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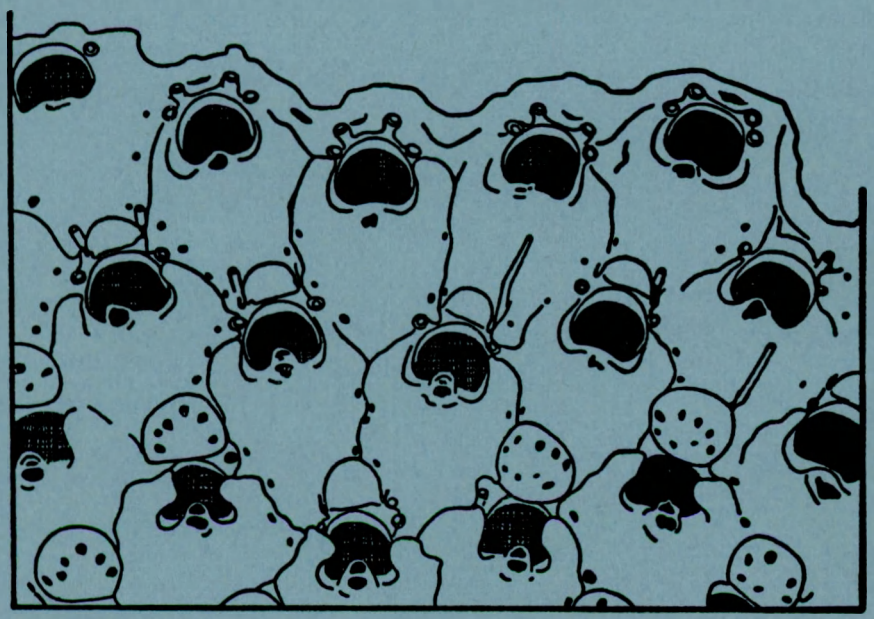
TYPE AND FIGURED MATERIAL FROM 'THE PLIOCENE BRYOZOA OF THE LOW COUNTRIES' (LAGAAIJ, 1952) IN THE COLLECTION OF THE ROYAL BELGIAN INSTITUTE OF NATURAL SCIENCES

by

J.D.D. BISHOP



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Type and figured material from 'The Pliocene Bryozoa of the Low Countries' (Lagaaij, 1952) in the collection of the Royal Belgian Institute of Natural Sciences

Type and figured material of 32 species from Wilmarsdonk and Deurne-Zuid (Antwerp) featured in R. Lagaaij's 1952 monograph 'The Pliocene Bryozoa of the Low Countries' is re-illustrated by scanning electron microscope, and catalogue details are given. The nomenclature of a number of species is updated. The Wilmarsdonk material, designated Scaldisian by Lagaaij, is considered to be from the Luchtbal Sands Member of the Lillo Formation.

Types en afgebeelde exemplaren van 'The Pliocene Bryozoa of the Low Countries' (Lagaaij, 1952) uit de verzamelingen van het K.B.I.N.

Van 32 soorten afkomstig uit Wilmarsdonk en Deurne-Zuid (Antwerpen, België) vroeger beschreven door R. Lagaaij (1952: The Pliocene Bryozoa of the Low Countries) werden de types en afgebeelde exemplaren opnieuw geïllustreerd met SEM foto's. De precieze kataloog gegevens worden vermeld en de nomenclatuur werd voor een aantal soorten op punt gesteld. Het materiaal van Wilmarsdonk door Lagaaij als Scaldisien aangeduid, wordt thans tot de Zanden van Luchtbal Member van de Lillo Formatie gerekend.

Types et exemplaires figurés du travail de Lagaaij (1952) 'The Pliocene Bryozoa of the Low Countries' des collections de l'I.R.Sc.N.B.

Les types et exemplaires figurés de 32 espèces, en provenance de Wilmarsdonk et Deurne-Zuid (Anvers, Belgique), décrites en 1952 par R. Lagaaij (The Pliocene Bryozoa of the Low Countries), ont été refigurés au Microscope électronique à balayage. Les données du catalogue de types sont indiquées avec précision. La nomenclature est mise à jour pour un certain nombre d'espèces. Lagaaij indique un âge scaldisien pour le matériel de Wilmarsdonk; ce matériel provient des Sables du Luchtbal, Formation de Lillo.

PLIOCENE BRYOZOA

Introduction

Part of the material studied for the monograph 'The Pliocene Bryozoa of the Low Countries' (Lagaaij, 1952) came from Wilmarsdonk near Antwerp, and had been provided as an unsorted sample by Dr M. Glibert of KBIN/IRScNB. Lagaaij identified 56 species from this sample, and treated the Wilmarsdonk assemblage as representative of the 'Scaldisian' of northern Belgium, which he correlated on this basis with the Coralline Crag of eastern England. Recent examination of Foraminifera from the residue of the Wilmarsdonk sample has indicated that Lagaaij's material is referable specifically to the Luchtbal Sands Member of the Lillo Formation (*Cibicides lobatulus* Peak-Zone) (Dr P.G. Laga, Geological Survey of Belgium, pers. comm.; stratigraphical nomenclature following de Meuter & Laga, 1977). In the light of this finding, the similarity noted by Lagaaij between the Wilmarsdonk material and the Bryozoa of the Coralline Crag is in agreement with the conclusions of subsequent studies on other faunal groups: the Luchtbal Sands have been correlated with the Coralline Crag on the basis of their Mollusca (Cambridge, 1977), Ostracoda (Wilkinson, 1980) and Foraminifera (King, 1983; Doppert, 1985).

Lagaaij's type and figured specimens from the Wilmarsdonk sample were subsequently registered and catalogued by Glibert for encorporation into the collections of KBIN/IRScNB. This material is re-illustrated here by scanning electron micrography, along with a paratype of *Metrarabdotos nysti* (Lagaaij, 1952) from Deurne-Zuid. The micrographs are of the uncoated specimens, and were produced from back-scattered electrons using an International Scientific Instruments model 60A fitted with charge-free anticontamination system and Robinson detector. The stated magnification of each figure was based on measurement of the actual specimen (not on the reading given by the electron microscope).

Specimen KBIN 4089 was erroneously catalogued as that illustrated by Lagaaij (1952: pl.22 fig.1) as *Hornera infundibulata* Busk, 1859; the colony illustrated by Lagaaij is in fact V.Br. 1178 of the Institute of Taxonomic Zoology, Amsterdam. Any other inaccuracies in the catalogue are corrected in the relevant sections below.

'BMNH' denotes material in the collections of the British Museum (Natural History), either in the Zoology Department (Recent specimens) or the Palaeontology Department (fossils).

1-3 *Biflustra savartii* (Audouin, 1826). 1, x13; 2, x59; 3, approx. x280.

KBIN 4085, Wilmarsdonk; figured Lagaaij (1952) pl.1 fig.3.

Flustra savartii Audouin, 1826 is the type species of *Acanthodesia* Canu & Bassler, 1919. The treatment of *Acanthodesia* as a junior synonym of *Biflustra* d'Orbigny, 1852 (type species *Biflustra ramosa* d'Orbigny, 1852) was advocated by Lagaaij (1952) and Buge (1956) on the grounds that their respective type species were identical. It should be noted that this argument rests upon acceptance of the traditional concept of *F. savartii*, which has arisen in the absence of type material and without certain knowledge of the type locality. Some workers, including Osburn (1950) and Cook (1968a), have included *F. savartii* in the genus *Membranipora* de Blainville, 1830. However, the type species of this genus, *Flustra membranacea* L., 1767 differs from Audouin's species in having minimal cryptocyst, and, being a specialist encruster of algal substrates, has uncalcified bands in the lateral zooecial walls. The combination *Biflustra savartii* employed by Lagaaij is therefore retained here.

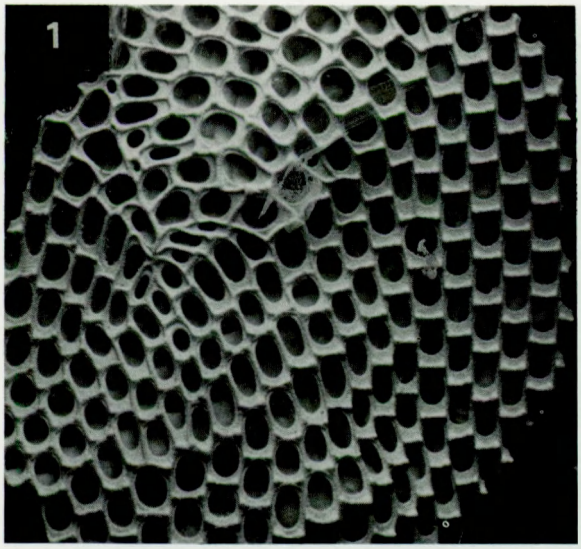
4-5 *Amphiblestrum rhynchotum* (Busk, 1859). 4, x28; 5, x91.

KBIN 4086, Wilmarsdonk; figured Lagaaij (1952) pl.1 fig.10, as *Ramphonotus rhynchotus* (Busk, 1859).

Ryland (1969) and Ryland & Hayward (1977) included the type species of *Ramphonotus* Norman, 1894 (i.e. *Membranipora minax* Busk, 1860) in *Amphiblestrum* Gray, 1848. This arrangement is supported here by the observation that the Recent lectotype (BMNH 1911.10.1.585) of *M. minax* selected by Lagaaij (1952) has sessile avicularia (as in *Amphiblestrum*), whereas columnar or pedicellate avicularia have been quoted as the distinguishing character of *Ramphonotus* (Canu & Bassler, 1920; Lagaaij, 1952; Buge, 1957; Gordon, 1984; see also Norman, 1903). (The ovicells of *M. minax* are, however, somewhat distinctive in having a uniform, granular frontal surface.) The present assignment of *Membranipora rhynchota* Busk to *Amphiblestrum* is provisional, especially in view of the uncertainty concerning the type species of Gray's genus (outlined by Ryland, 1969). *M. rhynchota* is the type species of *Rhynchotella* Canu, 1900, which was established as a subgenus of *Membranipora.* Subsequent authors have not employed Canu's taxon, which has been treated as a synonym of *Ramphonotus* (although the form of the frontal surface of the ovicell differs considerably between the respective type species).

6-7 *Verminaria oblonga* (Busk, 1859). 6, x26; 7, x94.

KBIN 4090, Wilmarsdonk; figured Lagaaij (1952) pl.3 fig.4.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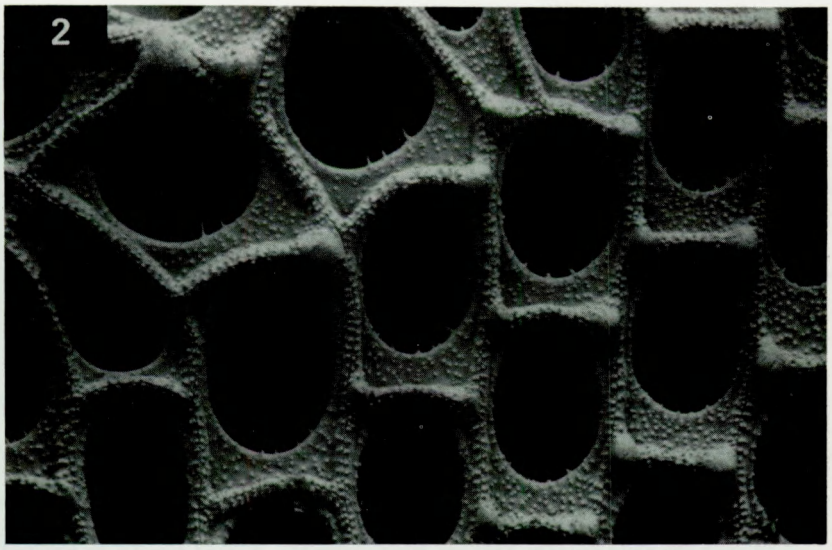
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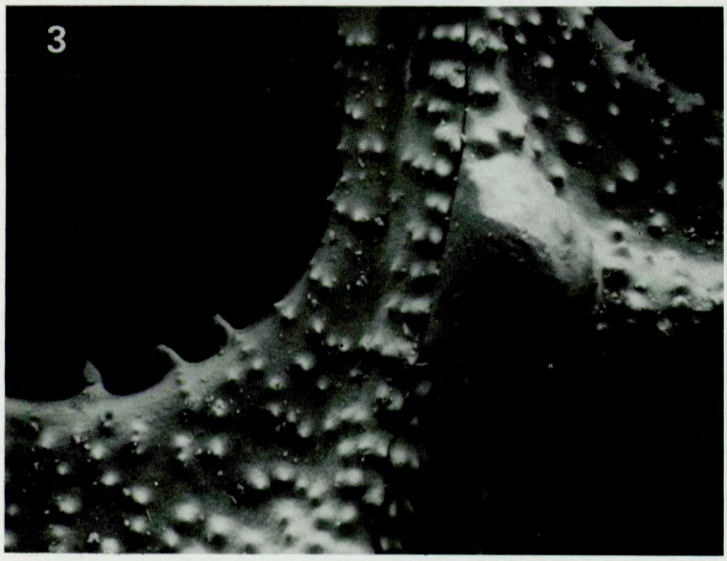
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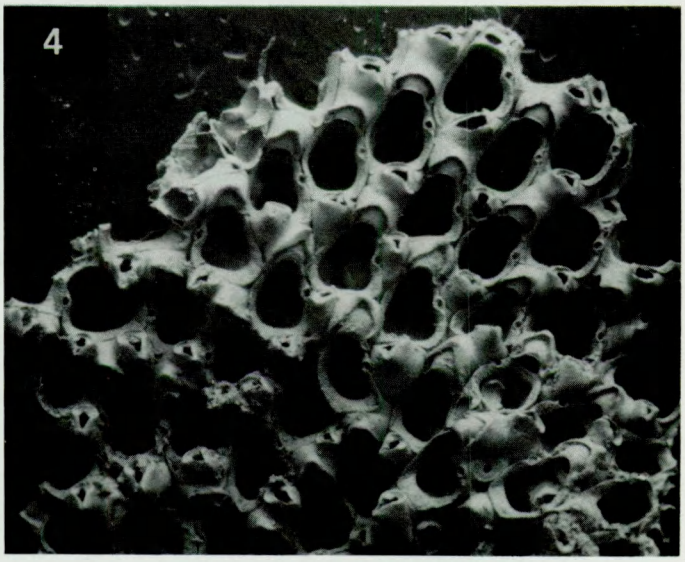
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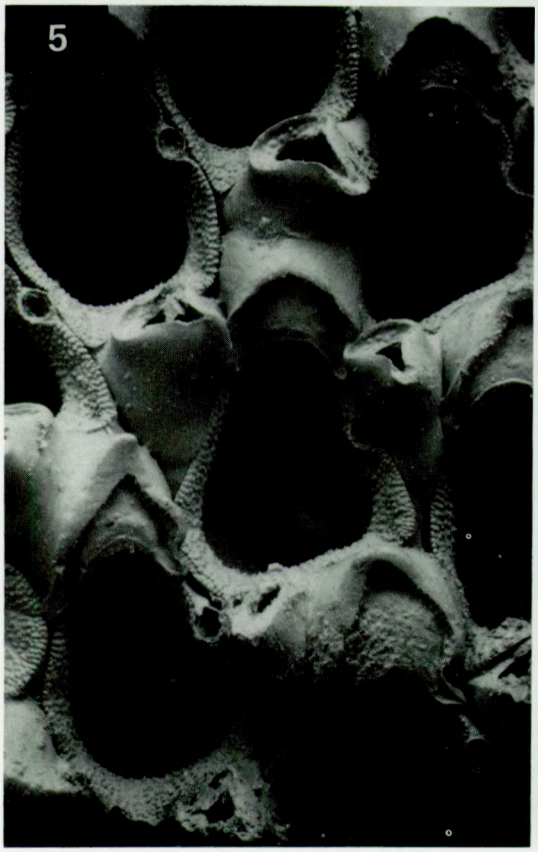
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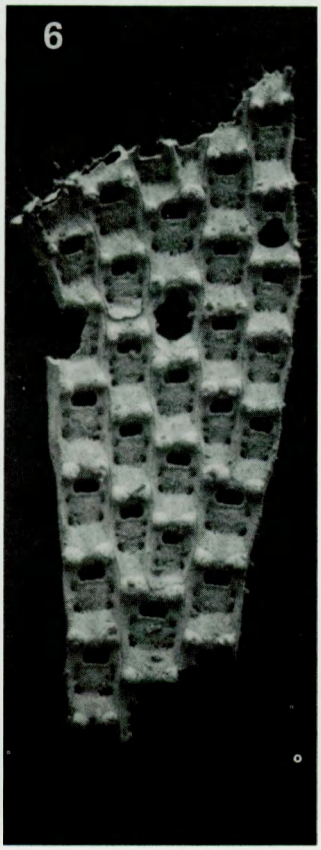
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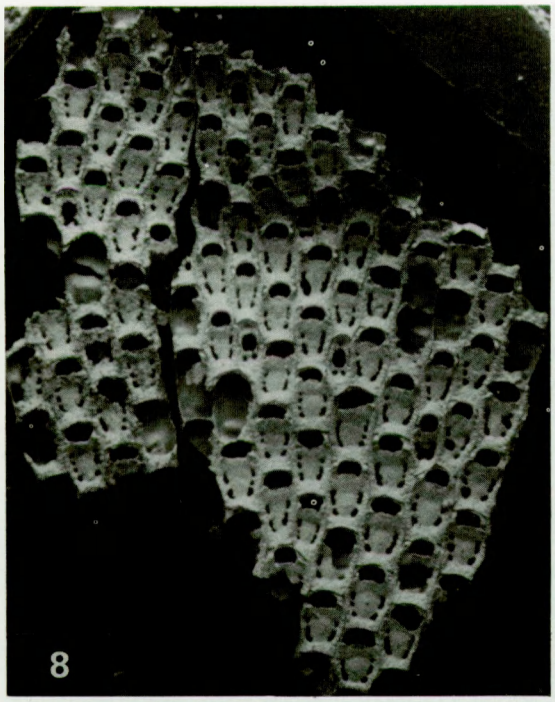
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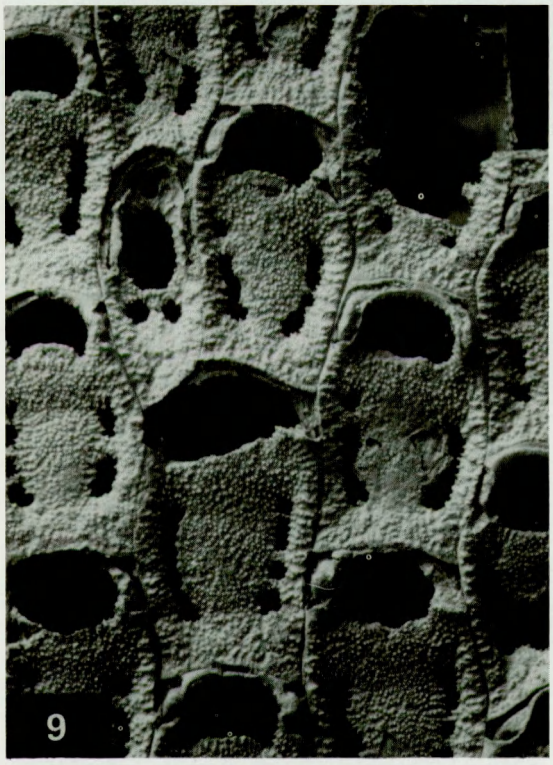
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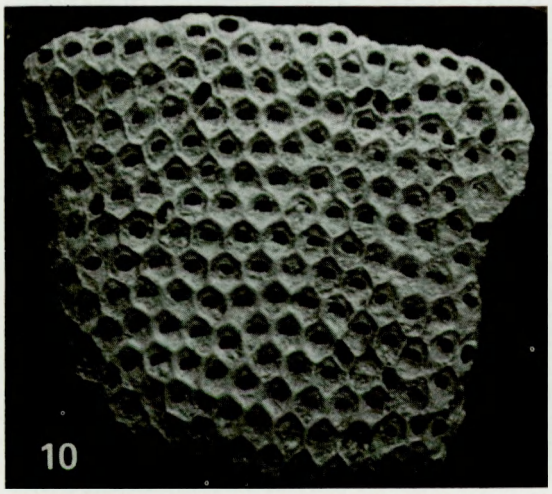
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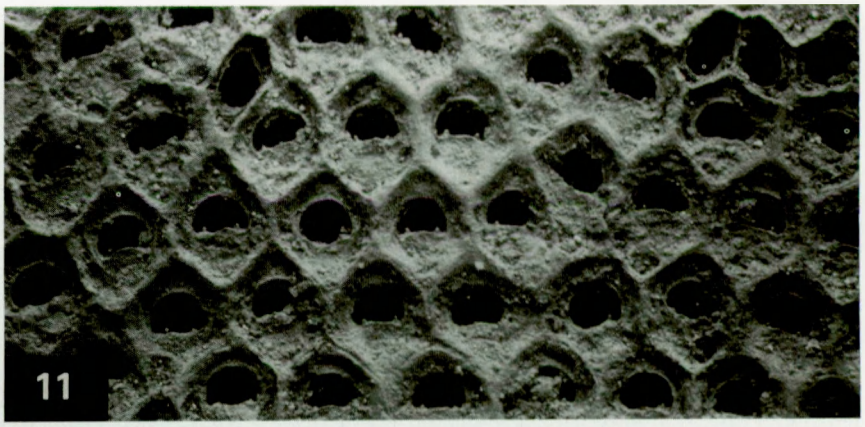
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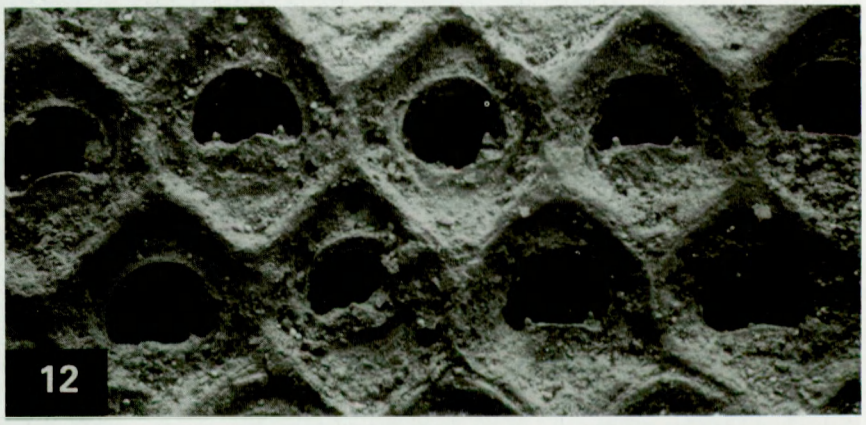
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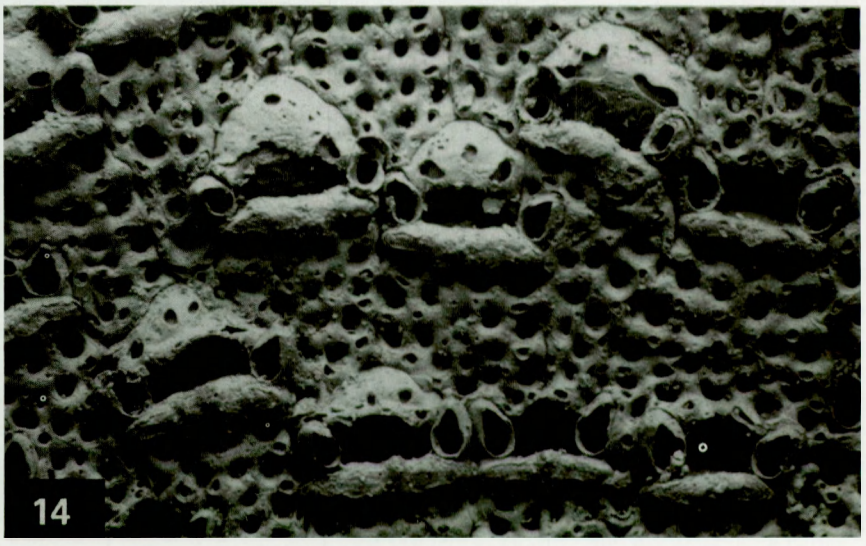
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8-9 *Manzonella fissurata* (Busk, 1859). 8, x16; 9, x69.

KBIN 4101, Wilmarsdonk; figured Lagaaij (1952) pl.3 fig. 2, as *Verminaria fissurata* (Busk, 1859). This specimen was erroneously catalogued as 'lectotype'; the holotype of *M. fissurata* is BMNH D6835 from the Coralline Crag.

This species is tentatively assigned here to *Manzonella* Jullien, 1888 because of the presence of vicarious avicularia at bifurcations of zooid rows. Avicularia are not seen in the type species of *Verminaria* Jullien, 1888, *Membranipora oblonga* Busk, 1859 (Figs 6, 7). Vicarious avicularia were first noted in the type species of *Manzonella*, *Membranipora exilis* Manzoni, 1869, by Neviani (1895), and were shown in his illustrations to occur at row bifurcations; however, the identity of Neviani's material with Manzoni's type specimen requires confirmation before the possession of these avicularia can be treated with certainty as a character of *Manzonella*.

10-12 *Melicerita charlesworthii* (Morris, 1843). 10, x17; 11, x58; 12, x102.

KBIN 4077, Wilmarsdonk; figured Lagaaij (1952) pl.3 fig.7, as *M. charlesworthii* Milne Edwards, 1836.

Morris (1843) appears to have introduced the name *charlesworthii* in its Latin form, but did not attribute the species unequivocally to *Melicerita* Milne Edwards, 1836, placing this genus alongside (presumably in the synonymy of) the invalid replacement genus *Melicertina* Ehrenberg, 1839 in his tabulation.

13-14 *Cribrilina watersi* Andersson, 1902. 13, x20; 14, x75.

KBIN 4102, Wilmarsdonk; figured Lagaaij (1952) pl.4 fig.10, as *C. punctata* (Hassall, 1841).

In addition to *C. watersi*, the material from Wilmarsdonk recorded as *C. punctata* by Lagaaij includes a second species to which the Recent lectotype (BMNH 1847.9.16.118) of *C. punctata* chosen by Lagaaij (1952) belongs. Following a ruling of the International Commission on Zoological Nomenclature (1974) Lagaaij's lectotype has been set aside and the species it represents is to be known as *C. cryptooecium* Norman, 1903. A specimen of *C. cryptooecium* from Wilmarsdonk has been registered as KBIN 5971.

15-16 "*Schizoporella*" sp. 15, x13; 16, x76.

KBIN 4078, Wilmarsdonk; figured Lagaaij (1952) pl.5 fig.6, as *Dakaria incisa* (Milne Edwards, 1836).

The genus *Dakaria* was established by Jullien (in Jullien & Calvet, 1903) and was based on characters of the orifice of its newly described type species and sole member, *D. chevreuxi*. Canu & Bassler (1920) referred a number of other species to *Dakaria* and re-defined the genus, apparently deriving the new characters from these additional species. However, they noted that not all of the species they referred to the genus shared the supposedly diagnostic form of the orifice reported in the type species by Jullien. Nor is it apparent that their revised definition was known to be applicable in all respects to the type species. Nevertheless, Canu & Bassler's account of *Dakaria* seems to have given rise to the concept of the genus adopted by later workers. A re-examination of the type species is needed to clarify the status of the genus.

Lagaaij's reasons for referring KBIN 4078 to *Eschara incisa* Milne Edwards, 1836 are not evident. In particular, Milne Edwards (1836: pl.9 fig.2) illustrated a form in which the proximal sinus of the orifice was considerably narrower and longer than that of the specimen from Wilmarsdonk. Examination of the orifice from the interior side of a zooid in KBIN 4078 revealed that the proportions of the orificial sinus were similar in early ontogeny to the later condition shown in Figure 16. Lagaaij's specimen resembles certain species usually referred to the genus *Calyptotheca* Harmer, 1957. (A species that agrees closely with the original account of *Eschara incisa* does in fact occur in the Coralline Crag, and is represented by specimen BMNH D55520.)

17-19 *Buffonellaria divergens* (Smitt, 1873). 17, x16; 18, x71; 19, approx. x240.

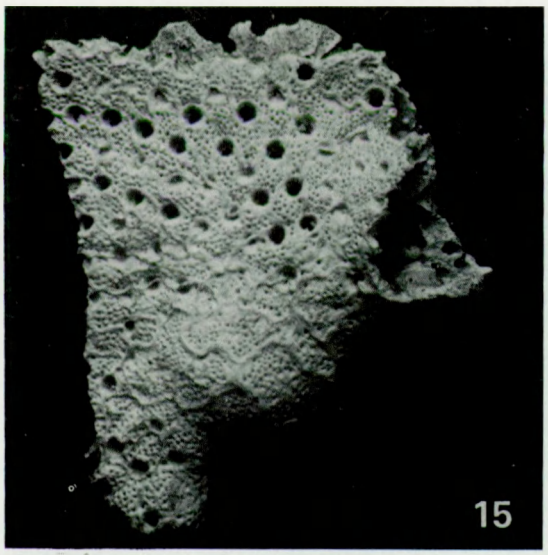
KBIN 4106, Wilmarsdonk; figured Lagaaij (1952) pl.6 fig.8, as *Stephanosella biaperta* (Michelin, 1848).

Ryland (1969) discussed the systematic status of *Stephanosella biaperta* and *Buffonellaria divergens*. KBIN 4106 agrees well with the account of *B. divergens* by Hayward & Ryland (1979). The entooecial ridges on the ovicell, shown here in Figure 19, were presumably mistaken by Lagaaij (1952: 75) for 'numerous minute pores in fan-shaped pattern'.

20-21 *Hippoporina pertusa* (Esper, 1796). 20, x33; 21, x72.

KBIN 4096, Wilmarsdonk; figured Lagaaij (1952) pl.7 fig.3.

H. pertusa is probably a species complex, and the name is used here in its broad sense. KBIN 4096 closely resembles BMNH 1964.9.1.1, the specimen from west Africa figured by Cook (1964: fig.1A).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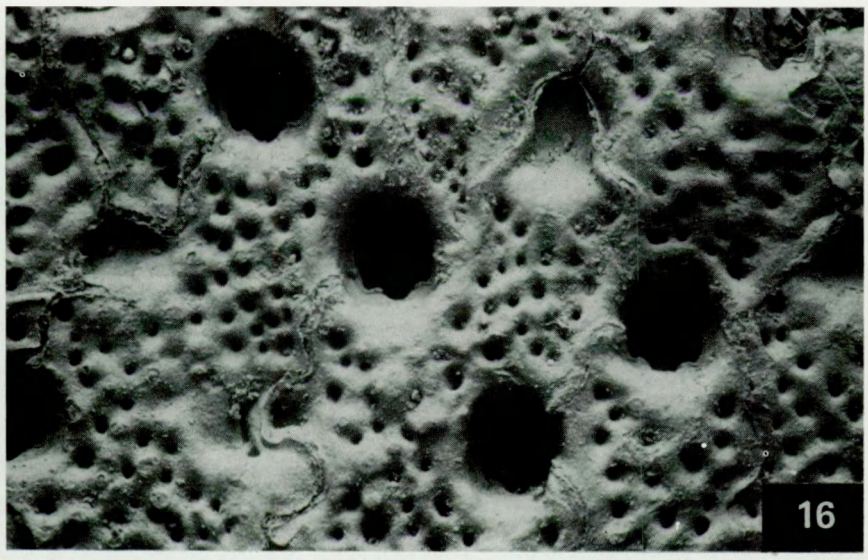
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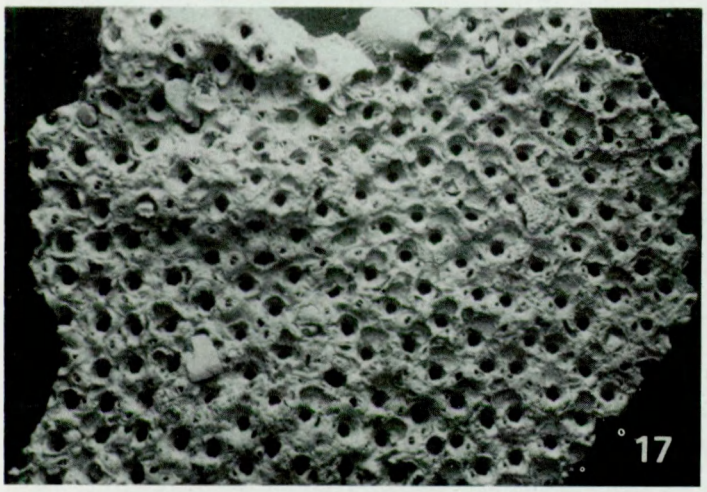
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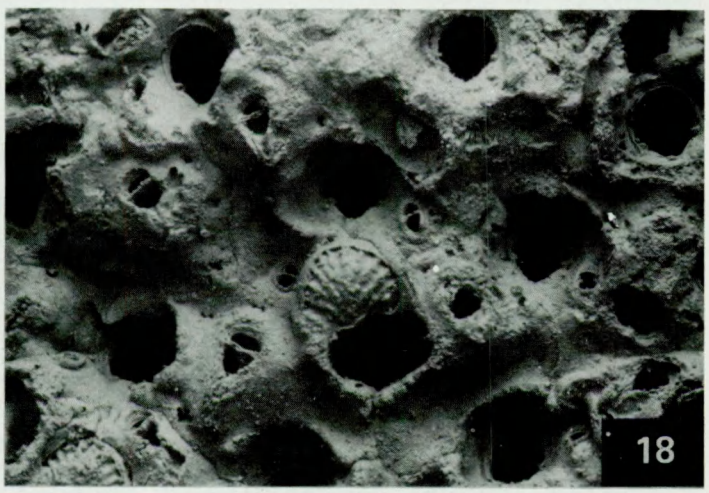
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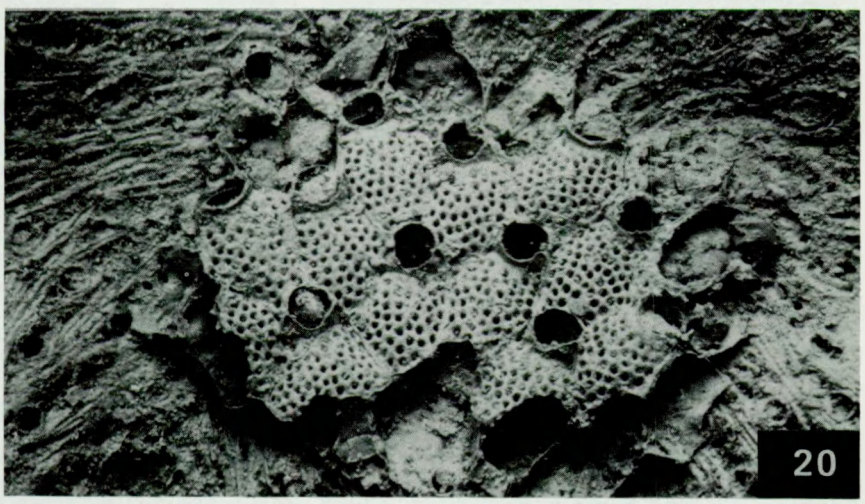
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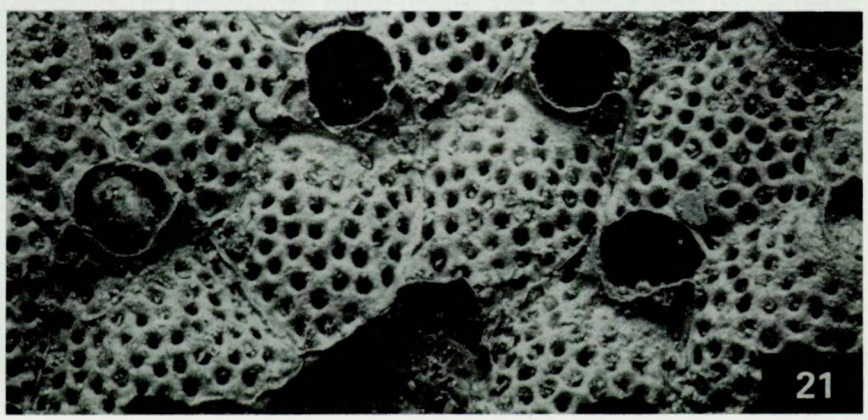
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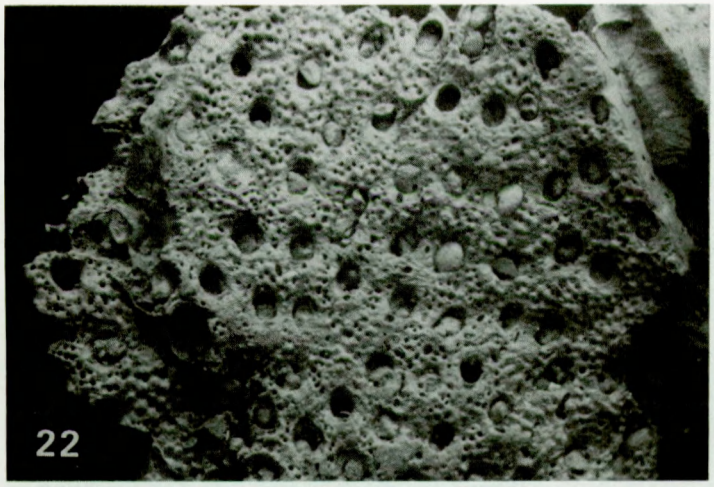
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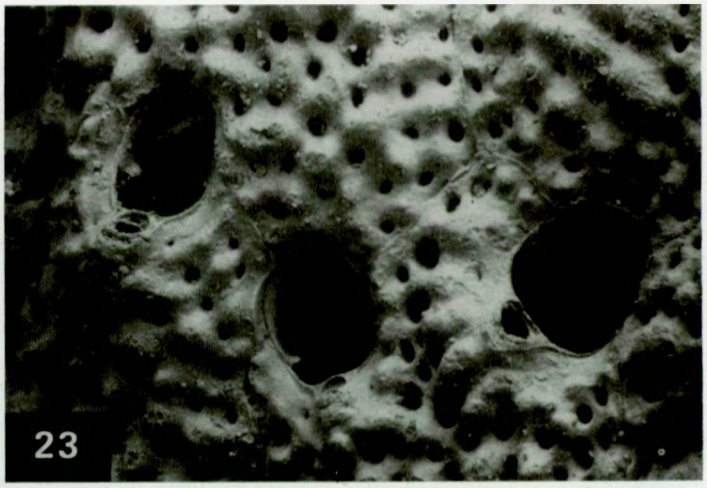
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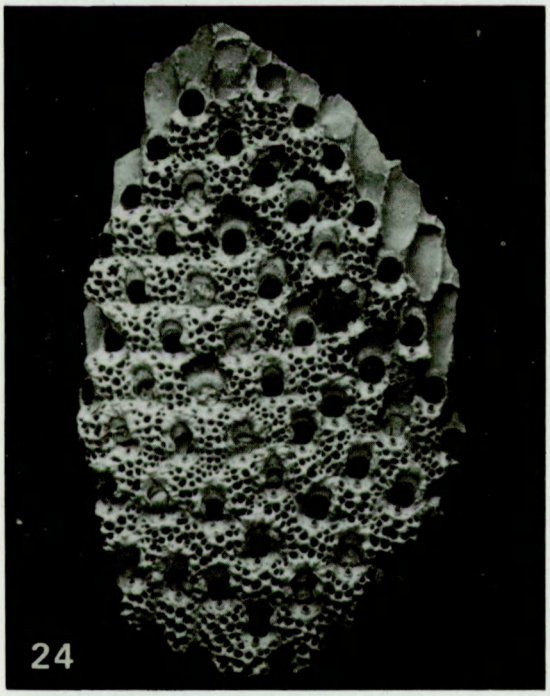
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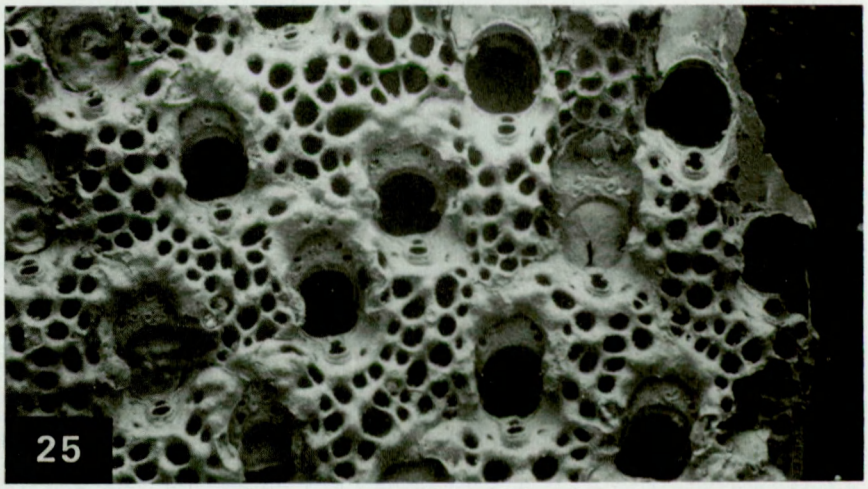
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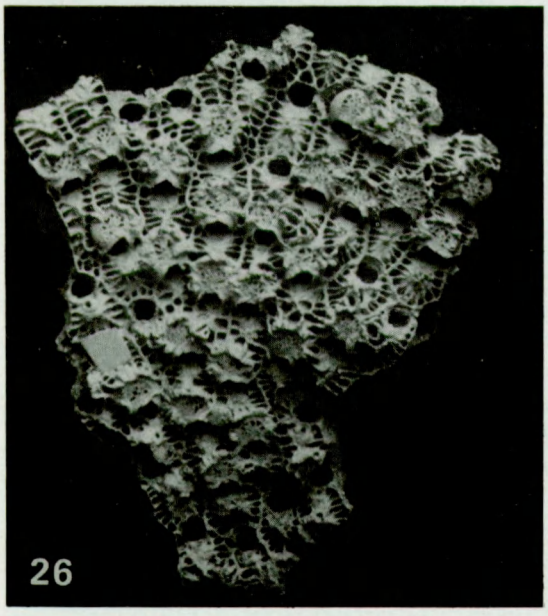
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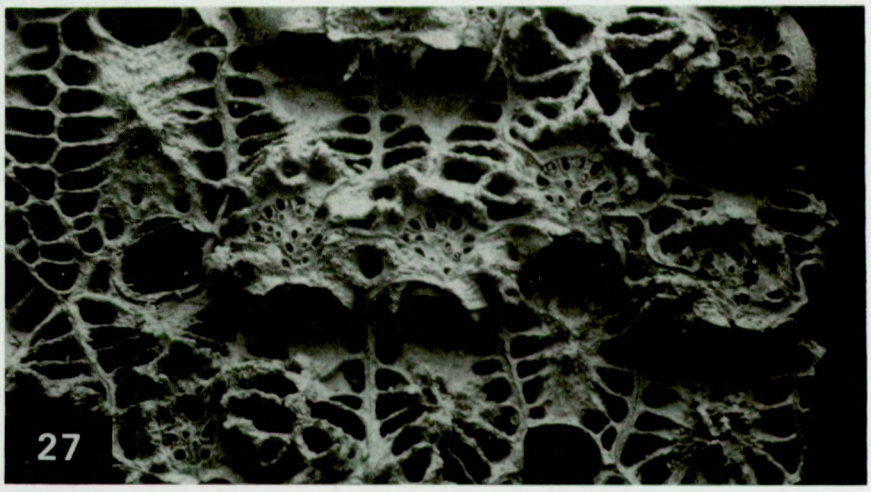
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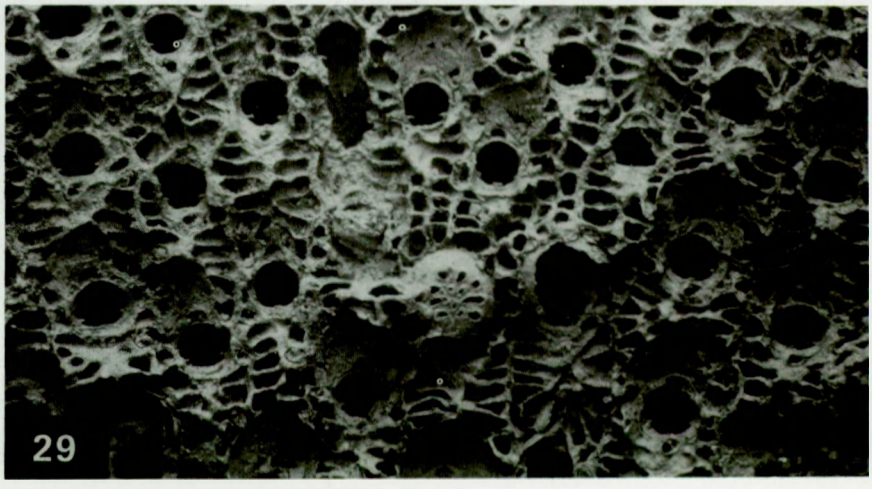
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22-25 *Pentapora foliacea* (Ellis & Solander, 1786). 22, x19; 23, x83; 24, x17; 25, x54.

KBIN 4083 (Figs 22, 23) and KBIN 4084 (Figs 24, 25), Wilmarsdonk; figured Lagaaij (1952) pl.7 figs 5, 6, as *Hippodiplosia ottomulleriana* (Moll, 1803).

Hastings & Ryland (1968) discussed the systematic status of *Hippodiplosia* Canu, 1916 and *Pentapora* Fischer, 1807, and referred the specimen (KBIN 4084) illustrated by Lagaaij (1952) in plate 7 figure 6 to *P. foliacea*.

KBIN 4084 is bilamellar, whereas KBIN 4083 is apparently encrusting and shows self-overgrowth.

26-29 *Hippomonavella ?umbonella* (Wood, 1844). 26, x17; 27, x58; 28, x20; 29, x41.

KBIN 4107 (Figs 26, 27) and KBIN 4108 (Figs 28, 29), Wilmarsdonk; figured Lagaaij (1952) pl.7 figs 8, 9, as *H. umbonella* (Wood, 1844).

The conspecificity of the Wilmarsdonk specimens with the neotype (BMNH D6798) selected and illustrated as plate 7 figure 10 by Lagaaij (1952) is open to doubt. The neotype has no ovicells and little or no secondary calcification, making comparison with KBIN 4107 and 4108 difficult. (Specimen BMNH D37769, which was also examined by Lagaaij, could not be found.) In KBIN 4108, a median proximal orificial denticle is seen in a number of those autozooids in which a suboral avicularium is present.

30-31 *Umbonula* sp. 30, x13; 31, x39.

KBIN 4097, Wilmarsdonk; figured Lagaaij (1952) pl.9 fig.2, as *U. littoralis* Hastings, 1944.

In the Recent species *U. littoralis*, part of the calcified secondary orifice of each autozooid is contributed by the distal autozooid (or autozooids), as shown in the illustration by Hayward & Ryland (1979: fig.22). In contrast, the zooidal boundary of the fossil form (KBIN 4097 and BMNH D37757) lies distal to the secondary orifice, which is therefore the product of a single zooid.

In Figure 31 the specimen was tilted slightly to reveal the suboral avicularia, which lie almost perpendicular to the plane of the secondary orifice.

32-33 *Umbonula megastoma* (Busk, 1859). 32, x11; 33, x54.

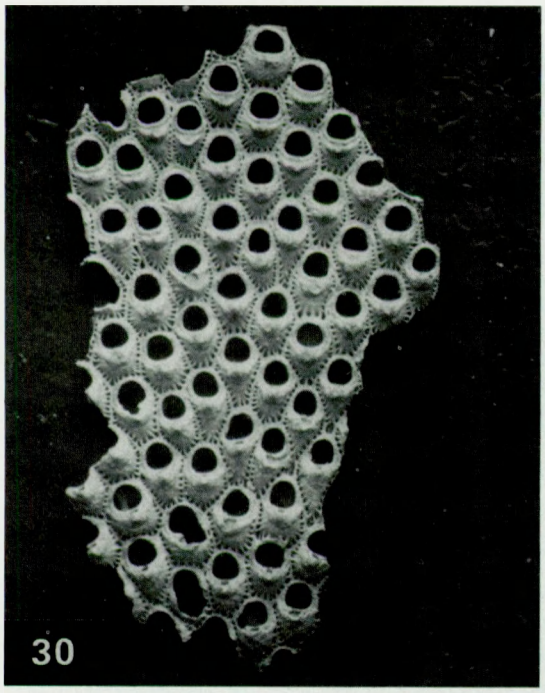
KBIN 4100, Wilmarsdonk; figured Lagaaij (1952) pl. 9 fig.3. This specimen was erroneously catalogued as 'lectotype'; the holotype of *U. megastoma* is BMNH B1688 from the Coralline Crag.

34-36 *Smittoidea* sp. 34, x17; 35, x79; 36, x138.

KBIN 4076, Wilmarsdonk; figured Lagaaij (1952) pl.9 fig.5, as *Smittina reticulata* (Macgillivray, 1842).

As pointed out by Soule & Soule (1973), the identity of *Lepralia reticulata* Macgillivray requires clarification by the designation of a neotype. The Wilmarsdonk specimen differs from the prevalent concept of Recent *Smittoidea reticulata* (for instance specimen BMNH 1899.5.1.916; see also account by Hayward & Ryland, 1979) principally in the possession of denticles on the distal margin of the orifice (Fig.36) and occasional spatulate frontal avicularia (Fig.35); the suboral avicularium has a more rounded rostrum in the fossil.

KBIN 4076 may in fact be referable to *Hemismittoidea* Soule & Soule, 1973, but details of the development of the suboral avicularium in the fossil form are not known at present.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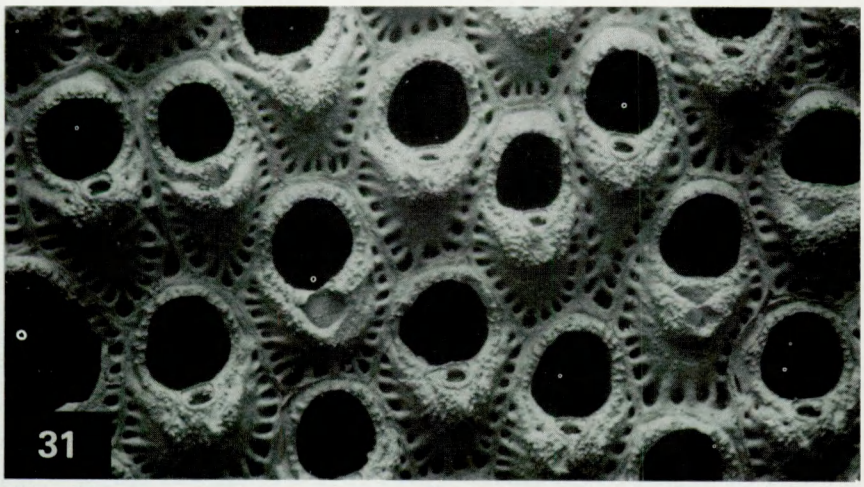
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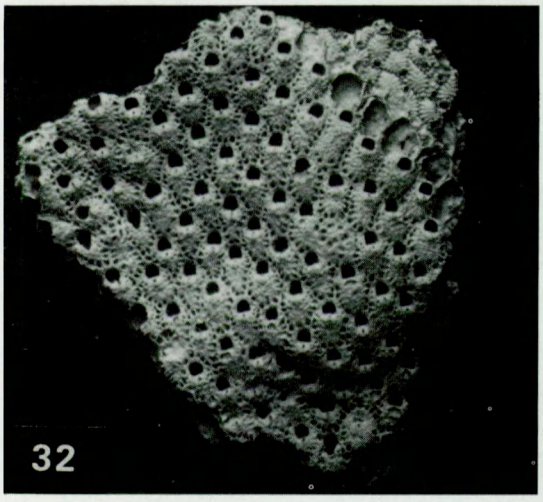
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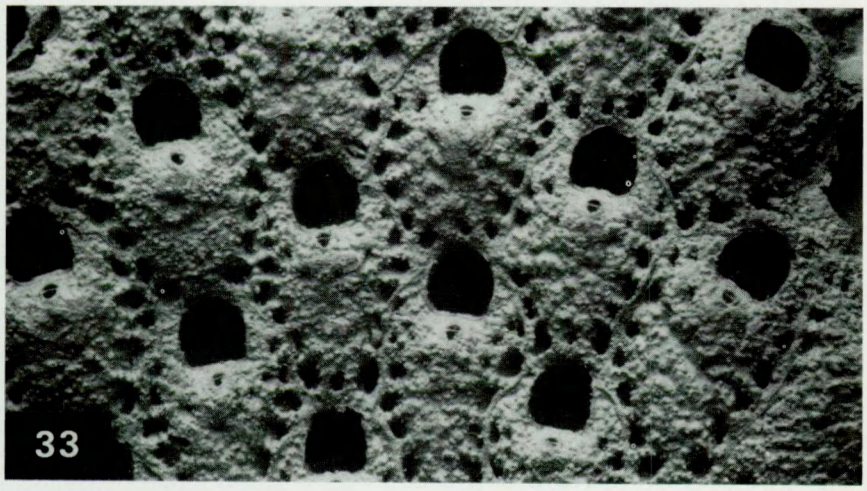
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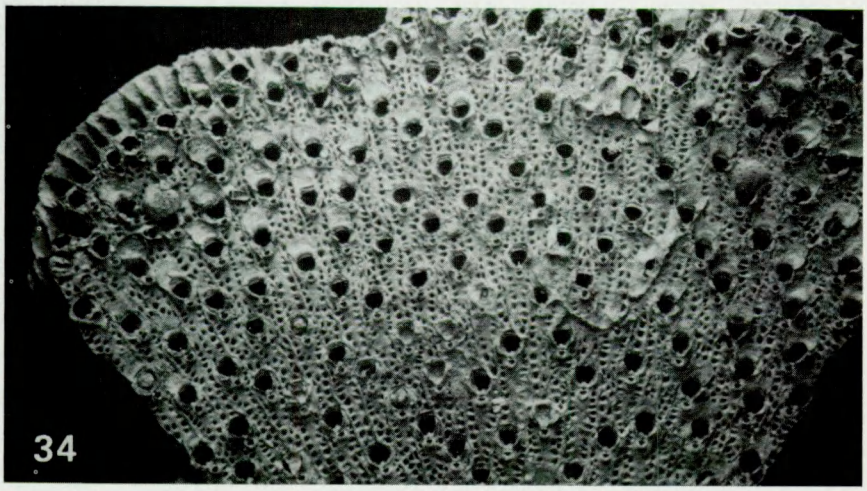
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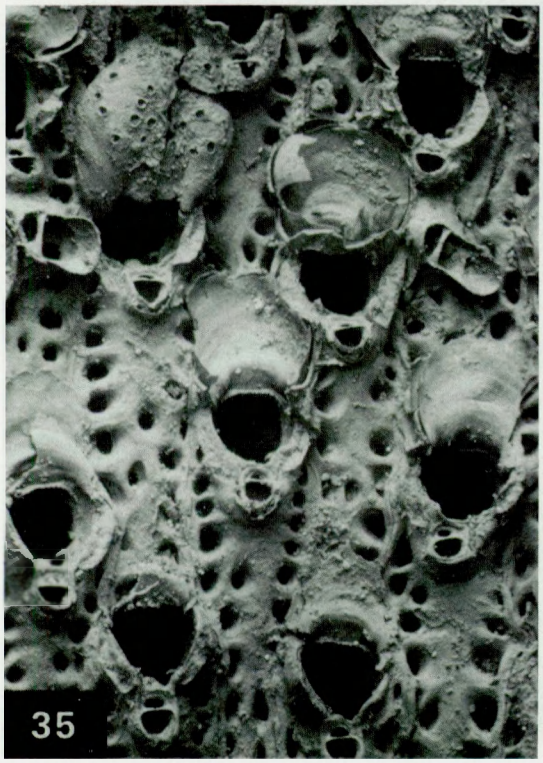
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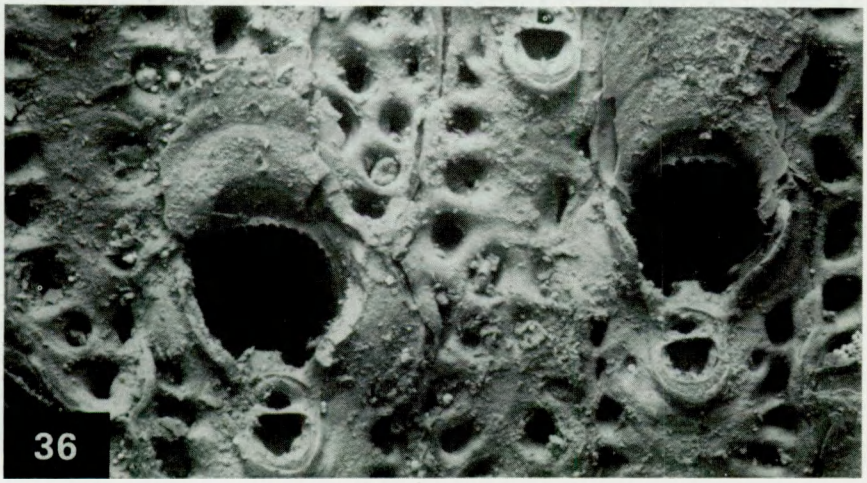
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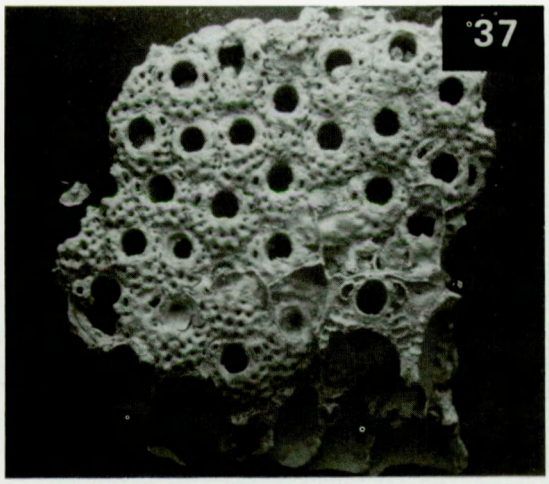
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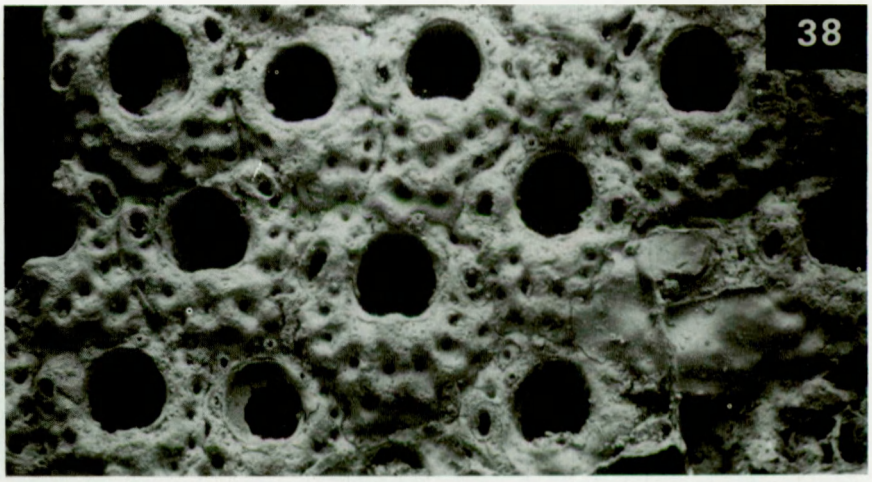
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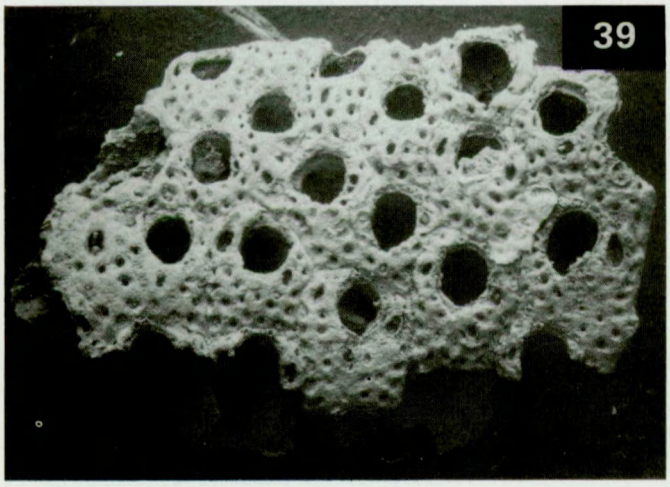
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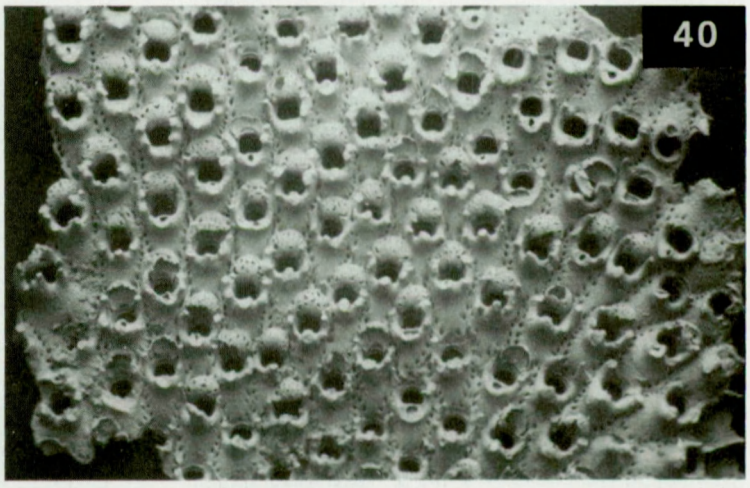
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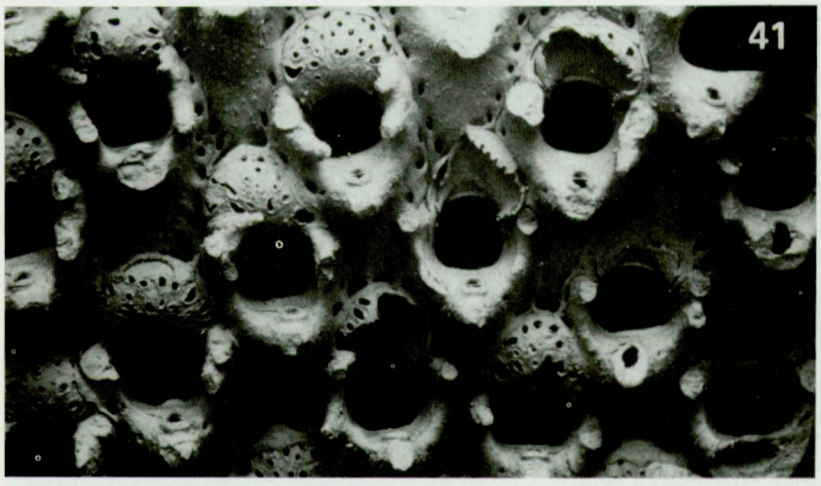
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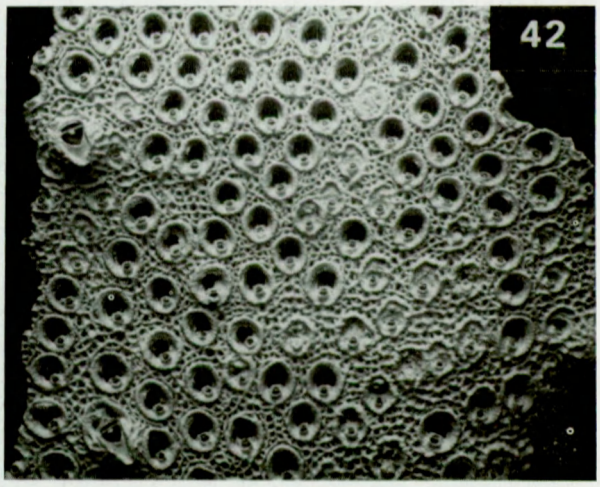
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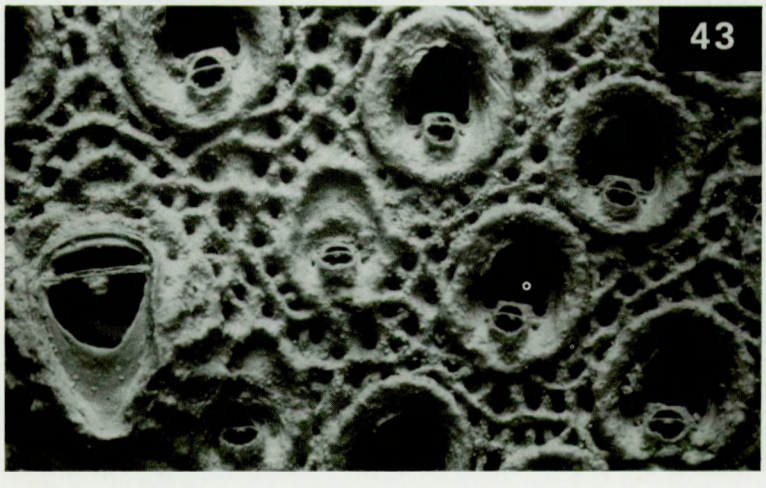
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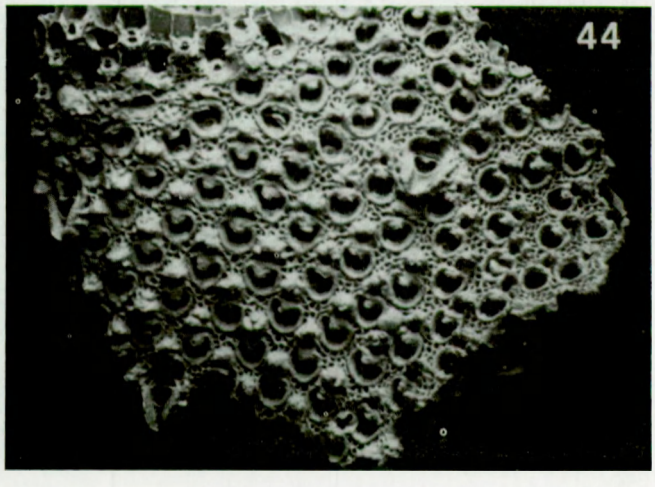
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37-39 *Hippopleurifera sedgwickii* (Milne Edwards, 1836). 37, x16; 38, x47; 39, x25.

KBIN 4075 (Figs 37, . 38) and KBIN 4075A (Fig.39, specimen worn), Wilmarsdonk; figured Lagaaij (1952) pl.8 fig.6 and pl.9 fig.4.

40-41 *Palmicellaria skenei* (Ellis & Solander, 1786). 40, x16; 41, x46.

KBIN 4110, Wilmarsdonk; figured Lagaaij (1952) pl.9 fig.6, as *P. bicornis* (Busk, 1859).

Ryland (1963a) and Hayward & Ryland (1979) considered *P. bicornis* to be conspecific with *P. skenei*, and their opinion is accepted here.

42-44 *Smittina cyclochyla* (Lagaaij, 1952). 42, x16; 43, x64; 44, x14.

KBIN 4104 (Figs 42, 43) and KBIN 4105 (Fig.44), Wilmarsdonk; paratypes, figured Lagaaij (1952) pl.10 figs 5, 6, as *Porella cyclochyla.*

See also Figures 45-47. Lagaaij (1952: 97) discussed the identity of the type species of *Porella* Gray, 1848, and suggested that a ruling of the International Commission on Zoological Nomenclature was required. This has since been obtained (Ryland, 1969a; ICZN, 1971), and *Millepora compressa* Sowerby, 1805 has been designated the type species of *Porella.* In *P. compressa*, the frontal wall has only marginal (areolar) pores, basal pore chambers are present, and the ovicell is imperforate. In Lagaaij's species *cyclochyla*, pores are present right across the frontal wall (see Figs 46, 47), basal pore chambers are not seen, and the ovicell has a large frontal pore. The fossil species is accordingly referred here to *Smittina* Norman, 1903. The other potential type species of *Porella* discussed by Lagaaij (1952), *Millepora cervicornis* Pallas, 1766, was referred to *Smittina* by Cook (1968).

45-47 *Smittina cyclochyla* (Lagaaij, 1952). 45, x50; 46, x22; 47, x63.

KBIN 4105 (Fig.45) and KBIN 5970 (Figs 46, 47), Wilmarsdonk; paratypes, KBIN 4105 figured Lagaaij (1952) pl.10 fig.6, as *Porella cyclochyla*.

See comments on Figures 42-44. Figures 46 and 47 are interior views of the frontal walls of a specimen in which the basal walls are missing.

48-49 *Escharella* sp. 48, x23; 49, x49.

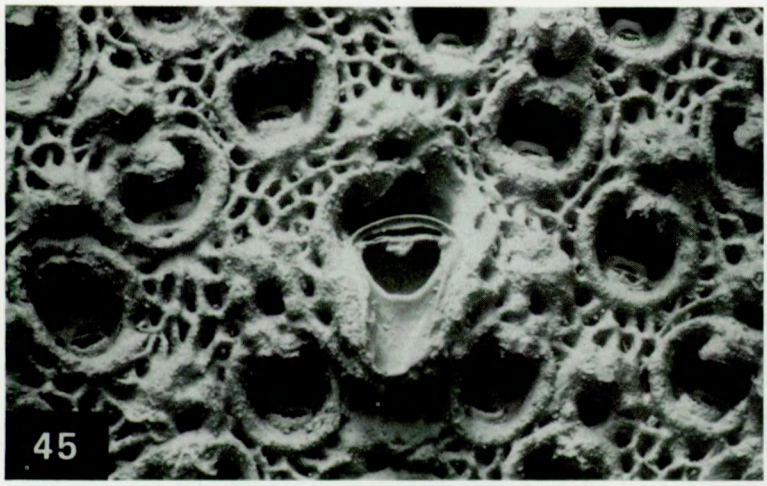
KBIN 4087, Wilmarsdonk; figured Lagaaij (1952) pl.11 fig.2, as *E. ventricosa* (Hassall, 1842).

The Wilmarsdonk specimen and the Coralline Crag material listed by Lagaaij (1952) differ from Recent British *E. ventricosa* (for instance BMNH 1847.9.16.79, 1893.8.7.37 and 1899.7.1.1894; see also account by Hayward & Ryland, 1979) as follows: the peristome of the fossil form appears wider, having a relatively straight proximal margin and prominent proximolateral corners; the lyrula lacks the distinctly upturned, cuspidate free corners seen in Recent material; the marginal areolae are better developed. The specimen (BMNH D37876) from the Red Crag examined by Lagaaij closely resembles the Recent form.

50-51 *Escharella variolosa* (Johnston, 1838). 50, x15; 51, x65.

KBIN 4098, Wilmarsdonk; figured Lagaaij (1952) pl.11 fig.3.

The areolar ridges of this specimen are extended considerably by secondary calcification.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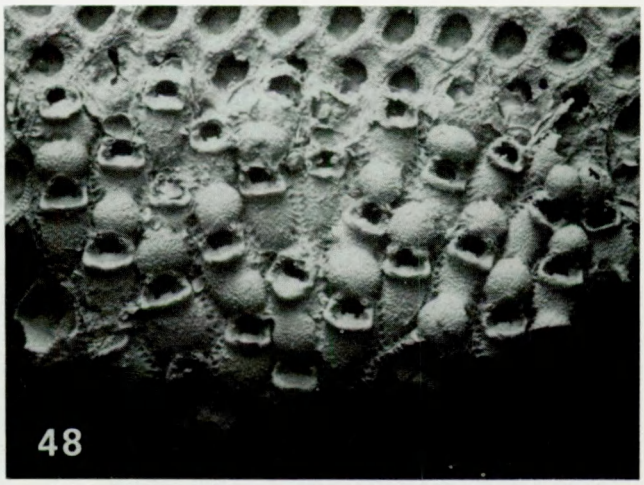
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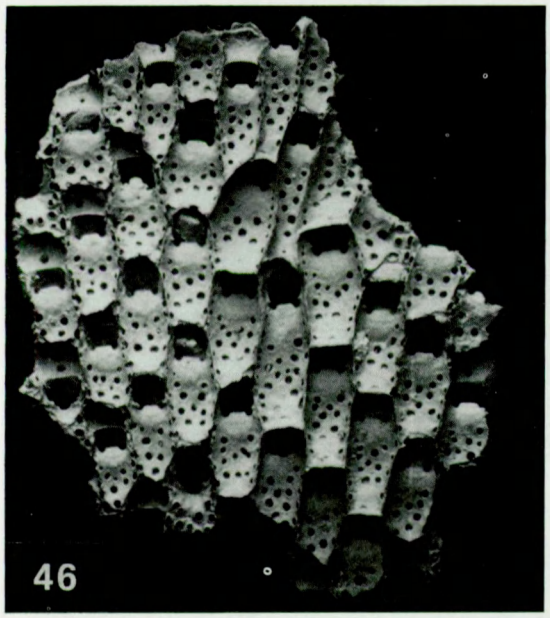
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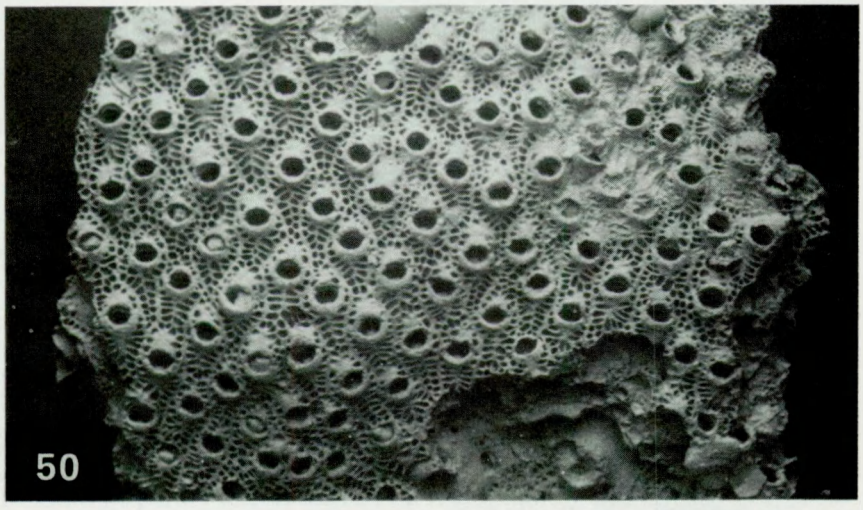
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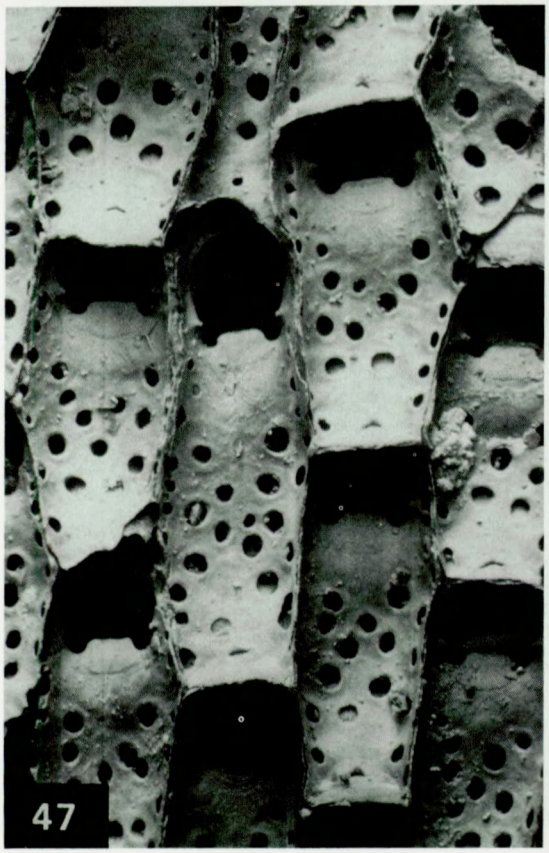
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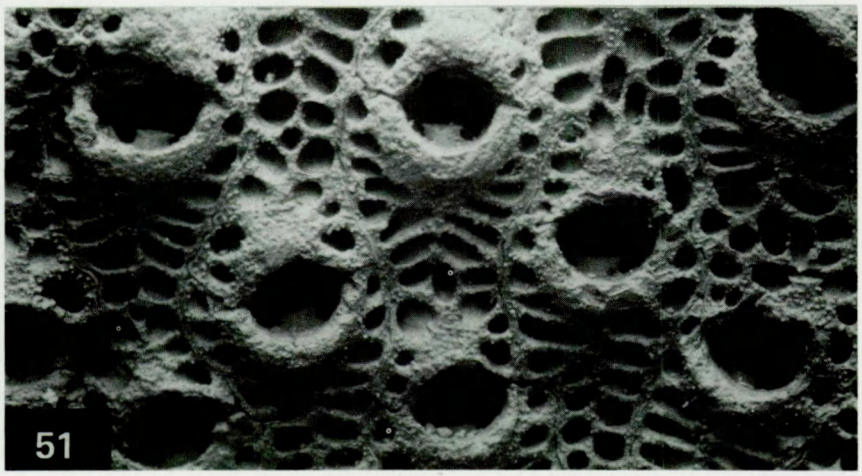
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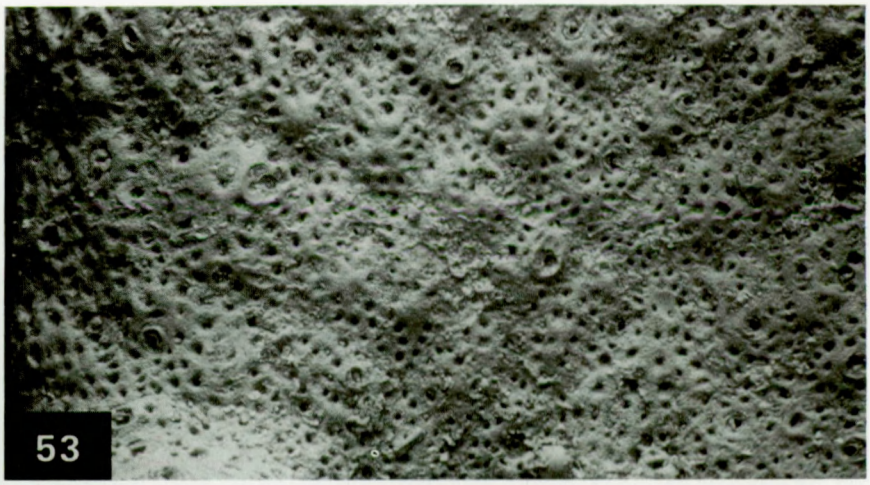
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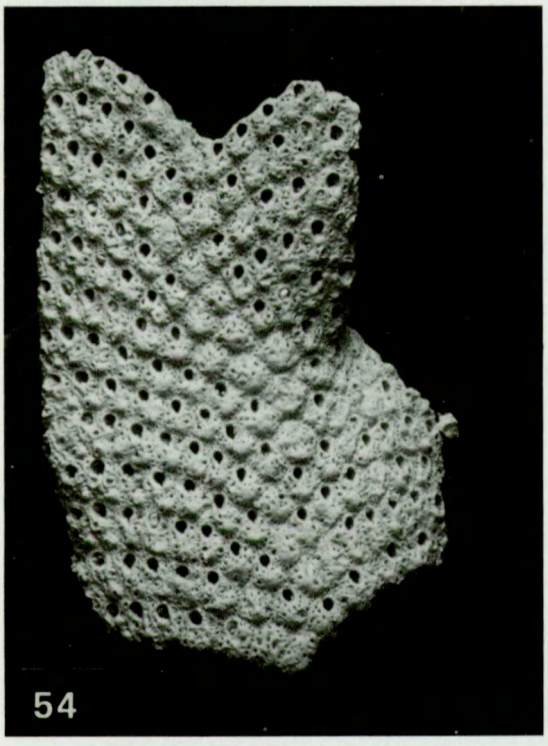
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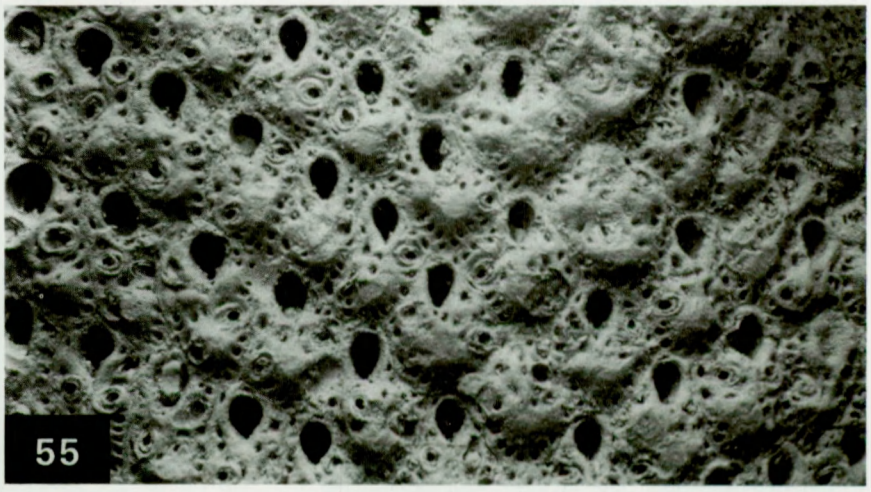
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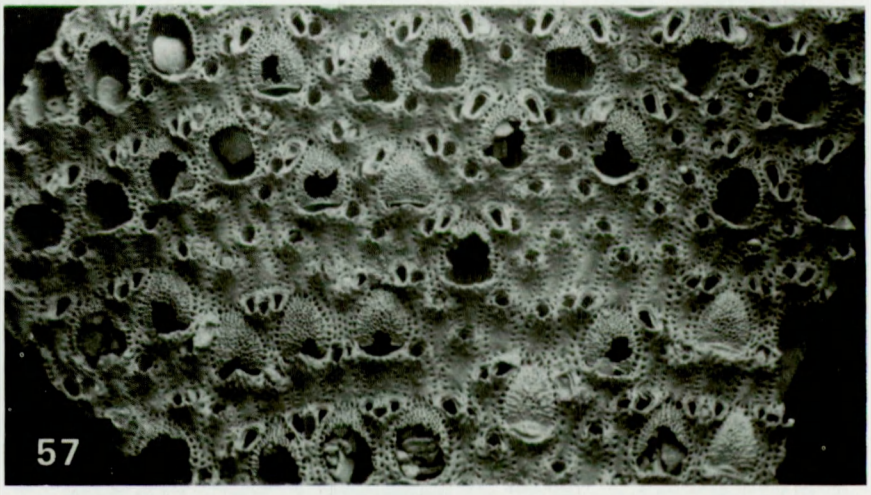
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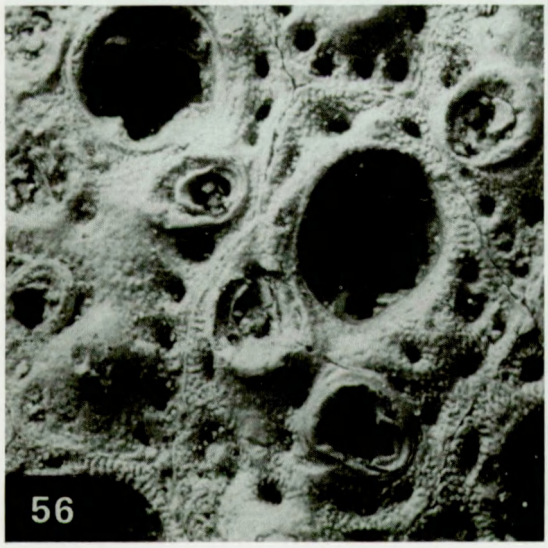
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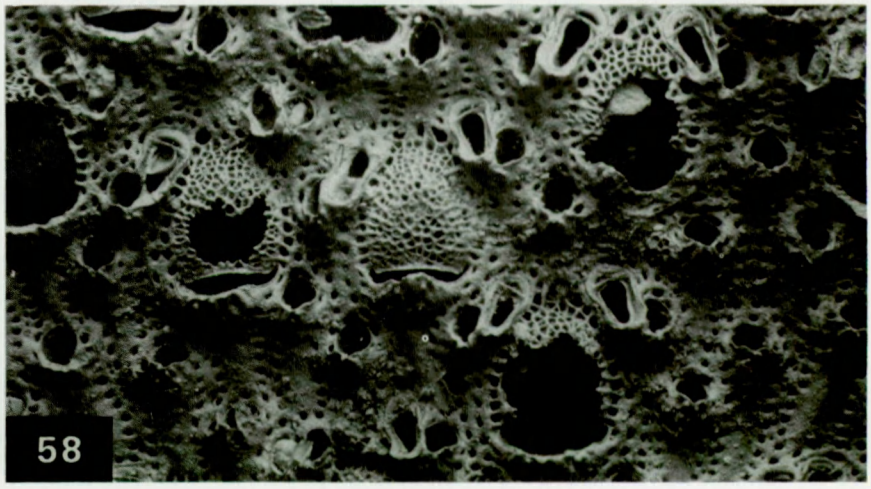
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52-56 *Schizostomella* sp. 52, x16; 53, x50; 54, x16; 55, x48; 56, x159.

KBIN 4080 (Figs 54-56) and KBIN 4081 (Figs 52, 53), Wilmarsdonk; figured Lagaaij (1952) pl.13 figs 4, 5, as *S. socialis* (Busk, 1859).

The lectotype (BMNH D6872) of *Eschara socialis* Busk, 1859 selected by Lagaaij (1952) is the heavily thickened colony base or bases of an adeoniform ascophoran species attached to a shell substrate. This was apparently the only material referred to by Busk in his description. The very few autozooidal orifices that are not occluded are in poor condition, and it is not possible to confirm the shape of the primary orifice illustrated by Busk (1859: pl.22 figs 1b, 1c). Lagaaij's reasons for regarding the Wilmarsdonk specimens as conspecific with the lectotype of *E. socialis* are unconvincing. The only point of comparison between the different sets of material was the similar appearance of occluded zooids in heavily thickened regions of the respective colonies, but such zooids look very similar in many adeoniform species. Cheetham (1966) considered that Lagaaij was correct to assign *E. socialis* to the genus *Schizostomella* Canu & Bassler, 1927. However, it is assumed here that Lagaaij's assignation was based on the features of the Belgian and Dutch material rather than those of the lectotype. Accordingly, KBIN 4080 and 4081 are referred to *Schizostomella* sp. here, while *Eschara socialis* Busk, 1859, as defined by the lectotype, is considered to be of uncertain affinity.

The shape of the proximal sinus of the primary orifice, seen in KBIN 4080 (Fig.56), differs from the relatively shallow U- or V-shaped notch illustrated in *E. socialis* by Busk (1859: pl.22 figs 1b, 1c). In KBIN 4080, the secondary orifices are almost circular near the edge of the branch but markedly ovoid near the middle (Fig.56).

57-58 *Metrarabdotos moniliferum* (Milne Edwards, 1836). 57, x14; 58, x32.

KBIN 4111, Wilmarsdonk. The specimens illustrated (as *Trigonopora monilifera*) by Lagaaij (1952) in pl.14 figs 3, 4 were not found, although KBIN 4111 and 4112 had been erroneously catalogued as the figured material.

Synonymy of the genera *Trigonopora* Maplestone, 1902 and *Metrarabdotos* Canu, 1914 is rejected for the reasons outlined by Cheetham (1968: 66), who referred *M. moniliferum* to the nominotypical subgenus of *Metrarabdotos*. Very few zooids in specimen KBIN 4111 bear 'ordinary avicularia' (*sensu* Cheetham, 1968); when developed in this species, the ordinary avicularia are directed proximo-medially.

59-60 *Metrarabdotos nysti* (Lagaaij, 1952). 59, x22; 60, x46.

KBIN 4113, Deurne-Zuid; paratype, figured Lagaaij (1952) pl.14 fig.5, as *Trigonopora nysti*. The specimen illustrated by Lagaaij (1952) pl.14 fig.6 was not found, although paratype KBIN 4114 had been erroneously catalogued as the figured material.

M. nysti was referred to the nominotypical subgenus of *Metrarabdotos* by Cheetham (1968), who gave characters by which the species could be distinguished from *M. moniliferum*.

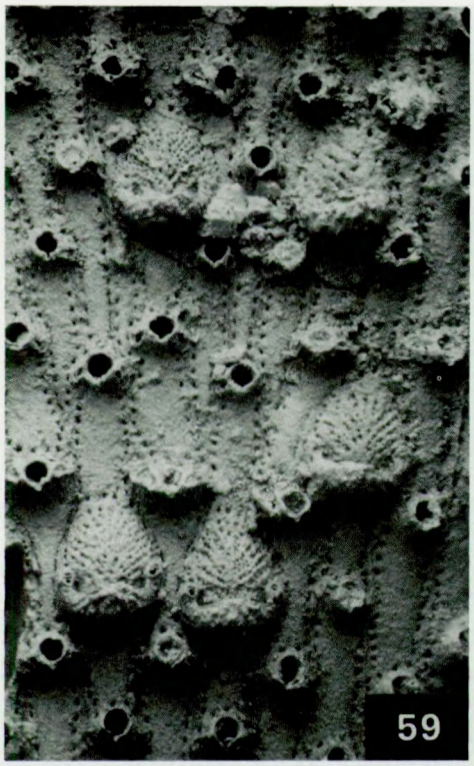
61-62 *Cheiloporina scaldisiensis* Lagaaij, 1952. 61, x19; 62, x49.

KBIN 4079, Wilmarsdonk; holotype, figured Lagaaij (1952) pl.15 fig.1 and text-fig.17.

63-65 *Cellepora pumicosa* (Pallas, 1766). 63, x32; 64, x27; 65, x58.

KBIN 4091 (Fig.63) and KBIN 4092 (Figs 64, 65), Wilmarsdonk; figured Lagaaij (1952) pl.15 figs 3, 4, as "*Cellepora*" *pumicosa* auctt. (*non* Linnaeus).

The status of *Cellepora* L., 1767 was clarified by Hayward (1979). Ryland (1969) designated a Recent neotype (BMNH 1899.5.1.1301, specimen 3) for the type species, *C. pumicosa* (Pallas, 1766) (*non* Linnaeus, 1767); the Wilmarsdonk specimens seem to be conspecific with this.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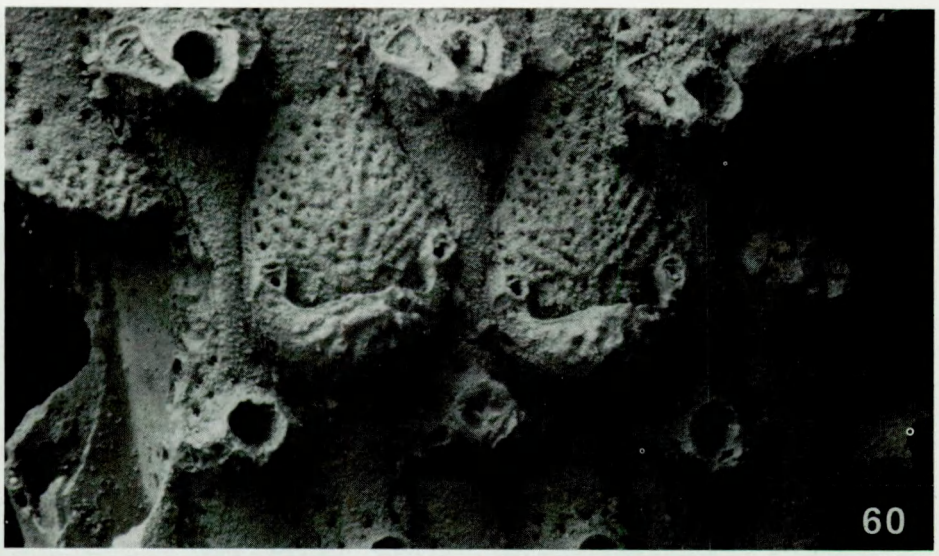
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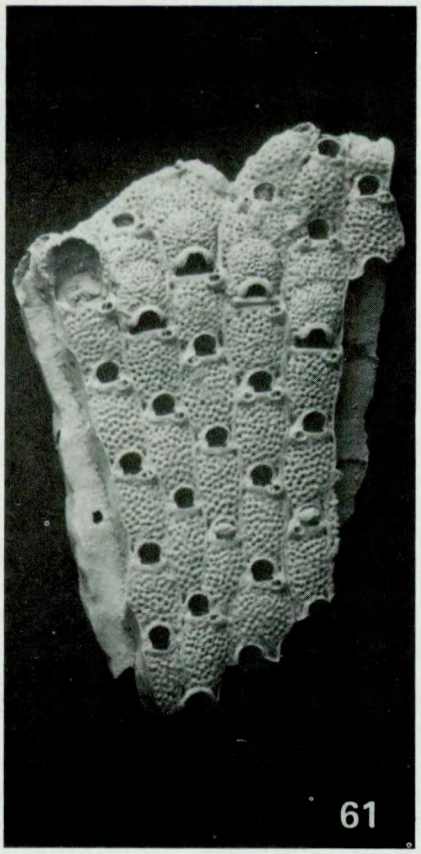
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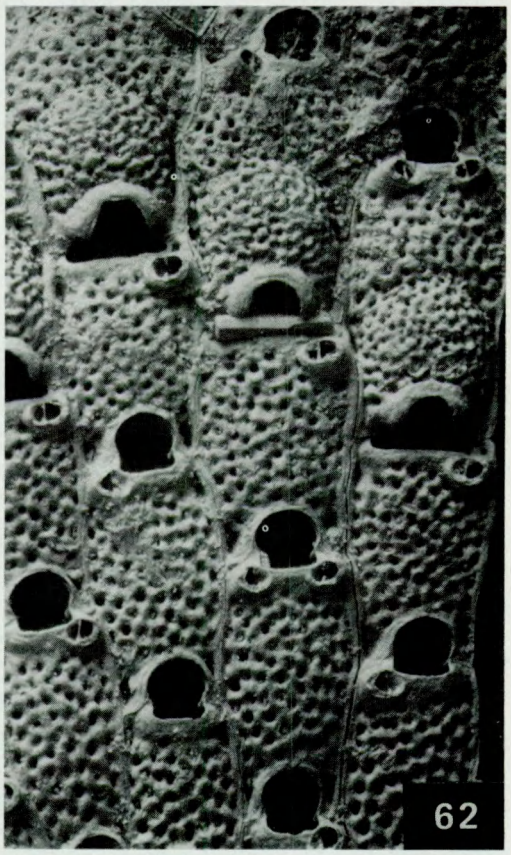
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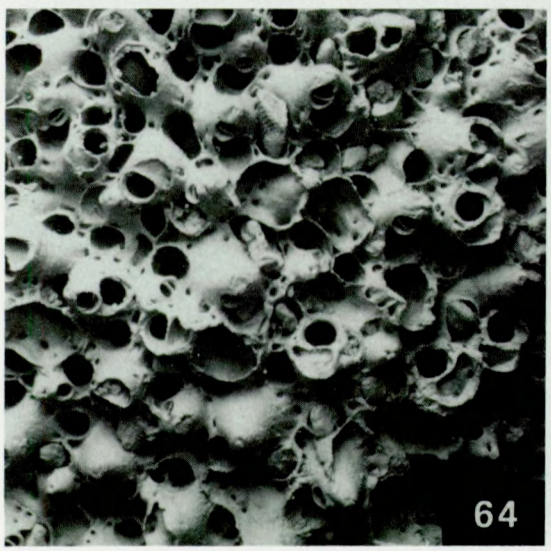
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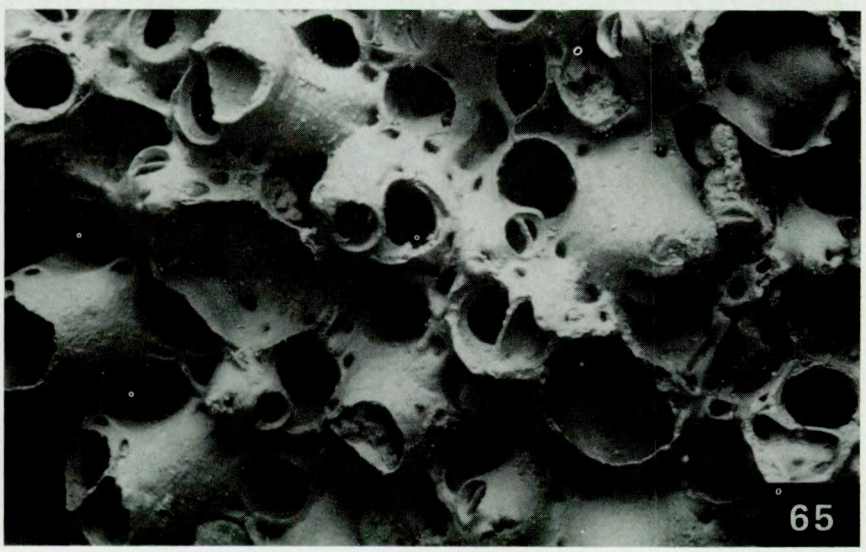
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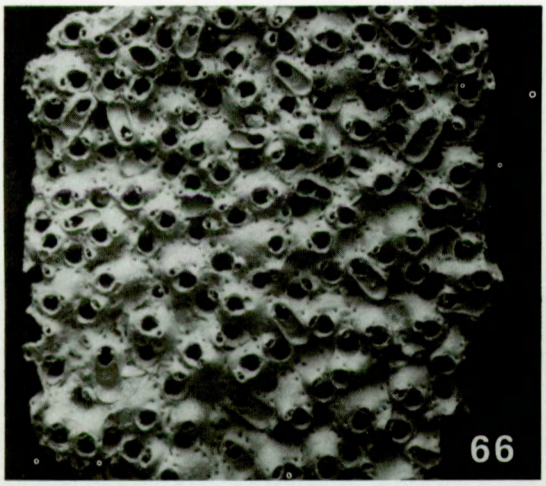
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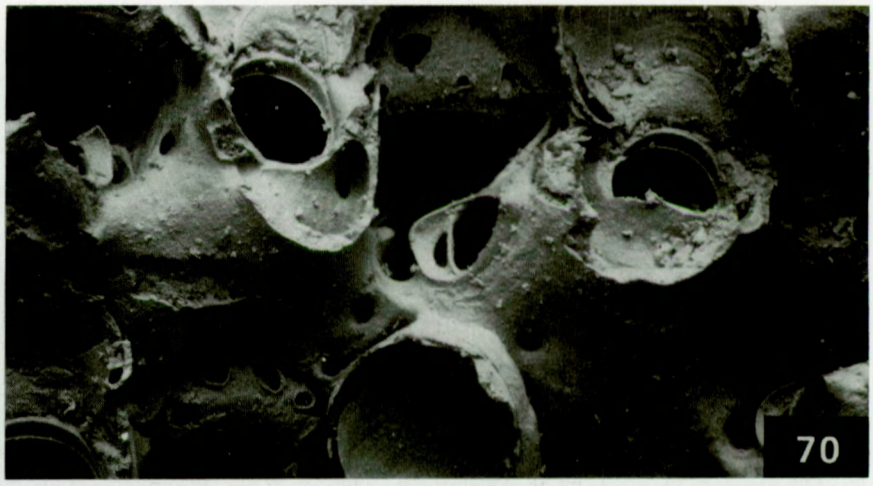
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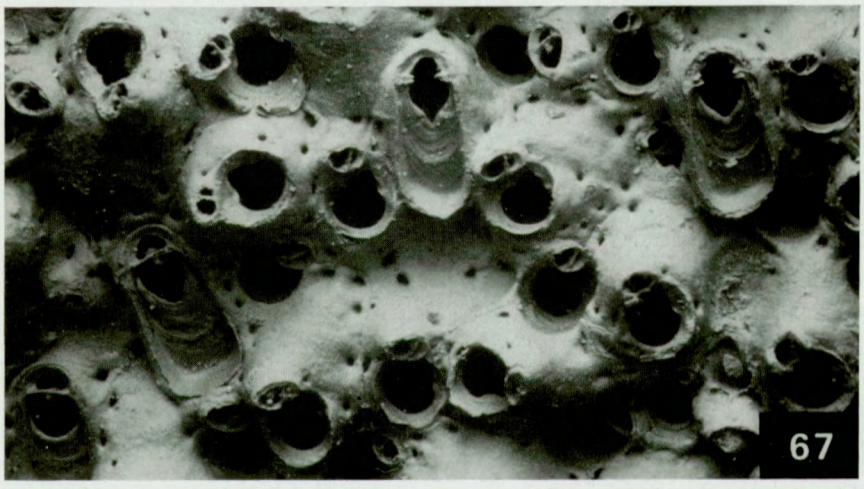
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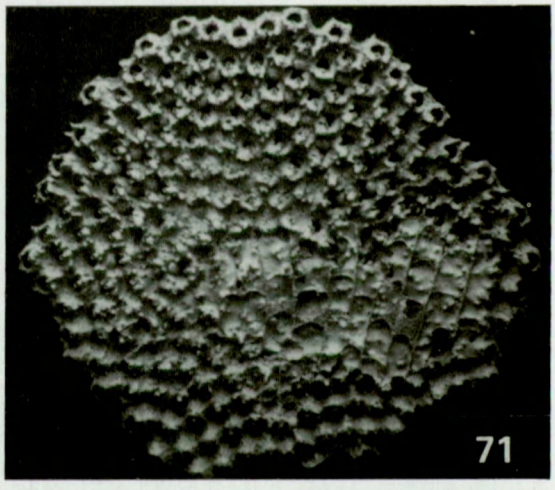
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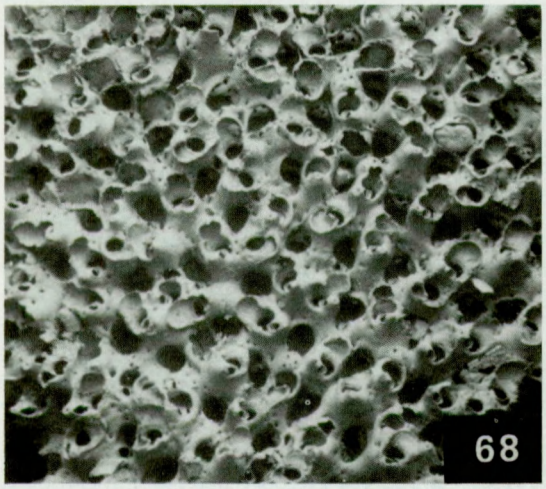
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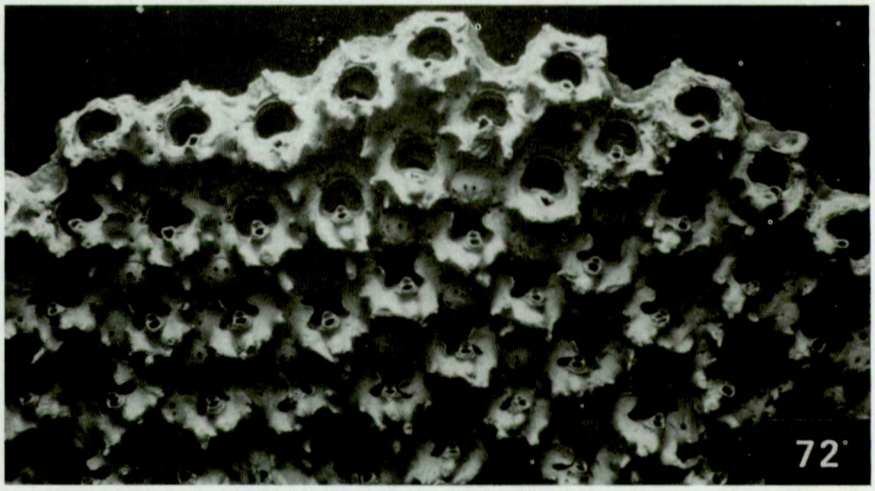
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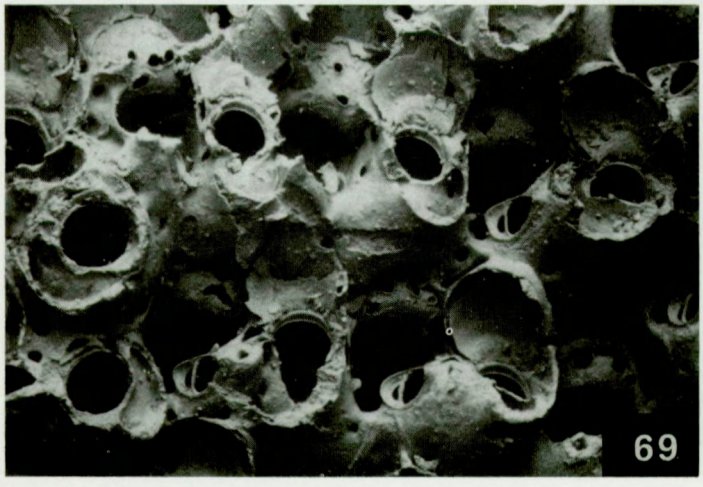
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73

66-67 *Turbicellepora coronopus* (Wood, 1844). 66, x16; 67, x54.

KBIN 4103, Wilmarsdonk; figured Lagaaij (1952) pl.15 fig.8, as *Osthimosia coronopus* (Wood, 1844).

Cellepora coronopus Wood, 1844 is the type species of the genus *Turbicellepora* Ryland, 1963. *T. coronopus* was redescribed in a review of Recent European species of *Turbicellepora* by Hayward (1978), and the genus *Osthimosia* Jullien, 1888 was dicussed by Rogick (1959).

68-70 *Buskea belgica* (Lagaaij, 1952). 68, x19; 69, x67; 70, x134.

KBIN 4088, Wilmarsdonk; holotype, figured Lagaaij (1952) pl.15 fig.11 and text-fig.19, as *Harmerella belgica.*

The generic assignment of this species presents some problems. *B. belgica* differs from the type species of *Harmerella* Lagaaij, 1952 (i.e. *Cellepora dichotoma* Hincks, 1862) as follows: it has an orbicular primary orifice without a marked sinus (Fig.69), whereas *H. dichotoma* has an almost semicircular orifice with a distinct proximal sinus; it has an adeoniform, rather than vinculariiform, colony growth habit; and it does not have vicarious avicularia. The primary orifice of *Buskea nitida* Heller, 1867, the type species of *Buskea* Heller, 1867, is almost orbicular with a shallow proximal sinus (Gautier, 1962; Waters, 1879: pl.24 fig.10, as *Cellepora margaritacea*, synonymy *fide* Gautier, 1962 and Hayward, 1978), and therefore resembles that of *B. belgica* more closely. However, the growth habit of *B. nitida* is again vinculariiform. The primary orifice of *Cellepora pumicosa* (Pallas, 1766), the type species of *Cellepora* L., 1767, is orbicular (Fig.65) like that of *B. belgica*, but the possession of a peristomial pseudosinus by Lagaaij's species (Fig.70) seems to debar it from *Cellepora.* The combination *Buskea belgica* adopted here is provisional, and follows the opinion of Ryland (1969) that *Harmerella* is a junior subjective synonym of *Buskea.*

71-73 *Palmicellaria alata* (Lagaaij, 1952). 71, x12; 72, x38; 73, x109.

KBIN 4082, Wilmarsdonk; holotype, figured Lagaaij (1952) pl.16 fig.3 and text-fig 20, as *Holoporella alata.*

Cellepora descostilsii Audouin, 1826, the type species of *Holoporella* Waters, 1909, has large vicarious avicularia and cucullate, imperforate ovicells (Savigny, date unknown: pl.7 fig.11). These features are not shared by *P. alata. Holoporella* has been considered a junior synonym of *Celleporaria* Lamouroux, 1821 by some authors, including Harmer (1957). Lagaaij's species *alata* is tentatively assigned here to *Palmicellaria* Alder, 1864 because it seems to agree in all major characteristics with *P. skenei* (Ellis & Solander, 1786) (Figs 40, 41; although not seen in KBIN 4110, oral spines are present in *P. skenei* early in the ontogeny of the autozooid). However, it should be noted that *P. elegans* Alder, 1864, rather than the better known *P. skenei*, is the type species of *Palmicellaria*; the primary orifice of *P. elegans* differs from that of *P. skenei* and *P. alata* in having a distinct proximal sinus.

74-77 *Tubulipora plumosa* Johnston, 1847 *sensu* Harmer (1898). 74, x17; 75, approx. x340; 76, approx. x155; 77, approx. x155.

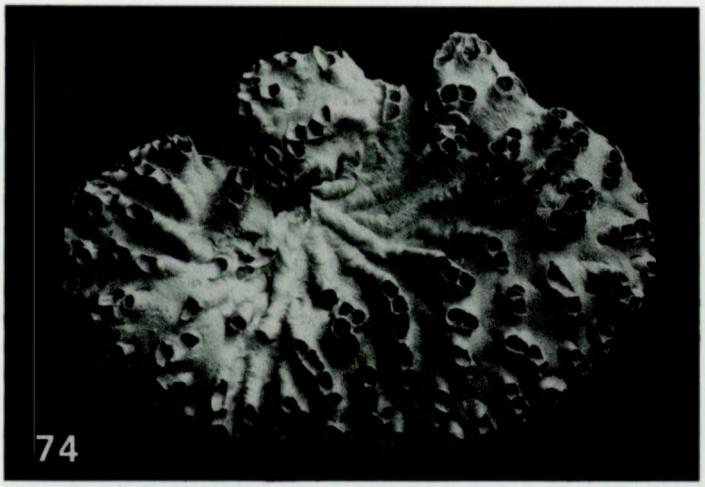
KBIN 4093, Wilmarsdonk; figured Lagaaij (1952) pl.17 fig.2, as *T. plumosa* "Thompson" Harmer.

See Page 31 for comments on the nomenclature of this species. In KBIN 4093, the ooeciostome (Figs 76, 77) seems to open approximately horizontally (and was probably at least slightly flared when complete). Hayward & Ryland (1985) specify that the ooeciostome opens directly upwards in '*T. plumosa* Thompson in Harmer', but a configuration similar to that seen in the fossil from Wilmarsdonk occurs in some gonozooids of some Recent colonies (for instance BMNH 1963.3.30.33, which is part of Harmer's material; see also Harmer, 1898: pl.8 fig.1). Figure 75 shows autozooidal pseudopores.

78-81 *Entalophoroecia deflèxa* (Couch, 1842). 78, x20; 79, x21; 80, x40; 81, x79.

KBIN 4095, Wilmarsdonk; figured Lagaaij (1952) pl.19 fig.5, as *Entalophora clavata* (Busk, 1859).

See comments on Figures 82-84. In Figure 81, the broken structure slightly to the right of centre between two peristomes is probably the remains of an ooeciostome.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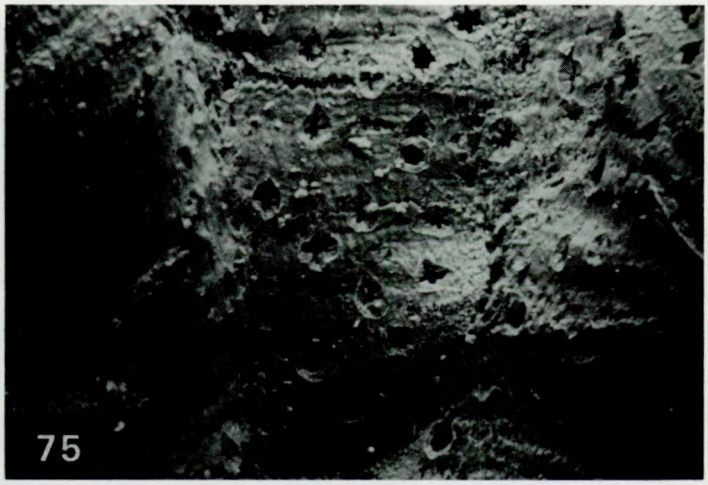
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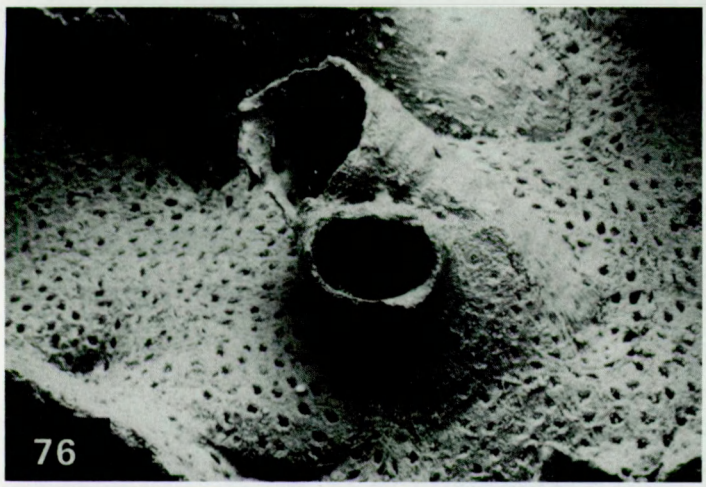
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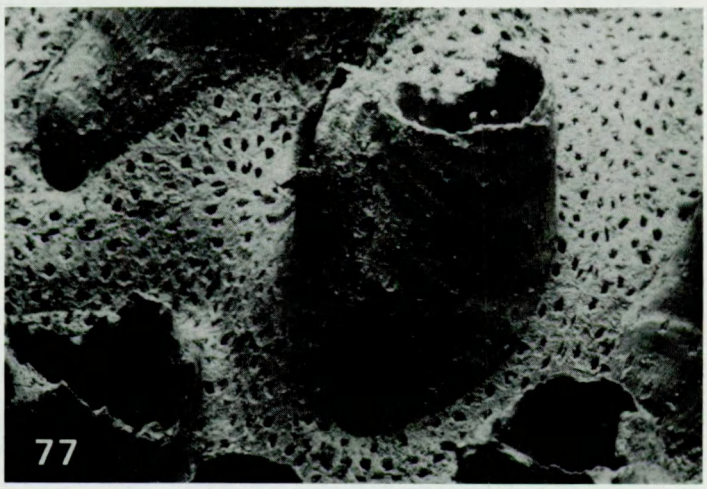
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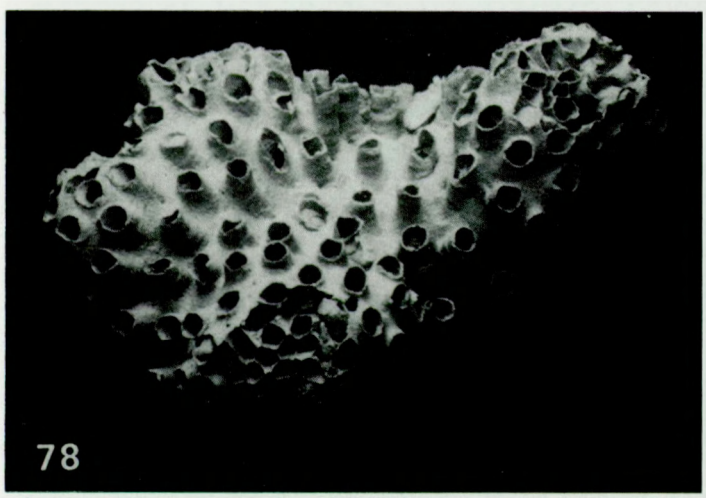
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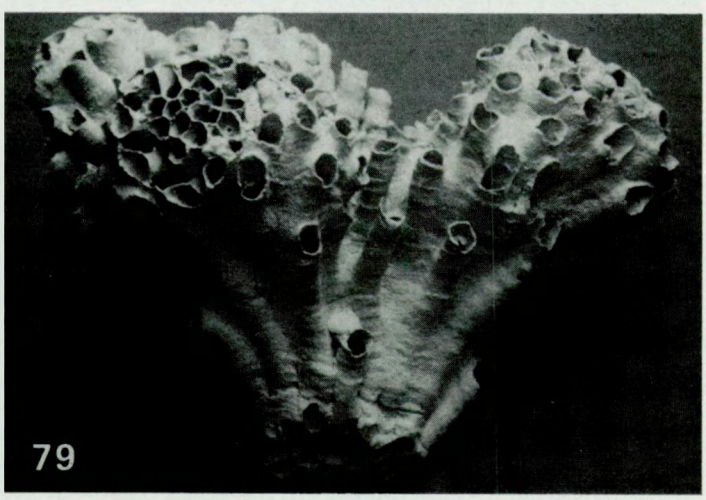
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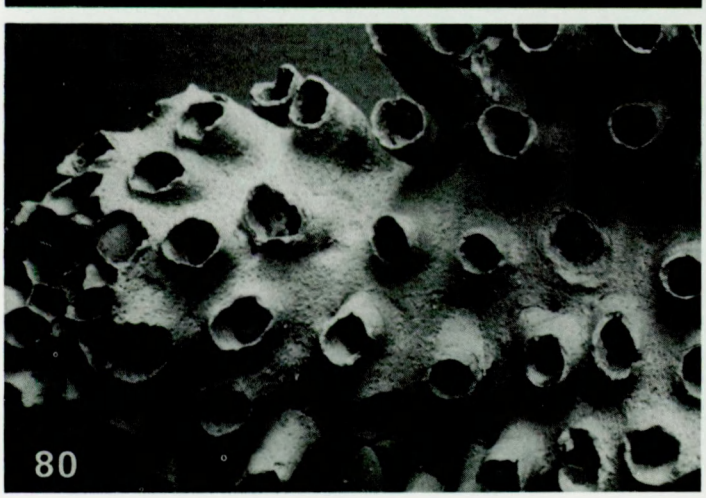
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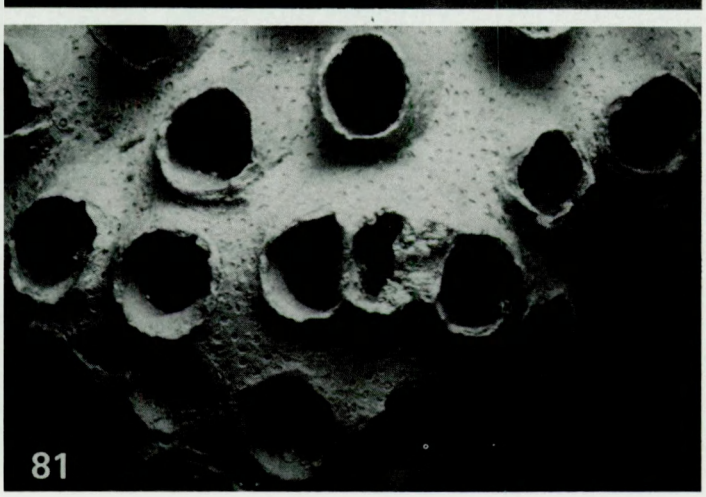
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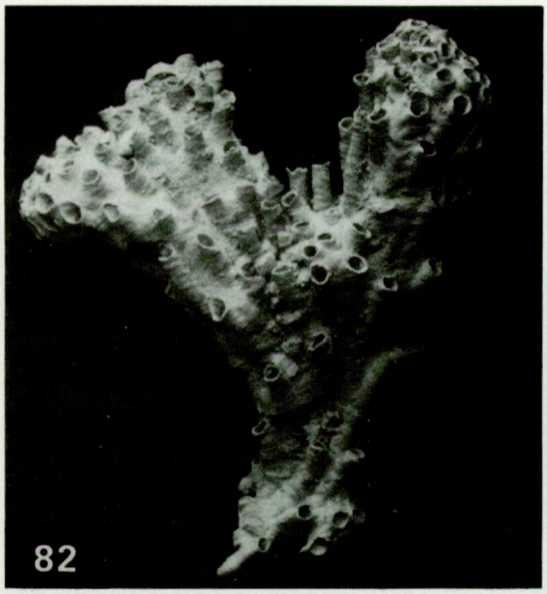
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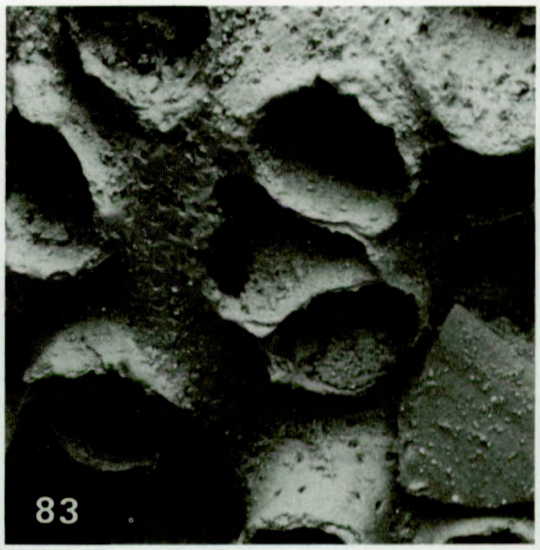
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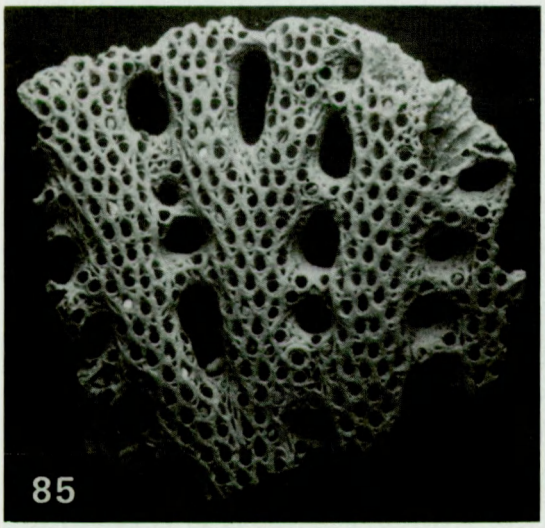
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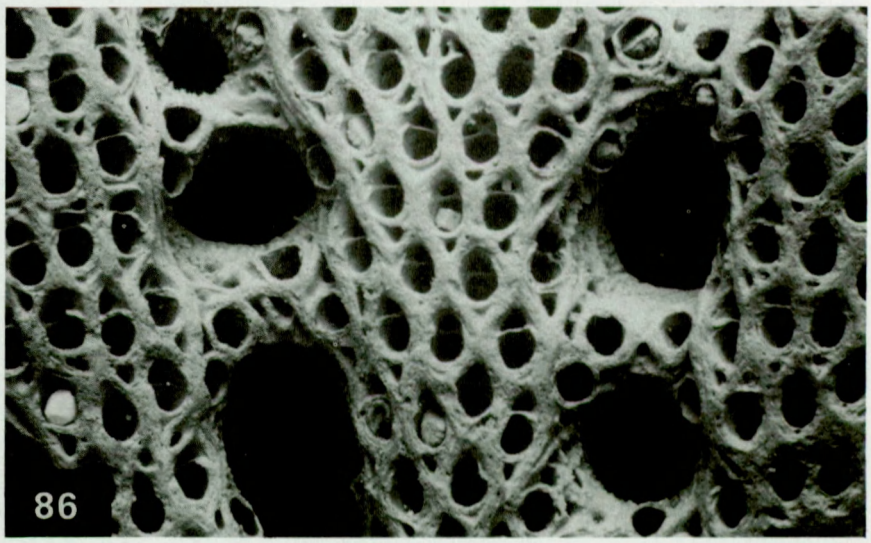
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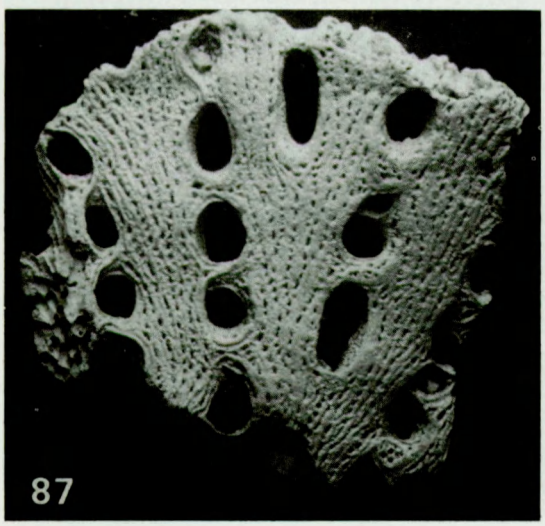
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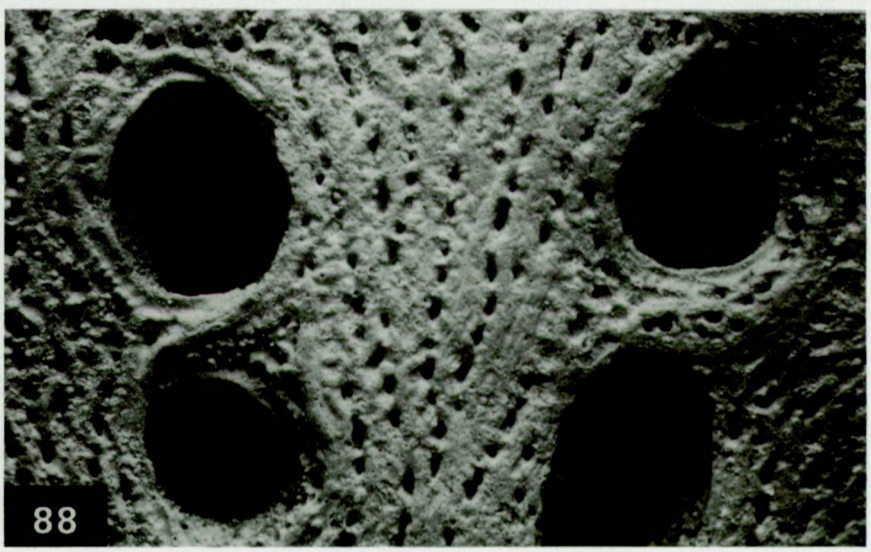
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82-84 *Entalophoroecia deflexa* (Couch, 1842). 82, x13; 83, x115; 84, approx. x340.

KBIN 4094, Wilmarsdonk; figured Lagaaij (1952) pl.19 fig.4, as *Entalophora clavata* (Busk, 1859).

See also Figures 78-81. *Pustulopora clavata* Busk, 1859 has been treated as a junior synonym of *Tubulipora deflexa* Couch, 1842 in several publications, including the important recent works of Harmelin (1976) and Hayward & Ryland (1985). This synonymy is therefore adopted here, although it should be noted that no type material of *T. deflexa* seems to exist and the original description is hardly adequate to define the species. *T. deflexa* is the type species of *Entalophoroecia* Harmelin, 1976.

Figure 83 may show the site of a damaged ooeciostome. Figure 84 shows gonozooidal pseudopores.

85-88 *Hornera canaliculata* Busk, 1859. 85, x14; 86, x44; 87, x14; 88, x48.

KBIN 4115, Wilmarsdonk; figured Lagaaij (1952) pl. 22 figs 2a, 2b.

Figures 85 and 86 show the obverse side, Figures 87 and 88 the reverse side.

89-91 Indeterminate tubuliporine cyclostome. 89, x10; 90, approx. x20; 91, x25.

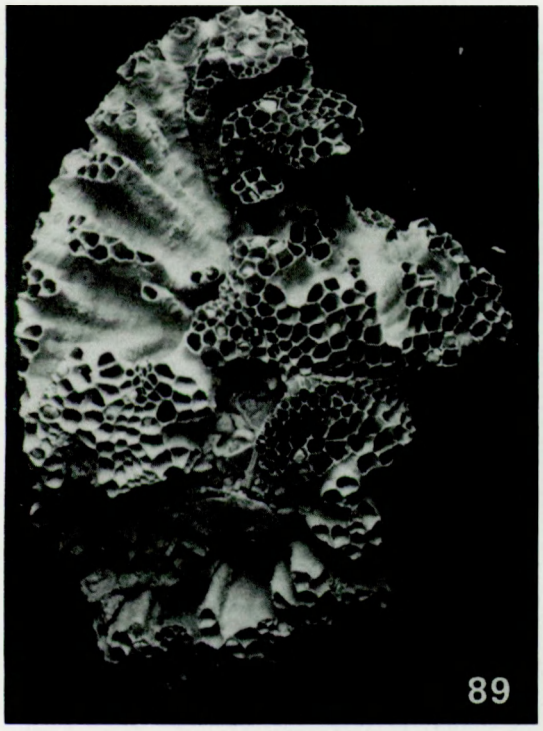
KBIN 4099, Wilmarsdonk; figured Lagaaij (1952) pl.23 fig.4, as *Meandropora aurantium* (Milne Edwards, 1838).

Lagaaij's reasons for referring this specimen to *M. aurantium* are not apparent. *M. aurantium* was redescribed by Balson & Taylor (1982).

92-94 Indeterminate lichenoporid cyclostome. 92, x10; 93, x41; 94, x41.

KBIN 4109, Wilmarsdonk; figured Lagaaij (1952) pl.24 fig.4, as *Lichenopora radiuscula.*

Specimen BMNH B1673, chosen as lectotype of *Heteroporella radiata* Busk, 1859 by Lagaaij (1952) (who introduced *radiuscula* as a replacement for Busk's pre-occupied name) falls within the concept of *Disporella hispida* (Fleming, 1828) employed by Hayward & Ryland (1985). If Lagaaij's opinion that B1673 and KBIN 4109 are conspecific were accepted, the Wilmarsdonk specimen could similarly be referred to *D. hispida*; however, the justification for this seems slight.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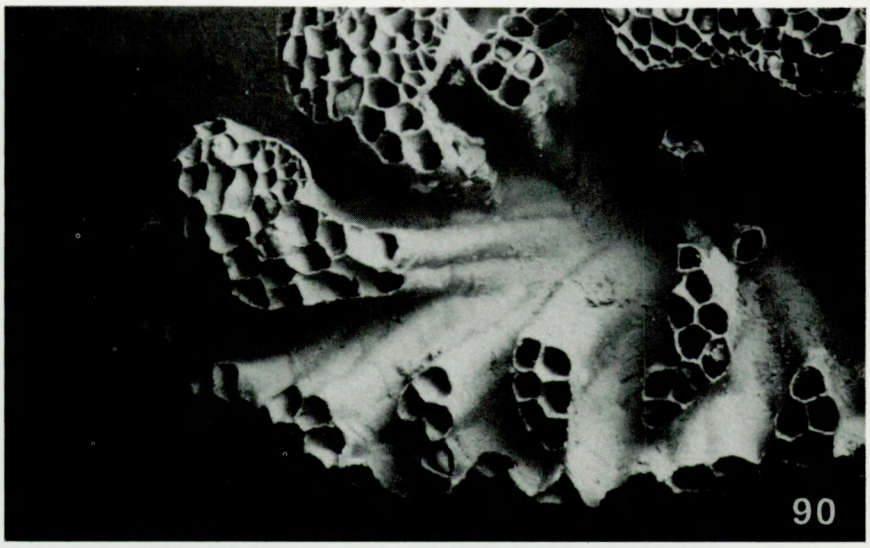
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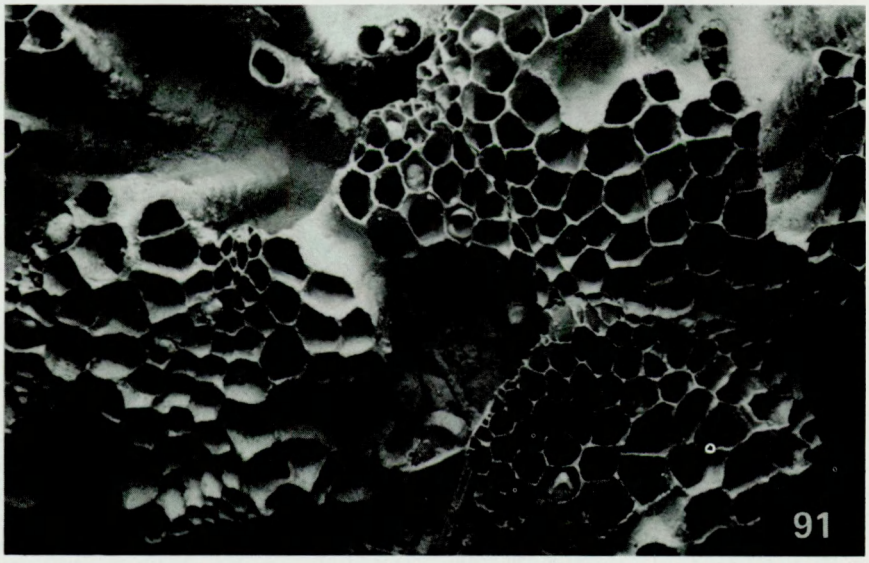
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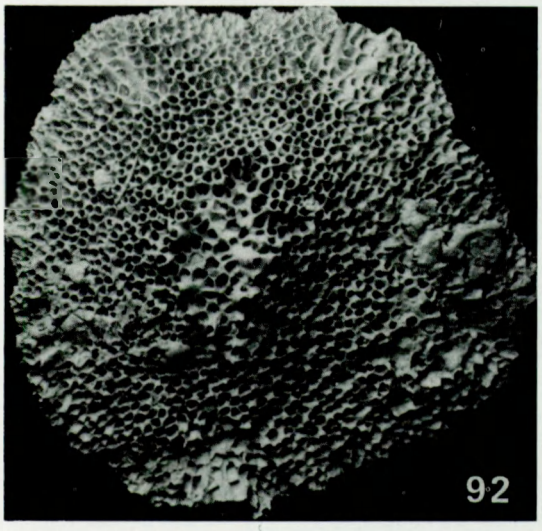
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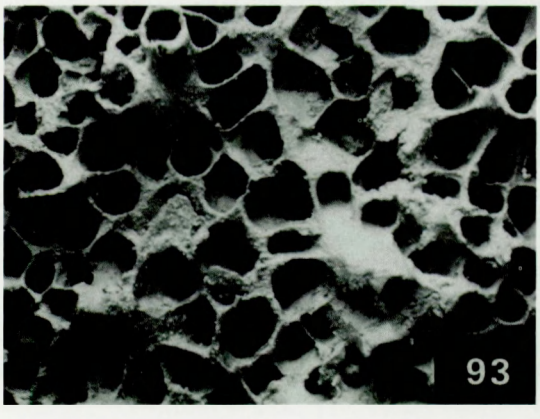
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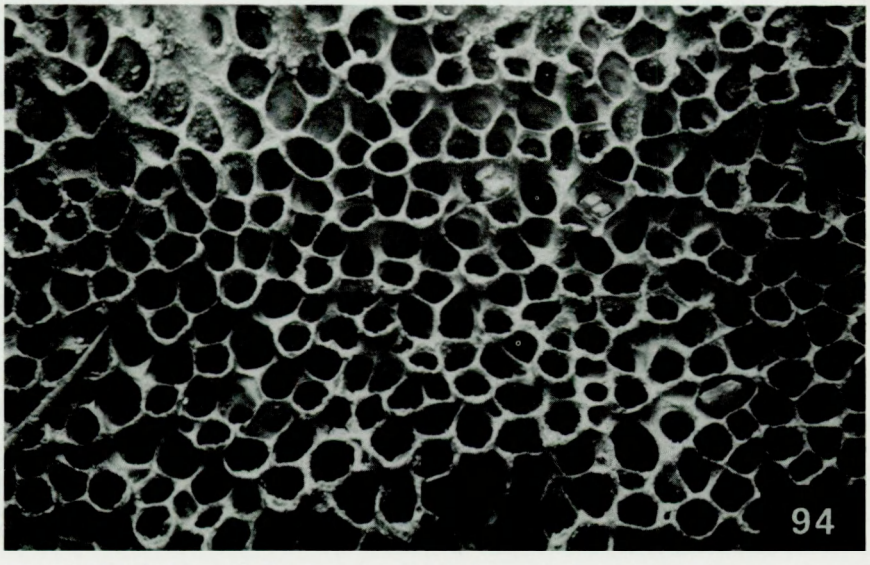
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Tubulipora plumosa

Thompson's manuscript name *Tubulipora plumosa* was introduced to the published literature by Johnston (1847) as a junior synonym of *T. flabellaris* (Fabricius, 1780), but was later adopted as a valid name by Harmer (1898) and used by subsequent authors. Articles 11(e) and 50(g) of the current edition of the International Code of Zoological Nomenclature (1985) indicate that in these circumstances authorship dates from the first introduction, and the species is to be known as *T. plumosa* Johnston, 1847. The type series is 'the specimens (or specimen) cited with that name in the published synonymy...' (Code: Art. 72(b)[iii]), in this case the colonies sent to Johnston as *T. plumosa* by Thompson (whose description Johnston reproduced). Ryland's (1963) rejection of Lagaaij's (1952) lectotype, part of Johnston's material from Thompson, and its replacement with a later specimen studied by Harmer (1898) is therefore invalid. The reason given by Ryland for this substitution was that several colonies were stored under the registration number BMNH 1847.9.24.78 indicated by Lagaaij, so that a single specimen had not been chosen. It should be noted that Ryland's (1963) citation of Harmer as the author of the species was at that time correct, but that the relevant part of Article 11 (d in 1961, e in 1985) has been altered upon revision of the 1961 edition of the Code. Johnston's material from Thompson was nevertheless part of the type series of '*T. plumosa* Harmer'. Lagaaij (1952) expressed doubt that Harmer's specimens were conspecific with Johnston's.

It is apparent from the above that a taxonomic clarification of all the relevant material, followed by the establishment of a valid lectotype, is required. If more than one species is found to be present, it may be necessary to adopt a different name for Harmer's form, or to request action by the International Commission on Zoological Nomenclature to validate the lectotype selected by Ryland (1963). A substantial part of one of the three colonies of BMNH 1847.9.24.76 figured by Johnston (1847: pl.46 fig.5) is intact, and Lagaaij's reasons (1952: 152, footnote) for not selecting this specimen as lectotype seem inadequate.

Acknowledgments

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