ N, 07°21′ W, 940 m.

Type material. Syntypes in USNM and BMNH, see WARÉN 1980b.

New records. Southern Iceland, southeast of Reykjanesridge, 250–350 m, 10 spms, from submerged wood, HL, SMNH.

Distribution. From western Iceland to the Mediterranean (DI GERONIMO & BELLAGAMBA 1986; HASZPRUNAR 1988a). Depth range 250–940 m.

Remarks. Also *Cocculina leptalea* VERRILL, 1884, has mainly concentric sculpture. It was described from wood bored by shipworms (VERRILL 1884:202). One paratype (USNM 35128, USFC Stn 2036, off Delawere, 3160 m, empty shell, fair condition), and the holotype (USNM 38079, USFC Stn 2038, off Delawere, 3700 m, fragments) have been examined. This may be a synonym of *C. corrugata*. *Copulabyssia leptalea*, however, has a more central apex, stronger sculpture at comparable size (especially the radial elements), and it grows larger. To give an opinion it will be necessary to examine more than two partly broken shells of *C. leptalea*. There are no doubts, however, that they are congeneric.

## Cocculiniformia, family uncertain

### *Pilus* gen.n.

Type species. *Pilus conica* (VERRILL, 1884).

Diagnosis. Minute limpets, retaining a slight degree of coiling and consisting of about 0.3 whorls, with indistinct sculpture of radiating ribs on the early teleoconch. There are concentric incremental lines and shallow pores irregularly dispersed over the shell. The protoconch consists of half a regularly coiled whorl, with a finely pitted surface, and a unique expansion and constriction of the diameter of the whorl, close to the aperture.

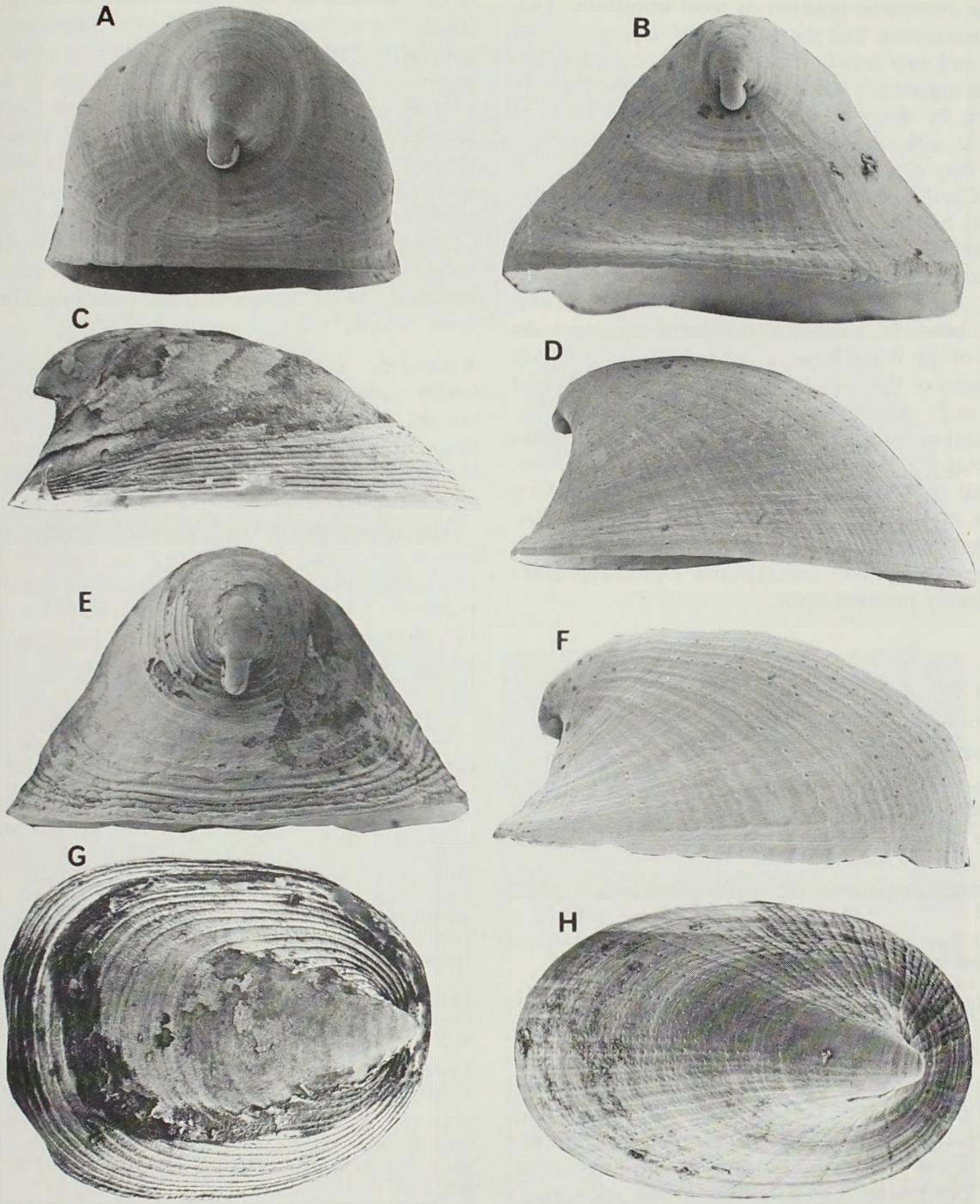


Fig. 19. A, B, D, F, H. *Coccopigya spinigera* (JEFFREYS), off southern Iceland. A–B. Posterior view, 2.07 and 2.50 mm breadth. D, F. Side view, 4.04 and 2.73 mm diameter. H. Apical view, diameter 2.85 mm. C, E, G. *Copulabyssia corrugata* (JEFFREYS), off southern Iceland. C. Side view, 2.02 mm. E. posterior view, 1.66 mm breadth. G. Apical view, 1.48 mm length.

Description. See redescription of *Cocculina conica*.

Remarks. The type species was described from a single specimen, kept in alcohol. Many of VERRILL's specimens that were kept in alcohol have dried out or disintegrated from being kept in too weak alcohol (personal observation). This is probably what has happened to the type of this species, since not even the jar or dried remains could be found in USNM.

The systematic position, is most uncertain. VERRILL mentioned that the animal has 'a nearly round foot and two small, slender, cylindrical tentacles, and is apparently without eyes'. These are features shared by many of the small limpets and do not help in assigning *C. conica* to a family, although they may be of help for specific assignment.

A *Capulus*-shaped shell, however, is very unusual among archaeogastropod limpets, and I have seen that shape only in some undescribed genera belonging to the vicinity of Lepetellidae or Bathysciadidae, and in Addisonidae. Species of Lepetellidae have, however, a characteristic larval shell with the sides of the initial bowl drawn out and spread over the sides of the aperture (Fig. 6B). This is not the case in *P. conica*.

Members of the family Pseudococculinidae have a larval shell somewhat similar to that of *Pilus*, but all species of that family have fairly uniform shape of the shell, excellently illustrated by B.A. MARSHALL (1986).

Because of these uncertainties I prefer to leave the family position open.

*Pilus conica* (VERRILL, 1884)
(Fig. 20A–E)

*Cocculina conica* sp.n. — VERRILL 1884:204.

Type locality. Off New York, USFC Stn 2078, 41°13′ N, 66°12′ W, 908 m.

Type material. Holotype USNM 38441, lost (JOHNSON 1989 and own search).

Material examined. Off southwestern Iceland, 62°58′ N, 25°36′ W, 970 m, 22 Apr 1980, 3 shs, JB, SMNH.

Distribution. Northeastern United States and southwestern Iceland. Depth range about 900–1000 m.

Redescription. The shell (Fig. 20A–C) is very small, *Capulus*-shaped, and forms 1/3 of a whorl. It is fragile, almost smooth and colour-less, with the apex overhanging the posterior edge. The larval shell (Fig. 20D–E) consists of about half a whorl, diameter 0.21 mm. It is regularly coiled, starting with a cup-shaped initial part; slightly expanded, then constricted, like a muffle, at the aperture. It is connected to the teleoconch by a very short, almost straight and cylindrical part. It is almost perfectly smooth, but has some very small pits or pores, which possibly are caused by corrosion. The transition to teleoconch is abrupt. The teleoconch is almost globular, with the initial part of very rapidly expanding diameter, and the last part is almost cylindrical. The shell is sculptured with about 25 short, indistinct, ribs just after the larval shell, spreading radially over the part of the shell which is not covered by the initial whorl of the protoconch, but fade out within 0.3 mm. There are also irregularly disposed and not very strong concentric incremental lines and small pits and pores, which to some extent follow the incremental lines in their distribution. The apertural plane is very slightly concave, as if adapted to sitting on a tube with the length axis of the shell at a right angle to that of the tube. The coiling of the shell consists of about 0.3 whorls and the angle of the larval shell clearly indicates a dextral coiling, with the left side expanding more rapidly than the right one. Dimensions, length 0.92 mm, width 0.72 mm.

Remarks. Despite being known from only 3 empty, somewhat broken shells, I find this little species worth some attention. Judging from the shape of the shell, which is close to cylindrical near the aperture or base, it is very unlikely that the specimens are juvenile.

The identification with VERRILL's species is, of course, uncertain since the type is lost, but VERRILL's description agrees in every detail, except the sculpture, where he did not notice the radial sculpture or the pits. These are, however, hardly discernible even under a good stereo-microscope.

## Family Trichotropidae

*Trichotropis bicarinata tenuis* E.A. SMITH, 1877
(Fig. 21A–D)

*Turbo bicarinatus* sp.n. — SOWERBY 1825:XII.
*Trichotropis tenuis* sp.n. — E.A. SMITH 1877:136.
*Trichotropis hjorti* sp.n. — FRIELE 1903:8.
*Trichotropis bicarinata:* GRIEG 1909:28
*Trichotropis bicarinata* var. *tenuis:* THORSSON 1941:55.

Type localities: *T. tenuis*, Northern Canada, Grinnel Land, off Cape Louis Napoleon, 79°38′ N, 40 m; *T. hjorti*, 64°53′ N, 10°00′ W (east of Iceland), 600 m.

Type material. *T. tenuis*, holotype, BMNH 1877.8.3.1; *T. hjorti*, 2 syntypes ZMB 5387.

Material examined. Greenland: Off West Greenland (intermediate specimens): 75°26′ N, 67°27′ W, 260 fms, 1 sh. — Bylot Sound, 76°33′ N, 69°13′ W, 200–180 m, 20 Aug 1968, 8 spms, ZMC. — 76°32′ N, 69°25.6′ W, 100–85 m, 16 Aug 1980, 1 spm, ZMC. — 75°29.6′ N, 65°45.1′ W, 146 m, 05 Aug 1980, 1 spm, ZMC. — 69°30′ N, 56°32′ W, 202 m, 25 Jun 1927, 1 spm, ZMC. — 72°08′ W, 30–80 m, 1 spm (SMNH 873). — East Greenland (typical *tenuis*): Hurry Inlet, 90 m, 11 Aug 1900, 3 spms, ZMC. — Off East Greenland, 72°25′ N, 17°56′ W, 300 m, 2 spms (SMNH 872). — Southeast of Pendulum Island, 74°35′ N, 18°15′ W, 150 m, 2 spms (SMNH 878).

Northern Iceland (typical *tenius*): Skalfandi; fishing banks around Kolbeinsöy and Grimsöy, about 15 specimens, in different collections, but originating from JHB. — *Dagny* Si 70, Stn 4, 67°46′ N, 18°59.7′ W, 350 m, 22 Jun. 1979, 4 ex, JB. — *Dagny* Si 70, Stn 5, 67°39′ N,

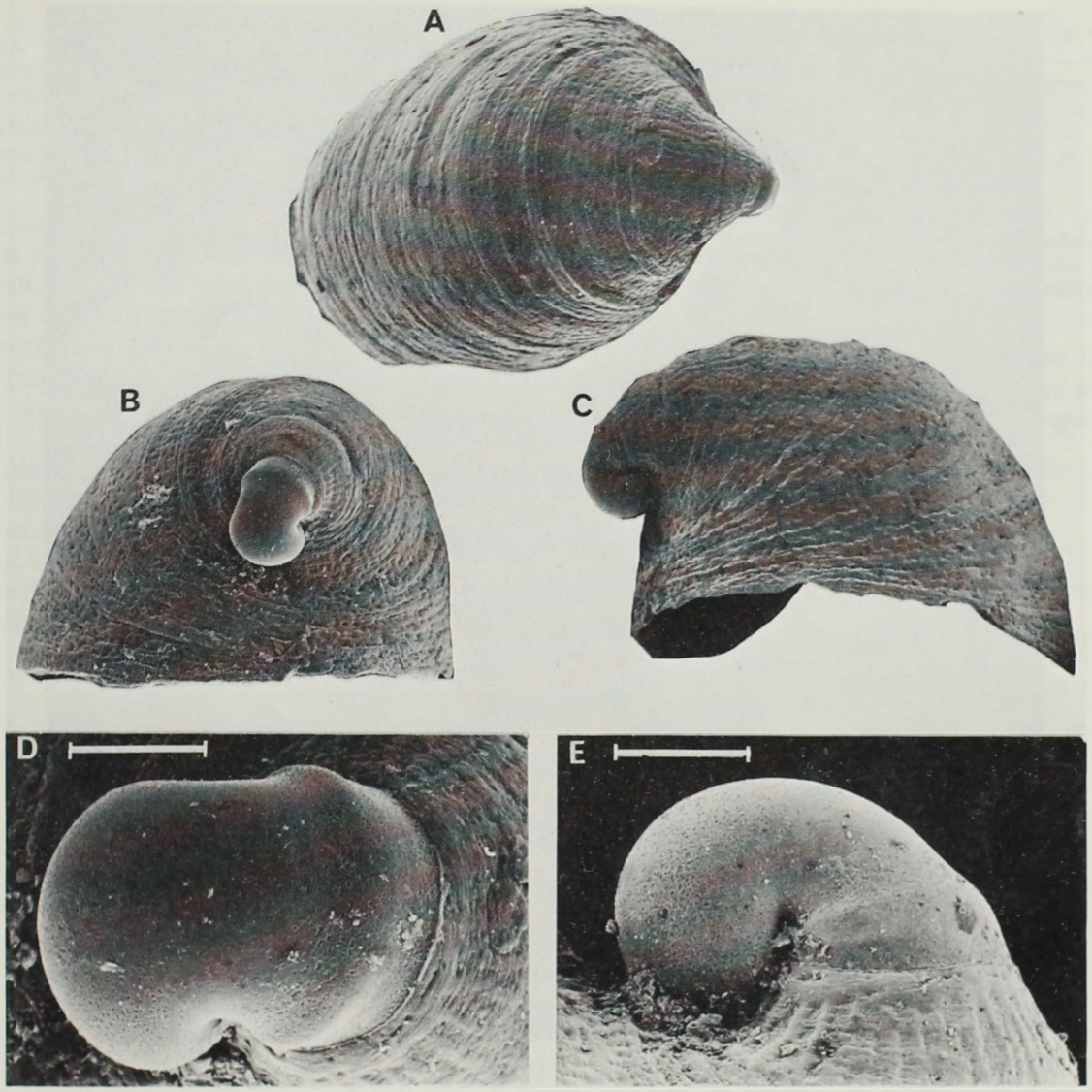


Fig. 20 A–E. *Pilus conica* (Verrill), off southwestern Iceland, 62°58′ N, 25°36′ W, 970 m, diameter 0.80 mm. A. Apical view. B. Posterior view. C. Side view. D–E. Larval shells. — Scale line 0.1 mm.

19°04′ W, 22 Jun 1979, 250 m, 2 ex, JB. — Southwestern Iceland: Grindavikursjo, 200 m, 2 ex, HL.

Distribution. Western, northern, and eastern Greenland (Thorson 1951), northern, eastern, and southwestern Iceland (Thorson 1941) and north of Svalbard (Golikov 1964) in 80–600 m. The typical form, *T. bicarinata bicarinata* continues westwards from Greenland, south to Hudson Bay, northern Canada and Alaska, and the north Pacific, south to Honshu and Hokkaido, northern Japan (Habe 1962), Nunivak Island, Alaska (Macginitie 1959) and north of Siberia to the Sea of Okhotsk (Habe 1962; Golikov & Gulbin 1978). It is a shallow-water species, normally occuring in 5–100 m depth.

Remarks. This very little known form is regularly obtained from the Icelandic fishing areas mentioned above. It has been discussed by Grieg (1909) and Thorson (1941), who arrived at conclusions similar to mine, although basing their conclusion on a smaller material.

*Trichotropis bicarinata tenius* is a fragile, thin-shelled form with evenly rounded aperture. This is, however, often broken as to give the impression of an indistinct siphonal canal as in *T. bicarinata bicarinata*. The latter has a solid shell with indistinct oblique axial sculpture, while *tenuis* has a conspicuous and regular oblique axial sculpture.

Specimens from northeastern Canada and western Greenland are intermediate between the typical *T. bicarinata bicarinata* and *T. bicarinata tenuis* in the development of the spiral keels, and specimens with a keel restricted to the body whorl are not rare, but they are always fairly thin-shelled.

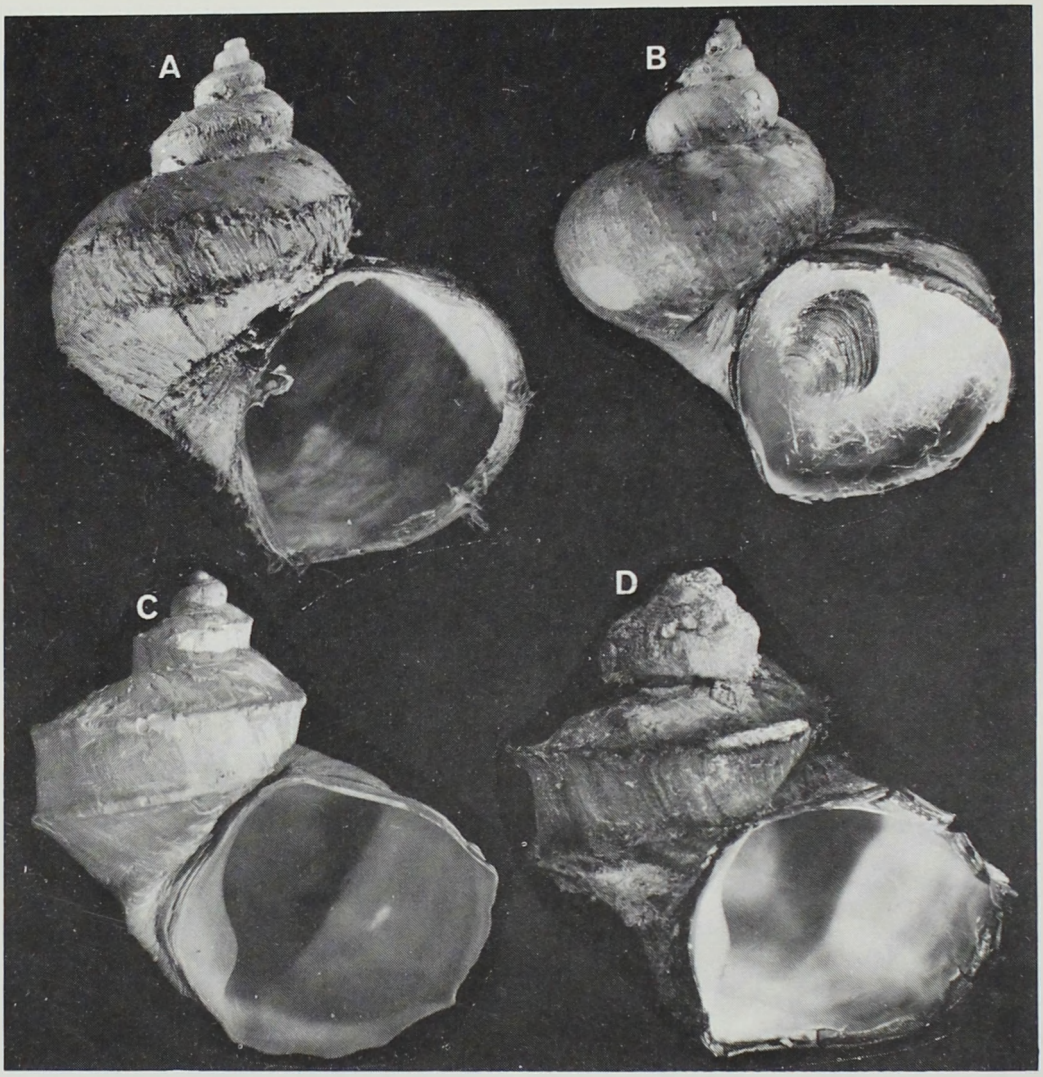


Fig. 21. *Trichotropis bicarinata* (SOWERBY). A. Transitional specimen, northeastern Greenland, 76°33′ N, 69°13′ W, 200–180 m, diameter 27 mm. B. Thin-shelled '*tenuis*'-form, northern Iceland, Kolbeinsöy, 28 mm diameter. C–D. Typical specimens of the nominate form, northeastern Siberia, 40 and 35 mm respectively. Periostracum removed in Fig. C.

Typical, solid specimens of *T. bicarinata bicarinata* are not known from Greenland (except as Plio-Pleistocene fossils (BENNIKE 1989)), while almost typical specimens of *T. bicarinata tenuis* do occur there.

There is also a bathymetrical difference in the distribution of the typical *bicarinata bicarinata* which has its main distribution in shallow water, 10–100 m, and *bicarinata tenuis* which occurs in 50–300 m. I can see no reason for separating these two forms at the species level, but I want to draw attention to this variation by using the subspecific epithet *tenuis* for specimens from Iceland and those from Greenland that qualify for it.

## Family Cerithiellidae

*Cerithiella cossmanni* (DAUTZENBERG & FISCHER 1896)
(Fig. 22C)

*Cerithiella cossmanni* sp.n. — DAUTZENBERG & FISCHER 1896:445.
*Cerithiella cossmanni*: DAUTZENBERG 1927:111.

Type locality. Not precisely designated, but close to the Azores in 400–1600 m.

Type material. Syntypes in Musée Océanographique Monaco.

New records. Western Iceland: Jøkultunga, 360 m, 1 sh HL. — Southeastern Iceland: Djupivogur, leg. JHB, 1 sh. The Faroes: BIOFAR Stn 158, 61°38′ N, 05°38′ W, 24

m, 1 sh. — BIOFAR Stn 355, 62°34′ N, 05°58′ W, 149 m, 1 sh.

Western Norway: Off Korsfjorden, 250–325 m, 30 records with 200 spms.

Distribution. Only known from the type material and the records above, from the Azores to Iceland, the Faroes, and western Norway. Depth range 150–1600 m.

Remarks. *Cerithiella cossmanni* was previously known only from the original description, no new material ever having been published. The generic position offers a dilemma; the shell has a superficial similarity to *Cerithiella* where it was originally described, but the radula is more similar to the cerithiopsid genus *Alipta* (see B.A. MARSHALL 1978).

Icelandic and Norwegian specimens differ only very slightly from the type material from the Azores, and it is possible that *C. cossmanni* has a continuous distribution along the Mid Atlantic Ridge (where there are numerous areas more shallow than 2000 m) to Iceland.

## Family Eulimidae

### *Halielloides nitida* (VERRILL, 1884)
(Fig. 22G–H)

*Eulimella nitida* sp.n. — VERRILL 1884:194.
*Halielloides nitida*: BOUCHET & WARÉN 1986:343.
*Halielloides ingolfiana* sp.n. — BOUCHET & WARÉN 1986:342.

New records. Greenland: 62°29′ N, 40°42′ W, 22 Sept 1976, 156 m, 8 ex, JB. — 65°17′ N, 36°28′ W, 11 Sept 1980, 199 m, 1 ex, JB.

Northwestern Iceland: 66°14′ N, 28°08′ W, 14 Mar 1981, 375–396m, 1 ex, JB. — Vikurall, haddock stomachs, HL, 50 shs. — Western Iceland: Jökultunga, 260–400 m, several shs, HL. — 63°46′ N, 26°28′ W, 15 Apr 1983, 545 m, corals, 1 ex, JB. — 63°32′ N, 25°17′ W, 12 May 1987, 329 m, 2 ex. JB. — Southwestern Iceland: Reykjanesridge, 200–400 m, several shs, HL. — Southeastern Iceland: 64°15′ N, 12°36′ W, 28 Feb 1978, 245 m, 1 ex, JB.

Distribution. American east coast from off Marthas Vineyard, north to Greenland, eastwards to northern Norway, and south to Portugal (39° N). Depth range 200–2000 m.

Remarks. This new material confirms the suspicions of BOUCHET & WARÉN (1986) that *H. ingolfiana* might be based on small specimens of *H. nitida*.

*Halielloides nitida* reaches a size of 5.2 mm. The material above also shows that the species is more variable than BOUCHET & WARÉN's original material indicated.

### *Curveulima macropthalmica* (WARÉN, 1972)
(Fig. 22A–B)

*Curveulima macrophthalmica*: BOUCHET & WARÉN 1986:399.

New records. Western Iceland: 63°46′ N, 26°28′ W, 15 Apr 1983, 545 m, corals, 2 ex (9.5 mm!), JB. — Southwestern Iceland: Grindavikursjo, 40–100 m, 7 spms, HL. — 63°09′ N, 21°41′ W, 27 Jul 1978, 570–528 m, corals, 6 ex, JB. — Southeastern Iceland: 63°20′ N, 16°52′ W, 7 Jul 1975, 245 m, black sand, 1 ex, JB. — 63°20′ N, 16°52′ W, 5 Apr 1978, 255 m, corals, 3 ex, JB.

Distribution. From western Iceland and Lofoten (northern Norway), along the European and northwestern African coast, south to 25° N (BOUCHET & WARÉN 1986). Depth range 50–2500 m. These new records enlarge the distribution considerably.

Remarks. Icelandic specimens can not be distinguished from Scandinavian ones, and there should be no great difficulties in identifying this species.

### *Melanella orphanensis* CLARKE, 1974
(Fig. 22F)

*Melanella orphanensis*: BOUCHET & WARÉN 1986:370.

New records. Northwestern Iceland: Latragrunn, 300–380 m, 1 sh, HL. — Western Iceland: Jökultunga, several spms, HL. — Koluall, 200–400 m, several shs, HL. — Southwestern Iceland: Reykjanesridge, several spms, HL. — 62°53′ N, 25°27′ W, 22 Apr 1980, 800–785 m, 1 ex, JB. — Northeastern Iceland: 67°01′ N, 16°32′ W, 31 Mar 1981, 322–352 m, 1 ex, JB.

### *Melanella myriotrochi* BOUCHET & WARÉN, 1986

*Melanella myriotrochi* sp.n. — BOUCHET & WARÉN 1986:380.

New records. Southwestern Iceland: 63°01′ N, 22°10′ W, 19 Apr 1980, 550–577 m, 1 sh, JB.

Remarks. This is the second specimen known of *M. myriotrochi*. The species was described from the Rockall Trough, where it was found in the oesophagus of the holothurian *Myriotrochus bathybius* H.L. CLARK. Also the new specimen is somewhat broken.

## Family Velutinidae

### *Pseudotorellia fragilis* WARÉN, 1989

*Pseudotorellia fragilis* sp.n. — WARÉN 1989:17.

Material examined. Northwestern Iceland: Djupall, Isafjardardjup, 20 Jan 1969, haddock stomach, 100–200 m, 2 ex, JB. — 66°51′ N, 24°11′ W, 158–182 m, 5 Nov 1981, 1 ex, JB. — Western Iceland: 64°55′ N, 25°05′ W, 158–157 m, 20 Mar 1982, 1 ex, JB.

Remarks. Since this species was described, I have got additional material and Jon Bogason has informed me that the periostracum is thick and felt-like, which conforms with a position in the Velutinidae.

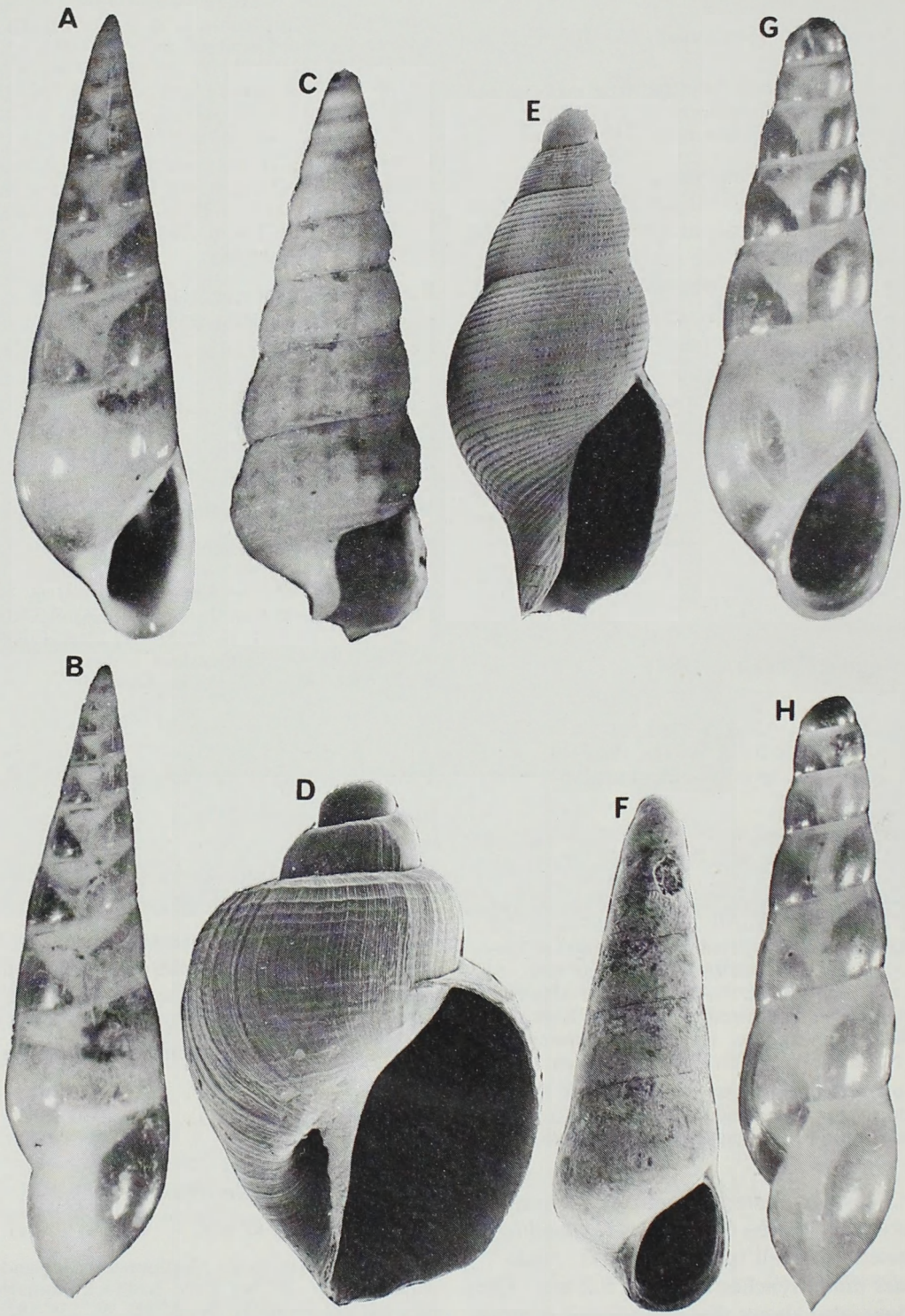


Fig. 22. A–B. *Curveulima macrophthalmica* (Warén), off western Iceland, 63°46′ N, 26°28′ W, 545 m, coll. JB, height 7.5 mm. C. *Cerithiella cossmanni* (Dautzenberg & H. Fischer), eastern Iceland, Djupivogur, coll. JHB, height 6.2 mm. D. *Iphinopsis alba* (Bouchet & Warén), off western Iceland, 62°58′ N, 25°36′ W, 970 m, coll. JB., height 3.6 mm. E. *Thesbia nana* (Lovén), western Iceland, leg. HL, SMNH, height 4.2 mm. F. *Melanella orphanensis* (Clarke), off northeastern Iceland, 67°01′ N, 16°32′ W, 322–352 m, coll. JB, height 3.04 mm. G–H. *Haliellοides nitida* (Verrill), off northwestern Iceland, Vikurall, leg. HL, SMNH. G. Front view, height 4.5 mm. H. Side view, height 4.4 mm.

Family Buccinidae

*Mohnia glyptus* (Verrill, 1882)

*Mohnia glyptus*: Bouchet & Warén 1985:213.

New Records. Northwestern Iceland: Latragrunn, 80–200 m and Kögurgrunn, 180 m, HL, 2 spms. — 65°56′ N, 20°50′ W, 81–106 m, 10 Jul 1980, 1 ex, JB. — Western Iceland: 63°46′ N, 26°28′ W, 15 Apr 1983, 545 m, 1 spm, JB.

Distribution. Northwestern Atlantic, from New Jersey to southern Greenland and north- and southwestern Iceland. Depth range 200–1000 m.

Family Turbinellidae

*Metzgeria alba* (Jeffreys in Wyville-Thomson, 1873)

*Metzgeria alba*: Bouchet & Warén 1985:254.

New records. Northwestern to southern Iceland: Many places between Latrabjarg and Grindavikursjo 100–340 m, HL. — Eastern Iceland: Hornafjördur, haddock stomach, 1 spm, NA.

Distribution. From Davis Strait, northwestern, southern, and eastern Iceland, the Shetland–Faroe Channel, eastern Finnmark, and the Norwegian west coast (Bouchet & Warén 1985). Depth range 100–1960 m.

Remarks.This species was earlier known from western Iceland (Thorson 1941), now also from eastern Iceland. I am not aware of any problems with this species; the specific and generic names were discussed by Bouchet & Warén (1985).

Family Cancellariidae

*Iphinopsis alba* Bouchet & Warén, 1985
(Fig. 22D)

*Iphinopsis alba* sp.n. — Bouchet & Warén 1985:263.

New records. Western Iceland: 62°58′ N, 2536′ W, 22 Apr 1980, 970 m, 1 sh, JB. — 63°46′ N, 25°38′ W, 22 Apr 1980, 970 m, black sand, 3 shs, JB.

Distribution. Western Iceland to the Bay of Biscay. Depth range 1000–3000 m.

Remarks. *Iphinopsis alba* is quite similar to *I. inflata* (Friele, 1879) which can be expected to occur in deep water off northern Iceland. *Iphinopsis inflata* has a single indistinct columellar fold, while *I. alba* has two fairly distinct ones.

Family Turridae

*Oenopota ovalis* (Friele, 1877)

*Oenopota ovalis*: Bouchet & Warén 1980:68.

New record. Southern Iceland: Grindavikursjo, 200–400 m, a few spms, HL.

Distribution. The Polar and Norwegian Basins and southwards to the Bay of Biscay. Depth range (200–400)–5000 m.

Remarks. *Oenopota ovalis* was also previously known from southern Iceland (Bouchet & Warén 1980). The present record is from considserably more shallow water than the previously known depth of 557 m and shows well that the species ascends to water shallow enough to cross the Iceland-Faroe Ridge. This explains the distribution in the abyssal parts of both the Norwegian Sea and the North Atlantic. This would otherwise be difficult to account for, since the species does not have planktotrophic larvae and has a fairly solid larval shell.

*Thesbia nana* (Lovén, 1846)

*Thesbia nana*: Bouchet & Warén 1980:75.
(Fig. 22E)

New records. Greenland: 62°29′ N, 40°42′ W, 22 Sept 1976, 156 m, 2 ex, JB. — 64°57′ N, 36°08′ W, 164–185 m, 1 ex, JB.

Northern Iceland: 67°02′ N, 22°38′ W, 6 Nov 1981, 201–224 m, 1 ex, JB. — 66°36.6′ N, 25°03′ W, 10 Nov 1981, 295–310 m, 6 ex, JB. — 66°35′ N, 21°18′ W, 8 Nov 1981, 180 m, 4 ex, JB. — 66°37′ N, 21°20′ W, 7 Nov 1981, 140–150 m, ex, JB. — 66°51′ N, 23°02′ W, 7 Nov 1981, 195–215 m, 2 ex, JB. — 66°31′ W, 6 Nov 1981, 190 m, 1 ex, JB. — 66°52′ N, 23°56′ W, 6 Nov 1981, 175–181 m, 1 ex, JB. — 65°06′ N, 26°42′ W, 6 Sept 1983, 241 m, 1 ex, JB. — 65°55′ N, 25°12′ W, 7 Sept 1983, 127 m, 5 ex, JB. — Northwestern Iceland: Önundarfjardar, 120 m, 4 Dec 1965, 2 ex JB. — Vikurall, 170 m, 22 Dec 1967, 2 ex, same loc. 200 m, 15 Feb 1970, 2 ex JB. — Isafjardardjup, 100–120 m, 20 Jan 1969, 1 ex, JB. — Southwestern Iceland: Faxafloi, 100–200 m, many spms, HL. — 63°40′ N, 24°07′ W, 9 Apr 1979, 160–166 m, 1 ex, JB. — 64°08′ N, 23°55′ W, 9 Apr 1979, 210–230 m, 1 ex, JB. — 63°02′ N, 22°16.5′ W, 20 Apr 1980, 659–645 m, 1 ex, JB. — 63°12′ N, 21°52′ W, 19 Apr 1980, 224–217 m, 1 ex, JB. — 63°32′ N, 23°01′ W, 3 Apr 1982, 190–225 m, 1 ex, JB. — Southern Iceland: Selvogsbanken, 159 m, 17 Jan 1969, 1 ex, JB. — Southeastern Iceland: 64°32.5′ N, 13°15′ W, 9 Oct 1982, 136 m, 1 ex, JB. — 63°54′ N, 15°11.5′ W, 10 Oct 1982, 134 m, 1 ex, JB.

Distribution. Iceland, Norway, Shetland, and the Orkney Islands (Bouchet & Warén 1980). Depth range 80–600 m.

Remarks. In Iceland, this species was previously known from a single, worn shell, from off Snaefellnes, 207 m (Thorson 1941), but it is evidently not rare.

*Typhlomangelia nivalis* (Lovén, 1846)

*Typhlomangelia nivalis:* Bouchet & Warén 1980:27.

New records. Northwestern to southern Iceland: Vestfirdir to Grindavikursjo, many places, 100–340 m, HL.

Distribution. Northwestern to southern Iceland, northern Norway and southwards to the Mediteranean and West Africa, to 15° N (Bouchet & Warén 1980). Depth range 45–3000 m.

Remarks. *Typhlomangelia nivalis* was previously known from five records off southern Iceland (Thorson 1941), and its distribution in Iceland is here considerably enlarged.

*Taranis moerchi* (Malm, 1861)

*Taranis moerchi:* Bouchet & Warén 1980:80.

New records. Northwestern Iceland, Kögurgrunn, 80–140 m, HL, 2 shs.

Distribution. From Florida to south of Davis Strait (Bouchet & Warén 1980), southwestern (Oskarsson 1982) and northwestern Iceland, and from northern Norway to the Mediterranean Bouchet & Warén 1980). Depth range 80–3000 m.

Subclass Heterobranchia

I use the concept Heterobranchia in accordance with Haszprunar (1988c) and Ponder (1991). The taxon includes the pulmonates, opistobranchs, pyramidellids, architectonicids, omalogyrids, and rissoellids, plus a number of little known genera presently included in other mesogastropod families. The relations between these groups is presently not known in detail and the origin of the Heterobranchia is not known at all.

Family Tjaernoeidae, fam.n.

Diagnosis. Shell very small, up to 1.0 mm in diameter, low and depressed to globular, with a wide umbilicus, with a protoconch, and about 1.9 teleoconch whorls. The protoconch is smooth or has scattered impressed pits. The teleoconch has spirally arranged, sharply impressed pits. The animal (Fig. 26) is unpigmented, with bifurcated tentacles, no eyes, and an extremely long and slender, deeply Y-shaped propodium. There is no snout or operculum. The radula consists of 20–50 transverse rows, each with one membranaceous marginal plate on each side and a pair of simple, hook-shaped teeth in the centre.

Remarks. At present *Tjaernoeia* is the only genus in the family. The sculpture and the globular or depressed shell with a wide umbilicus makes the members of the family easily recognizable among marine gastropods.

*Tjaernoeia* was recently provisionally placed in the Pyramidellidae (Warén & Bouchet 1988). We had then seen live animals and had some not very successful preparations of the radula. Discovery of a new, larger species of *Tjaernoeia*, described later in this paper, has made it possible to describe the radula in more detail and has made it unavoidable to erect a new family for the genus. Presently Tjaernoeidae seems not very closely related to any other known gastropod, but a position among the Heterobranchia is indicated by the bifid tentacles (shared with Rissoellidae), a slightly bifurcated anterior part of the foot (shared with most groups), deeply divided propodium (shared with *Graphis*, Cornirostridae, and several other taxa), and sculpture of sharply impressed pits (shared with many primitive Cephalaspidea).

*Tjaernoeia* Warén & Bouchet, 1988

Type species. *Adeorbis imperspicuus* Chaster, 1895 (= *Adeorbis exquisitus* Jeffreys, 1883 = *Fossarus monterosati* Granata, 1877, nom. nud.), by original designation.

Synonym. *Puncturina* Palazzi, 1988, type species *Adeorbis exquisitus* Jeffreys, 1883.

Remarks. *Puncturina* was published 11 November, *Tjaernoeia* 31 October 1988, and *Tjaernoeia* thus has priority with 11 days.

When Palazzi introduced *Puncturina* (Palazzi 1988b:5) it was partly based on some old correspondence between him and me, where I had mentioned that I considered *Tjaernoeia exquisita* and *Rugulina fragilis* widely different. He ascribed to me a statement, 'in litt.', that *Adeorbis exquisitus* lacks a radula. going back to that correspondance, I can not find this, only a comment that '*Adeorbis fragilis*' lacks a radula. That species has been discussed under *Rugulina*, and Palazzi's statement is wrong, as shown by Fig. 25.

In addition to the new species described here, the genus contains the following species: *Tjaernoeia exquisita* (Jeffreys, 1883) (=*Fossarus monterosati* Granata, 1877, nom. nud. = *Adeorbis imperspicuus* Chaster, 1895). Known from the Skagerrak to the Mediterranean in 25–200 m. Figs 23E, 24A, 25A, B, F, 26. This species was reported by Schiötte (1989:8) from northeastern Greenland. I had examined the specimen and identified it as the present species, but the shell was badly attacked by

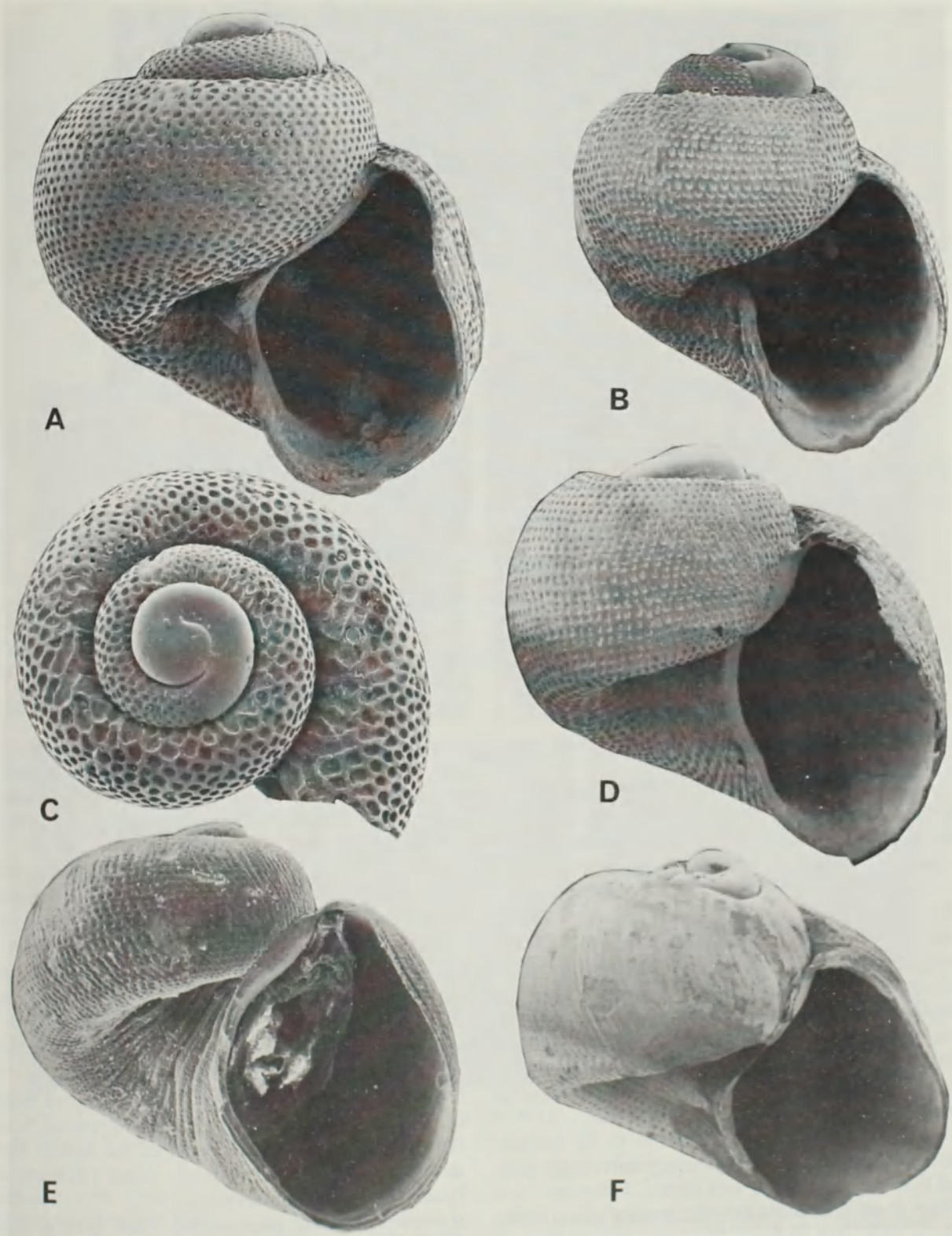


Fig. 23. A. *Tjaernoeia boucheti*, sp.n., holotype, diameter 0.93 mm. B. *T. boucheti*, Bay of Biscay, diameter 0.84 mm. C. *T. boucheti*, paratype, diameter 0.81 mm. D. *T. boucheti*, Iceland, diameter 0.95 mm. E. *T. exquisita* (JEFFREYS), Swedish west coast, diameter 0.70 mm. F. *T. unisulcata* (CHASTER), Swedish west coast, diameter 0.95 mm.

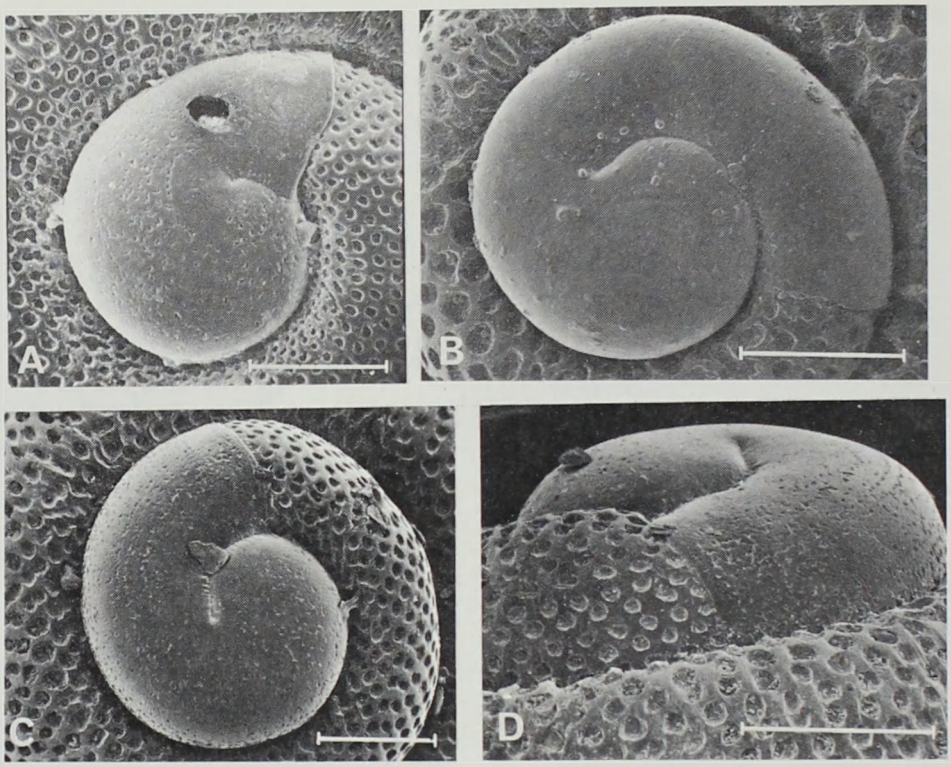


Fig. 24. A. *Tjaernoeia exquisita* (JEFFREYS), Swedish west coast. B. *T. boucheti*, paratype. C, D. *T. boucheti*, Bay of Biscay. — Scale lines 0.1 mm.

acidic formalin and it may belong to the new species described in this paper.

VAN AARTSEN & BOGI (1989) denied the identification by WARÉN & BOUCHET (1988) of *F. monterosati* with *A. exquisitus*, considered *F. monterosati* a *nomen nudum* and questioned that GRANATA really could have seen the very fine, 'punctati' sculpture. The background for this is that GRANATA gave a composite description of three species of *Fossarus* (*Megalomphalus*). The sculpture of spire was described as 'spirolineati ou punctati'. Since two of the species were previously described and have a sculpture which is 'spirolineati', the third one (*monterosati*) must be 'punctati'. This is an unusual sculpture, and among Mediterranean species of *Fossarus* shape, it is present only in *A. exquisitus*.

I still maintain this identification to be correct. Tests with an old mid-19th century microscope proved that the sculpture is well visible. GRANATA's use of the word apex does not necessarily refer to the protoconch, but is more likely to denote the top of the shell, when it was lying under the microscope, in the only stable position for this species, which means, with the umbilicus downwards.

There is no article in the Code which explicitly prohibits the identification of a species name by elimination, and thus the term 'indication' in the sense of ICZN Article 12(a) could include elimination. I have afterwards discussed the validity of GRANATA's introduction of the name *monterosati* with the Secretary of the ICZN, who has informed me that nevertheless the spirit of the word 'indication' is that it shall be a *direct* evidence for the identity of the species. This statement makes it clear that *monterosati* must be considered a *nomen nudum*.

I am grateful for this clarification, since it allows the more well known name A. *exquisitus* JEFFREYS to be kept.

Figure 23F is based on a shell of *Tjaernoeia unisulcata* (CHASTER, 1987), from the Koster area at the western coast of Sweden, the first record north of the British Channel. It is otherwise known from the southern and western coast of the British Isles and from the French Atlantic coast (RODRIGUEZ BABIO & THIRIOT-QUIÉVREUX 1947). The Swedish specimen has less pronounced basal furrow than French specimens, but is otherwise typical.

I have examined two more undescribed species of *Tjaernoeia*, from a depth of a few hundred meters, from New Zealand and the Gulf of Mexico. Both species are very similar to the new species described here.

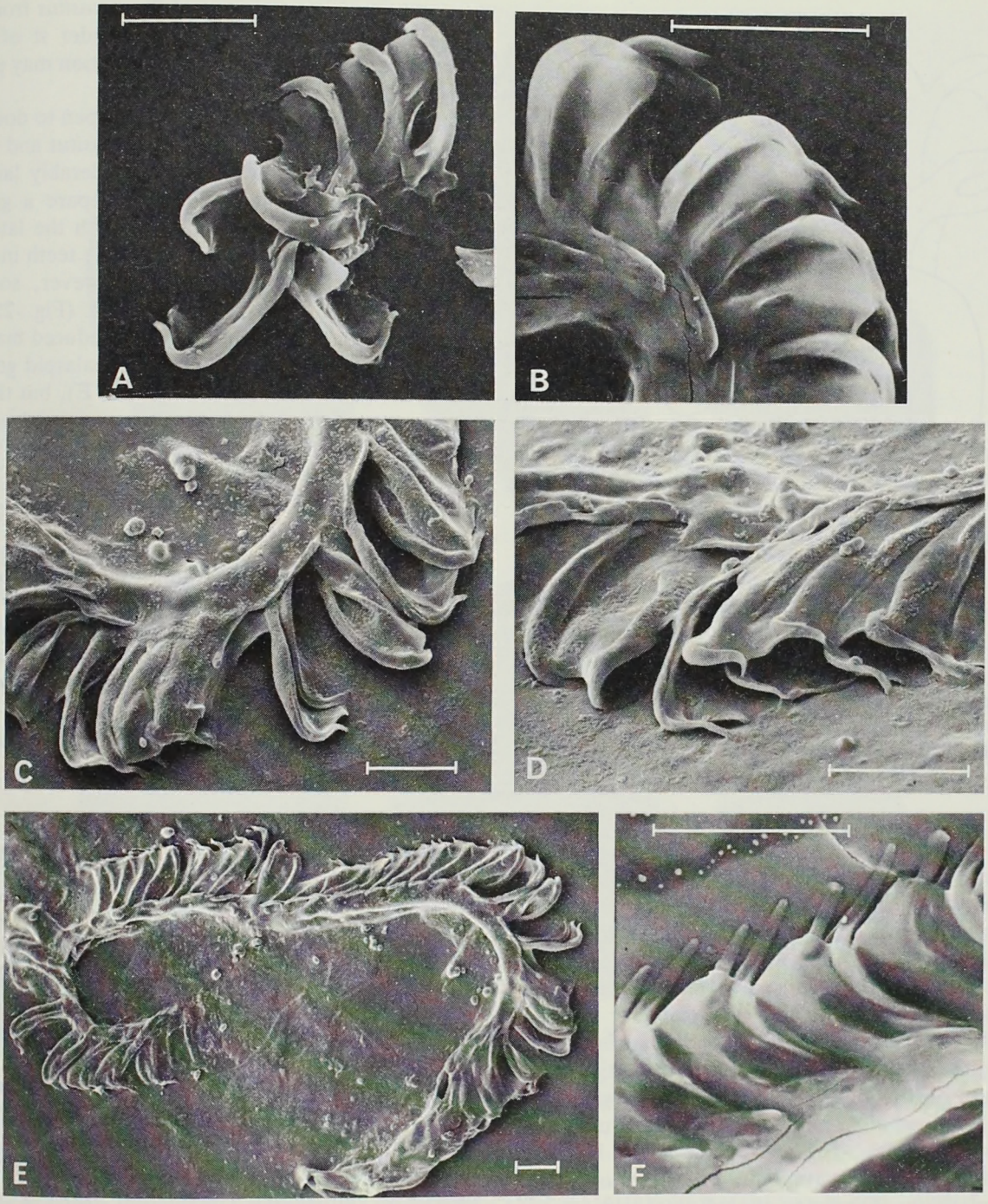


Fig. 25. *Tjaernoia* spp, radulae. A, B, F. *T. exquisita* (JEFFREYS), Swedish west coast. C–E. *T. boucheti*, holotype. — Scale lines 0.01 mm.

*Tjaernoeia boucheti* sp.n.
(Figs 23A–D shell, 24B–D protoconch, 25C–E radula)

Type locality. Rockall Trough, INCAL DS 01, 57°59′ N, 10°40′ W, 2091 m.

Type material. Holotype in MNHN, one paratype from the type locality SMNH 4184.

Material examined. Bay of Biscay, 48°39′ N, 10°37′ W, 1400 m, 1 specimen. — North of Iceland, 67°16′ N, 19°14′ W, 23 March 1983, 540 m, 1 sh, coll. JB.

Description. The shell (Fig. 23A) is very small and globular, has a wide umbilicus and a sharp sculpture of impressed pits. The larval shell (Fig.

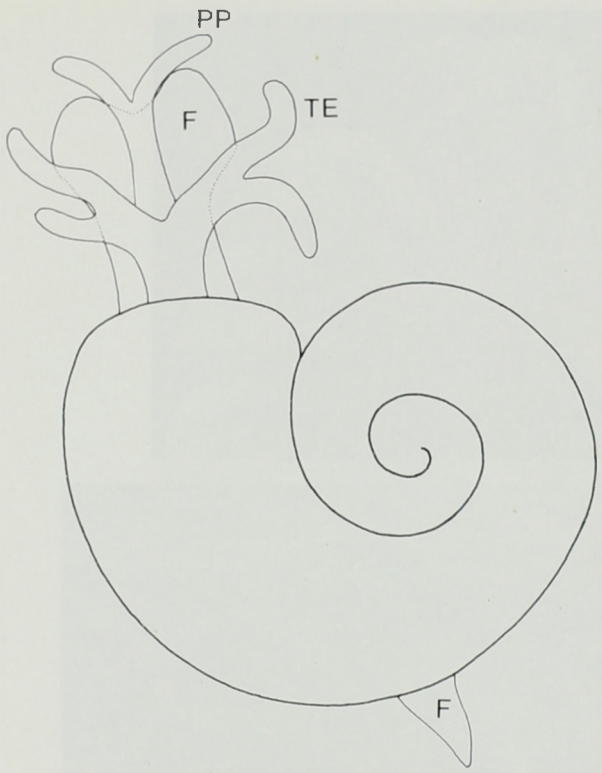


Fig. 26. *Tjaernoeia exquisita* (JEFFREYS), schematic drawing of crawling animal, diameter of shell 0.7 mm. F — foot; PP – propodium; TE — cephalic tentacle.

24B–D) consists of about 0.7–0.8 whorl, is perfectly smooth or sculptured with very small impressed, irregular pits of varying size and to some extent arranged in a spiral pattern. The diameter of the larval shell is 0.25 mm. The teleoconch consists of up to 1.9 whorls, sculptured by fairly large pits arranged in spiral lines, and of a diameter approximately equal to the width of the flat surface separating the pits. Close to the suture the pits are larger and partly anastomosing, giving an impression of a sculpture of raised zigzag lines. The umbilicus is deep and wide. The aperture is rather high and not drawn out sideways as in *T. exquisitus*.

Dimensions. Diameter of shell 0.93 mm.

Radula (Fig. 25C–D). Length 0.20 mm. It consists of about 40–50 transverse rows of fully formed teeth. Each transverse row seems to consist of a very thin marginal plate and a pair of central, simple, hook-shaped teeth.

Remarks. There is some variation in the sculpture of the protoconch. The two specimens from the Rockall Trough have a smooth protoconch of about 1/10 of a whorl more than the specimen from the Bay of Biscay. Such a variation has, however, also been observed in specimens of *T. exquisitus* from a single locality, and I presently consider it of no great importance. The sculptural variation may possibly be due to coprrosion.

The interpretation of the radula is open to doubt. Despite several attempts with *T. exquisitus* and one with *T. boucheti*, which has a considerably larger radula, I have not succeeded to prepare a good mount, but have always ended up with the lateral membranes folded up and covering the teeth in the centre. The lateral membranes, however, sometimes have a distict zigzag structure (Fig. 25F), which indicates that there may be a reduced marginal plate as in, for example, the cephalaspid genus *Toledonia* (see WARÉN 1989, fig. 4D, E), but there seems not to be any doubt that the two radulae figured in Fig. 25 are quite similar.

## Family Pyramidellidae

I have here enumerated the Scandinavian pyramidellid species, except those which normally should be classified in *Turbonilla* RISSO, 1826, *Odostomia* FLEMING, 1817, and *Ebala* GRAY, 1847. The reason for including several extralimital species is the considerable confusion in the determinations and the lack of good illustrations of many of the species.

### Genus *Aartsenia* nom.n.

Type species. *Amaura candida* MÖLLER, 1842, by monotypy.

Synonym. *Amaura* MÖLLER, 1842 (not GEYER, 1837).

Remarks. *Amaura* MÖLLER is preoccupied by the generic name of a butterfly and I have not been able to find a generic name which could be used to include the type species. Therefore the name has to be changed.

*Amoura*, ascribed to GRAY (1847) was cited by GRAY as '*Amoura*, MÖLLER, 1842. *Amoura candida*.', with no other explanation. According to ICZN article 33 (a)–(c) GRAY's spelling can not be considered an 'unjustified emendation', since there is no indication that it was GRAY's intention to change the name. Furthermore, subsequent authors who have noticed GRAY's deviating spelling, have considered it a misspelling (HERRMANNSEN 1852; PHILIPPI 1853; DALL & BARTSCH 1904; NEAVE 1939; VAN AARTSEN 1984 and pers. commn.). Therefore it has to be considered an 'incorrect subsequent spelling' and '*Amoura*' GRAY, 1847 has no nomenclatorial status.

This reasoning is also applicable on DE FOLIN's use of the name *Amoura* (1870), since he in the

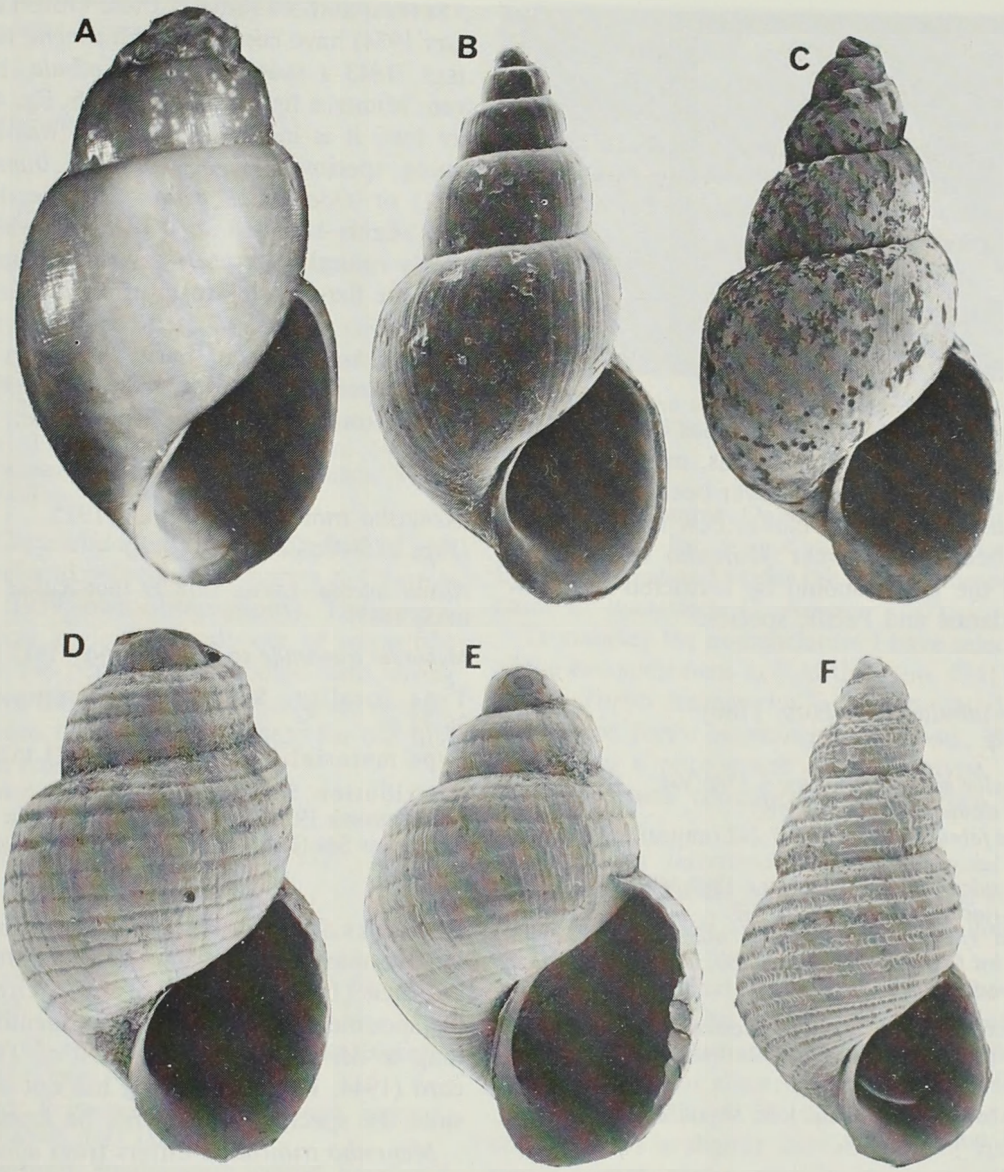


Fig. 27. A. *Artsenia candida* (Møller), syntype SMNH 3812, western Greenland, height 7.0 mm. B. *Liostomia eburnea* (Stimpson), northern Norway, Vadsø, ex. G.O. Sars, SMNH, height 4.6 mm. C. *Liostomia eburnea*, neotype, USNM 503943, height 4.2 mm. D–E. *Menestho truncatula* (Odhner), Spitsbergen, Advent Bay, 36–72 m, height 1.96 and 3.0 mm. F. *Menestho albula* (Fabricius), Iceland, coll. HL, height 2.91 mm.

legend to plate 9 quoted the name as '*Amoura* (Möller). Fig. 1. Amoura anguleuse. *Amoura anguliferens...*'

The generic name therefore has to be replaced and I name it after Mr. J. J. Van Aartsen, who has contributed with advice on this matter.

*Aartsenia candida* (Möller, 1842)
(Fig. 27A)

*Amaura candida* sp.n. — Möller 1842:80.

Type locality. West Greenland.

Type material. Several syntypes in ZMC, BMNH, and SMNH (3843).

Material examined. Greenland: Davis Strait, *Valorous* Expedition, 3 spms, BMNH 1877.11.28.84 — 'Greenland', 3 spms, coll. Cumming, BMNH. — West Greenland, 36 m, 3 lots with 4 spms.

Svalbard: Spitsbergen, 18–54 m, 3 lots with 10 spms. — Kong Karls Land, 60–70 m, 1 spm.

Kara Sea: 5 lots with 11 spms, east to 68°20′ E.

Northern Norway: Karlsøy, 9–27 m, 2 shs.

Distribution. Western Greenland, Svalbard, Kara Sea, northern Norway (Leche 1878; Posselt & Jensen 1898; unpublished material in SMNH). Depth range, usually 10–40 m.

Remarks. This little known species is so far not known from Iceland, but it is likely that it occurs at the northern coast. I give a figure of *A. candida* (Fig. 27A), since figures of this species are rare.

Möller's decription and examination of a rehydrated specimen confirms the systematic position in the Pyramidellidae. The columellar fold is very low and inconspicuous.

*Menestho* Möller, 1842

Type species. *Turbo albulus* Fabricius, 1780, by monotypy.

Remarks. The genus *Menestho* has been used for numerous groups of pyramidellids, mainly because the type species has almost never been well figured and because it is an old name. Few authors seem to have been aware what *Menestho* really looks like, and the genus should be restricted to a few North Atlantic and Pacific species.

*Menestho albula* (Fabricius, 1780)
(Fig. 27F)

*Turbo albulus* sp.n. — Fabricius 1780:394.
*Menestho albula:* Möller 1842:83.
*Odostomia fabricii* Jeffreys 1877:242 (unjustified emendation).
*Menestho sulcata* sp.n. — Verrill 1880:380.
*Menestho sulcata:* Verrill 1882:539.
*Odostomia* (*Menestho*) *morseana* nom.n. — Bartsch 1909:104, for *M sulcata* Verrill, 1880, not *Kleinella sulcata* A. Adams, 1862.

Type localities. *T. albulus*, western Greenland; *M. sulcata*, off Marthas Vineyard, northeastern United States, in 200–665 m.

Type material. *T. albulus*, lost; *M. sulcata*, presumably in USNM, not examined.

Material examined. West Greenland: Holsteinborg, 108 m, *Valorous* Expedition, 3 spms, BMNH 1877.11.28. 81. — 'West Greenland', leg. Möller, 3 spms, BMNH 1843.6.30.243–45. Same area, 3 lots with 9 spms, SMNH.

Northern Iceland: Skjalfandi, several spms, JHB. — 65°10′ N, 23°29′ W, 110–118 m, 9 Nov 1978, a few ex, JB. — 66°37′ N, 23°03′ W, 57–62 m, 9 Jul 1980, a few ex, JB. — Eastern Iceland: 64°32′ N, 13°02′ W, 123–136 m, 17 Aug 1980, a few ex, JB.

Svalbard: Spitsbergen, 8 lots with 80 spms, 6–90 m.

Distribution. Northeastern America from Massachusettes and northwards, western Greenland, northern Iceland, Svalbard (Verrill 1880; unpublished material in SMNH). Depth range, usually 10–100 m, occasionally 1000 m.

Remarks. Specimens from western Greenland and northern Iceland have flatter whorls than those from other localities. The specimen in Fig. 27F agrees perfectly with specimens from Möller in SMNH. Verrill's *M. sulcata* was based on a young specimen.

Several authors (among them Odhner 1915; Abbott 1974) have concidered *Phasinella sulcosa* Mighels, 1843 a synonym of *M. albula*, but judging from Mighels figure (1843, pl. 16, fig. 4; the types are lost) it is more likely that it was based on a young specimen of '*Odostomia*' *impressa* (Say, 1821) or '*Odostomia*' *trifida* (Totten, 1834). Mighels' figure shows a shell with flat whorls and an evenly conical spire and very shallow suture, while even the flat-whorled form of *M. albula* has a deep suture.

*Menestho albula* of early American authors is *Couthouyella striatula* (Couthouy, 1839), which I (1980a) transferred to the Epitonidae.

*Menestho truncatula* Odhner, 1915
(Figs 27D–E; 28 larval shell)

*Rissoa sulcosa:* Leche 1878:39 (not *Rissoa sulcosa* Mighels, 1843).

*Menestho truncatula* sp.n. — Odhner 1915:175.

Type locality. Svalbard, Spitsbergen, Advent Bay, 36–72 m.

Type material. Two syntypes SMNH 1538.

Distribution. Svalbard to Matotschkin Scharr, the Kara Sea (Odhner 1915; unpublished material in SMNH), and the Laptev Sea (Derjugin 1932). Depth range 20–270 m.

Remarks. This species is not known from Iceland, but it may well occur at the northern coast. Odhner (1915) recorded it from Greenland, but his specimens were erroneously identified and belong to *M. albula*. Examination of Thorson's record (1944, East Greenland) has not been possible since the specimens could not be found in ZMC.

*Menestho truncatula* differs from *albula* in having a more rapidly increasing diameter of the whorls, much weaker sculpture, and a thick, olive brown or green periostracum, instead of one that is thin and usually colourless. *Menestho truncatula* often occurs in the same samples as *M. albula*, which supports that they are two distinct species, and not phenotypic variations.

*Chrysallida* Carpenter, 1856

Type species. *Chemnitzia communis* C.B. Adams, 1852, by original designation, possibly subsequent designation Carpenter 1863:351.

Remarks. The species here included in *Chrysallida* form a heterogeneous assortment, but I have followed the traditional use of the genus, as long as no detailed treatment of the genus exists. Van

Aartsen (1977) reviewed the southern and western European species.

*Chrysallida spiralis* (Montagu, 1803)
(Fig. 29C)

*Turbo spiralis* sp.n. — Montagu 1803:323.
*Parthenina spiralis:* G.O. Sars 1878:200, tab. 11, fig. 4.

Type material. Three syntypes, RAMME no. 4240; three syntypes BMNH.

Type locality. Salcombe Bay, Devonshire, Great Britain.

New records. Southwestern Iceland, Faxafloi, numerous specimens, 20–50 m HL and JB.

Distribution. From Iceland and northern Norway, south to the western Mediterranean, in shallow water. Depth range 0–30 m.

Remarks. *Chrysallida spiralis* is a parasite of serpulid and sabellarid polychetes (Fretter & Graham 1949; Ankel 1959; own observations). The unusually large apical angle and sculpture of spiral ribs at and below the periphery combined with strong axial ribs above the periphery serve as good characters to recognize *C. spiralis*. It is here for the first time recorded from Iceland.

*Chrysallida interstincta* (J. Adams, 1797)
(Fig. 29A–B, G)

*Turbo interstinctus* sp.n. — J. Adams 1797:66.
*Turbo interstinctus:* Montagu 1803:324, plate 12 fig. 10.
*Jamina obtusa* sp.n. — Brown 1827, plate 50, fig. 38.
*Chrsallida obtusa:* Van Aartsen 1977:57, fig. 22.

Type locality. *T. interstinctus* and *J. obtusa*, Bigberry Bay, Devonshire, Great Britain.

Type material. *T. interstinctus* and *J. obtusa*, neotype, here selected, Ramme 4241 (Fig. 39C).

Material examined. Southwestern Iceland, Faxafloi, 8 Oct 1977, 25 m, a few shs, JB.

Distribution. Southwestern Iceland and northern Norway, to the Mediterranean. Depth range 0–50 m.

Remarks. Van Aartsen (1977) questioned why Winckworth (1932) had preferred the name of Brown (1827) in favour of the well known name *interstincta* Montagu (1803), since Winckworth never explained it. The reason may be that the name actually originates from J. Adams (1977), and that Winckworth considered J. Adams' poor figure to represent another species. Jeffreys (1867:153) also commented that a part of Adams' description does not fit *interstincta* as understood by all later authors, including Montagu (1803).

J. Adams' figure is certainly not more questionable than several others, which Winckworth considered good enough to require adoption of Adams' name (for example *Ondina divisa*). I can see no more reason for accepting the identification of Brown's name and prefer the more commonly used name *C. interstincta* (J. Adams, 1797).

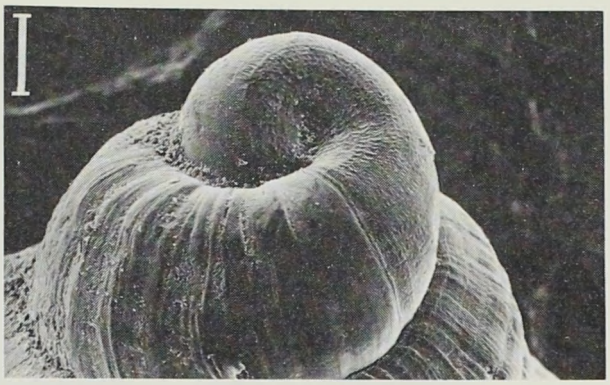

Fig. 28. *Menestho truncatula* Odhner, apex, Spitsbergen, Advent Bay, 36–72 m. — Scale line 0.1 mm.

To stabilize the nomenclature I have selected one of the two specimens in RAMME (no. 4241), determined *Turbo interstinctus* by Montagu (1803) as neotype of *Turbo interstinctus* J. Adams, 1797. Fig. 39C shows a photograph of the neotype. The lot mentioned also contained a badly worn shell of *Turbonilla* sp.

*Chrysallida interstincta* is characterized by its conspicuous columellar tooth, few spiral ribs, few and scattered axial ribs, and the deep and shouldered suture.

J. Adams' original figure does not fit the present species very well, his description does it better: 'T. testa laevi, quinque anfractibus costa tenui interstinctis. Obs. color albus, apertura subrotunda.'

Brown's (1827, pl. 50, fig. 38) figure of *Jamina obtusa* shows a slightly curved shell of rissoid or pyramidelloid shape with a distinct columellar tooth. It is thus a pyramidellid. It has a strong sculpture of straight axial ribs, which places it among the species here classified in *Chrysallida*. The presence of a columellar tooth excludes *C. indistincta* from the possible candidates for *Jamina obtusa*.

This neotype designation is also made in accordance with ICZN article 75G, since J. Adams' name may otherwise threaten other well established names.

*Chrysallida sarsi* Nordsieck, 1972
(Fig. 30A, C)

*Chrysallida (Besla) sarsi* sp.n. — Nordsieck 1972:98.
*Chrysallida sarsi:* Fasseaux 1974:121–129.

Type locality. Not designated, either De Panne, Belgium or Colunga, northern Spain.

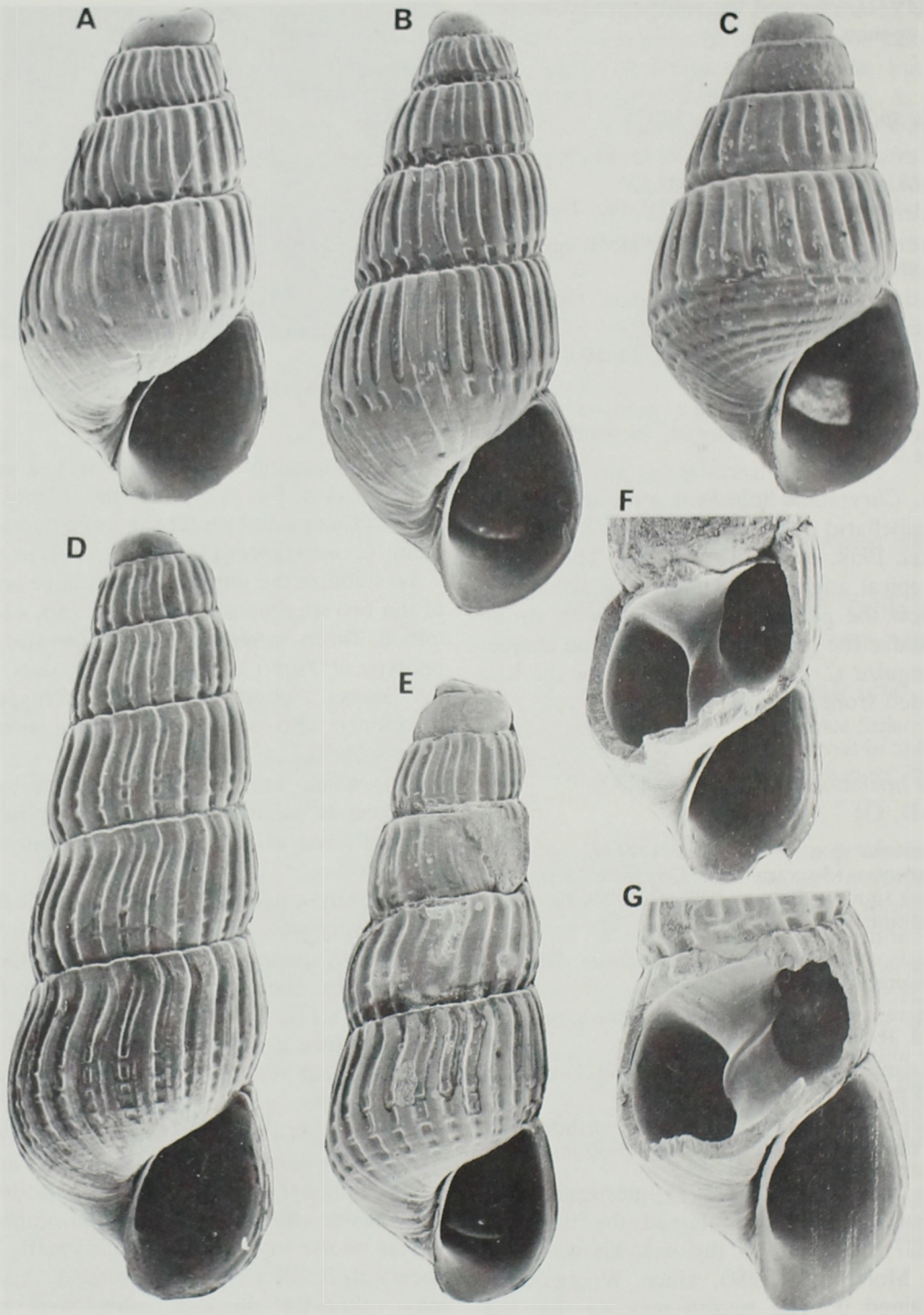


Fig. 29. *Chrysallida* spp. All magnified 33 times. A–B. *C. interstincta* (MONTAGU), Swedish west coast, Koster area, height 1.91 and 2.30 mm. C. *C. spiralis* (MONTAGU), Swedish west coast, Koster area, height 1.85 mm. D. *C. indistincta* (MONTAGU), Shetland, height 2.98 mm. E. *C. indistincta*, Swedish west coast, Koster area, height 2.38 mm. F. *C. indistincta*, body-whorl opened to show columellar fold. G. *C. interstincta*, body-whorl opened.

Type material. Several syntypes in private collection of W. Fasseaux, Charleroi, Belgium; 2 syntypes SMNH 4110.

Material examined. Western Norway: Bergen, 2 shs. Swedish west coast: Koster area, 25–40 m, 12 spms.

Distribution. Incompletely known, but here verified from western Norway to northern Spain.

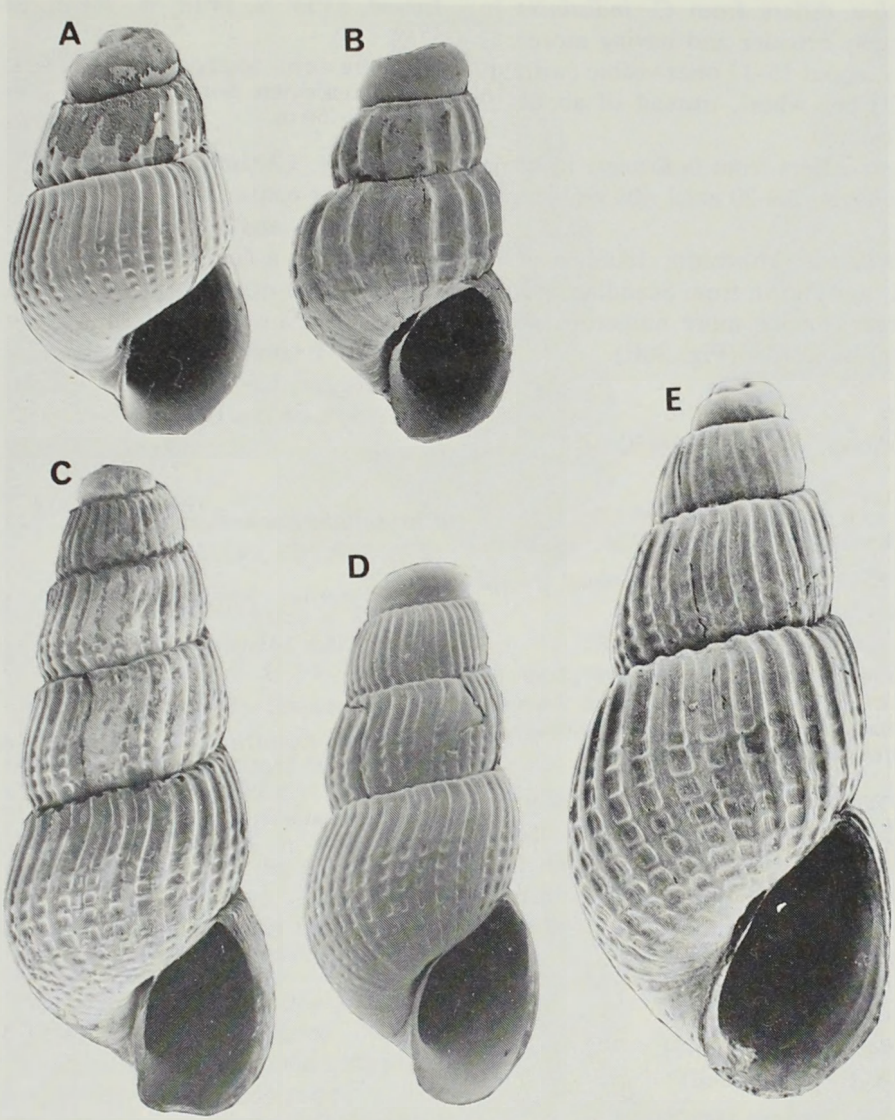


Fig. 30. *Chrysallida* spp. All magnified 33 times. A. *C. sarsi* NORDSIECK. Swedish west coast, Koster area, height 1.32 mm. B. *C. bjoernsoni* sp.n., eastern Greenland. 62°29′ N, 40°42′ W, 156 m, height 1.42 mm, JB. C. *C. sarsi*, syntype. Arcachon, France, SMNH, height 2.26 mm. D. *C. juliae* (DE FOLIN), syntype, MNHN, height1. 86 mm. E. *C. decussata* (MONTAGU), Shetland, height 2.55 mm.

Remarks. NORDSIECK (1972) suggested *sarsi* as a new name for the species figured by G.O. SARS (1878, plate 11, fig 2 and plate 22 fig. 14) as '*Parthenia interstincta* Montagu var.'. NORDSIECK's figure and description show very little resemblance to SARS' figures. NORDSIECK's specimen (and also the one figured by VAN AARTSEN (1977, fig. 15) under this name) have distinctly convex whorls and sigmoid ribs. I therefore interpret NORDSIECK's new name as a description of a new species based on the specimens in the collection of W. Fasseaux. The association with SARS' figures I consider a misidentification, and not as a reference to SARS' figure as being what the description was based upon.

*Chrysallida sarsi* was then described in more detail and illustrated by FASSEAUX (1974). I have borrowed the types from Fasseaux and Fig. 30C is based on one of them, kindly given to SMNH.

Comparison of specimens of *C. sarsi* from Scandinavia, and the types of *C. juliae* (DE FOLIN, 1872) (Fig. 30D), showed that although *juliae* and *sarsi* are quite similar, *sarsi* is proportionally broader and has flatter whorls. They both share the almost total lack of columellar fold with *C. indistincta*.

*Chrysallida juliae* differs from *C. indistincta* in being proportionally broader and having more numerous axial ribs, about 15–17 ones visible (without turning the shell) per whorl, instead of about 10 as in *C. indistincta*.

*Chrysallida sarsi* differs from *indistincta* in being still broader and having 18–20 axial ribs visible, per whorl.

*Chrysallida decussata* (MONTAGU, 1808), a more southern species, not known from Scandinavia, differs in being larger, having more numerous spiral ribs and straighter axial ribs (Fig. 30E).

*Chrysallida indistincta* (MONTAGU,1808)
(Fig. 29D–F)

*Turbo indistinctus* sp.n. — MONTAGU 1808:129.
*Chrysallida indistincta:* VAN AARTSEN 1977:55, fig. 14.

Type locality. 'Found in the Boysian cabinet' [presumably British].

Type material. Not in RAMME or BMNH.

Material examined. Western Norway: 60°17'30" N, 05°10'20" E, 17–22 m (E110–69), 1 sh. — Bergen, 2 spms.

Swedish west coast: Bonden, off Gullmarsfjorden, 4 spms. — Koster area, 20–50 m, 250 spms.

Remarks. *Chrysallida indistincta* can easily be confused with *C. interstincta*, but differs in having a very poorly developed columellar tooth (cf. Figs 29F and G), and in having three to four instead of two spiral lines at the periphery. For differences from *C. sarsi*, see that species.

*Chrysallida eximia* (JEFFREYS, 1849)
(Figs 31E–F; 33A–B, larval shell)

*Rissoa eximia* sp.n. — JEFFREYS 1849:299.
*Parthenia eximia:* G.O. SARS 1878:199, tab. 11, fig. 3.

Type locality. Lerwick, Shetland.

Type material. See WARÉN 1980b.

Material examined. Eastern Greenland: 62°29' N, 40°42' W, 156 m, 22 Sept. 1976, 3 ex, JB.

Northern Iceland: 67°07.9' N, 22°46.3' W, 265–270 m, 10 Sept 1983, a few ex, JB. — Southwestern to western Iceland: Reykjanesridge and Jökultunga, 200–400 m, a few shs, HL. — Southeastern Iceland: Skeidarardypi, 15 Apr 1988, 40 shs, JHB, SMNH.

Western Norway: 'Bergensfjorden' 1878, Hardangerfjorden 1879, Florø 1882, 61 shs, BMNH 1911.10.26. 29286–312. – Raunefjorden and Korsfjorden, also off the coast, usually 30–300 m, occasionally to 600 m, 14 samples with 70 spms.

Skagerrak: Swedish west coast, Koster area and southwest of the Koster Islands, 35–220 m, 8 samples with 68 spms.

British Isles: Shetland, coll. Jeffreys, BMNH 1859.4.18. 12 and 1861.11.22.6, 2 shs. — Shetland, 1899, BMNH 1911.10.26.29278–85, 8 shs; — Shetland, 1 sh, coll. Winckworth, BMNH. — *Porcupine* Expedition 1869, west of Ireland, 53°13' N, 14°18' W, 764 m, BMNH 1885.11.5. 1979, 1 sh.

Distribution. Southeastern Greenland, southern Iceland, and northern Norway, south to Great Britain. Depth range 75–750 m.

Remarks. *Chrysallida eximia* can be identified by its strongly convex whorls, with a strong sculpture of axial ribs and 3 spiral ribs. The protoconch is high and has a coarse surface (Fig. 33A–B).

*Chrysallida eximia* is a comparatively well known species, and it is surprising how restricted the distribution is. Examination of the collections in MNHN, BMNH, and USNM did not reveal a single specimen south of the British Isles.

*Chrysallida hoeisaeteri* sp.n.
(Figs 31A, C; 33C, larval shell)

Type locality. Southwestern Norway, off Korsfjorden, 60°07'53" N, 04°55'55" E, 270–250 m, 13 Feb 1973, 1 spm, together with 3 spms of *C. eximia* and 2 spms of *C. brattstroemi* (E76–73).

Type material. Holotype SMNH 4091.

Material examined. Eastern Greenland: 62°29' N, 40°42' W, 22 Sept 1976, 156 m, 1 sh, JB.

Western Iceland: 2 spms, HL. — Northern Iceland: *Ingolf* Expedition, Stn 126, 67°19' N, 15°52' W, 533 m, 2 spms, ZMC. — Southeastern Iceland: Skeidardypi, 15 Apr 1988, 20 shs, JHB.

Distribution. Only known from the material examined, from eastern Greenland, western to southeastern Iceland, and western Norway. Depth range 150–530 m.

Decription. The shell (Fig. 31A, C) is small, fairly solid, conical, colour-less, with a rather large, expanding aperture. The larval shell (Fig. 33C) consists of about one visible, perfectly smooth, strongly protruding whorl of a diameter of 0.35 mm. The teleoconch has 3.2 moderately convex whorls of slowly increasing diameter, with a main sculpture of 15–20 distinctly proscoline, broad, axial ribs per whorl. There are also two strong spiral ribs, just below the periphery and a more indistinct one at the pheriphery. The axial ribs stop at the lowermost spiral rib and leave the basal area smooth, except for the growth lines and an occasional rib that may continue. The suture is deep, not channelled. The aperture is ovate, its lower part is distinctly expanded. The parietal wall is covered by a thin callus. There is no columellar fold present. The umbilicus consists of a very narrow crevice between the inner lip and the parietal wall. Height of holotype 1.94 mm.

Remarks. *Chrysallida hoeisaeteri* resembles *C. eximia* in the general appearance of the shell, but has a distinctly more conical shape, an impression

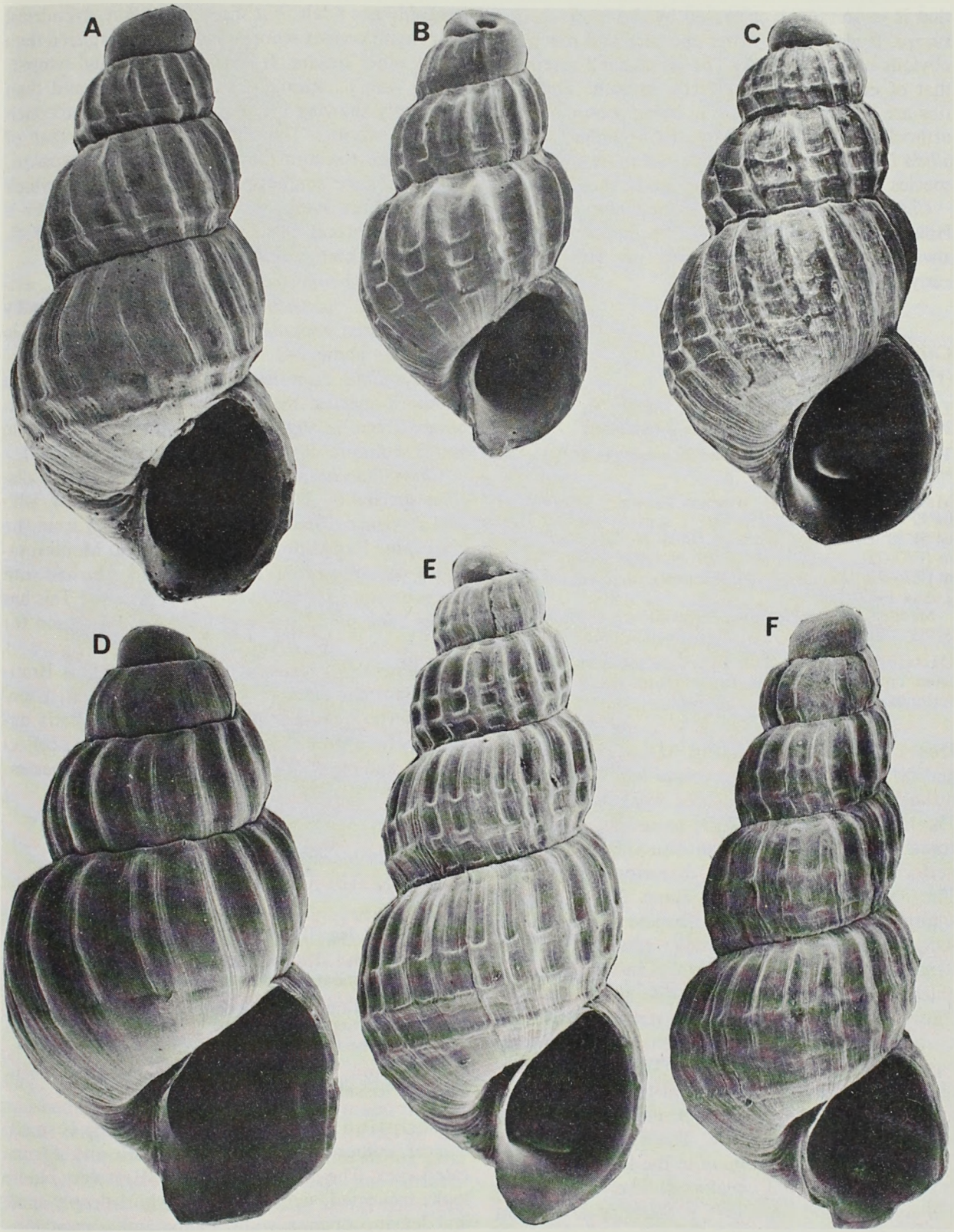


Fig. 31. *Chrysallida* spp. All magnified 45 times. A. *C. hoeisaeteri* sp.n., holotype, height 2.00 mm. B. *C. bjoernsoni* sp.n., holotype, height 1.52 mm. C. *C. hoeisaeteri,* southwestern Iceland (leg. HL), height 1.85 mm. D. *C. sublustris* (FRIELE), syntype, ZMB, height 2.03 mm. E. *C. eximia* (JEFFREYS), Koster area, Swedish west coast, height 2.3 mm. F. *C. eximia,* western Norway, Raunefjorden, 60°16.5′ N, 05°11.8′ W, 120 m (E62–69), height 2.11 mm.

that is to some extent caused by the more shallow suture. It also has a higher aperture and much less obvious umbilical chink. The larval shell resembles that of *eximia,* but is perfectly smooth. The axial ribs are very characteristic in being prosocline, not orthocline as in most species of *Chrysallida. Chrysallida brattstroemi* is a smaller and more cylindrical species with a less protruding larval shell.

*Chrysallida hoeisaeteri* is named after Mr Tore Høisæter. at the Biologisk Stasjon, Espegrend, who always was very helpful during my visits in the early seventies.

*Chrysallida brattstroemi* sp.n.
(Figs 32A–C, 33D larval shell)

Type locality. The Skagerrak, 58°54′ N, 10°33′ E, 200–220 m, mud with arenaceous foraminifera.

Type material. Holotype and 20 paratypes SMNH 4094 and 4095.

Material examined. Western Norway: 60°08′08″ N, 04°49′00″ E, 333 m (E53–73), 1 spm. — 60°08′05″ N, 04°51′30″ E, 306 m, 1 spm. — 60°08′ N, 04°51′30″ E, 306 m (E67–73), 1 spm. — 60°07′50″ N, 04°55′55″ E, 270–250 m (E76–73), 2 spms. — Trondheimsfjorden, Brettingsnes, 2 Aug 1939, 1 sh.

Mediterranean: *Porcupine* Expedition, 1870, Stn 56, 37°03′ N, 11°36′ E, 710 m, 5 shs, coll. Sykes, BMNH.

Distribution. Only known from the material examined, from Trondheimsfjorden, western Norway, to the Mediterranean. Depth range 200–710 m.

Description. The shell (Fig. 32A–C) is very small and cylindrical, blunt, and colour-less, with strong, orthocline axial ribs and three weaker spiral ribs. The larval shell is (Fig. 33D) somewhat depressed, consists of slightly less than one visible whorl, is perfectly smooth and has a diameter of 0.32 mm. The teleoconch consists of about 2.3 rather flat whorls of slowly increasing diameter, with a main sculpture of about 20 strong, rounded, slightly flexuous, orthocline ribs per whorl and irregular and much finer incremental lines. The spiral sculpture consists of three ribs, which do not cross the axial ribs, and which are placed so that the lowermost one is concealed by the suture. The axial ribs continue basally to the lower spiral rib and enter, although then much weaker, the umbilicus. The suture is deep and channelled. The aperture is large, ovate, and slightly expanded in the lower part. The parietal callus is well developed. There is no columellar fold. The umbilicus is fairly wide. Height of the holotype 1.15 mm.

Remarks. *Chrysallida brattstroemi* could easily be mistaken as a young specimen of some other species of *Chrysallida,* and the specimens examined are probably not adult, but the short, blunt, cylindrical shape with convex whorls, is more pronounced than in any other species. It has also been found sympatrically with *C. eximia* on two occasions and than constantly showing the more depressed protoconch and flat whorls. The shape is similar to that of *Chrysallida flexuosa* (Jeffreys MS, Monterosato, 1874), a more southern deep-water species which has a distinct subsutural notch, giving the ribs a strong subsutural curvature. I give a figure of *C. flexuosa* for comparison (Figs 32E–F, 33F).

*Chrysallida brattstroemi* also differs from *C. eximia* and *C. hoeisaeteri* in having proportionally lower whorls, about 2.3 times as broad as high, in the others about 2–2.1 times.

*Chrysallida stefanisi* (Jeffreys, 1869), a more southern species, has a shape similar to *C. brattstroemi,* but is slightly larger and has a uniform spiral sculpture covering all the shell (Fig. 32D).

*Chrysallida brattstroemi* was first noticed as a distinct species by J.T. Marshall (unpublished), who had recognized five shells in the material from the *Porcupine* Expedition and sent them to Monterosato for determination. They had been returned with a manuscript name, '*Odostomia procuerta*'. This has never been published, and I can see no reason for using it.

I name this species after Professor Hans Brattström, former director of Biologisk Stasjon, Espegrend, who helped and encouraged me greatly during my field work there around 1970, when I collected this and many other interesting and new species.

*Chrysallida bjoernssoni* sp.n.
(Figs 30b, 31B, 33E larval shell)

Type locality. Southeastern Iceland, Skeidarardypet, about 200 m, leg. JHB 15 Apr 1988.

Type material. Holotype and 9 paratypes, SMNH 4092 and 4093, 10 paratypes coll. JHB.

Material examined. Eastern Greenland: 62°29′ N, 40°42′ W, 22 Sept 1976, 156 m, 2 sh, JB.

Iceland: The type locality.

Distribution. Only known from southeastern Greenland and Iceland. Depth range 150–200 m.

Description. The shell (Figs 30B, 31B) is small, conical, colourless, with convex whorls and a truncated apex. The larval shell (Fig. 33E) is very blunt, looks truncated, with the initial whorl deeply sunk and leaving open a wide, deep, and conspicuous apical umbilicus. The protoconch consists of a little more than one visible whorl, diameter 0.38 mm, sharply set off from the teleoconch, which starts well inside the flange-like aperture of the larval

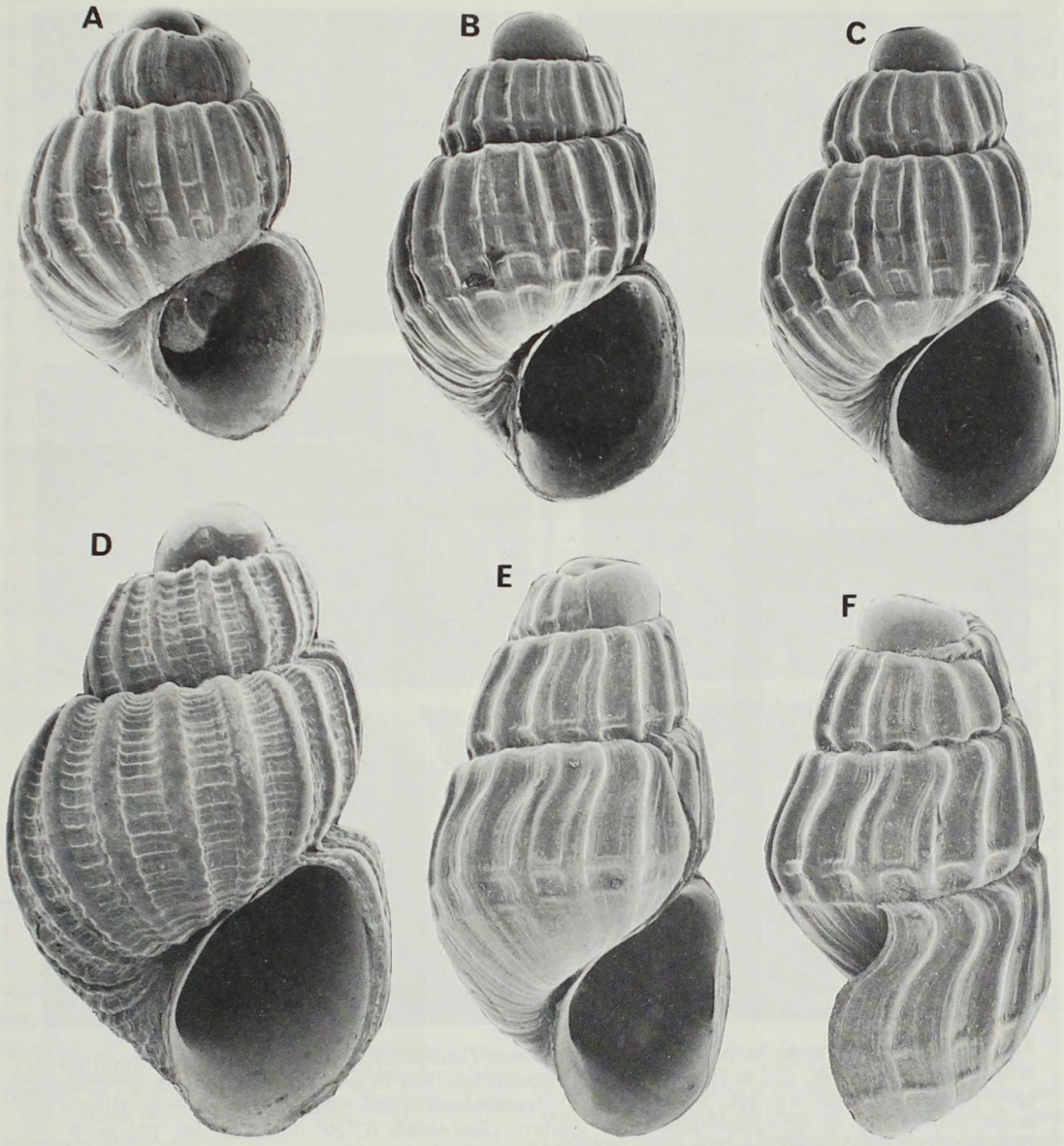


Fig. 32. *Chrysallida* spp. All magnified 50 m times. A. *C. brattstroemi* sp.n., Mediterranean, off Pantellaria, 710 m, coll. Sykes, BMNH, height 1.1 mm (aperture damaged). B–C. *C. brattstroemi*, paratypes, Swedish west coast, west of the Koster Islands, 200–220 m, height 1.17 and 1.19 mm. D. *C. stefanisi* (JEFFREYS), Mediterranean, Adventure Bank, 167 m, coll. Sykes BMNH, height 1.48 mm. E–F. *C. flexuosa* (JEFFREYS), France, off Banyuls, height 1.38 and 1.23 mm.

shell. The surface of the protoconch is smooth and polished, but there are 4–5 very sharp and narrow spiral lines. The teleoconch consists of up to 2.7 strongly convex whorls, sculptured with strong axial ribs, which become lower towards the sutures. There are also three much weaker spiral lines; the lower one concealed by the suture but visible on the body-whorl; the two higher ones situated at 1/5 and 2/5 of the height of the whorls. The basal area is only sculptured by the axial ribs, which here are much weaker. The aperture is fairly slender and there is a deep and narrow umbilicus demarcated by a distinct keel. There is no columellar fold. Height of holotype 1.40 mm, maximum height 1.65 mm.

Remarks. *Chrysallida bjoernssoni* bears some resemblance to *C. eximia* in the general shape of the teleoconch, but the truncated shape of the protoconch, the apical umbilicus, and the smooth surface of the protoconch will distinguish them well.

This species is named after Johannes Björnson,

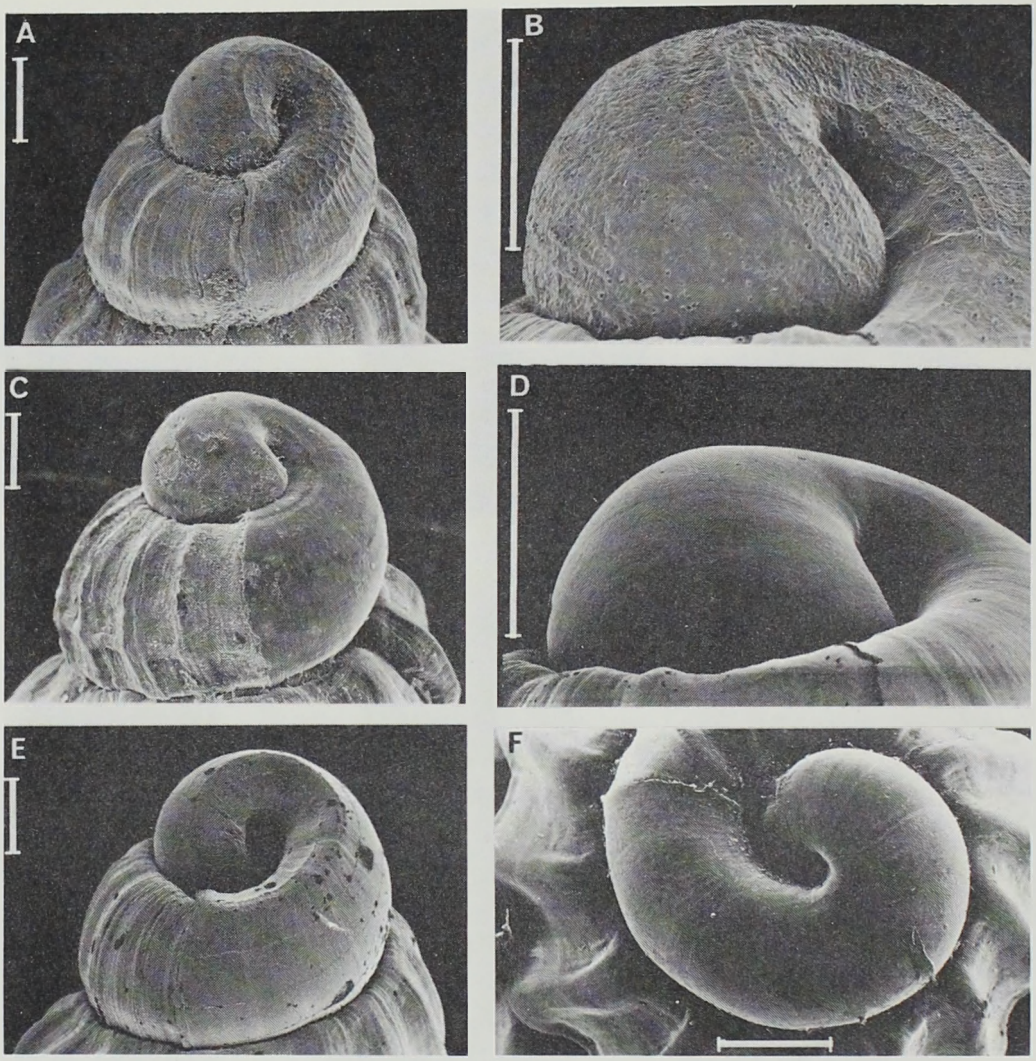


Fig. 33. *Chrysallida* spp., larval shells. A. *C. eximia* (JEFFREYS), western Norway, Raunefjorden, 6016.5′ N, 05°11.8′ W, 120 m (E62–69) B. *C. eximia*, Swedish west coast, Koster area. C. *C. hoeisaeteri* sp.n., Iceland, leg. HL, SMNH. D. *C. brattstroemi* sp.n., Sweden, west of the Koster Islands, 200–220 m. E. *C. bjoernssoni* sp.n., eastern Greenland, 62°29′ N, 40°42′ W, 156 m. F. *C. flexuosa* (JEFFREYS), Southern France, off Banyuls. — Scale lines 0.1 mm.

who has collected many interesting species from northern Iceland, especially from the fishing grounds around Kolbeinsöy, Grimsöy, and in Skjalfandi.

*Chrysallida sublustris* (FRIELE, 1886)
(Fig. 31D)

*Odostomia sublustris* sp.n. — FRIELE 1886:29.

Type locality. Den norske Nordhavsexpedition, off northwestern Norway, 640–1187 m.

Type material. Several syntypes ZMB 21612, 21613, 21614; BMNH 1910.10.26.29313 (coll. Norman, from Stn 157b).

Material examined. Jan Mayen: *Ingolf* Expedition, Stn 116, 70°05′ N, 08°26′ W, 675 m, 2 shs, ZMC.

Off northeastern Iceland: 66°12′ N, 12°21.5′ W, 17 Oct 1982, 364 m, 1 sh, JB.

Distribution. Only known from the material mentioned above, from south of Jan Mayen and eastern Iceland, to northwestern Norway. Depth range 364–1187 m.

Remarks. I have placed *C. sublustris* in *Chrysallida* because of its resemblance to *C. eximia*, from which it can be separated by being larger, broader and smoother with a less angular appearance. The columellar tooth is inconspicuous and visible as a small bump, and the shell has no spiral sculpture.

*Chrysallida fenestrata* (JEFFREYS, 1848)
Fig. 39A, B)

*Odostomia fenestrata* sp.n. — JEFFREYS 1848:345.

Type locality. Dartmouth, Devon, Great Britain.

Type material. Lost.

Material examined. Swedish westcoast, Koster area, between Tjärnö and Öddö, 5 m, 1 sh, leg. C. Schander.

Distribution. Western Sweden, western Ireland, and southwestern Great Britain, south to the Mediterranean. (GRAHAM 1988). Depth range usually 10–25 m.

Remarks. The single shell from Sweden is old and worn and may be a postglacial fossil. There is no species known in northwestern Europe which invites to confusion.

*Ondina* DE FOLIN, 1870

Type species. *O. semiornata.* DE FOLIN, 1872 ( = *Odostomia warreni* (THOMPSON, 1845)), by monotypy (Fig. 34E).

Remarks. I follow VAN AARTSEN (1984, 1987) in using the generic name *Ondina.*

*Ondina divisa* (J. ADAMS, 1797)
(Figs 30C, 36E–F larval shell, 39D type)

*Turbo divisus* sp.n. — J. ADAMS 1797:254.
*Turbo insculptus* sp.n. — MONTAGU 1808:129.
*Menestho* or *Odostomia insculpta:* (MONTAGU, 1808) AUCTT.

Type locality. *T. divisus* and *T. insculptus*, Great Britain, Devon, Ilfracombe.

Type material. *T. divisus*, neotype, here selected, the syntype, here selected as lectotype, of *T. insculptus*, in BMNH 1896.8.6.37, labelled 'Ilfracombe [Devon]' (Fig. 39D).

New records. Western to southwestern Iceland: Faxafloi; Isafjardardjup, several records, 100–350 m, HL.

Distribution. Western to southern Iceland and northern Norway, Sweden south to the Bay of Biscay. Depth range usually 10–100 m.

Remarks. I have examined the type material of *Auriculina coarctata* G.O. SARS and found it to differ from *O. divisa*, which is smaller and has less convex whorls (see below).

In Sweden *O. divisa* often is very common on muddy bottoms between 25 and 50 m depth.

A single record from northeast America (VERRILL 1880), off Marthas Vineyard in 886 m, needs to be verified (USFC Stn 892), but I did not find the specimen when examining the pyramidellids in USNM.

To stabilize the nomenclature, I have selected the syntype of *Turbo insculptus* MONTAGU, as neotype of *T. divisus* J. ADAMS. J. ADAMS mentioned in the description that *T. divisus* is both smooth and striated, which makes this identification convincing, especially since no other such species are known from Great Britain. The combined neo- and lectotype is figured in Fig. 39D.

*Ondina coarctata* (G.O. SARS, 1878)
(Fig. 30F)

*Auriculina coarctata* sp.n. — G.O. SARS 1878:205, tab. 11, fig. 10.
*Ondina coarctata:* VAN AARTSEN 1987:17, 18.

Type locality. Hasvig, northern Norway, 90–180 m.

Type material. One syntype, ZMO D 1126; 1 syntype, Hasvig, Finnmark, USNM 132715.

Material examined. Western Iceland: 1 spm., HL — 64°21′ N, 12°43.5′ W, 162 m, 31 Mar 1982, 1 sh, JB.

Distribution. Only known from the material above, from Iceland and northern Norway.

Remarks. *Ondina coarctata* resembles *O. divisa*, but can be separated by being larger, and having proportionally shorter aperture, stronger spiral sculpture, deeper suture and more convex whorls. The syntype in ZMO is 5.2 mm high, that one in USNM is 3.3 mm.

*Ondina diaphana* (JEFFREYS, 1848)
(Fig. 34B)

*Odostomia diaphana* sp.n. — JEFFREYS 1848:341.
*Odontostomia (Auristomia) perezi* sp.n. — DAUTZENBERG & FISHER 1925:81.
*Ondina perezi:* VAN AARTSEN 1987:14, fig. 50.

Type localities. *O. diaphana*, southwestern Great Britain, Exmouth; *O. perezi*, western France, Bisayeres, Cochons-noirs and Goulet de Brest, in shells inhabited by *Phascolion strombi* (Sipunculoidea).

Type material. *O. diaphana*, USNM 753707. — *O. perezi*, in coll. Dautzenberg, Institut Royal de Sciences Naturelles, Bruxelles, also in USNM, see VAN AARTSEN 1987.

Material examined. Northern Iceland: Skjalfandi, 2 shs, HL from JHB. — Southwestern Iceland: Faxafloi, 100–150 m, 2 shs., HL. — Faxafloi 25 m, Aug 1974, a few ex, JB.

Swedish west coast: Koster area and off Gullmarsfjorden, 25–100 m, 20 shs and spms.

British Isles: The Hebrides, coll. Jeffreys, 1 sh, BMNH 1866.10.2.19. — Shetland, coll. Jeffreys, BMNH 1884.2.5.118–119, 2 rather slender spms. — Shetland, coll. Jeffreys, BMNH 1861.11.22.24, a badly broken sh, similar to typical *perezi*. — Brora Shetland, 1 sh., coll. Conch. Soc. of G.B., BMNH. — Cornwall, leg. Barlee, 4 shs, BMNH 1911.10.26. 30234–38. — Hoy Sound, the Orkneys, 66 m, 1 sh, leg. Winckworth, 8 Sept 1917, BMNH.

Western France: Roscoff, 18 spms leg. Perez (not types), coll. Winckworth, BMNH.

Distribution. So far known from northern Iceland, the Swedish west coast, and south to the French Atlantic coast. Depth range 10–100 m. It lives in gastropod and scaphopod shells inhabited by the sipunculoid *Phascolion strombi* (Montagu).

Remarks. Van Aartsen (1987) considered *O. diaphana* and *O. perezi* to represent two different species. *Ondina perezi* was said to differ by its larger size, by having a less glossy surface, less convex whorls, and a less distinct umbilicus.

I have seen a similar variation in Scandinavian material, but it does not follow the same combination of characters. The specimens from Iceland are somewhat smaller than typical *perezi,* they have comparatively flat whorls and a polished surface. Swedish specimens are also smaller than *perezi,* but there is a variation in shape ranging from typical *perezi* to *diaphana,* and there is also a variation in the development of the umbilicus, unrelated to the variation in shape. Specimens from sandy bottom have a more shiny shell surface than those from muddy bottoms. I therefore agree with other autors who have considered the two names to be based on the same species.

Jeffreys' type specimen is a badly broken specimen that does not constitute a reliable basis for identification. I can not deny or verify its identity with the present concept, neither does the original description contain information enough to do this.

Jeffreys (1848, 1851, 1867), however, compared it with *O. obliqua* and pointed out that it is most similar to that species but has a more cylindrical shell. This supports the present identification. So do also the specimens used for the redescription by Jeffreys (1867).

Kristensen (1970) considered *O. diaphana* to be host-specific on *Phascolion strombi,* and I have found living specimens only by cracking the shells used by the sipunculoid.

*Odostomia oblongula* J.T. Marshall (1895:39), described from the Minch, the Hebrides, 72 fathoms may have been based on large specimens, like the typical *perezi.*

*Ondina obliqua* (Alder, 1844)
(Fig. 34D)

*Odostomia obliqua* sp.n. — Alder 1844:327.
*Ondina obliqua:* Van Aartsen 1987:19, fig 29.

Type locality. Tynemouth, eastern Great Britain.

Type material. Not seen.

Material examined. Swedish west coast: Koster area, 30 spms

British Isles: Channel Islands, Guernsey, 3 shs, BMNH 1911.10.26.30173–75.

Distribution. From Great Britain and the Swedish west coast south to the Mediterranean, quite rare (Van Aartsen 1987; Jeffreys 1867; material in SMNH). Depth range 30–100 m.

Remarks. *Ondina obliqua* resembles *O. warreni* (Thompson, 1845) (Fig. 34E), but the initial whorl is distinctly upturned and almost disjunctly coiled, not tightly apressed to the succeding whorl as in *warreni. O. warreni* was recorded from western Norway by G.O. Sars (1878), but I have not been able to find his specimens, and question the determination. It has a more southern distribution, from the western part of the British Isles and southwards, occurs in more shallow water and is more common than *obliqua.*

*Ondina normani* (Friele, 1886)
(Fig. 34A)

*Odostomia normani* sp.n. — Friele 1886:29.

Type locality. Bergen area and Sognefjorden, western Norway, 54–90 m.

Type material. Two syntypes (1 badly broken) ZMB 21621 (Florø, 54 m), 1 syntype USNM 185333, 'Den norske Nordhavsexpedition. Stn 28, Lervig 237 m' (depth and station number inconsistent); 1 syntype BMNH 1911.10. 26.30172 (Florø, 180 m).

Distribution. Only known from the type material from western Norway.

Remarks. *Ondina normani* has never been correctly identified since the description. Thiele (1928) assumed it to be an older name of *Toledonia limnaeoides* (Odhner, 1913). This was denied by Lemche (1948), who considered it a distinct pyramidellid, while Marcus (1976) placed it in *Toledonia,* without giving any reasons. Platts (in Just & Edmunds 1985:162) referred *O. normani* to *Toledonia.* Warén (1989) examined the syntypes and referred *Odostomia normani* to the Pyramidellidae.

Examination of the type material showed that it is quite similar to *Liostoma afzelii,* but differs in being proportionally more slender, having a deeper, channelled suture, a more slender and higher aperture, a much more narrow umbilical chink, and a small but distinct columellar tooth.

I have placed *O. normani* provisionally in *Ondina* because of the shape and the texture of the shell. Furthermore, the development of the columellar tooth is quite similar to the species of *Ondina.*

*O. normani* has shorter and more shouldered whorls, a more cylindrical shape, and broader umbilicus than *O. diaphana.*

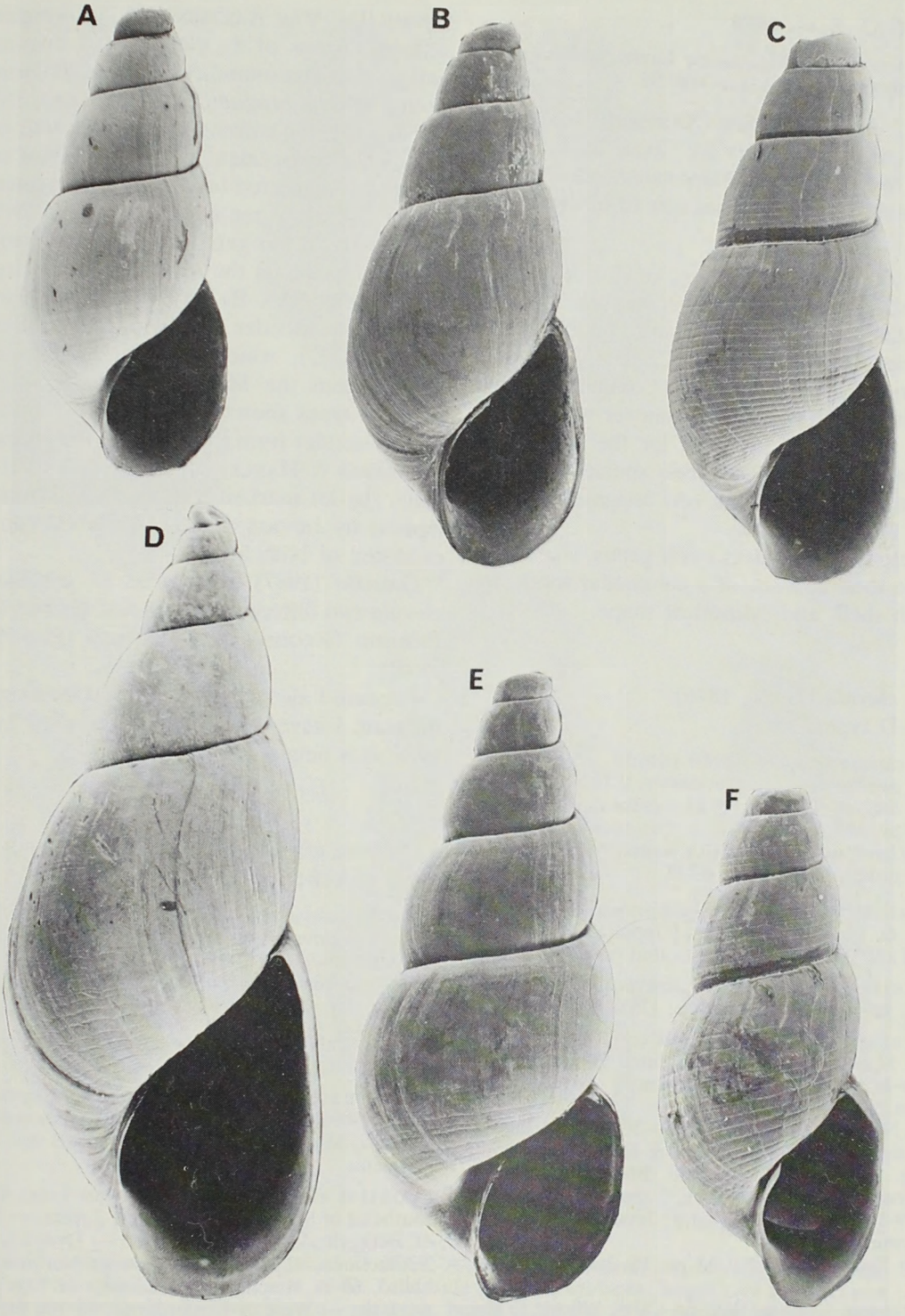


Fig. 34. *Ondina* spp. All magnified 25 times. A. *O. normani* (FRIELE), syntype, ZMB 21621, height 2.40 mm. B. *O. diaphana* (JEFFREYS), France, Roscoff, height 2.9 mm. C. *O. divisa* (J. ADAMS), Swedish west coast, Koster area, height 2.96 mm. D. *O. obliqua* (ALDER), England, height 4.1 mm. E. *O. warreni* (THOMPSON), Shetland, height 3.3 mm. F. *O.coarctata* (G.O: Sars), Iceland. coll. HL., height 2.68 mm.

*Liostomia* G.O. Sars, 1878.

Type species. *Turbonilla clavula* Lovén, 1846, subsequent designation Monterosato 1884:95.

Remarks. *Rissoa eburnea* Stimpson, 1851 was designated as type species by Dall & Bartsch 1904, who had overlooked Monterosato's designation, a mistake which then has spread in the literature.

Due to the misidentification of Lovén's *Turbonilla clavula* by all later authors (see that species) the genus *Liostomia* is actually 'based on a misidentified species' in the sense of ICZN and the case should have to be referred to the Commission for a decision. In reality, however, whatever way a decision goes, makes no difference for the interpretation of the genus since the two species must be closely related. I have tentatively assigned Lovén's species as the type species.

I have used *Liostomia* as a full genus, characterized by the total absence of a columellar tooth, by the smooth shell, and cylindrical shape.

*Liostomia clavula* Lovén, 1846)
(Fig. 35C–D types, 35G)

*Turbonilla clavula* sp.n. — Lovén 1846:18.
*Odostomia pistillus* sp.n. — Brugnone 1873:9.
*Odostomia brugnoni* nom.n. — Monterosato 1874:266.
*Odostomia pistilliformis* nom.n. — Brugnone 1876:24.
*Odostomia (Liostomia) clavula:* Van Aartsen 1987:6, fig. 7.
*Odostomia pistillus:* Gaglini 1987:9.

Type localities. *T. clavula,* Gullmarsfjorden, Swedish west coast; *O. pistillus,* calcareous [Upper Pliocene-Pleistocene] tuff and Recent in the sea around Palermo, Sicily.

Type material. *T. clavula,* four syntypes; SMNH 1519; *O. pistillus,* three possible syntypes, USNM 133026.

Material examined. Swedish west coast: Koster area, 5 lots with 13 spms, 20–90 m. — Central part of Bohuslän, Bohus–Malmön, Brandskär, 45 m, 1 spm. — Gullmarsfjorden, S. Lovén, 1 spm.

Western Norway: Korsfjorden, 150–300 m, 2 spms.

British Isles: 'Figured by Forbes & Hanley [1853, pl. XCVII, fig. 8]', coll. Hanley, 1 sh, BMNH 1904.12.30. 578. — Cornwall, Isle of Cumbrae, 2 spms, BMNH 1911. 10.26.30349–55. — Channel Islands, Jersey, 72 m, 2 shs, leg. Winckworth, BMNH.

Northern Spain: Vigo Bay 36 m, 16 shs, coll. Sykes, BMNH.

Mediterranean: Corsica, Baie de Calvi, 120 m, 15 shs, SMNH. — Sicily, Palermo, 2 + 3 + 6 shs, BMNH 1885. 4.11.90–91, 1911.10.26.30343–45, 30352–57. — 'Coast of Piedmont' (Golfo di Genova, Italy), 1 spm, BMNH 1856. 5.19.200. — Pantellaria 710 m, 10 + 7 shs. — Tripoli, 72–218 m, 3 shs. — Adventure Bank, 167 m, 15 + 30 shs. — Sicily, Palermo, leg. Monterosato, 2 + 15 shs; all in coll. Sykes, BMNH.

Distribution. Western Norway and the Skagerrak, south to the Mediterranean. Depth range 20–100 m (cf. material examined).

Remarks. Van Aartsen (1987) distinguished two different forms of *L. clavula,* the nominate form and *pistillus* Brugnone, 1873 (= *pistilliformis* Brugnone, 1876 = *brugnoni* Monterosato, 1874).

Primarily, the correct name for *pistillus* is *brugnoni,* since a replacement name of a junior secondary homonym suggested before 1961 permanently invalidates the name replaced (ICZN art. 59(b)).

Secondly, it has generally been assumed that *clavula* was based on the larger form with less convex whorls (Fig. 35A–B) and that *pistillus* was based on the more slender form with more convex whorls (Fig. 35C–D), which was earlier the only form known from the Mediterranean. Examination of Lovén's types showed that also *clavula* was based on this slender form. So was also the specimen used by Forbes & Hanley (1851, plate XCVIII, fig. 8), while the lot marked 'Fig. d. B. C.' (which means figured by Jeffreys 1869) in USNM (no. 133010) consisted of both forms.

Gaglini (1987) considered *O. pistillus* and *O. clavula* two different species and figured them from Palermo (Recent) and Ficarazzi (Plio-Pleistocene fossil).

Because I also consider the two forms specifically different I have described the so-called 'typical *clavula*' as a new species.

*Liostomia afzelii* sp.n.
(Figs 35A–B; 36A, larval shell)

*Liostomia clavula:* G.O. Sars 1878:207, tab. 7, fig. 13.
*Liostomia clavula* var. robusta var.n. Chaster 1898:22 (infrasubspecific).
*Liostomia clavula:* Van Aartsen 1987:6 (partim), fig. 6 (not Lovén, 1846).

Type locality. Swedish west coast, Koster area, south of Lilleskär, 30–40 m.

Type material. Holotype and numerous syntypes SMNH 4096 and 4097; numerous syntypes sent to BMNH 1989135, MNHN, USNM 860474, ZMB 66417, coll. van Aartsen.

Material examined. Swedish west coast: Koster area, southeast of Sneholmen, 35–55 m, 3 spms. — 300 m north of Berggylteskär, 36 m, 1 spm. — Dynekilen, south of Tjällholmen, 42 m, 1 sh. — Between Nordhällsö and Sydhällsö, 60 m, 4 spms. — Southwest of Tegelskär, 18–27 m, 1 sh. — West of Kosteröarna, 40–100 m, 6 spms. — South of Lilleskär, 30–40 m, very fine silt, c. 600 spms. — Off Gullmarsfjorden, Bohus–Malmön, Dynan–Brandskär, 50 m, 10 spms. All in SMNH.

Western Norway: Korsfjorden, 150–300 m, 1 spm.

British Isles: Shetland, 3 shs, BMNH 1911.10.26. 30339–41.

Mediterranean: Tunisia, off Tunis, 91–182 m, 4 shs, coll. Sykes, BMNH.

Distribution. Western Norway to the western Mediterranean. Depth range 20–200 m.

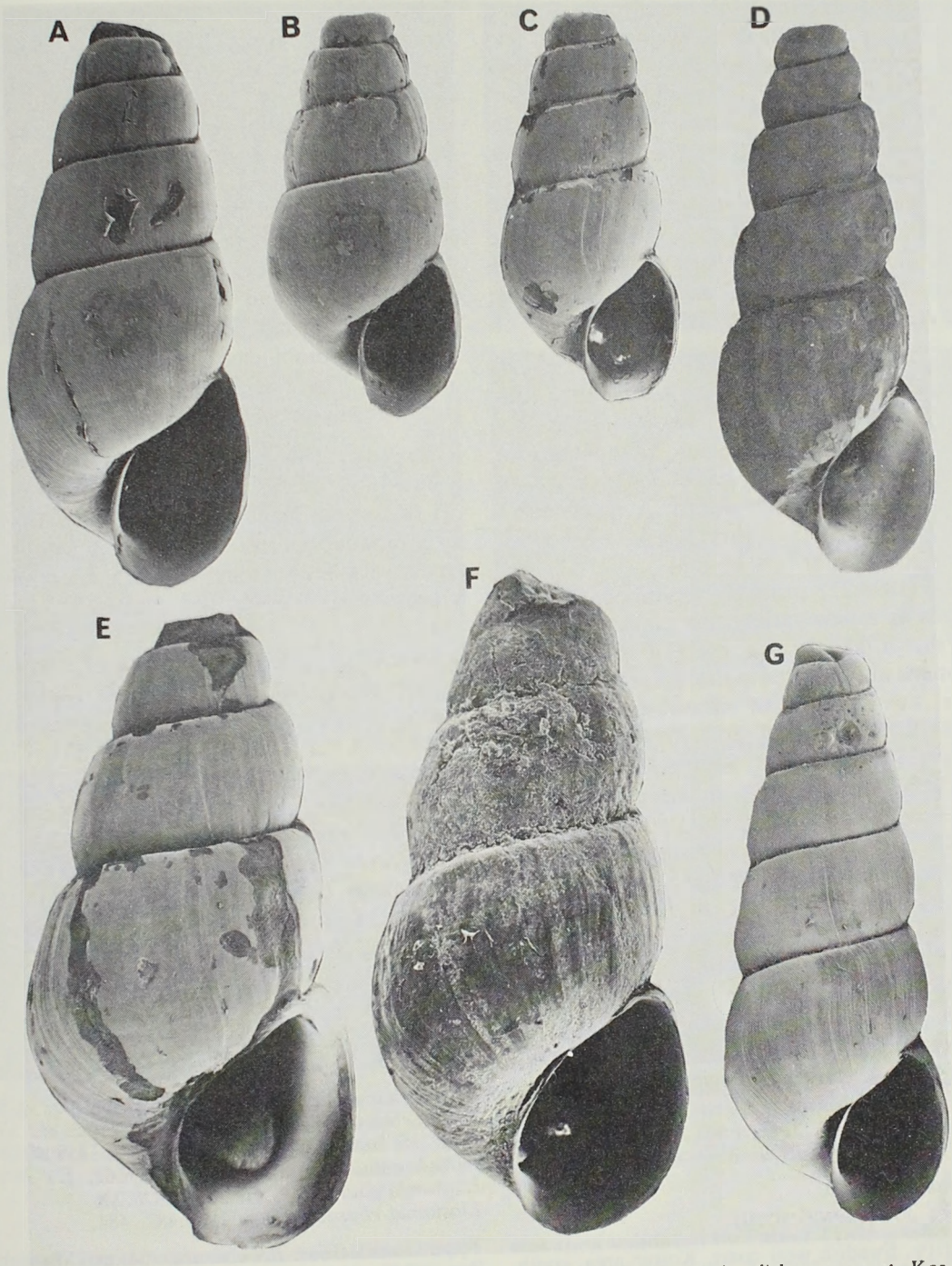


Fig. 35. *Liostomia* spp. All magnified 33 times. A–B. *L. afzelii* sp.n., Swedish west coast, Koster area, height 2.12 and 1.51 mm. C–D. *L. clavula* (Lovén), syntypes, height 1.17 and 2.15 mm (shell corroded). E. *L. hansgei* sp.n., paratype, height 2.39 mm. F. *L. hansgei*, holotype, with ferrugineous deposits, height 2.62 mm. G. *L. clavula*, Corsica, Baie de Calvi, 120 m, height 2.12 mm.

Description. The shell (Fig. 35A–B) is small, cylindrical, transparent colour-less, and broad, with truncated apex. The larval shell (Fig. 36A) consists of slightly more than one whorl (initial part concealed) and its diameter is about 0.38 mm. Adult specimens have about 3.8 distinctly and evenly convex, smooth, and polished teleoconch whorls, sculptured only by very indistinct incremental lines. Occasionally there is a stronger growth line or incremental scar, marking a longer stand-still in the growth.

There is a less transparent subsutural zone, formed by the contact surface to the preceding whorl, and of a height corresponding to 0.20–0.25 of the height of the whorls. The aperture is regularly ovate, evenly rounded below, slightly pointed in its upper part. The parietal callus is very thin, the outer lip never thickened. The inner lip is thin and fragile and forms a deep umbilicus. There is no trace of columellar tooth, even after half a whorl has been broken open. The outer lip is slightly protruding in its lower part, most so at 3/8 of its height. Height of holotype 2.28 mm, diameter 1.06 mm.

Remarks. There is some variation in the convexity of the whorls and the breadth of the shell, but still it is broader and has flatter whorls than *L. clavula*. The most slender specimen in the type lot (600 spms) is 2.04 mm high, has a diameter of 0.96 mm and has 3.5 teleoconch whorls. A specimen of *clavula* of similar size (2.14 mm) has 4.3 teleoconch whorls and a diameter of 0.86 mm.

Chaster (1898:22) probably described the present species as a new variety, but considering that he wrote that it 'has the characters of ordinary British specimens markedly exaggerated', I feel convinced that it was intended as infrasubspecific in the sense of ICZN article 45 G II 1.

Van Aartsen (1987:6) mentioned that one sample in USNM contained specimens intermediate between *clavula* and *afzelii*, an opinion he has maintained in our correspondence. I have examined the same sample, but failed to find any intermediates. There is always a difference in the number of whorls when similar sizes are compared, *clavula* having about 0.8 whorls more in adult specimens.

I have occasionally found the two species sympatrically.

*Liostomia afzelii* is named after Mr. Lars Afzelius, director of Tjärnö Marine Biological Laboratory.

*Liostoma hansgei* sp.n.
(Fig. 35E–F; 36C, larval shell)

Type locality. Swedish west coast, Koster area, south of Lilleskär, 30–40 m, fine silt.

Type material. Holotype and four paratypes, SMNH 4098 and 4099.

Material examined. Western Norway: Outer part of Fanafjorden, 60°13′10″ N, 04°14′20″ E, 200–190 m, clay (E386–69), 1 spm. — Korsfjorden, 60°12.5′ N, 05°11.2′ E, 280–200 m, ooze (E99–70), 1 spm, 1 juvenile spm. — Fanafjorden, 60°14′24″ N, 05°17′00″ E, 150 m, clay with some sand (E242–72), 2 shs.

Description. The shell (Fig. 35E–F) is of medium size for the family, fairly solid, with a deep suture. It is cylindrical, colour-less, often covered by solid ferrugineous deposits, has a blunt apex and a small aperture. The larval shell (Fig. 36C) is blunt, its initial part is deeply sunken in the centre, perfectly smooth, very bluntly and indistinctly keeled on top, and has a diameter of about 0.44 mm. Adult specimens have about 3.5 smooth teleoconch whorls, which are covered by a thin, transparent, slightly iridescent periostracum. There are some very indistinct growth lines but no spiral sculpture. The suture is very deep and sharply channelled. The aperture is fairly broad, continuous, with a thin parietal callus. The umbilicus consists of a slender fissure or chink. There is no trace of columellar tooth. Holotype, height 2.62 mm.

Remarks. This new species bears some resemblance to *L. afzelii*, but is larger at the same number of whorls, has a much deeper and broader suture, broader aperture, and a more solid shell. The types were found together with *L. afzelii*, which indicates that they do not constitute a fenotypical variation.

The only species I am aware of that resembles *L. hansgei* is *Odostomia aartseni* Nofroni, 1988, from 100–200 m depth between Corsica and Sicily, which has a very similar shape, but differs in having a weak columellar tooth.

The shell of *L. hansgei* when covered by ferrugineous deposits has some superficial resemblance to *Hyala vitrea* (Montagu, 1808) (Iravadiidae).

*Liostomia hansgei* is named after Mr. Hans G. Hansson, Tjärnö Marine Biological Laboratory.

*Liostomia eburnea* (Stimpson, 1851)
(Fig. 27B; C, neotype)

*Rissoa eburnea* sp.n. — Stimpson 1851a:14.
*Rissoa eburnea:* Stimpson 1851b:34.
*Hydrobia nitida* nom.nud. — M. Sars 1859:85.
*Jeffreysia nitida* sp.n. — Friele 1876:61.
*Liostomia eburnea:* G.O. Sars 1878:206.
*Liostomia eburnea:* Bush 1909:482, 484.

Type localities. *R. eburnea*, 54 m, Massachusettes Bay, off Cape Ann; *J. nitida*, western Norway, Florø.

Type material. *R. eburnea*, lost in 'the Great Chicago Fire' 1871 (Abbott 1973), neotype here designated. Fig. 27C, USNM 503943; *J. nitida*, lost, not in ZMB or ZMO.

Material examined. United States: Maine, Frenchmans Bay, leg. W.F. Clapp, 2 spms, USNM 503943 (neotype) and 860476, Maine, Frenchmans Bay, 27 m, 2 spms, USNM 406608.

Svalbard: Spitsbergen, Kol Bay, 3–4 m, 1 sh,. — Bell Sound, 36 m, 1 sh.

Northern Norway: Vadsø, 18–36 m, G.O. Sars leg., 2 shs, ZMO 1014; 4 spms, ZMB 28182; 6 spms, SMNH; 3 + 2 spms, BMNH 1911.10.26.30334–36, 30337–38.

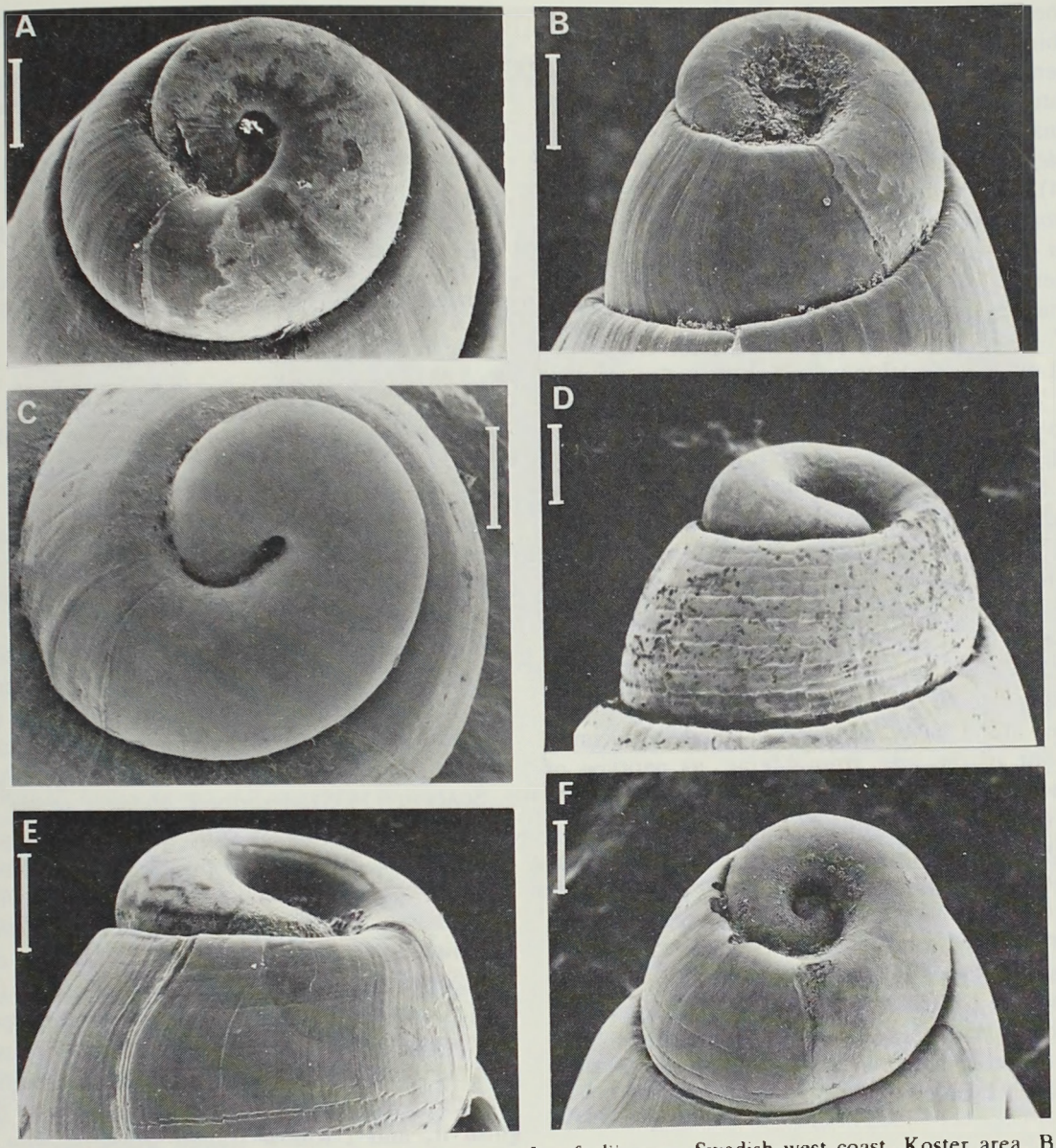


Fig. 36. *Ondina* and *Liostomia*, larval shells. A. *L. afzelii* sp.n., Swedish west coast, Koster area. B. *O. diaphana* (JEFFREYS), western France, Roscoff. C. *L. hansgei* sp.n., western Norway, Korsfjorden, south of Lerøyosen, 60°12.5′ N, 05°11.2′ E, 280–200 m (E99–70). D. *O. coarctata* (G.O. SARS), Iceland, coll. HL. E–F. *O. divisa* (J. ADAMS), Swedish west coast, Koster area. — Scale lines 0.1 mm.

Distribution. Incompletely known, from Massachusettes and the Gulf of St. Lawrence east to Svalbard (ODHNER 1915) and northern Norway, in shallow water.

Remarks. MÖRCH (1857) was probably the first author after STIMPSON to use the name *eburnea*, for an unidentified gastropod (number 4), mentioned by MÖLLER (1842) from western Greenland. It has not been possible to find his specimens and because of that I can not confirm its presence in Greenland, although it probably occurs there.

M. SARS (1859) mentioned but did not describe *Hydrobia nitida* from western Norway. This name was then validated by FRIELE (1876), who described and figured M. SARS' species under the name *Jeffreysia nitida*. WHITEAVES (1872) recorded *R. eburnea* from the Gulf of St. Lawrence. G.O. SARS (1878) recorded it from northern Norway, figured it, and identified M. SARS' name with that of STIMPSON. BARTSCH (1909) listed the species in his revision of the New England pyramidellids, but said that he had not seen it and referred to STIMPSON's description. BUSH (1909:482, 484, fig. 7) in a commentary on BARTSCH's paper, figured the species, from Maine, a figure agreeing with G.O. SARS' concept

of the species. ODHNER (1915) used G.O. SARS' combination of names and recorded it from Spitsbergen (Kol Bay). LEMCHE (1948) considered all literature records of STIMPSON's *eburnea*, except the original description, to be based on *Toledonia limnaeoides* (ODHNER, 1913) (see WARÉN 1989). ABBOTT (1974) simply omitted it. HØISÆTER (1986) listed *Liostomia eburnea* (STIMPSON, 1851) and *Liostomia nitida* (FRIELE, 1876) as two different species.

There is thus a considerable confusion concerning the names involved here. I have examined G.O. SARS' and ODHNER's specimens and there is no doubt that they belong to the same species. M. SARS' and FRIELE's single specimen could not be found in ZMB or ZMO and I assume it to be lost. It did, however, agree well with G.O. SARS' specimens, judging from FRIELE's figure of *J. nitida*.

There are no types left of STIMPSON's *Rissoa eburnea*. Examination of all undetermined pyramidellids from the western Atlantic, in USNM, revealed two lots of the same species as the one for which G.O. SARS used the name *Liostomia eburnea*. These two lots can not be identified with any species described from the western Atlantic, except STIMPSON's *Rissoa eburnea* and I have therefore selected a specimen from one of the lots, from Maine, as neotype of *Rissoa eburnea*, to stabilize the use of STIMPSON's name (Fig. 27C).

Examination of one of G.O. SARS' specimens from Vadsø, after rehydration of the dried soft parts, confirmed the position in the Pyramidellidae. The animal has centrally situated eyes; triangular, flattened tentacles, and lacks a radula.

Although *L. eburnea* differs considerably from the other species here placed in *Liostomia* I have found no other genus in which to place it, and for this reason I have kept it in *Liostomia*.

### *Eulimella* FORBES & MACANDREW, 1846

Type species. *Eulima macandrei* FORBES, 1844, by original designation.

Remarks. VAN AARTSEN (1988) discussed the type designations of *Eulimella* and concluded that all previous authors were wrong, and that the genus and its type species should be quoted as above. I share this view.

### *Eulimella scillae* (SCACCHI, 1835)
(Figs 37A; 38C, larval shell)

*Melania scillae* sp.n. — SCACCHI 1835:51.
*Eulima crassula* nom.nud. — JEFFREYS 1839:34.
*Eulima macandrei* sp.n. — FORBES 1844b:412.
*Eulimella compactilis*: G.O. SARS 1878:208 (not JEFFREYS, 1867).

Type localities. *E. macandrei*, the Hebrides, Loch Fine, 20 m; *M. scillae*, Upper Pliocene(?), southern Italy, around Gravina di Puglia.

Type material. Not known.

Material examined. Southern and western Iceland: Grindavikursjo to Vestfjordur, numerous records, 100–200 m, HL. — 63°09′ N, 21°41′ W, 570–528 m, 22 Jul 1978, a few ex, JB. — 62°58′ N, 25°36′ W, 970 m, 22 Apr 1980, a few ex, JB.

The Faroes: BIOFAR Stn 295, 59°54′ N, 07°37′ W, 655 m, 1 sh.

Distribution. Eastern Atlantic from western Iceland and northern Norway to the Mediterranean. Depth range usually 50–500 m.

Remarks. G.O. SARS' (1878) *Eulimella compactilis* was based on young specimens of *E. scillae* (ZMO 997, Lofoten, numerous spms and shs, coll. G.O. SARS).

There seems to be no species which easily can be confused with *E. scillae*, even if the young can be confused with *E. laevis*. The large size (up to 13 mm), flat whorls and shallow suture distinguish it from *E. laevis* and *E. ventricosa* (cf Fig. 38A–E).

SCACCHI (1835) described *Melania scillae* as an Upper Pliocene (-Pleistocene ?) fossil from southern Italy. From the same deposits he also described other species which have been identified with recent ones living in intermediate depths (*Bathyarca pectunculoides*, *Abra longicallus*, '*Murex calcar*' [not SOWERBY, 1823] [= *Trophon echinatus* (BIVONA)], *Cadulus olivi*) and listed many other species, now living in the Mediterranean. I therefore assume that the fossil form is so similar to the recent one that there is little or no practical reason to distinguish it, and I follow Italian workers, who have continued to use SCACCHI's name, as did VAN AARTSEN (1988).

The name *Eulimella affinis* (PHILIPPI, 1844) has sometimes been used for this and the following species, but this is an Italian Pleistocene fossil from Palermo, evidently not known as Recent (see CERULLI-IRELLI 1914).

*Eulimella polita* (VERRILL, 1872) was said to resemble *E. scillae* (VERRILL 1882:539). VERRILL did, however, not specify any differences. It was described from 36 m depth in Maine (United States). The type of *E. polita* was not found by BARTSCH (1909), nor by me. A single badly corroded specimen, USNM 203244 from Nova Scotia, Bay of Funday, 1872 (determined by Verrill), still exists in USNM, but is in too poor condition, even for generic determination.

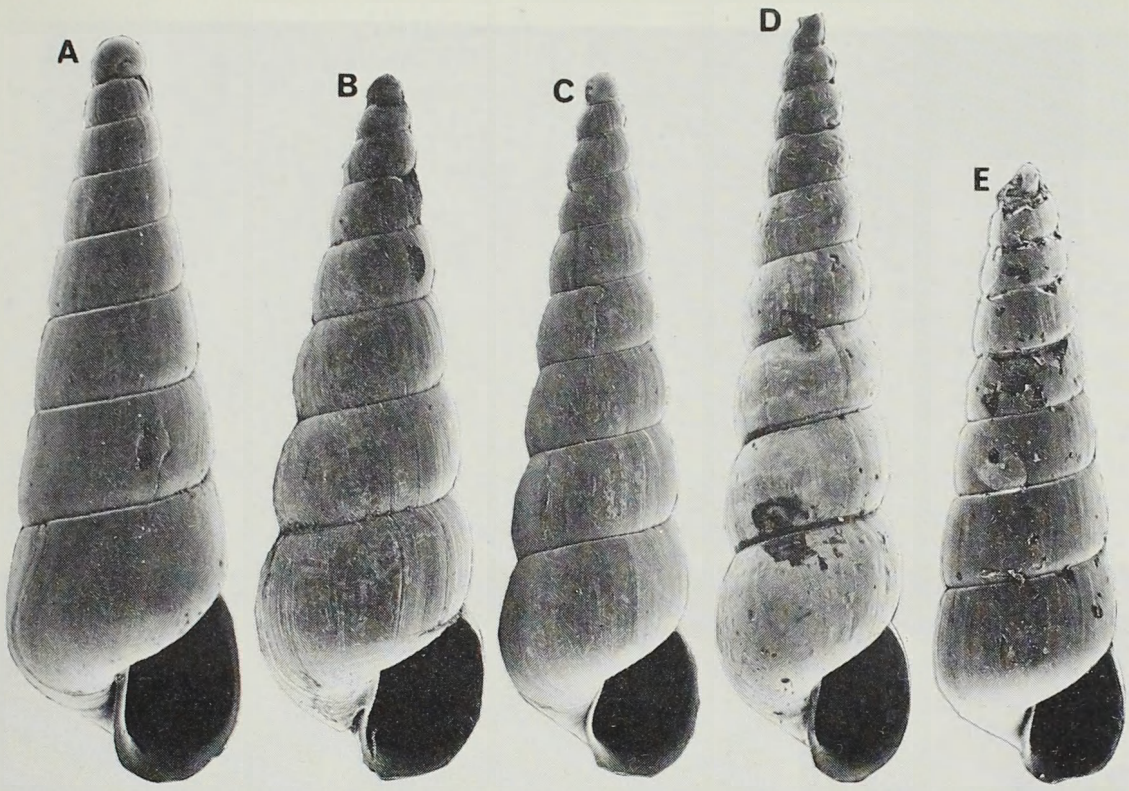


Fig. 37. *Eulimella* spp. All magnified 20 times. A. *scillae* (Scacchi), western Norway, Korsfjorden, southeast of Fiksneset, 60°10.5′ N, 05°09.0′ E, 230–175 m (E78–70), height 4.10 mm. B, *E. ataktos* sp.n., paratype, western Norway, Hjeltefjorden, 60°24′30″ N, 05°07′00″ E, 100–180 m, height 4.08 mm. C. *E. ventricosa* (Forbes & Hanley), western Norway, Korsfjorden, 60°08.5′ N, 05°03.5′ E, 540–460 m (E15–73), height 4.0 mm. D. *E. ventricosa*, western Iceland, coll. HL, height 4.27 mm. E. *E. laevis* (Brown), Swedish west coast, Koster area, height 3.49 mm.

*Eulimella ventricosa* (Forbes, 1844)
(Figs 37C–D; 38D, larval shell)

*Parthenia ventricosa* sp.n. — Forbes 1844a:188.
*Eulimella gracilis* sp.n. — Jeffreys 1847:311.
*Eulimella affinis:* Forbes & Hanley 1850:313 (not *Eulima affinis* Philippi, 1844).
*Eulimella obeliscus* sp.n. — Jeffreys 1858:46.
*Eulimella ventricosa:* G.O. Sars 1878:209, tab. 11, fig. 19 (not? tab. 22, fig. 16)

Type localities. *P. ventricosa,* Aegean Sea; *E. gracilis,* Oban and Loch Fyne, Scotland; *E. obeliscus* Shetland and Skye, the Hebrides.

Type material. *P. ventricosa,* not known; *E. gracilis,* lost; *E. obeliscus,* 2 syntypes, USNM 132406.

New records. Western Iceland: Jökultunga, 260–400 m, several shs, HL. — Southwestern Iceland: Grindavikursjo, 340 m, HL.

The Faroes: BIOFAR Stn 100, 61°35′ N, 06°17′ W, 283 m, 1 sh.

Western Norway: Korsfjorden and surroundings, 75–300 m, 42 samples with 400 spms.

Swedish west coast: Koster area, 50–200 m, 5 samples with 10 spms, 75–150 m.

Off southwestern Portugal: 200–300 m, 3 samples with 4 shs.

Mediterranean: Off Corsica, Baie de Calvi, 75–150 m, and southern France, off Banyuls, 100–400 m; 10 samples with 300 spms.

Distribution. From western and southwestern Iceland and northern Norway southwards to the Mediterranean. Depth range 50–1000 m.

Remarks. This species bears some resemblance to *E. laevis* but has a much more fragile and thinner, transparent shell with no trace of a spiral sculpture. The whorls are evenly convex instead of flat with a channelled suture as in *E. laevis*. The shell is cylindrical in *E. laevis,* distinctly conical in *E. ventricosa*.

The description of *E. ataktos* in this paper raises the question about the identity of Forbes' name. His description is incomplete, the species is not figured, and no types remain. There is, however, only a single species in the Mediterranean for which the name has been used, and it is quite common.

It is very likely that one of G.O. Sars' figures of *Eulimella ventricosa* (1878, tab. 22, fig. 16) actually is based on *E. ataktos,* but I did not find the figured specimen in ZMO.

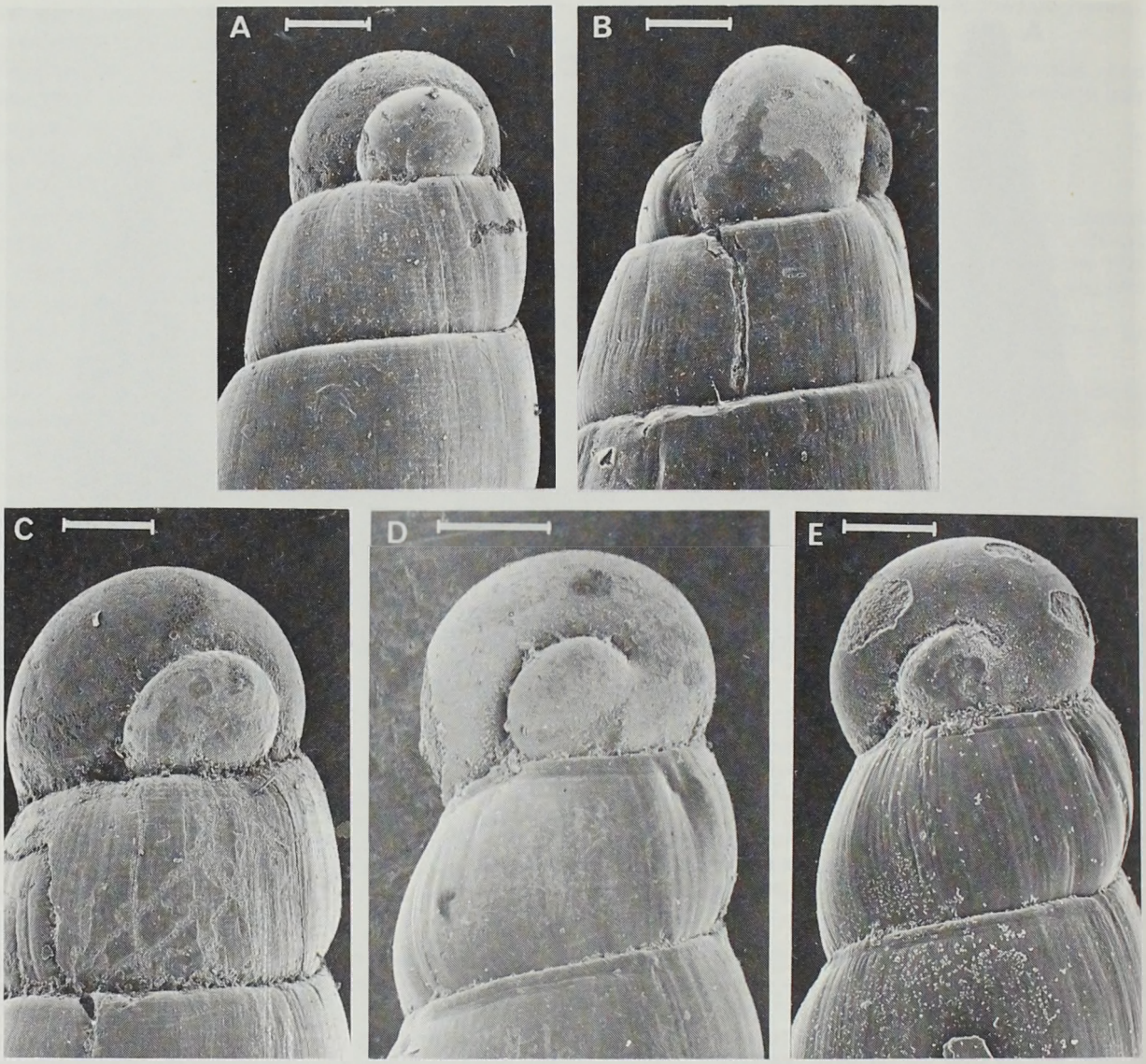


Fig. 38. *Eulimella* spp., larval shells. A–B. *E. laevis* (Brown), Swedish west coast, Koster area. C. *E. scillae* (Scacchi), western Norway, Korsfjorden, southeast of Fiksneset, 60°10.5′ N, 05°09.0′ E, 230–175 m (E78–70). D. *E. ventricosa* (Forbes & Hanley), western Norway, Korsfjorden, 60°08.5′ N, 05°03.5′ E, 540–460 m (E15–73). E. *E. ataktos*, holotype. — Scale lines 0.1 mm.

Comparison of Scandinavian and Mediterranean specimens show that the larval shell is about 10 % smaller in those from the Mediterranean, but specimens from off southwestern Portugal are intermediate. Scandinavian specimens also reach a slightly larger size, about 6 mm instead of 4.5 mm.

G.O. Sars (1878) raised this species back to specific rank after Jeffreys (1867) had reduced it to a variety of *E. laevis* (as *Odostomia acicula* var. *ventricosa*), and still in 1884 Jeffreys questioned its validity, but maintained it as a species, adviced by G.O. Sars.

J.J. Van Aartsen (pers. commn) considers *Eulimella gracilis* a nomen dubium and does not agree with its inclusion as a synonym of *E. ventricosa*. Jeffreys (1867:162) considered *gracilis* a synonym of *ventricosa*, which he considered a variety of *E. acicula*. I can see no reason for doubting this. The only result will be that the name *gracilis* will be drifting around, possibly threatening to other names.

Verrill (1880:380) recorded *E. ventricosa* from Maine, off Eastport, and off Marthas Vineyard, USFC Stn 873, in 180 m. These records were by Bush (1909:478) referred to *Eulimella polita* Verrill, 1872 and *Aclis tenuis* Verrill, 1882.

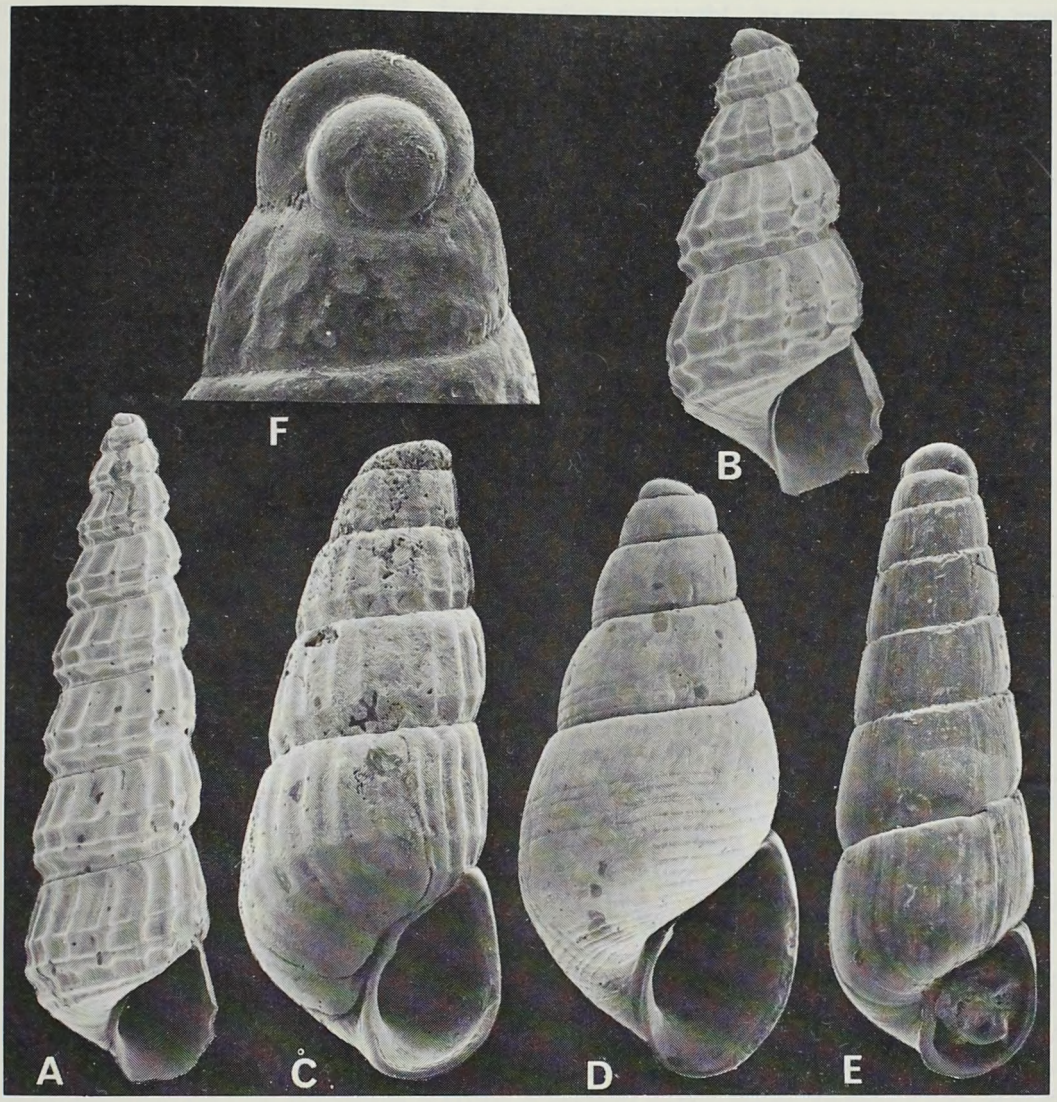


Fig. 39. A–B. *Chrysallida fenestrata* (FORBES), Algarve, Portugal, height 3.9 and 1.6 mm. C.- *Chrysallida interstincta* (J. ADAMS), neotype, height 2.0 mm. D. *Ondina divisa* (J. ADAMS), neotype, lectotype of *Turbo insculptus* (MONTAGU), height 2.6 mm. E–F. *Eulimella acicula* (PHILIPPI), possible syntype, height 2.1 mm and 0.19 mm diameter of larval shell.

*Eulimella laevis* (BROWN, 1827)
(Figs 37E; 38A–B, larval shell; 39E, F)

*Pyramis laevis* sp.n. — BROWN 1827, pl. 50, figs 51, 52.
*Melania acicula* sp.n. — PHILIPPI 1836:135.
*Odostomia scillae* var. *compactilis* var.n. — JEFFREYS 1867:169.

Type localities. *Pyramis laevis*, Dunbar, northeastern Great Britain; *M. acicula*, Pleistocene fossil, Sicily; *O. scillae* var. *compactilis*, the Hebrides.

Type material. *Pyramis laevis*, lost; *Melania acicula*, possible syntype SMNH 3787 (Fig. 39E, F); *O. scillae* var. *compactilis*, syntype, USNM 132718.

Distribution. Northern Norway to the Mediterranean. Not known from Iceland although it is likely to occur there. Depth range usually 10–50 m.

Remarks. *Eulimella laevis* may be recognized by the cylindrical shape, flat whorls and microscopic spiral striae.

The nomenclatorial history of this species is somewhat confusing. BROWN's original figure of *E. laevis* is not good, but it can hardly have been based on any other species from Great Britain than *E. laevis*.

Fig. 39E, F is based on a shell sent to LOVÉN by PHILIPPI as *'Eulima' acicula*. This is the only possible type material I have seen. It agrees well with the Recent north European species on which BROWN's name *laevis* supposedly was based. The figured shell does not show the indistinct spiral sculpture, but neither do only slightly worn, Recent specimens.

JEFFREYS' original specimen of *Odostomia scillae* var. *compactilis* is a typical *Eulimella laevis* (BROWN, 1827). G.O. SARS (1878) used the name *compactilis* for small specimens of *E. scillae,* while JEFFREYS later (1884:362) used the name for a mixture of youngs of three different, probably undescribed species from deep water off southwestern Europe.

*Eulimella (Menestho) lissa* VERRILL, 1884 is a species similar to *E. laevis,* height about 5 mm, but the shell has more convex sides and deeper suture; at the same height it is 1/3 broader. Furthermore, the larval shell is 1/3 smaller than that of *E. scillae.* (Holotype and five paratypes, USNM 35433, examined.)

JEFFREYS' lot in USNM, of 'specimens figured in *British Conchology*' (1867) contained one specimen of *E. acicula* and one of *E. subcylindrata* DUNKER, 1862, which was verified by direct comparison with DUNKER's types in the JEFFREYS collection. *Eulimella laevis* differs from that, more southern, species by having a larger larval shell. It is possible that JEFFREYS' specimen of *subcylindrata* originates from the Mediterranean and was included to show the variation, since he considered *E. subcylindrata* a synonym.

*Eulimella ataktos* sp.n.
(Figs 37B; 38E, larval shell)

Type locality. Northern Norway, Grøtsund, 142–182 m.

Type material. Holotype SMNH 4100.

Material examined. The holotype and Norway, Hjeltefjorden, 60°24'30" N, 05°07'00" E, 100–180 m, coral gravel (E39–71), 1 spm.

Distribution. Only known from northwestern and western Norway. Depth range about 100–200 m.

Description. The shell (Fig 37B) is very similar to that of *E. ventricosa,* but broader and in adult specimens of the same size with one whorl less. The larval shell (Fig. 38E) consists of about one whorl, diameter 0.30 mm, perfectly smooth and with its axis twisted 90° to the axis of the teleoconch. The holotype has 7.2, evenly convex teleoconch whorls, sculptured with indistinct, scattered growth lines. The aperture is rather wide and the columella is straight. Height of the holotype 4.08 mm.

Remarks. *Eulimella ataktos* is very similar to *E. ventricosa,* but a specimen of *E. ventricosa* of the same size (4.08 mm) has 8.2 whorls and a diameter of 1.12 mm. The second specimen of *E. ataktos* has almost the same dimensions as the holotype, height 4.12 mm, diameter 1.28 mm and 7.2 teleoconch whorls. Furthermore, the soft parts of dried specimens of *E. ventricosa* are flesh-coloured with occasional patches of bluish-blackish while those of *E. ataktos* are bright pink.

It is possible that this new species is what J.T. MARSHALL (1900b:335) called *Odostomia compactilis,* but search in BMNH did not reveal any specimens in the Sykes collection of the *Porcupine* material that J.T. MARSHALL had studied. It is also possible that one of G.O. SARS' figures of *E. ventricosa* (see that species) was based on *E. ataktos.*

The Greek word ataktos means confusion.

## Class BIVALVIA

### Family Mytilidae

The species treated here belong to some of the less well-known groups of Mytilidae. The genus *Dacrydium* was recently made the type of a new subfamily, Dacrydiinae OCKELMANN, 1983. OCKELMANN (1983) also discussed and summarized what is known about that subfamily.

DELL (1987) revised the genera *Idasola* and *Adipicola,* two groups of opportunistic deep-water species, normally living accociated with organic remains like pieces of wood, fish- and whale bones, fruits of nipa palm.

For more detailed information I refer to these two papers. A few details in DELL's (1987) paper are commented upon later.

*Dacrydium vitreum* (MÖLLER, 1842)
(Fig. 40D–F)

*Dacrydium vitreum* sp.n. — MÖLLER 1842:91.
*Dacrydium vitreum:* MATTSON & WARÉN 1977:2.

Type material. Lost?, not in BMNH, SMNH or ZMC.

Type locality. Western Greenland.

New records. Iceland: Skjalfandi; fishing Banks around Grimsöy and Kolbeinsöy, many spms, JHB.

Distribution. Northeastern America, Nova Scotia to western and eastern Greenland, Jan Mayen, Svalbard, western, northern, and eastern Iceland, Barents Sea, White Sea, Kara Sea, Norway south to Lofoten, and the Faroes. Depth range usually 5–200 m.

Remarks. *D. ockelmanni* can be distinguished from *D. vitreum* by being more slender, and by the teeth of the posterior hingline being proportionally thicker and less crowded (Fig. 40 C and F).

*Dacrydium ockelmanni* MATTSON & WARÉN, 1977
(Fig. 40A–C)

*Dacrydium ockelmanni* sp.n. — MATTSON & WARÉN 1977:2.

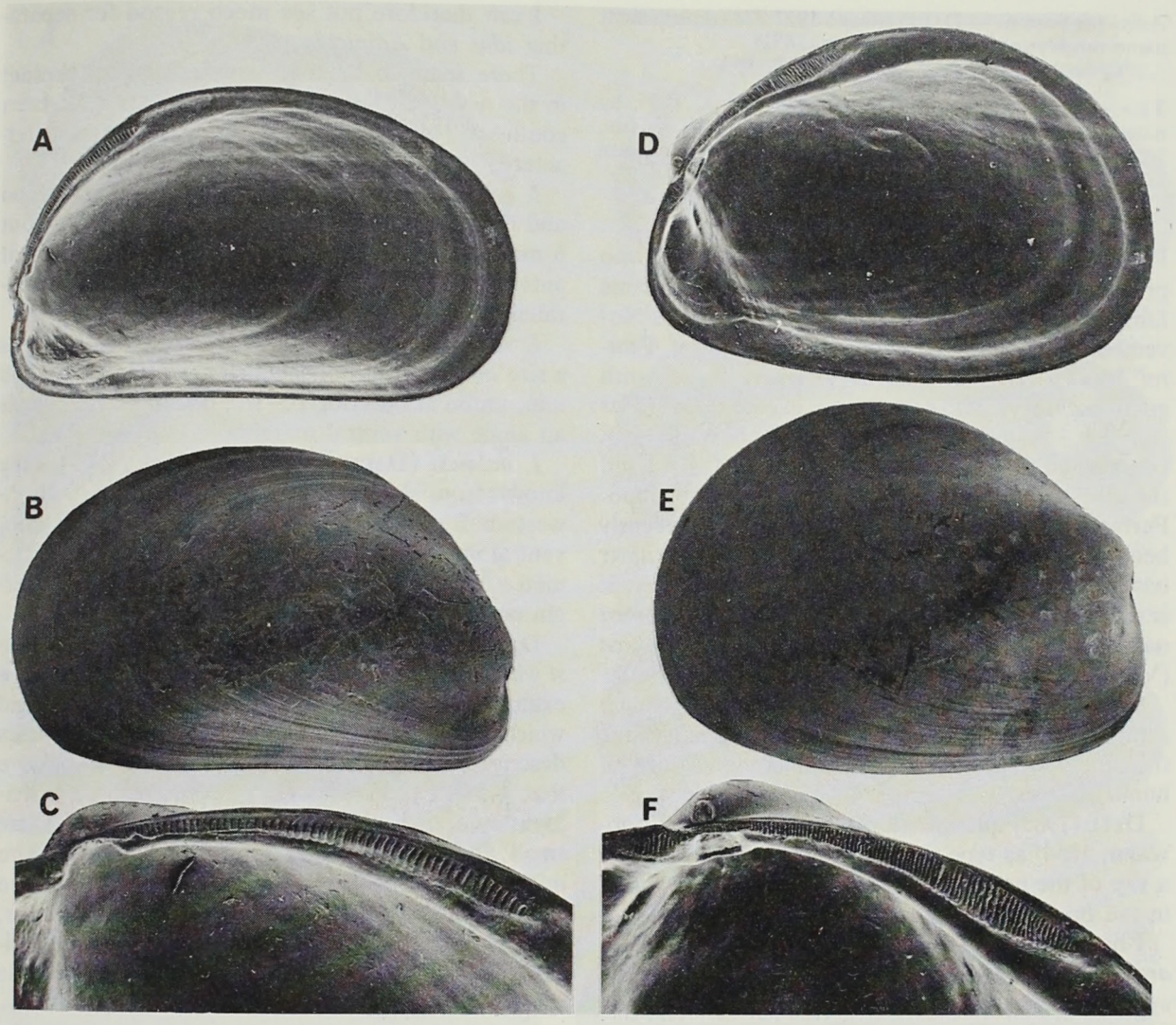


Fig. 40. *Dacrydium* spp. A–C. *D. ockelmanni* Mattson & Warén, western Iceland, shell 3.9 mm, hingeline 2.5 mm. D–F. *D. vitreum* (Møller), northern Iceland, Skjalfandi, shell 4.44 mm, hinge-line 2.34 mm.

Type locality. Western Norway, off Korsfjorden, 260–300 m.

Type material. Holotype ZMB 58633, numerous paratypes ZMB 58634, also in USNM and SMNH.

New records. Southern Iceland: Grindavikursjo and Grindavikurdjup, 40–400 m, several shs, HL. — Southwestern Iceland: Reykjanesridge, 200–400 m, several shs, HL. — Faxafloi, 100–400 m, several shs, HL. — Western Iceland: Jökultunga, 260–400 m, several shs, HL.

Distribution. Western, southern, and southeastern Iceland, the Faroes, western Norway and south to the Bay of Biscay. Depth range 150–600 m.

Remarks. *Dacrydium vitreum* is larger and proportionally higher than *D. ockelmanni* and has an arctic, shallow-water distribution.

*Dacrydium viviparum* was described by Ockelmann (1983) from 1000–1700 m depth at the Reykjanes Ridge. It differs from the two species discussed here by having the anterior dorsal margin forming an angle of close to 90° with the ventral margin and by having the posterior crenulated area divided in two parts, an anterior one corresponding to the posterior larval set of teeth and a posterior one corresponding to the normal posterior crenulated area in mytilids. In *D. vitreum* and *ockelmanni* these two areas are not clearly separated.

## Genus *Idas* Jeffreys, 1876

*Myrina* gen.n. — H. & A. Adams 1854:76 (not Fabricius, 1808).
*Idas* gen.n. — Jeffreys 1876:428 (non Mulsant, 1876).
*Idasola* nom.n. — Iredale 1915:340 (replacement name for *Idas* Jeffreys, 1876).

*Adipicola* nom.n. — DAUTZENBERG 1927:274 (replacement name for *Myrina* H. & A. ADAMS, 1854).
(For further synonymy see DELL 1987:25.)

Type species. *Idas, Idas argenteus* JEFFREYS, 1876, by monotypy; *Myrina, Myrina denhami* H. & A. ADAMS, 1854 (= *Modiolarca pelagica* FORBES MS; WOODWARD, 1854), by monotypy.

Remarks. I can not agree with DELL (1987) who preferred to use IREDALE's (1915) replacement name *Idasola*. JEFFREYS' name was published in the November issue of the *Annals and Magazine of Natural History* and can thus be assigned a date with good accuracy. MULSANT's use of the name *Idas* (for a hummingbird), on the other hand, can not be assigned to a date more precisely than 1876, and should thus be judged to be published 31 Dec 1876. Furthermore, the name *Idas* JEFFREYS has recently been used, as listed by DELL, while *Idas* MULSANT has been more or less unnoticed in ornithology; it is not even cited by PETERS (1945), and the present name of the type species is *Lophornis magnifica* (VIEILLOT, 1817) (GREENWALT 1977; HARTEL 1900).

In order to follow the ICZN, JEFFREYS' name should be kept (as did VOKES 1980), especially since this does not disturb the present nomenclature of hummingbirds.

DELL (1987) quoted '*Modiolarca*? *pelagica* WOODWARD, 1854' as type species of *Adipicola*, evidently a slip of the pen, since that name was not included in the original description of *Myrina*.

I have examined the types in BMNH of *Modiolarca pelagica* WOODWARD (no. 1842.12.10.67–68, syntypes) and *Myrina denhami* H. & A. ADAMS (no. 1988042, holotype?), and agree that the names are synonyms. I also agree with DELL that the acceptance by the ADAMS brothers of WOODWARD's name can be taken as an indication that WOODWARD's name is older.

It is not obvious from DELL's paper why he distinguished between *Adipicola* and *Idas*, but the presence of crenulated areas along the hinge line seems to have been considered important. This is, however, only a juvenile character. In *I. argenteus*, type species of *Idas*, it is maintained up to adult size, about 6 mm. In other species for example *I. simpsoni*, the crenulation is lost in the adult, but at a size comparable to *argenteus* it is maintained to almost the same degree (see Fig. 41E and J). Furthermore the figure given by DELL of *I. argenteus* is actually based on a young specimen of *I. simpsoni*, as I could verify by examination of the same specimen. So are also my figures (1979, plate 7, figs. 11–12) based on specimens from the same station of the *Triton* Expedition.

I can therefore not see much reason for separating *Idas* and *Adipicola*.

There seem to be three species of *Idas* present in the northeast Atlantic and since they have been confused, I give figures of them and distinctive characters.

*I. argenteus* lives on pieces of submerged wood and other organic remains, reaches a size of about 6 mm, prodissoconch diameter 0.50 mm, umbo at anterior 1/4, dorsal and ventral margins almost parallel.

*I. simpsoni* lives on old whale skeletons, reaches a size of 40 mm, prodissoconch diameter about 0.50 mm, umbo at anterior 1/5–1/7, dorsal margin forms an angle with ventral margin.

*I. dalmasi* (DAUTZENBERG & FISHER, 1897), only known from shells from the Azores and off southwestern Europe, reaches a size of at least 9 mm, ventral margin distinctly curved, prodissoconch diameter 0.60 mm, umbo at anterior 1/4, dorsal margin parallel with ventral margin (Fig. 41D).

DAUTZENBERG (1927) synonymized *Myrina dalmasi* with *Idas pelagica* (from off South Africa). I have examined specimens from off southwestern Portugal which agree well with DAUTZENBERG & FISCHER's description and figures. I find it difficult to be sure that it is the same as *pelagica* since both my specimens and those of DAUTZENBERG & FISCHER are small and all specimens available of *pelagica* are much larger, 15–30 mm, and the umbonal areas are quite worn. My Portuguese specimens do, however, have no trace of the crenulation of the hinge, typical for *I. argenteus* and *I. simpsoni* of comparable size.

*Myrina modiolaeformis* STURANY, 1896 was described from deep water in the Mediterranean (STURANY 1896). Its systematical position is uncertain and it has not been found since the description. It was reported by CARROZZA (1984) from off Corsica, but examination of his specimens showed them to differ considerably from STURANY's types and they have been described as a distinct species, *Idas ghisottii* WARÉN & CARROZZA, 1990. Fig. 41A–C shows the two syntypes of *M. modiolaeformis* (kept in Naturhistorisches Museum, Wien), since the original figures are not very good. As a matter of fact, I find it questionable if this species really belongs to *Idas*.

*Idas argenteus* JEFFREYS, 1876
(Fig. 41E)

*Idas argenteus* sp.n. — JEFFREYS 1876:428.
*Idas argentus* var. lamellosa var.n. — VERRILL 1882:579.

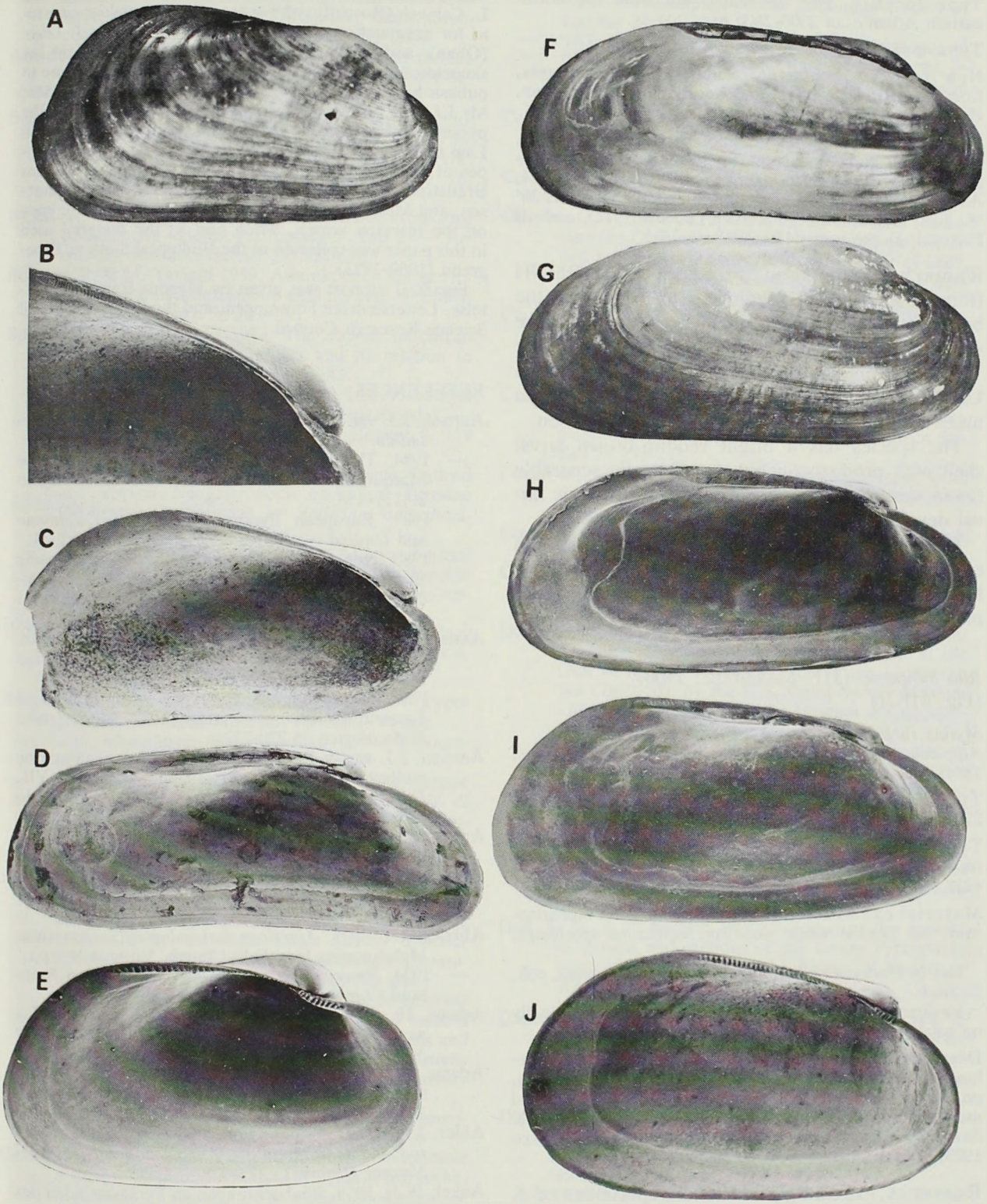


Fig. 41. A–C. *Myrina modiolaeformis* STURANY, syntypes; A; 13,0 mm; B, length of hinge-line 4.5 mm; and C, 6.6 mm. D. *Idas dalmasi* DAUTZENBERG & FISCHER), Gorringe Bank, off southwestern Portugal, 36°44.3′ N, 11°23.0′ W, 1940–2075 m, 9.1 mm. E. *Idas argenteus* JEFFREYS, western Iceland, HL, 4.07 mm. F–G. *Idas simpsoni* (MARSHALL), southern Iceland, 29.0 mm, leg. HL, SMNH. H. *Idas simpsoni,* Faroe Channel, 7.5 mm. I. *Idas simpsoni,* southern Iceland, HL, 6.8 mm. J. *Idas simpsoni,* off Corsica, coll. F. Carrozza, 3.9 mm.

Type locality. Not designated but from the northeastern Atlantic, in 2000–2600 m.

Type material. See WARÉN 1980b.

New records. Southern Iceland, off Vestmannaeyar, from trawled whale bone, and wood, 150–400 m, 1 spm, H.L.

Distribution. Known from the northwestern Atlantic, off Virginia and Massachusettes (VERRILL 1882 and unpublished specimens from sunken drift-wood in USNM, AW), from the *Ingolf* Expedition Stn 67, 61°30′ N, 22°30′ W, 1750 m, off southern Iceland (JENSEN 1912), and off Portugal. Depth range 150–2600 m.

Remarks. Comparison of the specimen in BMNH from the *Porcupine* Expedition, Stn 16, which is the best preserved type specimen, proved it to agree well with the specimen in Fig. 41E.

I have examined specimens from off Virginia in USNM and found them so similar to European material that I can see no reason for distinction.

The species has a bright reddish-brown larval shell with prodissoconch 1 and 2 easily separable (as in *simpsoni*). This indicates planktotrophic larval development.

*Idas argenteus* was recorded from the Dutch coast by REGTEREN ALTENA (1964), but judging from his figures, this record is based on young specimens of *Modiolus modiolus* (L., 1758).

*Idas simpsoni* (J.T. MARSHALL, 1900)
(Fig. 41F–J)

*Myrina simpsoni* sp.n. — J.T. MARSHALL 1900a:167.
*Adipicola pelagica*: OSKARSSON 1982:46 (not FORBES, 1854).

Type locality. Northern edge of Great Fisher Bank, 270 km northeast of Aberdeen, Scotland, 70–90 m.

Type material. Syntypes in National Museum of Wales (not examined), BMNH 1900.10.16.19–21, and SMNH 4238.

Material examined. Southern Iceland, off Vestmannaeyar, on trawled whale skeleton, numerous specimens, HL.

Bay of Biscay: On drifting whale blubber, 2 spms, coll. Cabioch.

Mediterranean: Off Bastia, Corsica, 300 m, occasionally on whale-bone, 12 spms. coll. Carrozza.

Distribution. From Iceland (Bjarnarey, southern Iceland, 100–200 m, OSKARSSON 1982) and the North Sea, on whale skeletons (incl. dolphins), in a few hundred metres depth, to the Mediterranean (170 m) (BARSOTTI & GIANNINI 1974; CABIOCH 1973; CAROZZA 1984; QUERO 1973). Depth range 0–300 m.

Remarks. The largest Icelandic specimens of *I. simpsoni* attain a length of 40 mm.

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