Studies on some Elphidiidae (foraminifera) from the Miocene of Denmark

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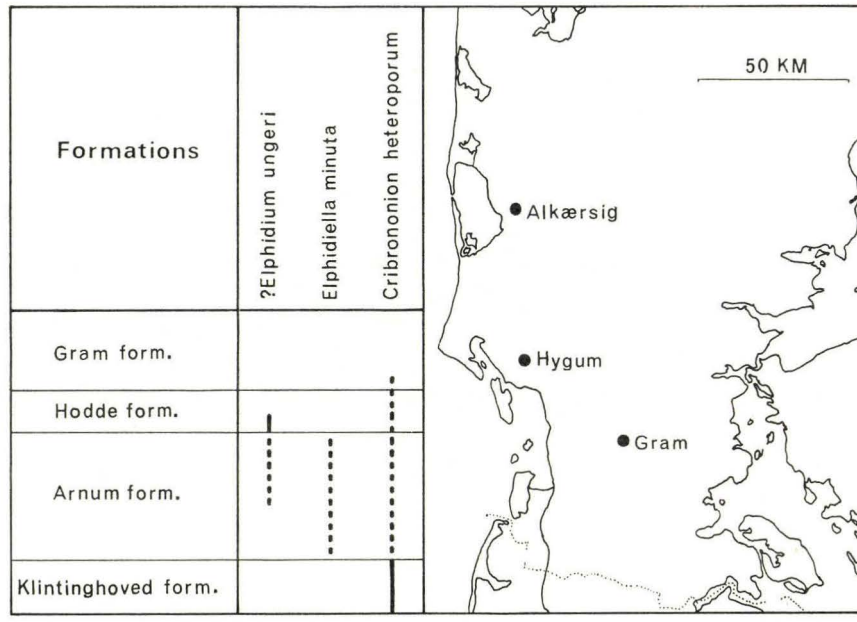
The three Elphidids examined, *?Elphidium ungeri* (Reuss), *Elphidiella minuta* (Reuss) and *Cribrononion heteroporum* (Egger) are derived from the Lower and Middle Miocene formations of Denmark.. They are shown to differ considerably from each other in distinct features diagnostic at the generic level.

The spiral canals are rather complicated in *?E. ungeri* and *C. heteroporum,* which show a system af anastomosing canals connecting different parts of spiral canals, while the spiral canal in *E. minuta* is rather simple. The specimens referred to *C. heteroporum* show a distinct apertural chamberlet, which is decided to be of generic importance in the emended diagnosis of the genus *Cribrononion.*

The results of preliminary investigations of the species *Cribrononion heteroporum* (Egger 1857) and the problems concerning the genus *Cribononion* Thalmann 1947 were discussed by the author at a meeting held in May 1971 at the University of Aarhus with the title 'Symposium on the taxonomy of neritic, benthonic foraminifera from Quaternary and Recent deposits, with special reference to the taxonomic problems of *Elphidium* and *Nonion*'. Since then these investigations have been completed with studies in the scanning electron microscope. Subsequently the two species *? Elphidium ungeri* (Reuss 1850) and *Elphidiella minuta* (Reuss 1865) have been examined. A number of plastic casts have been prepared in order to study the canal systems.

With the exception of some species of the genus *Protelphidium* Haynes 1956, all Elphidids recorvered from the Lower tnd Middle Miocene formations of Denmark are dealt with in the present paper. The three species, however, constitute only a minor part of the faunas found in the formations in question. Nevertheless they are of a certain stratigraphic importance at least within the Danish part of the North Sea basin. Thus *Elphidiella minuta* seems to be restricted to the Arnum Formation in which it is a rare constituent. *?Elphidium ungeri* shows a scattered occurrence in the Arnum



Text-fig. 1. Situation of the borings and the vertical distribution of the species within the Miocene formations in Denmark.

Formation, while its occurrence in the Hodde Formation is restricted to the basal sandy beds, in which it composes about 4 per cent of the fauna. *Cribrononion heteroporum* is common in the Klintinghoved Formation, less common in the Arnum Formation and has a scattered occurrence in the Hodde Formation. A few badly preserved specimens of *C. heteroporum* have been recorded from the lower part of the Upper Miocene Gram Formation.

Materials and methods

The specimens examined came from the Alkærsig boring (D.G.U. file No. 93.101), the Hygum boring (D.G.U. file No. 121.211), both located in Western Jutland, and the Gram boring (D.G.U. file No. 141.277) located in South Jutland. Although the three species investigated have been recorded from several other borings in Jutland, only specimens from the Alkærsig. Hygum and Gram borings have been prepared for the present study.

In order to study the canal systems the author prepared a number of plastic casts showing canal systems, impressions of test surfaces and sometimes the retral processes if present. The embedding method used differs

slightly from the one described by Nørvang (1966). The specimens were embedded in a mixture of Araldite (a two-component epoxy glue) and xylene. The polymerisation was activated by heating the specimen to 150° C for about 15 minutes. With a needle or a sharp knife a small area of the test surface was exposed, after which the specimen was dissolved in EDTA. The object was then cut horizontally and deep enough to allow the casts of the chamber cavities to be removed with a needle or a moist brush with a water soluble glue on the tip, leaving the impression of the test surface and the casts of the canal system and the perforations exposed. Because evacuation was not used during the embedding process, one large air bubble frequently persisted in each chamber, separated from the inner chamber surface by a thin plastic film. Thus only the more peripheral parts of the chamber, such as retral processes, were filled with solid plastic. When the plastic film was removed the solid casts of the retral processes often persisted in the correct position (Pl. 1, fig. 5). After coating with gold the specimens were studied in the scanning electron microscope.

The figured specimens are stored in the collections of the Geological Survey of Denmark.

Systematical part

Family Elphidiidae Galloway 1933
Genus *Elphidium* Montfort 1808
?Elphidium ungeri (Reuss 1850)
Pl. 1, figs. 1–6; Pl. 2, fig. 1; Pl. 4, figs. 1–2.

1942. *Elphidium ungeri* (Reuss) – ten Dam and Reinhold, p. 79, pl. 5, fig. 7.
1962. *Elphidium ungeri* (Reuss) – Indans, p. 56, pl. 8, fig. 4.

Diagnosis: Species of the genus *Elphidium* with distinct peripheral keel, 9–11 chambers in the adult coil and covered with numerous small rounded bosses. Length of septal bridges about one third of the chamber length. Spiral canal with complicated anastomoses. Bilamellar and radiate.

Dimensions: Diameter 0.19 – 0.72 mm, breadth 0.10 – 0.39 mm.

Description: Test planispirally coiled, consisting of two convolutions with 9–11 chambers to the adult coil, involute and bilaterally symmetrical. Test discoidal and almost circular in outline. Periphery rather sharply rounded with distinct peripheral keel. The margin is slightly lobulated. The sutures are curved and rather indistinct. Distinct apertural pores are present at the base of the apertural face, each pore bordered by a thickened rim. Septal

pores of the same shape and arrangement. The elongate sutural pores and rather strong septal bridges orientated at right angles to the sutures constitute about one third of the chamber length. The entire test including septal bridges and the area around apertural pores is densely covered with small rounded bosses. The test is densely and finely perforate, the pores being restricted to the area between the small bosses. Distinct retral processes which do not connect with the preceding chamber are present below septal bridges alternating with sutural pores. The canal system is well developed. The sutural canals, compressed in a plane parallel with the septal surfaces, communicate with the surface through compressed sutural pores, which are slightly branched near the surface. Successive sutural canals connect in the umbilical region through an irregular spiral canal. Different parts of the spiral canal are connected by a complicated system of anastomosing canals. The test is bilamellar and radiate in microstructure.

Remarks: The species found in the Miocene of Denmark is generally slightly more compressed than the species recorded by ten Dam and Reinhold (1942) and Indans (1962). The author has previously (Kristoffersen 1972) referred this species to *Elphidium inflatum* (Reuss 1861), though distinct specimens have not been recorded. A sample from Dingden, however, collected and placed at the author's disposal by Dr. Leif Banke Rasmussen, yielded a number of distinct *Elphidium inflatum* and *?Elphidium ungeri* as well as a number of specimens which might possibly be interpreted as intermediate forms. Thus the degree of compression, the length of septal bridges and the extent and distinctness of the peripheral keel seem to be strongly variable. The individuals obtained from the Dingden sample are covered by numerous small bosses, also shown on the specimens from the Miocene of Denmark. The numerous coarse perforations indicated on the original figure of *E. inflatum* (Reuss) are presumably due to the presence of these small bosses. Only rather compressed and distinctly keeled individuals of the type which ten Dam and Reinhold (1942) and Indans (1962) refer to *E. ungeri* are met with in the Miocene of Denmark. It seems debatable, however, whether this form is referable to *E. ungeri* (Reuss) described from the Vienna Basin or not. Apparently it has been difficult to decide which form Reuss really described. Thus specimens recorded from the type area by Cushman (1939) and Papp (1963) seem to differ considerably from the form figured by Reuss. As already mentioned by Marks (1951) the original figure of Reuss indicates a somewhat more angular periphery and shorter septal bridges than shown on Cushman's figure. A distinct umbilical plug, as shown on the figure of Papp, was stated by Reuss not to be present.

The present specimens differ from the one figured by Reuss mainly in the rather long septal bridges.

Distribution:
Holland: Middle Miocene (ten Dam and Reinhold 1942)
Belgium: Houthalenian and Anversian (Meuter 1970)
Niederrhein area: Hemmoor-Stufe and Reinbek-Stufe (Indans 1962)
Denmark: Arnum and Hodde Formations.

Genus *Elphidiella* Cushman 1936

Elphidiella minuta (Reuss 1965)
Pl. 2, figs. 2–5; Pl. 4, fig. 3.

1865. *Polystomella minuta* Reuss, p. 478, pl. 4, fig. 6.
1951. *Elphidium minutum* (Reuss) – Marks, p. 53, pl. 6, fig. 6.
1958. *Elphidium minutum* (Reuss) – Batjes, p. 164, pl. 12, fig. 1.
1962. *Elphidium minutum* (Reuss) – Indans, p. 56, pl. 8, fig. 6.

Diagnosis: A smooth discoidal species with 9–12 chambers in the adult coil. Rather densely pustulous area in front of basal apertural pores. Canal system with simple spiral canal. One row of tiny stutural pores. Retral processes are lacking. Bilamellar and radiate.

Dimensions: Diameter 0.15 – 0.49 mm, breadth 0.08 – 0.20 mm.

Description: Test planispirally coiled, consisting of two convolutions, 9–12 chambers to the adult coil, involute and bilaterally symmetrical. Test discoidal with almost circular outline and rather broadly rounded periphery without peripheral keel. The margin is slightly lobulated. Sutures slightly curved and somewhat depressed in the younger part of the last coil. In the older part the sutures are flush with the surface. Last few chambers weakly inflated. Test surface smooth and finely perforate. Apertural pores bordered by thickened rim are present at base of apertural face. The part of the previous coil situated immediately in front of apertural pores is rather densely pustulous. One row of sutural pores communicate with subsutural canal. Spiral canal forming a simple and rather regular spiral without complicated anastomoses. Retral processes not present. Bilamellar and radiate in microstructure.

Remarks: This species, so far referred to the genus *Elphidium*, is excluded from this genus because of the absence of retral processes. It is realized,

however, that the reference of the species to *Elphidiella* is debatable. Thus the double row of sutural pores which should characterize this genus are not present. When the species nevertheless is placed in the genus *Elphidiella* it is due to a superficial resemblance with the type species *Elphidiella artica* (Parker and Jones 1864) and especially to the striking resemblance with *E. hannai* (Cushman and Grant 1927) and to the fact that it does not fit into any of the remaining genera available.

Distribution:
Vienna Basin: Tortonian (Marks 1951)
Belgium: ?Sand of Antwerp (Batjes 1958)
Niederrhein area: Hemmoor-Stufe (Indans 1962)
Denmark: Arnum Formation.

Genus *Cribrononion* Thalmann 1947

Type species: Cribrononion heteroporum (Egger 1857)

Emended diagnosis: Test planispirally coiled and bilaterally symmetrical. Distinct apertural chamberlet is present. Apertural face, apertural chamberlet and adjoining part of previous coil densely pustulous. Test finely perforate, only apertural chamberlet with scattered coarse perforations. Different parts of spiral canal connected through anastomosing canals. Wall structure granular. Retral processes are not present.

Remarks: The type species *Cribrononion heteroporum* (Egger 1857) recorded from Miocene deposits of Niederbayern is rather thoroughly described and figured for that period. The depository is unknown, however, and the type species has apparently not been recorded by later authors. Nevertheless Thalmann (1947) designated this form as type species, although it had not been recovered for almost a hundred years. For that reason many authors have referred species to the genus *Cribrononion* more from an idea of what the type might possibly look like than from real knowledge of the type. That a species has not been recorded for more than a hundred years and is known from the original description alone, is remarkable, and therefore it seems natural to presume that the type descriptions and figures are misleading and that the actual form has been referred to another species.

The form described below and referred to *C. heteroporum* has so far been referred to *Cribrononion hiltermanni* (Hagn 1952), which species was described from Upper Rupelian of Oberbayern, that is to say from the same part of Germany as *C. heteroporum*. The only difference between the

two species, as it appears from the type descriptions, seems to be in the size of the specimens, *C. heteroporum* being somewhat bigger than *C. hiltermanni*. The dimensions given by Egger are debatable, however, mainly because of the restricted possibilities in his time of accurate measurements of smaller specimens. Hagn (1952) mentions that 'Gewisse Elphidien aus dem Burdigal von Maierhof stehen unserer Art ebenfalls sehr nahe, doch sind die miozänen Formen dickbauchiger und etwas grösser (Durchmesser 0,4 mm). Sie stellen vielleicht eine Varietät der forliegenden Art dar'. It is interesting to note that the locality Maierhof is one of the Miocene localities near Ortenburg, from where Egger (1857) described *C. heteroporum* and thus it is obvious that the specimens mentioned by Hagn, being only 0,1 mm smaller than Egger's type, are identical with *C. heteroporum*.

Recently Meuter (1970) appears to have been of the same opinion as the present author. Thus in table 1 he refers one of his species to *C. heteroporum* and mentions that this form has been dealt with by Indans (1962). The only form in the paper of Indans, however, which resembles the type species is the species referred to *Elphidium hiltermanni*.

Thalmann (1947) stated that 'Das neue Subgenus zeichnet sich aus durch das Vorhandensein einer siebplatten-artigen Mündungsfläche sowie lochartiger Perforationen in den Kammernaht-Furchen'. Studies in the scanning electron microscope have shown, however, that the entire test surface including the pustulous area is finely perforate. Only the apertural chamber shows a few coarse perforations.

Cribrononion heteroporum (Egger 1857)
Pl. 2, fig. 6; Pl. 3, figs. 1–6; Pl. 4, figs. 4–6

1857. *Nonionina heteropora* Egger, p. 300, pl. 14, figs. 19–21.
1952. *Elphidium hiltermanni* Hagn, p. 163, pl. 1, fig. 6, pl. 2, fig. 14.
1958. *Elphidium hiltermanni* Hagn – Batjes, p. 165, pl. 12, fig. 4.
1959. *Elphidium sp.* Dinesen, p. 90, pl. 8, fig. 6.
1962. *Elphidium hiltermanni* Hagn – Indans, p. 56, pl. 8, fig. 8.
non 1969. *Cribrononion hiltermanni* (Hagn) – van Voorthuysen and Toering p. 106, pl. 7, fig. 16.
?non 1970. *Elphidium hiltermanni* Hagn – Y. Calvez, p. 167, pl. 26, fig. 1.

Diagnosis: A species of the genus *Cribrononion* in which apertural face, apertural chamberlet, adjoining part of previous coil, and umbilical area are densely pustulous. 5–6 chambers in the adult coil and 7–8 chambers in all.

Dimensions: Diameter 0.11 -- 0.26 mm, breadth 0.07 – 0.16 mm.

Description: The test is planispirally coiled with 5–6 chambers in the adult coil, involute, and bilaterally symmetrical. Test slightly compressed, greatest diameter about twice as large as greatest thickness. Periphery broadly rounded and with weakly lobulated outline. Sutures slightly curved and depressed. Chambers inflated. The test is almost circular in outline because the aperture is covered by a small bulla-like apertural chamberlet, which eliminates the angle between the apertural face and the adjoining part of previous coil. The area comprising the apertural face, the apertural chamberlet, the adjacent part of previous coil and the umbilical region is densely covered with pustules. The entire test is finely perforate and only the apertural chamberlet shows scattered coarse perforations, mainly restricted to the sutures. The aperture is a low, rather short slit at the base of the apertural face, bordered by a thickened rim. The aperture is not visible in undamaged specimens, but in specimens with a damaged or dissected last chambers the aperture is easily observed (Pl. 3, fig. 3). The septal foramina are mostly a row of a few large pores resulting from a subdivision of the originally slitlike aperture. The surface of the previous coil inside the chambers shows an irregular system of keels and furrows running parallel with the margin and continuing through the aperture into the apertural chamberlet. The septa, originally densely pustulous, are covered with reduced and rather indistinct pustules and indistinct furrows radiating from the septal foramina. Sutural pores are rather small, and septal bridges are weakly developed. Sutural pores connect with subsutural canal situated between septal flap and the edge of previous chamber. A spiral canal is present, but seems to be of a rather primitive nature. The proximal parts of the sutural canals connect with a system of anastomosing canals of which the ones which directly connect the successive sutural canals are interpreted as the spiral canal. Retral processes are not present. The test is bilamellar and granular in microstructure.

Remarks: Egger's descriptions and figures show a specimen with apertural face and adjoining part of previous coil densely covered with coarse perforations and pustules. Even in modern light microscopes, however, it has been impossible with certainty to decide whether coarse perforations are present between the pustules or not. Because of reflections from the pustules, the observer gets an impression rather of a coarsely perforate surface with scattered pustules than of a finely perforate and densely pustulous surface. Studies in the scanning electron microscope have finally shown that scattered coarse perforations are restricted to the apertural chamberlet while the remaining part of the pustulous area is finely perforate, as is the non-pustulous part of the test. Egger did not observe any apertural openings,

and consequently it seems reasonable to assume that it has been covered by an apertural chamberlet, as shown on the present specimens. The apertural chamberlet is only visible in dissected specimens or in thinsections, however, and therefore its presence was easily overlooked by Egger. The distinct suture drawn between final chamber and previous coil on the type figure 21 (Pl. 4, fig. 5) seems to be drawn according to Egger's idea of how a foraminifera is normally built. At least the side view in the type figure 19 shows a rather smooth transition from apertural face to previous coil, the angle between them being more or less eliminated by a small lobe, which might suggest the presence of the apertural chamberlet.

The form recorded by Y. Calvez (1970) from the Eocene of the Paris Basin and referred to *Elphidium hiltermanni* differs slightly from the present species, the umbilical area being rather strongly excavated. The figures of Y. Calvez, however, suggest the presence of features of the genus *Cribrononion*. Thus the figured fragment shows septal foramina which are subdivided original basal slitlike apertures, and furthermore an apertural chamberlet seems to be visible. Retral processes are missing and information on the wall structure is not given. In the author's opinion this form may prove to be a new species of the genus *Cribrononion*, and so far the only species known by the author, besides *C. heteroporum* which is referable to this genus. It may possibly represent an ancestral form of *C. heteroporum*.

Distribution:

Bayern: Upper Rupelian, Kattian, Aquitanian and Burdigalian (Hagn 1952)
Niederrhein area: Hemmoor-Stufe and Reinbek-Stufe (Indans 1962)
Belgium: Houthalenian and Anversian (Meuter 1970)
Denmark: The Vejle Fjord Formation (Dinesen 1959), the Klintinghoved, Arnum and Hodde Formations.

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Mr. *O. Neegaard Rasmussen* has done the photographic work.

The scanning electron micrographs have been taken by a Jeol JSM-S1, provided by the Danish Research Council of Natural Sciences and installed at the Geological Survey of Denmark.

Dansk sammendrag

De tre undersøgte elphidider, *?Elphidium ungeri* (Reuss), *Elphidiella minuta* (Reuss) og *Cribrononion heteroporum* (Egger), stammer fra de nedre og mellem miocæne formationer i Jylland. Selvom de kun udgør en ringe del af faunaerne i de respektive for-

mationer repræsenterer de en vis stratigrafisk værdi (text-fig. 1). Således er *Elphidiella minuta* tilsyneladende begrænset til lag tilhørende Arnum formationen. *?Elphidium ungeri* optræder sparsomt i Arnum formationen, medens den i Hodde formationen er begrænset til den nedre sandede del, i hvilken den udgør omkring 4 procent af faunaen. *Cribrononion heteroporum* er almindelig i Klintinghoved formationen, medens den i det store og hele optræder ret sparsomt i Arnum og Hodde formationerne. I den nedre del af Gram formationen er fundet enkelte dårligt bevarede eksemplarer af *C. heteroporum*.

De undersøgte arter har hidtil næsten uden undtagelse været henført til slægten *Elphidium*. Imidlertid er kun *?E. ungeri* fundet i besiddelse af de for denne slægt karakteristiske retral processer (pl. 1, figs. 2 og 5; pl. 2, fig. 1). *Cribrononion heteroporum* har granulær skalstruktur og det basale apertur er dækket af et lille aperturalt kammer (pl. 3, fig. 2; pl. 4, fig. 4). I den reviderede slægtsdiagnose er dette aperturale kammer tillagt særlig betydning.

Plastik afstøbninger af kanal systemerne er undersøgt i scanning elektron mikroskop. Spiralkanalen hos *?Elphidium ungeri* (pl. 1, figs. 4 og 6) og *Cribrononion heteroporum* (pl. 3, figs. 5–6) har vist sig at være ret komplicerede, idet forskellige dele af den egentlige spiral er forbundet ved et system af anastomoserende kanaler. Derimod er sådanne anastomoser ikke påvist hos *Elphidiella minuta* (pl. 2., fig. 4).

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Plate 1

D.G.U.
Catalogue No.

Figs. 1–6. *?Elphidium ungeri* (Reuss)

Locality: Alkærsig, D.G.U. file No. 93.101, depth 51 m.

Fig. 1. Side view. SH–8,14–FNK, × 130. ..... 1972–FNK–1

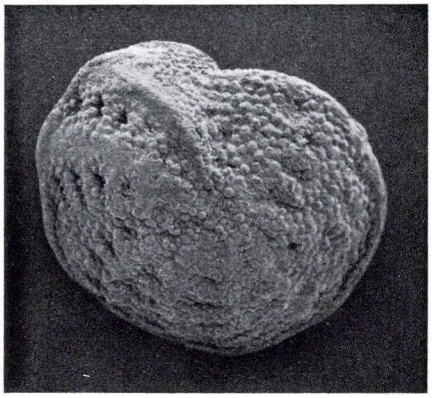
Fig. 2. Specimen with broken final chamber showing retral processes and distinct septal pores with thickened rim. SH–8,12–FNK, × 210. 1972–FNK–2

Fig. 3. Edge view. SH–8,14–FNK, × 110. ..... 1972–FNK–1

Fig. 4. Detail of fig. 6 showing plastic cast of anastomosing spiral canal and proximal parts of sutural canals. SH–8,9–FNK, × 200... 1972–FNK–3

Fig. 5. Plastic cast showing retral processes, sutural pores and canals. SH–8,2–FNK, × 330. ..... 1972–FNK–4

Fig. 6. Plastic cast showing canal system and impresion of the test surface. SH–8,9–FNK, × 200. ..... 1972–FNK–3



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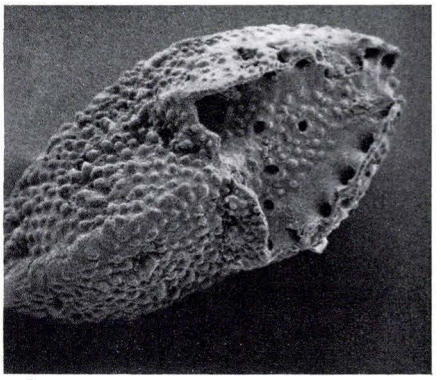

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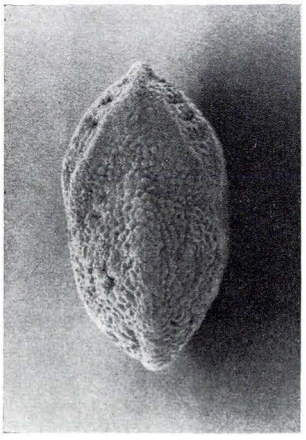

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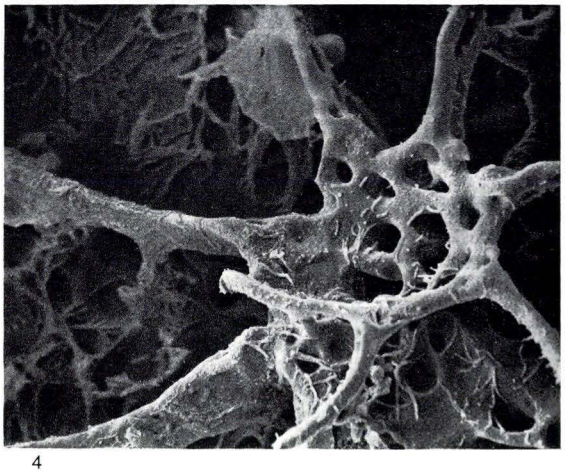

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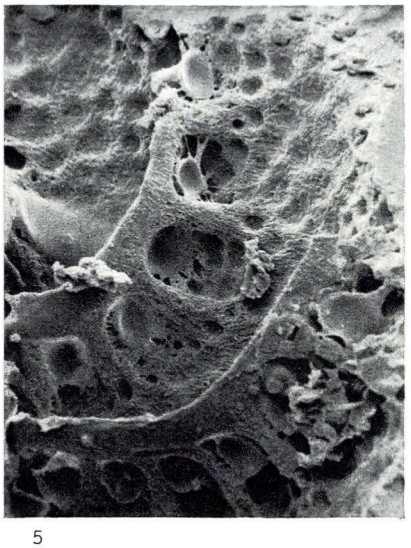

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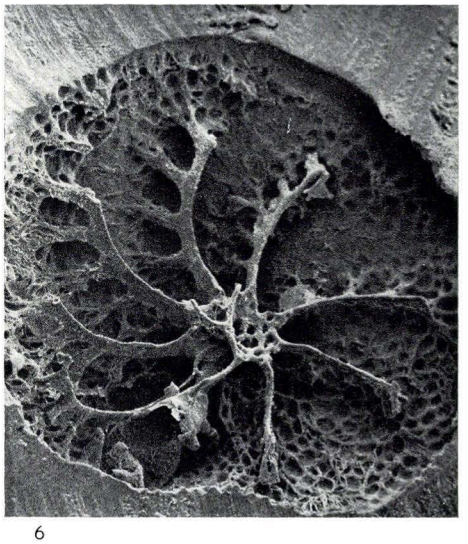


6

D.G.U.
Catalogue No.

Fig. 1. *?Elphidium ungeri* (Reuss)

Horizontal section through peripheral area showing retral processes, septal flap and sutural canal. Locality: Alkærsig, D.G.U. file No. 93,101, depth 51 m. SH–11,3–FNK, × 670. ..... 1972–FNK–5

Fig. 2–5. *Elphidiella minuta* (Reuss)

Fig. 2. Side view. Locality: Alkærsig, D.G.U. file No. 93.101, depth 60 m. SH–8,15–FNK, × 100. ..... 1972–FNK–6

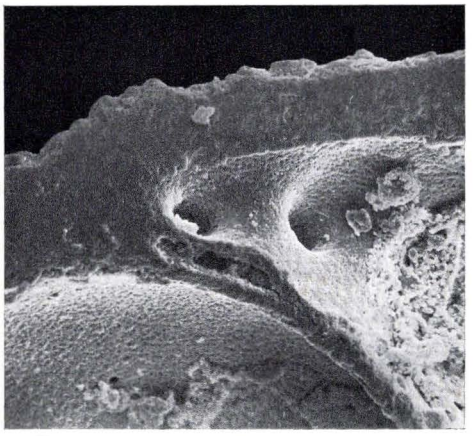
Fig. 3. Edge view. Locality: Hygum, D.G.U. file No. 121.211, depth 122–123 m. SH–13,4–FNK, × 300. ..... 1972–FNK–7

Fig. 4. Plastic cast showing umbilical part of canal system with spiral canal and sutural canals. Locality: Alkærsig, D.G.U. file No. 93.101, depth 80 m. SH–10,1–FNK, × 670. ..... 1972–FNK–8

Fig. 5. Oblique apertural view of specimen with broken final chamber. Locality: Alkærsig, D.G.U. file No. 93.101, depth 80 m. SH–10,2–FNK, × 200 m. 1972–FNK–9

Fig. 6. *Cribrononion heteroporum* (Egger)

Side view. Locality: Alkærsig, D.G.U. file No. 93.101, depth 53 m. SH–3,30–FNK, × 200. ..... 1972–FNK–10



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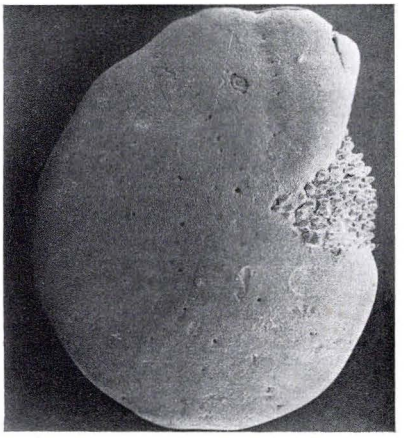

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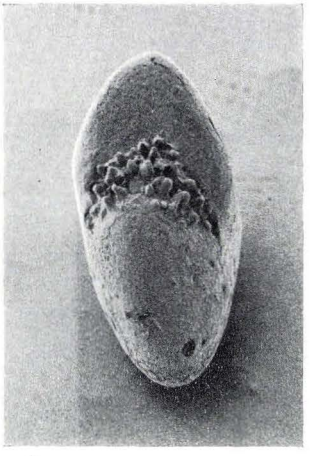

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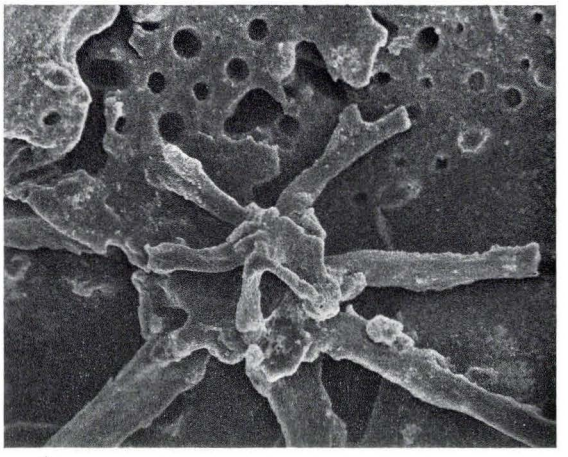

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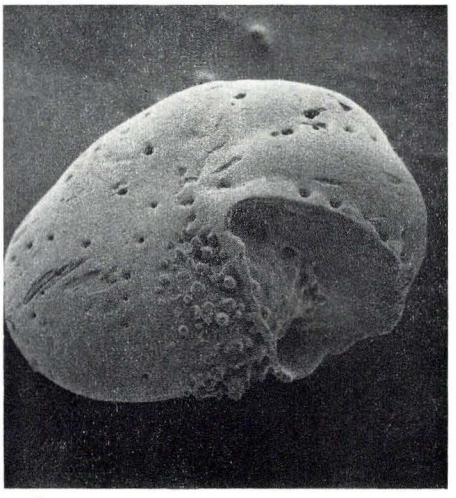

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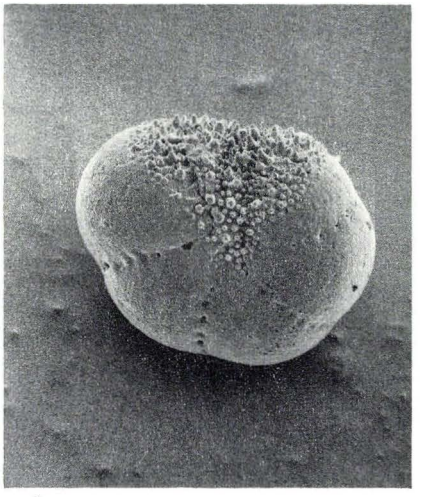

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D.G.U.
Catalogue Nc

Fig. 1–6. *Cribrononion heteroporum* (Egger)

Fig. 1. Edge view. Locality: Alkærsig, D.G.U. file No. 93.101, depth 53 m. SH–13,8–FNK, × 270. ..... 1972–FNK–11

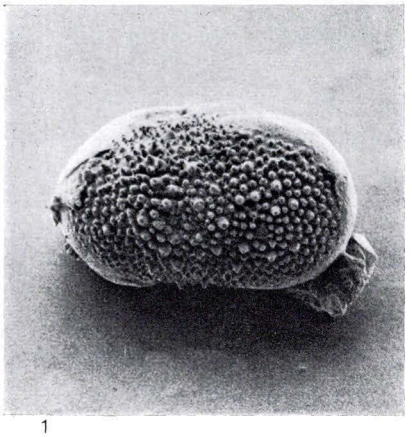
Fig. 2. Horizontal section showing apertural chamberlet. Locality: Alkærsig, D.G.U. file No. 93.101, depth 54 m. SH–11,4–FNK, × 670. ..... 1972–FNK–12

Fig. 3. Specimen with broken final chamber showing the slitlike aperture from the reverse. Locality: Alkærsig, D.G.U. file No. 93.101, depth 51 m. × 200. (specimen lost).

Fig. 4. Damaged specimen showing coarse striations on previous coil inside the chambers. Locality: Alkærsig, D.G.U. file No. 93.101, depth 51 m. × 200. (specimen lost).

Fig. 5. Plastic cast showing canal system and impression of the test surface. Locality: Alkærsig, D.G.U. file No. 93.101, depth 51 m. SH–11,2–FNK, × 670. ..... 1972–FNK–13

Fig. 6. Plastic cast showing primitive spiral canal. Remnants of the chambers casts persist in the specimen. Locality: Alkærsig, D.G.U. file No. 93.101, depth 51 m. SH–7,5–FNK, × 670. ..... 1972–FNK–14



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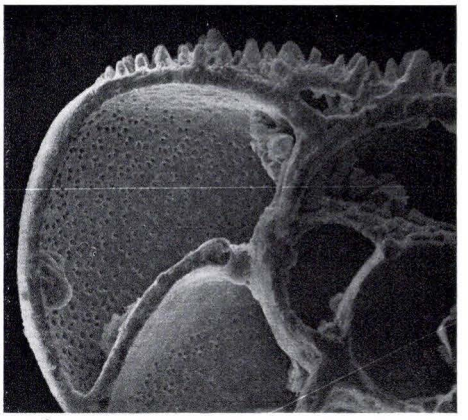

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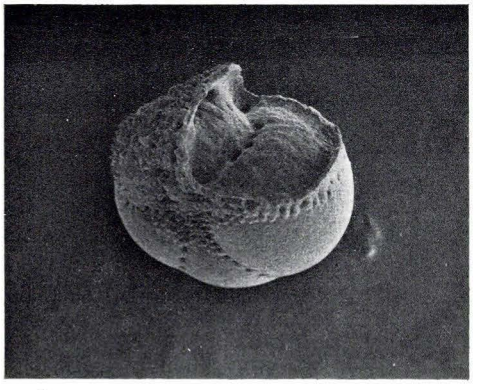

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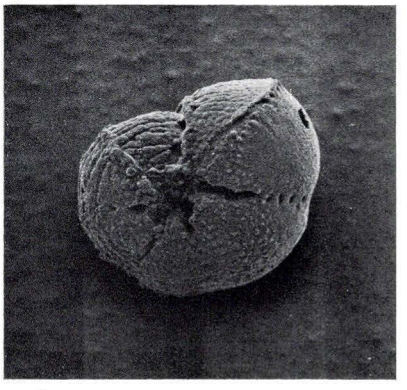

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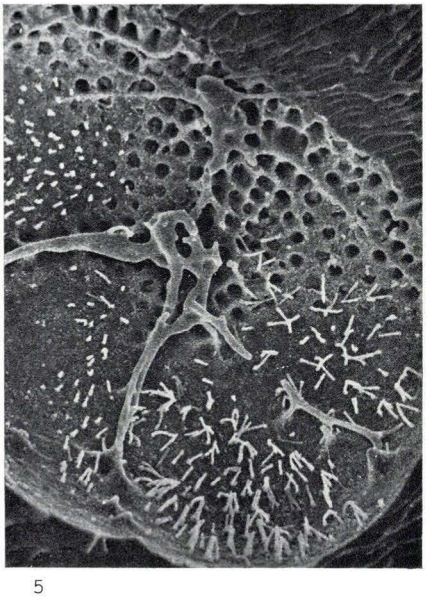

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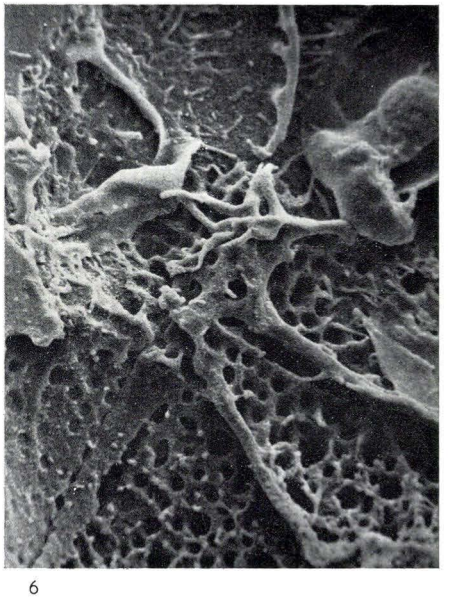

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Plate 4

D.G.U.
Catalogue No.

Figs. 1–2. *?Elphidium ungeri* (Reuss)

Fig. 1. Locality: Gram: D.G.U. file No. 141.277, depth 34.70–35.00 m. × 90. ..... 1972–FNK–15

Fig. 2. Vertical section. Locality: Gram, D.G.U. file No. 141.277, depth 34.70–35.00 m. × 110. ..... 1972–FNK–16

Fig. 3. *Elphidiella minuta* (Reuss)
Locality: Alkærsig, D.G.U. file No. 93.101, depth 54 m. × 90. .. 1972–FNK–17

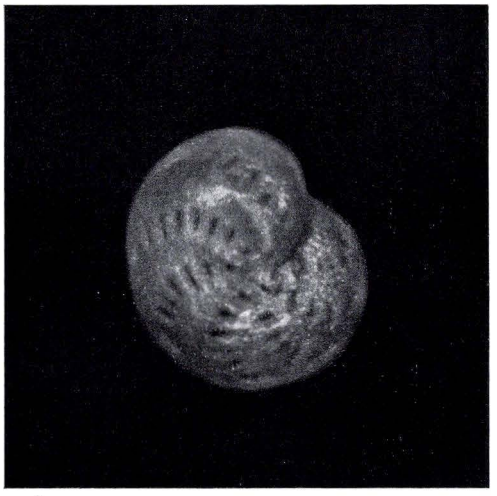
Figs. 4–6. *Cribrononion heteroporum* (Egger)

Fig. 4. Horizontal section showing apertural chamberlet. Locality: Alkærsig, D.G.U. file No. 93.101, depth 61 m. × 240. ..... 1972–FNK–18

Fig. 5. Holotype after Egger 1857, Pl. 14, fig. 19–21. × 60.

Fig. 6. Side view. Locality: Alkærsig, D.G.U. file No. 93.101, depth 53 m. × 90. ..... 1972–FNK–19

Phot. O. Neergaard Rasmussen (figs. 1,3,5–6)



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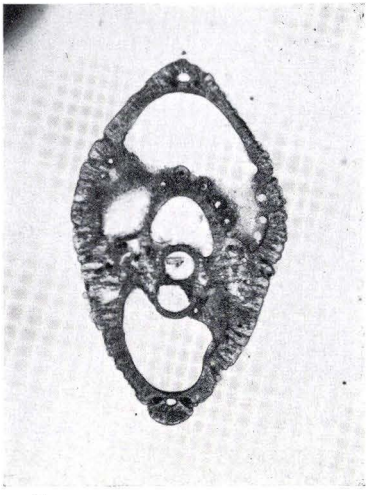

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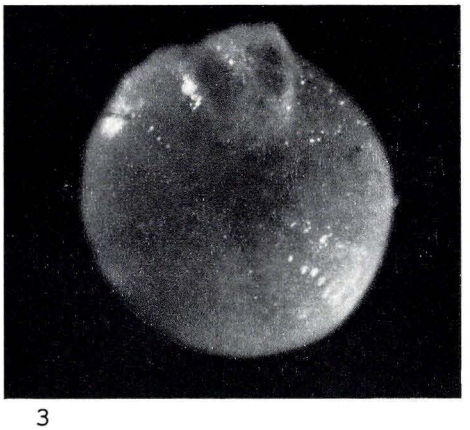

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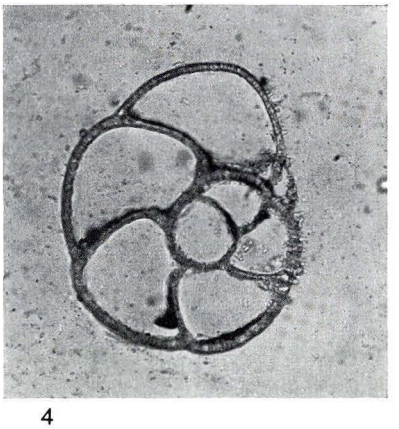

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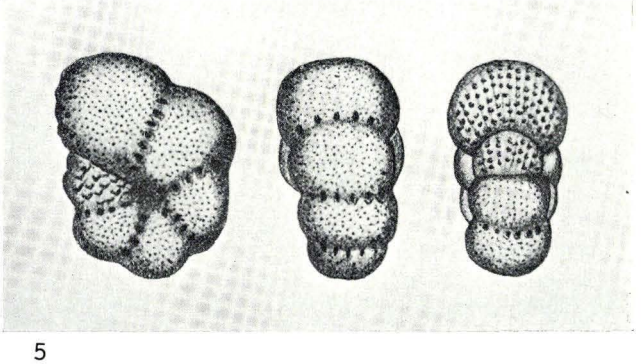

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