Lochkovian (Early Devonian) rugose corals from Prince of Wales and Baillie Hamilton islands, Canadian Arctic Archipelago

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Abstract

Lochkovian rugose corals from the Canadian Arctic Archipelago are illustrated for the first time. **Tryplasma** sp. and **Lythophyllum thorsteinssoni** sp. n. are described from the **delta** or **pesavis** Zone, in the upper member of the Drake Bay Formation on northwestern Prince of Wales Island. **Adinophyllum smithi** gen. et sp. n. (family Mucophyllidae) is described from beds equivalent to either the **eurekaensis** or **delta** Zone of the same member and region. **Stylopleura julli** Pedder, **Mochlophyllum** sp., **Lekanophyllum** sp. and **Lyrielasma** sp. are illustrated and discussed from beds equivalent to the **eurekaensis** Zone, in the middle unit of the Sophia Lake Formation on eastern Baillie Hamilton Island. Corals from all three locations are well dated on evidence provided by brachiopods, trilobites, conodonts and graptolites. The unnamed species of **Mochlophyllum** and **Lekanophyllum** are the oldest known representatives of these genera.

Résumé

Les coraux rugosa (Lochkovien) prélevés dans l'archipel Arctique canadien sont illustrés pour la première fois. Les **Tryplasma** sp. et les **Lythophyllum thorsteinssoni** n. sp. sont décrits à partir de la zone à **delta** ou à **pesavis,** dans le membre supérieur de la formation de Drake Bay dans la partie nord-ouest de l'île Prince de Galles. L'**Adinophyllym smithi** n. gen. et sp. (Mucophyllidae fam.) décrit, provient de couches équivalentes soit de la zone à **eurekaensis,** soit de celle à **delta** du même membre dans la même région. Les **Stylopleura julli** Pedder, **Mochlophyllum** sp., **Lekanophyllum** sp. et **Lyrielasma** sp. sont illustrés et commentés en fonction de couches équivalentes à la zone à **eurekaensis,** dans l'unité traversant le centre de la formation de Sophia Lake située dans la partie orientale de l'île Baillie Hamilton. Les coraux provenant de ces trois endroits ont pu être datés avec précision grâce aux preuves fournies par les brachiopodes, les trilobites, les conodontes et les graptolites. Les espèces non désignées des genres **Mochlophyllum** et de **Lekanophyllum** constituent les représentants les plus anciens de ces genres.

Introduction and acknowledgments

Lochkovian Rugosa have been made known from several northern regions of the world, including Yukon Territory, Novaya Zemlya, Pay Khoy and Chernyshev ranges, and the northern to polar Urals, but until now, none has been described from the Canadian Arctic Archipelgao.

The known Lochkovian coral faunas from the Canadian Arctic Islands are small, and any discussion of their zoogeographic or evolutionary significance would be premature. However, it is interesting to note that they include only one species common to any other region, and that neither of the two most abundant Lochkovian genera – **Carlinastraea** and **Neomphyma** – is represented in them. Furthermore, two of the three cystiphyllid genera present are confined to younger rocks elsewhere, and the only mucophyllid genus present is apparently endemic to the region.

The author is indebted to R. Thorsteinsson and R.E. Smith for making collections available for study, and to Q.H. Goodbody for accompanying him on Baillie Hamilton Island in 1983. Transport and logistic support in the Arctic Islands were provided by the Polar Continetal Shelf Project for all of the collectors and their assistants. Identifications in animal groups, other than corals, were made mostly by colleagues, as follows: brachiopods by J.G. Johnson and R.E. Smith, trilobites by A.R. Ormiston, conodonts by T.T. Uyeno, and graptolites by R. Thorsteinsson.

Biostratigraphy

Drake Bay Formation. This formation was established by Mayr (1978, p. 23-29) for a predominantly dolostone and silty argillaceous limestone unit with minor amounts of graptolitic shale, occurring on western Prince of Wales Island, where it attains a maximum thickness of about 1550 m, and western Russell Island. Essentially, it is a western carbonate equivalent of the clastic Peel Sound Formation of the eastern regions of the same two islands. Two members of the Drake Bay Formation were recognized by Mayr. The Upper member contains Lochkovian brachiopods (Johnson, 1975; Smith, 1980), trilobites (A.R. Ormiston in Smith, 1980), conodonts (T.T. Uyeno in Smith, 1980, personal communication, 1982) and at least one occurrence of the early Lochkovian graptolite **Monograptus uniformis** (R. Thorsteinsson in Smith, 1980, p. 4). The Upper member also contains Pragian brachiopods, trilobites and conodonts (Ormiston, 1969), and a bed near the top of the formation on northwestern Prince of Wales Island has yielded the late Pragian graptolite **Monograptus yukonensis** (Thorsteinsson and Uyeno, 1981, p. 15). Much of the Lower member of the Drake Bay Formation is unfossiliferous dolostone. However, a conodont, identified as **Pedavis** sp. aff. **thorsteinssoni**, is present in the basal beds of the formation on western Prince of Wales Island (Thorsteinsson and Uyeno, 1981, p. 27), and is considered indicative of late Ludlow time.

Tryplasma sp. and **Lythophyllum thorsteinssoni** sp. n. are described from 18.6 m above the base of an incomplete exposure of the upper part of the Drake Bay Formation. From the same section, Johnson (1975) described **Quadrithyris** Zone brachiopods from both below (GSC loc. C-8214 to C-8217) and above (GSC loc. C-8219) the corals. T.T. Uyeno (personal communication, 1982) isolated **Ozarkodina remscheidensis remscheidensis** from 17 m below (GSC loc. C-8215) and 4 m above (GSC loc. C-8219) the coral bearing bed. He also identified an undetermined subspecies of **Pedavis pesavis** 18 m (GSC loc. C-8214) and 17 m (GSC loc. C-8215) below the same horizon. The age of these two corals is evidently either that of the **delta** or **pesavis** conodont zone.

Adinophyllum smithi gen. et sp. n. occurs 3.5-7.5 m above the base of an 11.5 m thick exposure (Section 10 of Smith, 1980) of the Upper member of the Drake Bay Formation. Brachiopods occur abundantly in the section, but Smith (1980, p. 7) noted that they do not include key **Quadrithyris** Zone genera. Some weight was attached to the presence of the trilobite **Basidechenella laticaudata**, identified by A.R. Ormiston, which, it was said, "could indicate an age of conodont fauna 3". In present zonal terminology, the old conodont fauna 3 is the **delta** Zone. Conodonts, identified by T.T. Uyeno (in Smith, 1980, Fig. 6) as **Ozarkodina remscheidensis remscheidensis** and **O. remscheidensis** cf. **repetitor**, have been obtained from 2.5 m below (GSC loc. C-26911) and 2.5 m above (GSC loc. C-26913) the type stratum of **Adinophyllum smithi**. On these data, the age of **Adinophyllum smithi** is approximately middle Lochkovian (**eurekaensis** or **delta** Zone equivalent).

Sophia Lake Formation. This formation was proposed by Thorsteinssson (in Thorsteinsson and Uyeno, 1981, p. 7-8) for planar bedded limestones and lesser amounts of dolostone, quartzose siltstone and sandstone, shale and, on Devon Island only, gypsum and gypsiferous shale. Outcrops are confined to an arcuate belt in the Sophia Lake area of eastern Cornwallis Island, the Griffin Inlet region of southwestern Devon Island, and the eastern coastal area of Baillie Hamilton Island (Thorsteinsson and Uyeno, 1981, Fig. 5). The type section, which is situated 6 km south of Sophia Lake, near the head of Read Bay, previously comprised Member D of the Read Bay Formation.

The Sophia Lake Formation on Baillie Hamilton Island was referred to as "unnamed Gedinnian limestones" by Ormiston (1967, p. 62). The same Baillie Hamilton outcrops were tentatively assigned to the Stuart Bay Formation by Thorsteinsson and Kerr (1968) and to the Sutherland River Formation by Kerr and others (1977).

Thorsteinsson (1984, p. 273) and Smith (1980, p. 7) recognized a threefold division of the Sophia Lake Formation (Unnamed Lochkovian carbonate of Smith) on Baillie Hamilton Island. The lower unit is about 135 m (Smith, 1980, Section 11) to 190 m (Thorsteinsson, 1984, p. 273) thick, and consists of thin planar limestones with minor amounts of shale and siltstone. A shale near the base of the unit has yielded the early Lochkovian graptolite **Monograptus uniformis angustidens** Přibyl, identified as **M.** cf. **M. uniformis** in Kerr and others (1977, p. 285). The important Lochkovian trilobite **Warburgella rugulosa canadensis** Ormiston ranges through all but the lowest 6 m of the unit. The large, early Lochkovian brachiopod fauna described by Smith (1980) from the unit includes **Orbiculoidea** sp., **Tyersella** sp., **Schizophoria fossula fossula** Smith, **Salopina submurifer** Johnson, Boucot and Murphy, **Gypidula pelagica pyraforma** Smith, **Leptaena nassichuki** Smith, **Iridistrophia johnsoni** Smith, **Barbaestrophia bieleri** Smith, **Strophonella** sp. cf. **S. plasi** Havlíček, **Mesodouvillina equicosta** Smith, **M. tuberosa** Smith, **Ancilotoechia gutta rotunda** Smith, **A.** sp., **Tadschickia**(?) **crassiforma crassiforma** Smith, **T.**(?) **crassiforma producta** Smith, **Atrypa nieczlawiensis** Kozlowski, **Notoparmella gilli** Johnson, **N. costalata** Smith, **Arctispirifer canadensis** Smith, **Coelospira exilicosta orbita** Smith, **Protathyris**(?) sp., **Cyrtina** sp., **Ambocoelia** sp., **Howellella** sp. and **Acanthospirifer macdonaldi** Smith. Abundant conodonts have been obtained from the lower unit of the Sophia Lake Formation on Baillie Hamilton Island (Kerr and others, 1977; Uyeno in Smith, 1980; and in Thorsteinsson and Uyeno, 1981). The most important for zonation are **Icriodus woschmidti hesperius** Klapper and Murphy, 163 m above the base of the unit at Washington Point, and **Ozarkodina paucidentata**

Murphy and Matti, **O. remscheidensis repetitor** (Carls and Gandl) and **Amydrotaxis** sp. n. in the uppermost 4 m of the unit, one to two km southwest of Surprise Point (Smith's Section 11). **O. remscheidensis remscheidensis** (Ziegler) ranges through the upper part of the lower unit. On the basis of the occurrence of **Monograptus uniformis angustidens** near the base of the unit, and of published conodont ranges (Klapper and Johnson, 1980, tables 1, 2; Murphy and Matti, 1982), the bulk of the lower unit of the Sophia Lake Formation on Baillie Hamilton Island is equivalent to the **hesperius** and at least some part of the overlying **eurekaensis** zones of Nevada.

The middle unit of the Sophia Lake Formation on Baillie Hamilton Island consists of about 140 m (Thorsteinsson, 1984, p. 273) to 260 m (Smith, 1980, Section 12) of medium to thin bedded, slightly silty lime-mudstones with subordinate shaly beds. Faunally, it is characterized by abundant colonial corals, especially favositids, as well as stromatoporoids, bryozoa and brachiopods. The exact stratigraphic position of the Sophia Lake Formation corals described in this paper is not known, but they are certainly from within the lower 100 m of the middle unit. Genera and species occurring in this part of the formation are **Amphipora** sp., **Favosites** sp., **Cladopora** sp., **Alveolites** sp., **Aulopora** sp., **Stylopleura julli** Pedder, **Mochlophyllum** sp., **Lekanophyllum** sp., **Lyrielasma** sp., **Orbiculoidea** sp., **Schizophoria fossula fossula** Smith, **Gypidula pelagica pyraforma** Smith, **Iridistrophia johnsoni** Smith, **Mesodouvillina equicosta** Smith, **Cymostrophia**(?) sp., **Ancillotoechia gutta rotunda** Smith, **Tadschikia** (?) **crassiforma crassiforma** Smith, **T.**(?) **crassiforma producta** Smith, **Atrypa nieczlawiensis** Kozlowski, **Spinatrypa**(?) sp., **Meristina**(?) sp., **Cyrtina** sp., **Ambocoelia** sp., **Howellella** sp., **Acanthospirifer macdonaldi** Smith, **A. norfordi** Smith, **Conocardium** sp., **Warburgella rugulosa canadensis** Ormiston, **Ozarkodina remscheidensis remscheidensis** (Ziegler), **O. remscheidensis** cf. **repetitor** (Carls and Gandl), **O.** sp. 7 of Uyeno, and **Oulodus** sp. Although the cystimorph genera **Mochlophyllum** and **Lekanophyllum** have not been reported previously in beds as old as Lochkovian (McLean, 1976a), the overall composition of this fauna, and its position above beds equivalent to part of the **eurekaensis** Zone, demand an approximate age assignment equivalent to the middle **eurekaensis** Zone of Nevada.

Smith (1980, p. 17) noted that corals in the middle unit of his Section 12 occur in very silty, slightly argillaceous lime-mudstone-wackestone, and appear to be in growth position. In this paper most of the corals described from the middle unit of the Sophia Lake Formation are from a silt-free lime-packstone, with only subordinate wackestone, and show unmistakable signs of preburial transport and damage.

The upper surface of the upper unit of the Sophia Lake Formation on Baillie Hamilton Island is a present-day erosion surface. According to Thorsteinsson (1984, p. 273), about 440 m of the unit are preserved. Most of the unit consists of thin to very thin bedded, silty lime-mudstones and minor amounts of dolomitic limestone. Features such as lime-mud intraclasts, ripple marks and an impoverished low diversity fauna, dominated by leperditicopid ostracodes, point to a shallow subtidal to intertidal environment. Smith (1980, p. 7) speculated that the unit is not significantly younger than the lower units, and thought that it is also probably equivalent to the **eurekaensis** Zone ("conodont fauna 2").

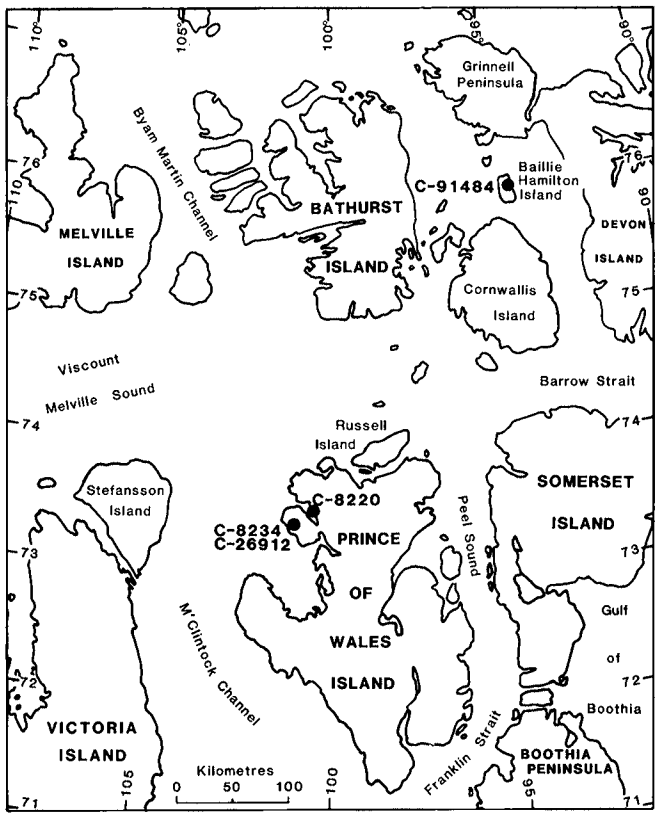


Figure 35.1. *Map of the central part of the Canadian Arctic Archipelago with locations of GSC locs. C-8220, C-8234, C-26912 and C-91484.*

Systematic paleontology

Family TRYPLASMATIDAE Etheridge, 1907
Genus **Tryplasma** Lonsdale, 1845

Cyathophyllum subgenus **Tryplasma** Lonsdale, 1845, p. 613.

Type species. **Cyathophyllum (Tryplasma) aequabile** Lonsdale, 1845, p. 613-614, Pl. A, figs. 7, 7a. The occurrence of the figured specimen was given by Lonsdale as Silurian; Kakva River, east side of the North Ural Mountains. Smaller, unfigured specimens, that "possibly belonged to a distinct species", were said to be from the Silurian or Devonian, Petropavlofsk (**sic**), northernmost Russo-Uralian mines. All of these specimens are missing, and presumed lost, although Rosen and Wise's (1980, p. 148-150) discussion of Murchison's Russian corals suggests this is not necessarily the case.

A neotype, designated and figured by Ivanovskiy and Shurygina (1975, p. 15, Pl. 1, figs. 1a, b) and refigured by Hill (1981, figs. 40, 2a, b), is from the **Favosites regularissimus** Zone on the left bank of Kakva River, 2.5 km above the Karpinsk Highway. The **F. regularissimus** Zone on Kakva River corresponds to some part of the Vagran Suite of older literature and to the Karpinsk Horizon of recent work (Khodalevich and others, 1982). Its age is approximately middle Zlichovian to early Dalejan, on the evidence of conodonts (loose range chart accompanying Khodalevich and others, 1982) and goniatites (Chlupáč and Turek, 1983, p. 137-138).

Remarks. A correct synonymy and diagnosis of **Tryplasma** is given in Hill (1981, p. 98). The genus is represented by many named species, ranging in age from Late Ordovician to Early Devonian. It is essentially cosmopolitan, but is not known in the Devonian of the Eastern North Americas Realm.

Tryplasma sp.
Figures 35.2, 35.3

Material. One specimen, GSC 68647, from GSC loc. C-8220.

Description. Corallum solitary, ceratoid; estimated length along the convex side 35 mm; mean diameter at base of calice 15 mm. The peripheral stereozone is 2.5 mm thick and mostly septal in origin. Septa are essentially undifferentiated and consist of blunt spines that only just project into the lumen; about 60 of these spines are visible in a transverse section taken from immediately below the calice. The fine structure is holacanthine, but not well preserved. There are no dissepiments. The tabulae, which are complete and typically flat, are separated from each other by 1.0 to 2.5 mm, and are coated with as much as 0.8 mm of sclerenchyme.

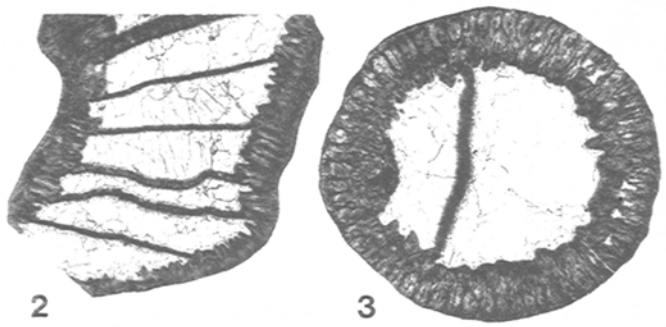
Remarks. This specimen is not a typical example of **Tryplasma**, because of its short, holacanthine and peripherally contiguous septa. It almost certainly represents an unnamed species, but does not constitute sufficient material on which to base a new taxon.

It resembles two poorly known species – **Tryplasma anastasiae** Cherepnina (1970, p. 112-113, Pl. 40, figs. 1a, b) from the early Pragian Yakushin Beds of the Mountain Altay of central Asia, and **T. yanbianense** (He, 1978, p. 170, Pl. 82, figs. 5a, b), from beds said to be equivalent to the late Pragian or early Zlichovian Ganxi Formation, in Szechwan Province, southern China. **T. anastasiae** has less sclerenchyme and a narrower stereozone than the species from Prince of Wales Island, and is said to have rhabdacanthine septa. **T. yanbianense** is larger than the species from Prince of Wales Island and yet has fewer septa (49 septa at a diameter of 22 mm). Also, its septal spines are longer than those of the Prince of Wales specimen.

Family MUCOPHYLLIDAE Hill, 1940

Diagnosis. Family of predominantly solitary corals with horizontal skeletal elements restricted to broad tabulae and peripheral platform (diaphragmatophorous). Two included genera, **Mucophyllum** and **Stylopleura**, are known to have flaring calices at maturity. Septa are radially arranged and not amplexoid. In the unexpanded region of the corallite, the septa are either short and narrowly cuneate, leaving wide interseptal loculae, or they are broad and contiguous, forming a septal stereozone of variable width. In the unexpanded region of a corallite, the trabecular structure is either simple holacanthine (probably secondary), or compound rhabdacanthine; in the expanded part of the corallite, the trabecular structure is entirely rhabdacanthine. Development of long, hollow, supporting rootlets, and absence of septal fossulae, are characteristic of the family.

Included genera. **Mucophyllum** Etheridge, 1894 (=**Mycophyllum** Lang, Smith and Thomas, 1940); **Pseudamplexus** Weissermel, 1897 (=**Pselophyllum** Počta, 1902; **Pseliophyllum** Lang, Smith and Thomas, 1940 and ?**Pseudotryplasma** Ivaniya, 1958); **Kungejophyllum** Sultanbekova, 1971; **Stylopleura** Merriam, 1974; **Adinophyllum** gen. n.; ?**Pseudamplexophyllum** Shurygina, 1968.



Figures 35.2, 35.3. ***Tryplasma*** *sp., both figured specimen GSC 68647, x3.*
2, 3. Longitudinal and transverse sections.

Remarks. It is not known whether the Mucophyllidae were derived from the Tryplasmatidae by loss of peripheral sclerenchymal tissue, or from the Kodonophyllidae (sensu Hill, 1981, p. 171-175) by development of rhabdacanthine trabecular structure and loss of amplexoid septal ridges. The present author favours the first of these hypotheses, and envisages a similar composition for the Mucophyllidae as that cited by Hill (1981, p. 175-178). However, two genera, **Briantia** Barrois (1889, p. 44-45) and **Ningqiangophyllum** Cao (1975, p. 184), that were tentatively attributed to the Mucophyllidae by Hill, should be excluded from the family. The long, axially dilated and rotated septa, and highly arched tabulae of **Briantia**, and its probable junior synonym **Symphyphyllum** Spasskiy (in Bulvanker and others, 1968, p. 14), necessitate classification with the Kodonophyllidae. Although **Ningqiangophyllum** Cao (1975, p. 184) is a junior homonym of **Ningqiangophyllum** Ge and Yu (1974, p. 171), a substitute name is not required, because **N. tenuiseptatum**, the type species of **Ningqiangophyllum** Cao, is a species of **Pilophyllia** Ge and Yu, 1974 (multiple spellings in Ge and Yu – **Pilophylloia** on p. 170, **Pilophylloides** on p. 170, and **Pilophyllia** on the legend to Plate 78 – are considered stabilized by the use of **Pilophyllia** in Hill, 1981, p. 173). Species of **Pilophyllia** have long, adaxially attenuate, amplexoid septa and broadly arched, closely spaced tabulae, and, because of these morphological features, are better classified with the Kodonophyllidae than the Mucophyllidae.

Genus **Stylopleura** Merriam, 1974

Stylopleura Merriam, 1974, p. 34-35.

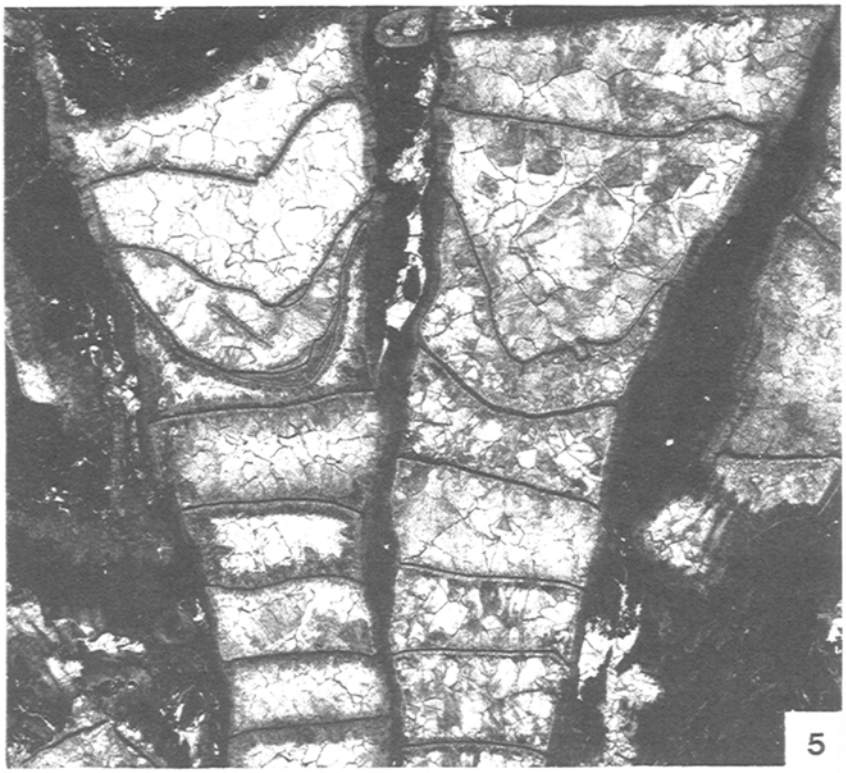
Type species. **Stylopleura berthiaumi** Merriam, 1974, p. 35, Pl. 3, figs. 6-20. See Pedder (1985, p. 588) for occurrence.

Stylopleura julli Pedder
Figures 35.4-35.14

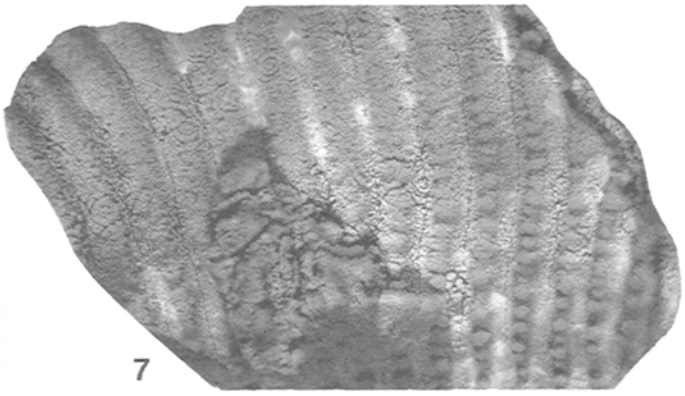
Stylopleura sp., Pedder in Jackson and others, 1978, p. 38, Pl. 27, figs. 1-5.
Stylopleura julli Pedder, 1985, p. 589-592, Pl. 70.1, figs. 2-7, 9, 11-23.

Material from Baillie Hamilton Island. Two colonies, GSC 75987, 75988; two silicified fragments recovered from acid residue, GSC 75989, 75990. All from GSC loc. C-91484.

Remarks. The holotype and paratypes of **Stylopleura julli** are from Lochkovian beds, assigned to the **eurekaensis** and **delta** zones, in the headwaters area of Royal Creek, Yukon Territory. The material from Baillie Hamilton Island is more silicified and suffered greater preburial damage than the types. Most of the original description of the species applies



Figures **35.4-35.6.** ***Stylopleura julli*** *Pedder, all figured specimen GSC 75987, x2.5.*
4. Subcalicular transverse section.
5. Longitudinal section of two corallites.
6. Transverse section, mostly near and above calicular bases.



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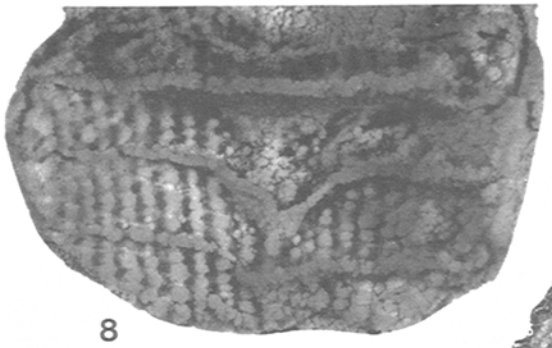

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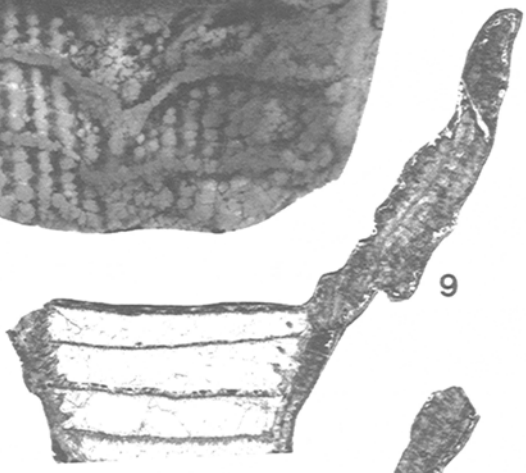

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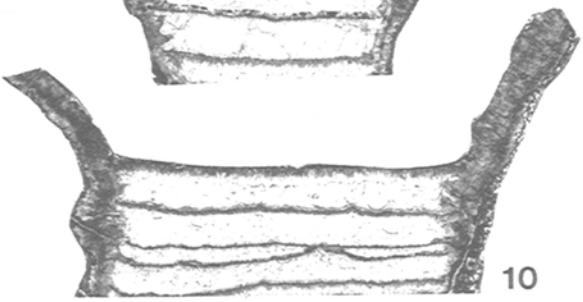

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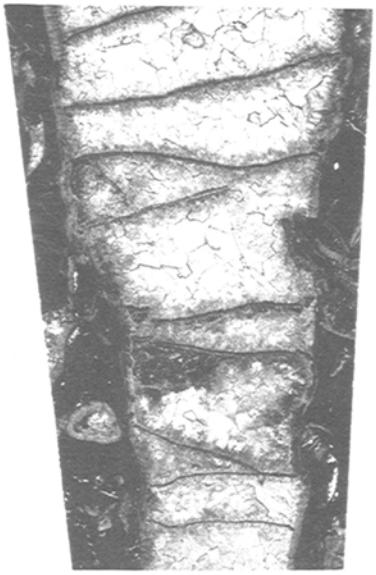

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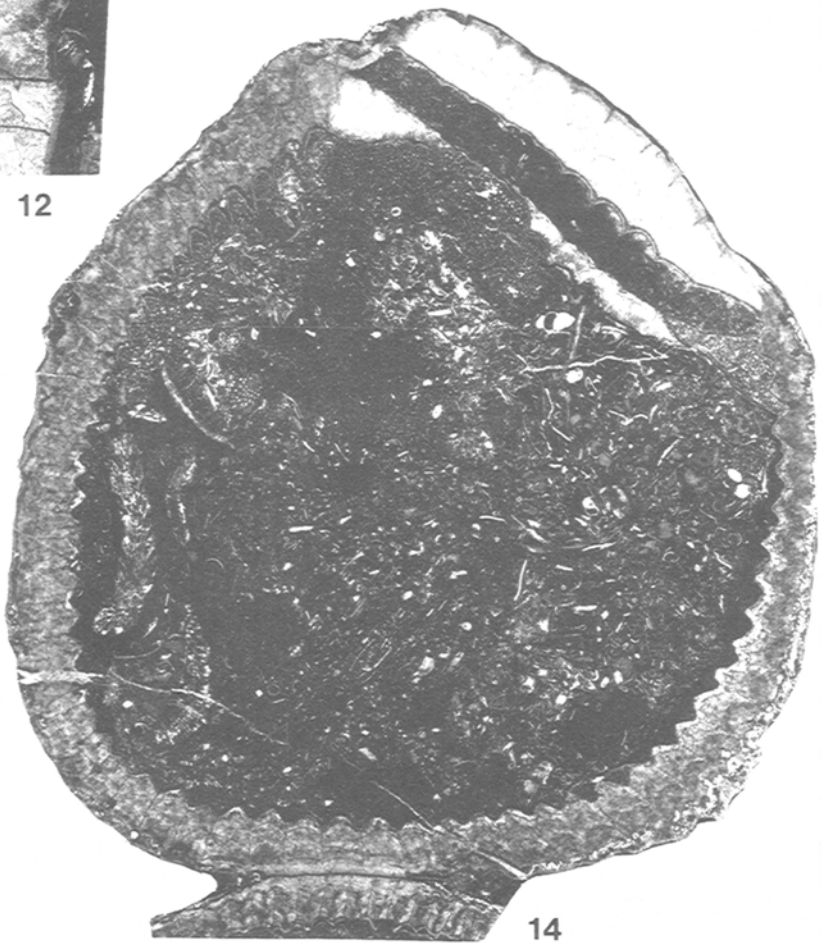

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to the new material, although there are some taxonomically insignificant differences. Colonies from Baillie Hamilton Island consist of larger clusters of corallites, and individual corallites are known to have grown to a length of 8 cm or more. Diameters of the unexpanded and expanded calices are comparable in both sets of material, as are the numbers of septa (49 septa at 10 mm diameter, 56 septa at 23 mm diameter and 66 septa at 47 mm diameter in specimens from Baillie Hamilton Island). Silicified fragments from acid residues, such as the specimen depicted in Figure 35.8, show peripherially situated, superposed series of funnel shaped tabular depressions, which may, or may not, lead into hollow supporting rootlets. Further examination of Yukon material has revealed similar depressions, although none was recorded in the original description of the species. Spacing of the tabulae is more variable in specimens from Baillie Hamilton Island (two to eleven in a vertical distance of one cm), and one calicular section, illustrated by Figure 35.14, shows a gerontic rejuvenescent phenomenon, in which a part of the otherwise rhabdacanthine platform is replaced by a series of thin, nontrabecular walls that mimic presepiments.

Genus **Adinophyllum** nov.

Type species. **Adinophyllum smithi** sp. n. Upper member (Lochkovian; equivalent to the **eurekaensis** or **delta** Zone) of the Drake Bay Formation; GSC loc. C-8234, northwestern Prince of Wales Island.

Diagnosis. Solitary genus of mucophyllid corals having a calice approaching the shape of an inverted cone. Septa rhabdacanthine, long and greatly expanded; predominantly contiguous in the subcalicular region. Tabulae few or entirely lacking.

Remarks. **Adinophyllum** is closely related to **Pseudamplexus**, but differs from it by having greatly enlarged septa that essentially displace the tabularium. At present, the type species is the only species attached to the new genus.

The name derives from the Greek words, **adinos** meaning thick or crowded, and **phyllon** meaining a leaf.

Adinophyllum smithi sp. n.
Figures 35.15-35.27

Type series. Holotype, GSC 75991 from GSC loc. C-26912. Paratype, GSC 75992 from GSC loc. C-8234.

Description. Corallum solitary, trochoid, large, attaining a maximum diameter of at least 50 mm, and a length of 75 mm measured along the convex side. The well preserved exterior of the holotype bears septal furrows and interseptal ridges of about the same amplitude, as well as fine growth rings. Scars of two broken radiciform processes were present, close to the apical tip of the holotype, before it was sectioned. Calice deep, accounting for two thirds of the length of the corallum, and shaped like an inverted cone. The distal region of the calice is excentric due to the greater length of the septa on the convex side of the coral.

Near the rim of the calice, minor and major septa are undifferentiated, and are separated by shallow, adaxially open, interseptal loculi. As the coral enlarges and the calice migrates away from the proximal tip of the corallum, the septa thicken, and the minor septa, which are mostly less than 3.0 mm long, become engulfed by contiguous major septa. Adaxially, some major septa fuse with others, or, like the minor septa, are themselves engulfed by other pairs of major septa. In this way, the lower part of the corallum fills with septal skeleton. Thin sections of early stages (mean diameters 5.0, 7.5 and 10.5 mm) of the holotype have been prepared, but poor preservation obscures the boundaries between contiguous septa, so that it is not possible to count septa accurately in these stages. In later stages of the holotype, numbers of septa at given mean diameters are 43 x 2 at 26 mm, 48 x 2 at 33 m, and 49 x 2 at 42 mm. Despite inadequacies of the preservation, especially in the paratype, it is clear that the trabecular structure is rhabdacanthine in the thickened parts of the septa.

A few peripherally situated partitions are suspended between adjacent septa in the most distal part of both specimens. As the material has been prepared, the partitions are visible only in transverse sections (left hand side of Fig. 35.15), and it is not known whether they are true dissepiments. Their alignment suggests a rejuvenescent feature. Concave tabulae may be present (none in the holotype; six in the paratype, Fig. 35.26) above the level where the subcalicular diameter is 25 mm or more. Some of these tabulae are overlain by thick septal skeleton, others bear only a thin layer (0.1-0.15 mm thick) of apparently structureless sclerenchyme.

Remarks. The trivial name is a patronym for R.E. Smith, who collected the type specimen and described the accompanying brachiopod fauna.

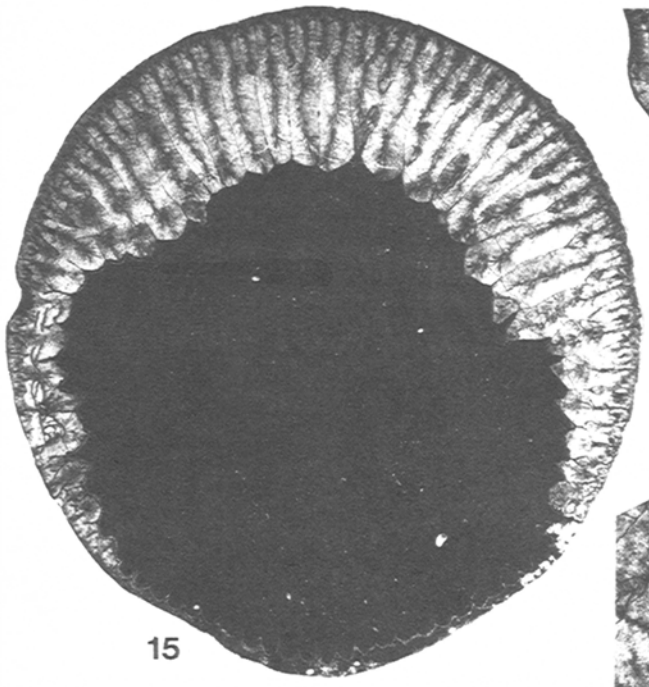
Figures 35.7-35.14. *(opposite)*

Stylopleura julli *Pedder*

7. *Figured specimen GSC 75989, silicified fragment showing change from spinose septal structure below mature calice, to the nonspinose rhabdacanthine septal structure of the mature, expanded calice, x5.*
8. *Figured specimen GSC 75990, silicified fragment showing lateral, funnel shaped depressions on the tabulae, and short septal spines, x5.*
9, 10. *Figured specimen GSC 75988, longitudinal sections of the distal parts of mature corallites, x2.5.*
11. *Figured specimen GSC 75988, transverse section of part of a mature, expanded calice with four offsets; same corallite as one depicted in Figures 10, 14, x2.5.*
12, 13. *Figured specimen GSC 75987, longitudinal sections, x2.5.*
14. *Figured specimen GSC 75988, transverse section discussed in text; same corallite as one depicted in Figures 10, 11, x2.5.*

Family CYSTIPHYLLIDAE Milne Edwards and Haime, 1850
Subfamily CYSTIPHYLLINAE Milne Edwards and Haime, 1850
Genus **Lythophyllum** Wedekind, 1925

Lythophyllum Wedekind, 1925, p. 32-33.
Nardophyllum Wedekind, 1925, p. 36.
Plagiophyllum Wedekind and Vollbrecht, 1931, legend to Pl. 17 (Pl. 3 of reprints); 1932, p. 113-114, 115.
Lytophyllum Wedekind and Vollbrecht, 1932, p. 115 (**nomen vanum**).
Lithophyllum Lang, Smith and Thomas, 1940, p. 78 (**nomen vanum**).
Wedekindophyllum Stumm, 1949, p. 39 (**nomen substitutum** for "**Lithophyllum** (as **Lythophyllum**) Wedekind, 1925 (not Mueller, 1859), p. 32").
Dansikophyllum Ulitina, 1963, p. 5, 15, in part (**nomen nudum**).



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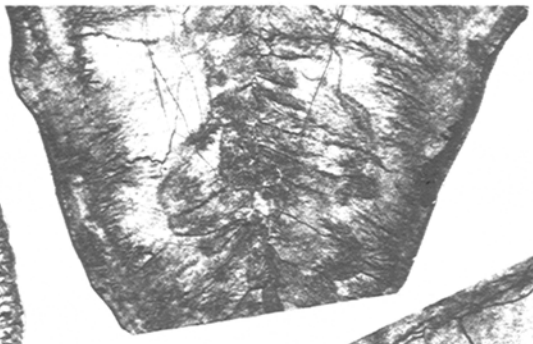

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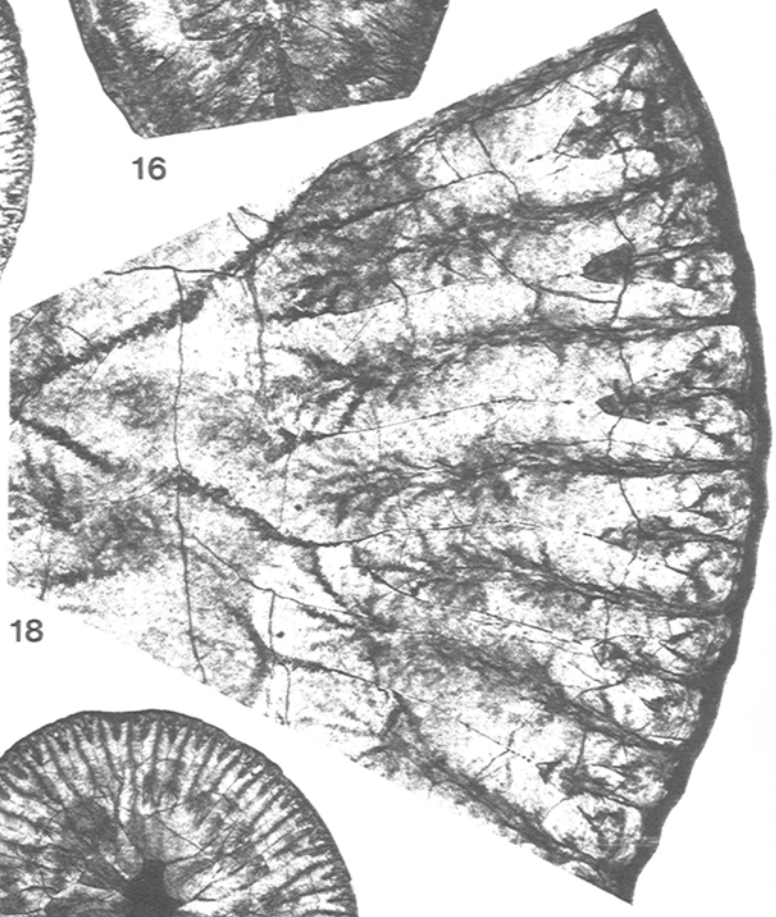

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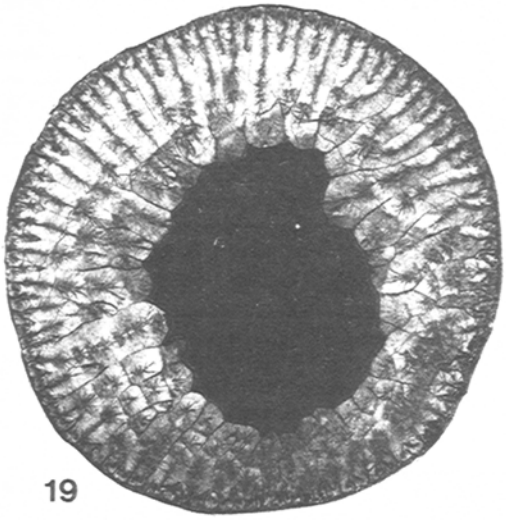

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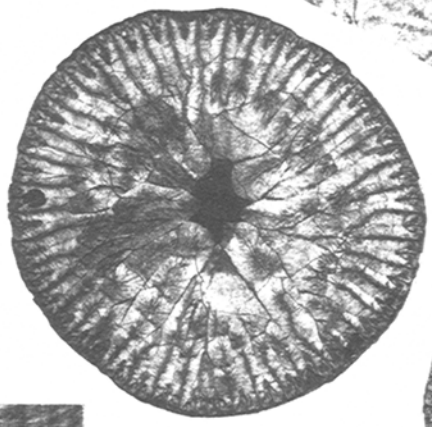

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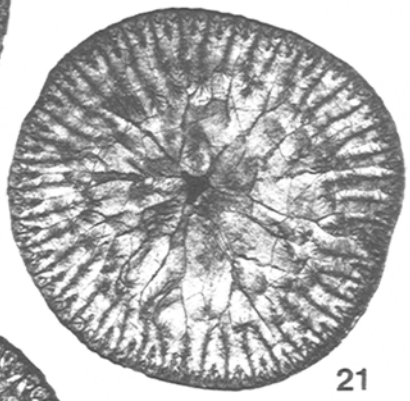

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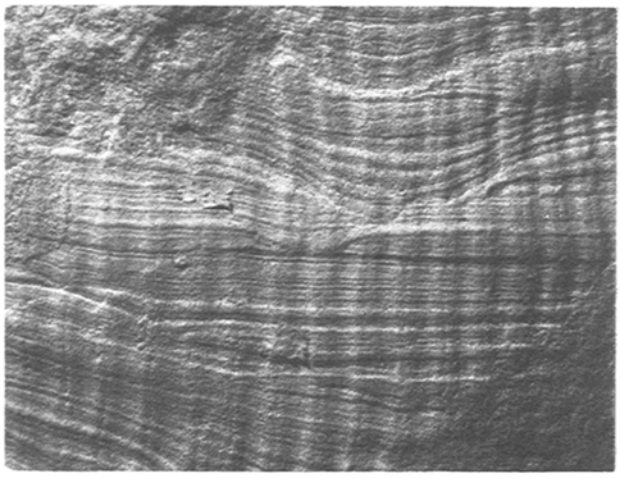

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Patridophyllum Ulitina, 1963, p. 5, 15 (**nomen nudum**).
Patridophyllum Ulitina in Sytova and Ulitina, 1966, p. 207 (**nomen nudum**).
Patridophyllum Ulitina, 1968, p. 86.

Type species of **Lythophyllum, Lytophyllum, Lithophyllum** (Lang, Smith and Thomas, 1940) and **Wedekindophyllum**. **Lythophyllum marginatum** Wedekind, 1925, p. 33, Pl. 6, figs. 32, 33. Lower Stenophyllumschichten, middle Middle Devonian; Dachsberg, near Gerolstein, Eifel region, Germany. Birenheide (1964, p. 33) considered this species to be a junior synonym of **Cystiphyllum macrocystis** Schlüter, 1889, which he incorrectly (Weyer, 1971) referred to **Plasmophyllum**. In current terminology, the type stratum of **Lythophyllum marginatum** is probably in the early Givetian Loogh Schichten.

Type species of **Nardophyllum** and **Plagiophyllum**. **Nardophyllum exzentricum** Borchers in Wedekind, 1925, p. 36-37, Pl. 9, fig. 59. Beds overlying the upper Stenophyllumschichten, middle Middle Devonian; Plateau Berndorf, near Hillesheim, Eifel region, Germany. This species was also considered synonymous with **Cystiphyllum macrocystis** Schlüter, 1889, by Birenheide (1964, p. 33). In current terminology, the type stratum of **Nardophyllum exzentricum** is certainly Givetian and presumably in the Cürten Schichten.

Type species of **Patridophyllum**. **Patridophyllum paternum** Ulitina, 1968, p. 86-88, Pl. 18, figs. 1a-d; Pl. 19, figs. 1a, b. Upper Eifelian Stage; right bank of the Arpa River, near the village of Danzig, Nakhichevan ASSR, Soviet Union. Mamedov (1983, loose fig. 5) and Spasskiy (1983, Table 1) assign the type horizon to the late Dalejan or early Eifelian (**patulus** Zone) Sharurskaya Suite.

Remarks. In previous Canadian cystiphyllid systematics (McLean, 1976a, 1976b; Pedder and McLean, 1982), **Lythophyllum** was put in synonymy with **Cystiphylloides** Chapman, 1893. Here, **Cystiphylloides** is reserved for fasciculate species, and **Lythophyllum** is used for solitary cystiphyllid species that have distinct centric or excentric septal crusts, and weak, or nonexistant septal crests.

The synonymy given above is not necessarily complete. Genera that might be added include **Skoliophyllum** Wedekind (1937, p. 50, 52) and **Praenardophyllum** Spasskiy (1955, p. 99), both with type species characterized by progressively offset calices. **Comanaphyllum** H. Flügel (in Flügel and Flügel, 1961, p. 388-389) may belong here also, although the type species apparently lacks proper septal crusts. **Pseudozonophyllum** Wedekind (1924, p. 25-28) and **Paralithophyllum** Wedekind (1925, p. 35-36) are other possible synonyms, but their type species are not strictly determinable.

Figures 35.15-35.24. *(opposite)*

Adinophyllum smithi *gen. et sp. n., all holotype GSC 75991.*

15, 19-21. Transverse sections through calice, x2.
16. Longitudinal section below calice, x3.
17, 23, 24. Transverse sections below calice, x4.
18. Part of transverse section showing rhabdacanthine septal structure, x10.
22. Part of the exterior surface of the corallum, x5.

Stumm (1949, p. 39) introduced the name **Wedekindophyllum** because he believed that **Lythophyllum** Wedekind (1925) should be spelled **Lithophyllum** and that it is therefore a homonym of **Lithophyllum** Müller (1859, p. 62). He was wrong on two counts. Firstly, the change of spelling is illegal, and secondly, **Lithophyllum** Müller (1859, p. 62) is, itself, a **nomen nullum**, being a misspelling of **Lithophyllium** (Müller, 1858, p. 154, 155; 1859, p. 52). **Lithophyllium** Müller in a radiolarian genus.

Lythophyllum thorsteinssoni sp. n.
Figures 35.28-35.36

Type series. Holotype, GSC 68187 and paratypes GSC 68188-68191, all from GSC loc. C-8220.

Diagnosis. Ceratoid to subcylindrical species of **Lythophyllum** with a maximum known length of 65 mm and mean diameter of 16 mm. Septal crusts centric and up to 1.4 mm thick. Tabularium distinct from dissepimentarium.

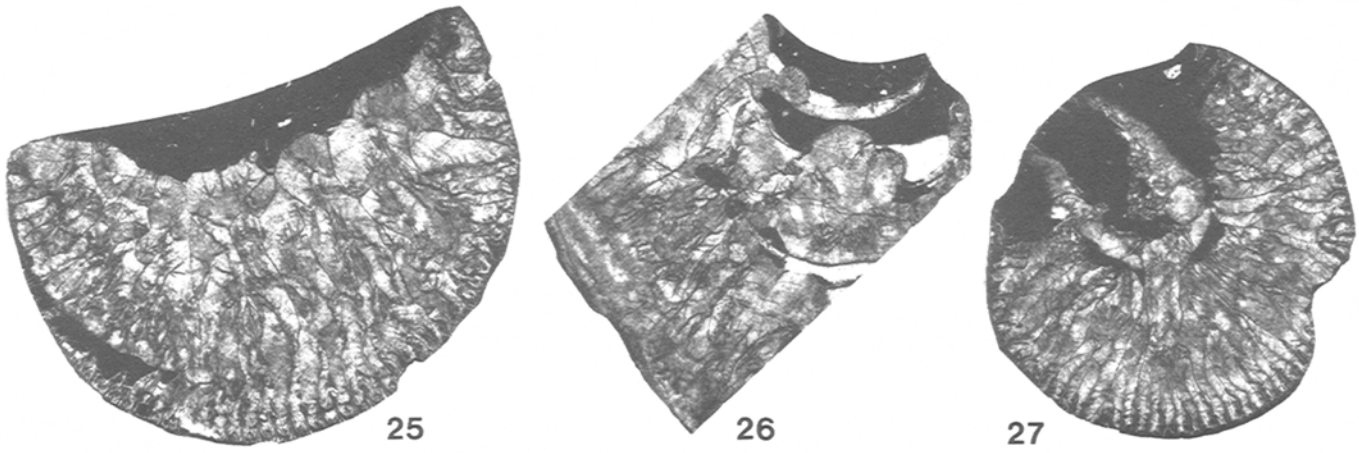
Description. Corallum solitary, ceratoid in early stages, subsequently subcylindrical with minor rejuvenescences. Absence of radiciform processes, and pronounced twisting of the direction of growth, indicate that the coral was not firmly attached to the substrate. Length, measured along the predominately convex side, and maximum mean diameter of the largest specimen, 65 mm and 16 mm, respectively. The exterior of the corallum bears fine and coarser growth rings; septal furrows and interseptal ridges are not present. Calice shallow, less deep than wide, with gently sloping sides and an undulant, subhorizontal base.

Septal apparatus weak, comprising irregularly spaced septal crusts, that are centric rather than excentric, and cover entire calical surfaces. The septal crusts have a maximum observed thickness of 1.4 mm, and, at the periphery, locally incorporate short, but coarse, and commonly contiguous monacanths. The longest peripheral monacanths project only 0.2 mm into the lumen, and they are not differentiated into major and minor orders of septa.

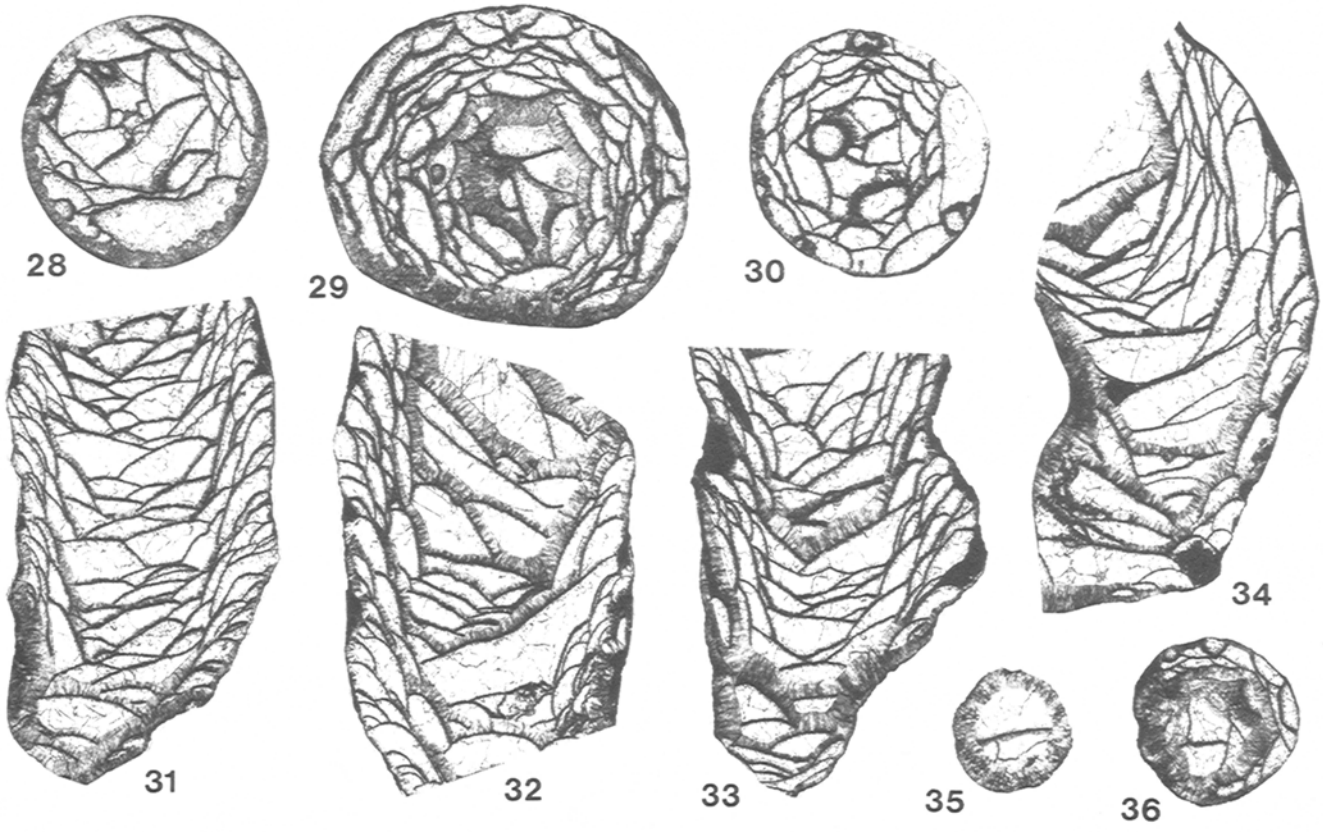
Most of the dissepiments are large and steeply inclined towards the axis. On the whole, compared with other species of the genus, the dissepiments are well differentiated from the tabulae. Although the tabularium is dominated by broad, gently sloping, convex plates, a few of the tabulae are complete and flat. The tabularium occupies between one half and two thirds of the total diameter of the corallum.

Remarks. **Lythophyllum thorsteinssoni** resembles several European and Asian species more than other North American species. Soshkina (1936, p. 27-33, figs. 7-20) erected three species – **Lythophyllum minimum, L. aconicum** and **L. platycalix** – on material from a single bed, said to be Eifelian, exposed on Malyi Patok River, on the western slope of the Northern Urals. In 1949 (p. 52, Pl. 13, figs. 1a-f), she proposed yet another name – **Nardophyllum vermiforme** – for a similar specimen from the same bed and locality. All four species were put in synonymy by Ivanovskiy and Shurygina (1980, p. 17) under the name **Zonophyllum minimum** (Soshkina). The synonymy seems correct, although the species is better retained in **Lythophyllum. L. minimum** Soshkina is similar to **L. thorsteinssoni**, especially in size (adult length 30-70 mm; adult diameter 11-15 mm), but has more, and therefore on average, smaller dissepiments.

The new species also resembles Lochkovian specimens identified as **Pseudomicroplasma devonica** (Soshkina) by Sytova (1968, p. 59-60, Pl. 3, figs. 4a, b) and Lavrusevich (1968, p. 126, Pl. 12, figs. 6a, b) from the Borshchov Horizon of Podolia and the Shishkat Horizon of central Tadzhikistan.



Figures 35.25-35.27. ***Adinophyllum smithi*** *gen. et sp. n., all paratype GSC 75992, x2.*
25, 27. Transverse sections.
26. Longitudinal section intersecting six tabulae.



Figures 35.28-35.36. ***Lythophyllum thorsteinssoni*** *sp. n., all x3.*
28, 31. Paratype, GSC 68188, transverse and longitudinal sections.
29, 32, 35, 36. Holotype, GSC 68187, three transverse and a longitudinal section.
30, 33. Paratype, GSC 68189, transverse and longitudinal sections.
34. Paratype, GSC 68191, longitudinal thin section.

Compared with **L. thorsteinssoni**, the Russian forms have much fewer and thinner septal crusts, and they have a peripheral stereozone that is independent of the septal crusts. Like the poorly known type specimen of **Microplasma devonicum** Soshkina (1937, p. 79-80, 99, Pl. 15, figs. 5, 6), which is probably from the Zlichovian to Dalejan Karpinsk Horizon (**Favosites regularissimus** Zone according to Ivanovskiy and Shurygina, 1975, p. 35) on the right bank of Kakva River, 2.5 km above the Kakva Ferry, on the eastern slope of the central Urals, Sytova's and Lavrusevich's specimens have been considered to be solitary examples of **Loboplasma** by Pedder and McLean (1982, p. 69).

The coral named **Pseudomicroplasma minima** by Goryanov (in Bulvanker and others, 1968, p. 26-27, Pl. 10, figs. 2a, b), from the Pragian Talbulak Horizon of central Tadzhikistan, resembles **Lythophyllum thorsteinssoni** in some respects, but it is much smaller (maximum diameter said to be 7 mm) and may have significantly weaker septal crusts and a stronger peripheral stereozone. In any event, Goryanov's name appears to be an uncorrected primary homonym of **Pseudomicroplasma minima** Cherepnina (1967, p. 170-171, Pl. 3, figs. 3, 4) which is from the Eifelian Shiverta Beds of the Gornoy Altay, and is not similar to **L. thorsteinssoni.**

Lythophyllum distortum (Jin and He, 1982, p. 144, Pl. 36, figs. 1a-f) from the Dalejan Dale Member of the Sipai Formation of Xiangzhou xian (county), Guangxi Province, southern China, also resembles the new species. It is, however, larger (maximum mean diameter at least 22 mm), has thinner, excentric septal crusts and a relatively narrower dissepimentarium with more steeply inclined and elongate dissepiments.

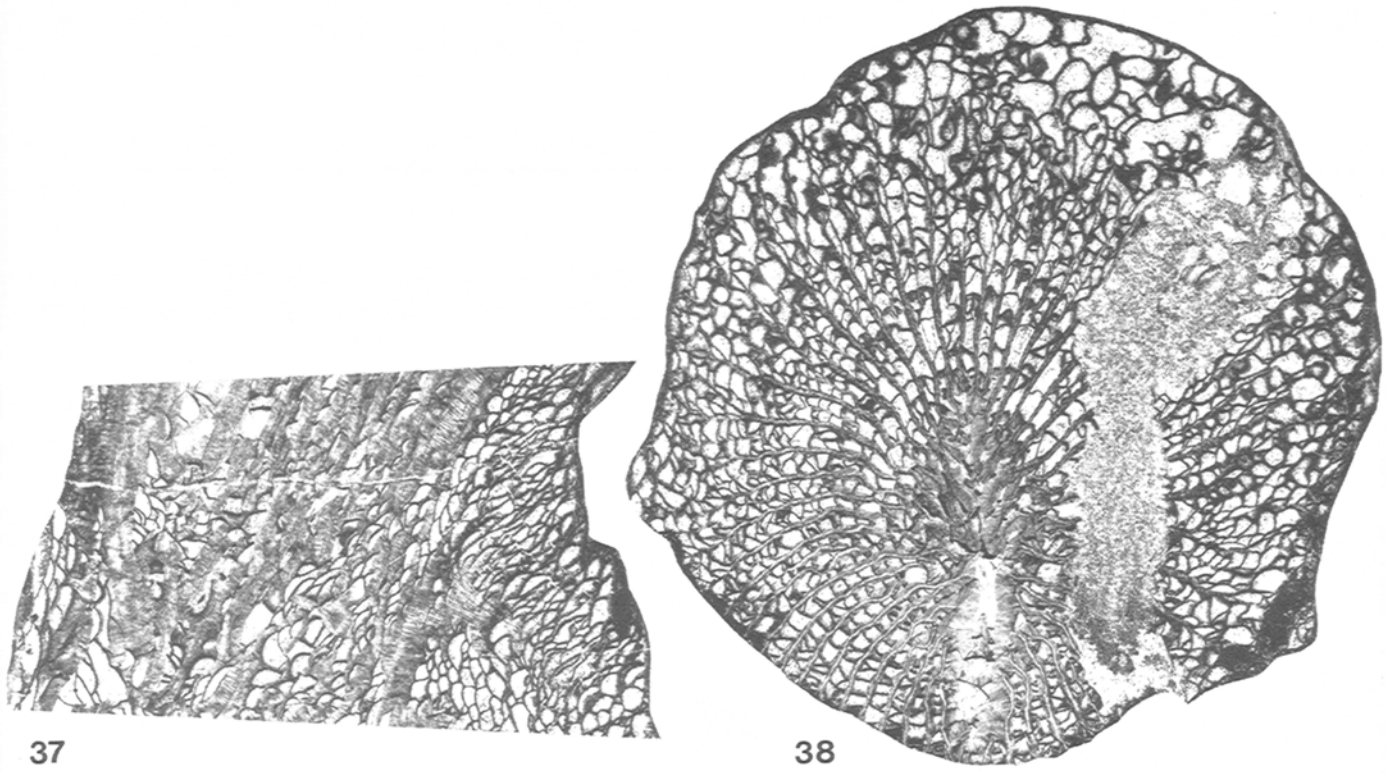
The trivial name is a patronym for R. Thorsteinsson, distinguished arctic geologist and collector of the type series.

Subfamily DIGONOPHYLLINAE Wedekind, 1923
Genus **Mochlophyllum** Wedekind, 1923

Mochlophyllum Wedekind, 1923, p. 31, 35.
Bothriophyllum Vollbrecht, 1926, p. 220 (**nomen imperfectum**).
Uralophyllum Soshkina, 1936, p. 44-45.

Type species of **Mochlophyllum. Cyathophyllum maximum.** Originally, Wedekind (1923, p. 35) gave neither authorship nor reference to identify the species. However, in 1925 (p. 39) he indicated that it is **"Mesophyllum" maximum** Schlüter (1889, p. 70). This species was founded as **Actinocystis maxima** by Schlüter in 1882 (p. 207) and has been revised under the name **Plasmophyllum (Mesophyllum) maximum maximum** by Birenheide (1964, p. 43-44, Pl. 7, figs. 30, 31; Pl. 8, fig. 32; Pl. 15, fig. 74; Pl. 28, fig. 136). The lectotype (Birenheide, 1964, p. 42) is one of Schlüter's syntypes, sectioned by Wedekind and first illustrated by Vollbrecht (1926, Pl. 15, fig. 2). According to Birenheide, it is from the Rechert or Nims Horizon of the Junkerberg Schichten (Eifelian) on the south slope at Auberg, Gerolsteiner Mulde, Eifel region, Germany.

Type species of **Uralophyllum. Uralophyllum unicum** Soshkina, 1936, p. 45-49, 73, figs. 43-46. Lower Middle Devonian (Soshkina, 1936, Table 1), Bed 5; Outcrop 8, River Malyi Patock, western slope, northern Urals. Later, Soshkina (1952, p. 81) assigned the type horizon to the Biya Beds. Sapel'nikov and Mizzens (1980, table on p. 34, 35) equate the Biya Beds with the **patulus** conodont zone, which straddles the Dalejan-Eifelian boundary. In the most recent revision of **U. unicum** by Ivanovskiy and Shurygina (1980, p. 19, Pl. 4, figs. 2a, b) the species is referred to the genus **Digonophyllum.**



Figures 35.37, 35.38. ***Mochlophyllum*** *sp., both figured specimen GSC 68838, x3.*
37, 38. Longitudinal and transverse sections of an abraded specimen.

Remarks. The generic name **Bothriophyllum** is invalid for want of a named species. Essentially, **Mochlophyllum** differs from **Digonophyllum** by possessing abundant discrete, crossbar carinae, and differs from **Mesophyllum** by having substantially expanded septa in the axial region.

Mochlophyllum sp.
Figures 35.37, 35.38

Material. One specimen, GSC 68838, from GSC loc. C-91484.

Remarks. The single available specimen represents a new species, but is incomplete, due to both preburial abrasion and present-day damage, and is also affected by dolomite replacement. It is characterized by having well developed septa, an elongated fossula surrounded by sclerenchyme that thickens septa and tabulae alike, discrete, crossbar carinae and some lateral dissepiments.

This occurrence is the earliest known of the genus, and is the only Canadian occurrence known to the author.

Genus **Lekanophyllum** Wedekind, 1924

Lekanophyllum Wedekind, 1924, p. 29-34 (in part, includes a species of **Mesophyllum**).

Type species. **Lekanophyllum punctatum** Wedekind, 1924, p. 30, 34, figs. 36-38. "**Dohmophyllum**-Stuffe", Middle Devonian; "Schurf" on the south slope, Auburg, Gerolsteiner Mulde, Eifel Region, Germany. Birenheide (1968, p. 23) assigned the type horizon to the Eifelian Junkerberg Schichten.

Remarks. A full synonymy and diagnosis of **Lekanophyllum** is given in Pedder and McLean (1982, p. 75).

Lekanophyllum sp.
Figures 35.39-35.42

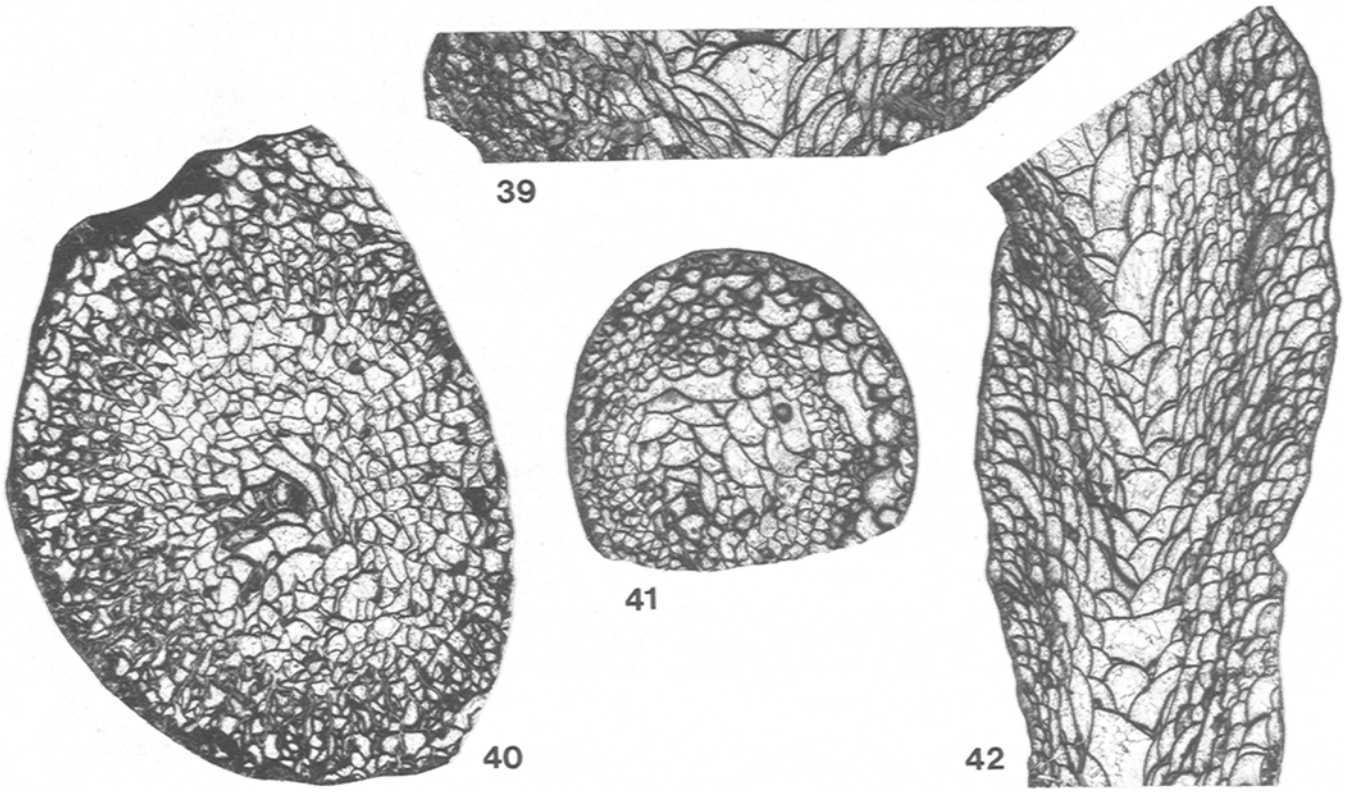
Material. Two specimens, GSC 75993, 75994, both from GSC loc. C-91484.

Remarks. Other than differences in apparent adult diameters (19 mm in GSC 75994; 29 mm in GSC 75993), the specimens have similar morphology and presumably are conspecific. The species is probably new, but both specimens are far from complete and it would be inappropriate to found a new taxon on them. They are entirely typical of **Lekanophyllum**, despite being the earliest known examples of the genus.

Family PTENOPHYLLIDAE Wedekind, 1923
Subfamily PTENOPHYLLINAE Wedekind, 1923
Genus **Lyrielasma** Hill, 1939

Lyrielasma Hill, 1939, p. 243-244.

Type species. **Cyathophyllum subcaespitosum** Chapman, 1925, p. 112, Pl. 13, figs. 15-16b. "Silurian (Yeringian)"; Cave Hill, Lilydale, Victoria, Australia. The name is a junior primary homonyn of **Cyathophyllum subcaespitosum** Meek, 1873, p. 470; 1877, p. 60-61, Pl. 5, figs. 4-4b, and has been replaced by **Lyrielasma chapmani** Pedder, 1967, p. 5. The age of the Lilydale Limestone is Pragian (Philip and Pedder, 1967; Strusz, 1972).



Figures 35.39-35.42. ***Lekanophyllum*** *sp., all x3.*
39, 40. Figured specimen GSC 75993, longitudinal and transverse sections of an abraded specimen.
41, 42. Figured specimen GSC 75994, transverse and longitudinal sections of an abraded specimen.

Diagnosis. Ptenophyllid genus with fasciculate corallum produced by nonparricidal marginarial budding. Septa of both orders normally complete, variably carinate, expanded peripherally to form a narrow to broad stereozone. Trabeculae moderately coarse, horizontal to only slightly elevated adaxially. Dissepimentarium narrow, with inwardly sloping surface; presepiments rare, normally absent. Tabularium typical of family.

Remarks. Most specimens of **Lyrielasma chapmani** from the type locality are single corallites, but this is believed to be due to post mortem damage sustained in a high energy environment. The type specimen is fasciculate (Pedder, 1967, Pl. 1, figs. 9, 13) and Philip (1962, Pl. 28, fig. 6) has illustrated a topotype with abundant offsets.

Lyrielasma sp.
Figures 35.43-35.46

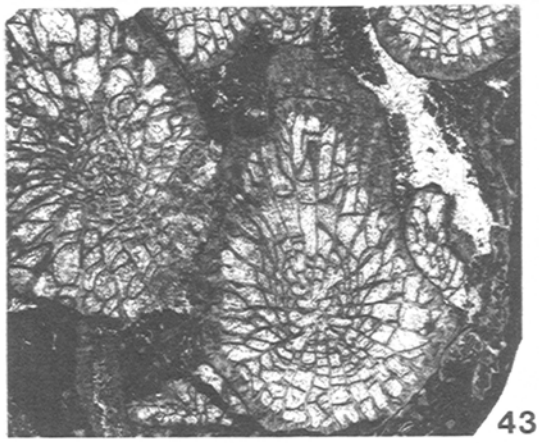
Material. Three specimens, GSC 75995-75997, from GSC loc. C-91484.

Remarks. The material from Baillie Hamilton Island suffered severe preburial damage, and also has been adversely affected by stylolitization. It probably represents a new species, although it is similar, especially in respect to the short minor septa and dissepimentarial morphology, to **Lyrielasma crassiseptatum**, described by Cherepnina (1970, p. 115, Pl. 40, figs. 4a, b; Pl. 41, fig. 1) from the early Pragian Yakushin Beds of the Mountain Altay region of central Asia. One obvious difference between the two is that whereas the Canadian species has 20x 2 to 23 x 2 septa at corallite diameters of 7.5 to 9.0 mm, **L. crassiseptatum** is reported to have no more than 18 x 2 septa in corallites with diameters as large as 10.0 mm.

Most of the described species of **Lyrielasma** fall within the range of Pragian to Middle Devonian, and consequently are younger than the species found on Baillie Hamilton Island. However, Lochkovian occurrences of **Lyrielasma** are known in the Elmside Formation of New South Wales (Picket in Bradley, 1982, p. 49) and in the Beck Pond Limestone of Maine (Oliver, 1960, p. 10-12, Pl. 2, figs. 1-6; Pl. 3, figs. 1-5). Specimens identified as species of **Weissermelia** by Guo (1978, p. 56, Pl. 15, figs. 6a-7b), from the supposedly Late Silurian Bateraobao Group in the region northwest of Bailingmiao in Inner Mongolia, resemble **Lyrielasma** more than **Weissermelia**, but their age is not beyond doubt, and may also be Lochkovian.

Locality register

GSC loc. C-8220. Drake Bay Formation, Upper member, 18.6 m above base of section, 195.2 m below top of section; **delta** or **pesavis** Zone. East side of Drake Bay, northwestern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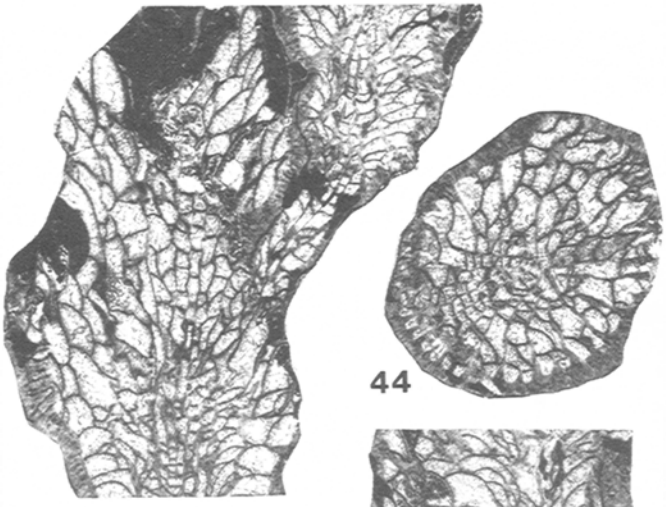
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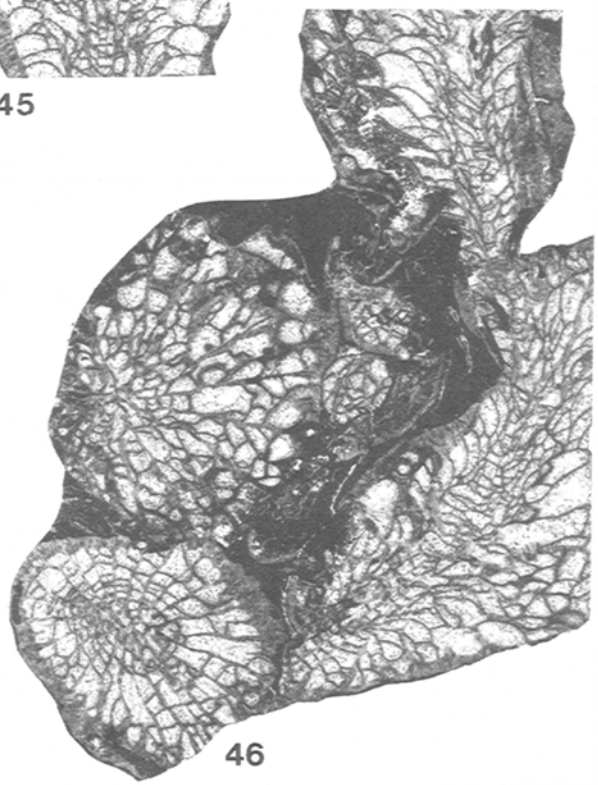
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Figures 35.43-35.46

Lyrielasma *sp., all x4.*

43. *Figured specimen GSC 75996, transverse and oblique sections.*
44. *Figured specimen GSC 75995, slightly oblique transverse section of an abraded and stylolitized corallite.*
45. *Figured specimen GSC 75995, longitudinal section of an abraded corallite and offset, both affected by stylolites.*
46. *Figured specimen GSC 75997, transverse and longitudinal section of abraded and stylolitized corallites.*

Prince of Wales Island; 73°29'40"N latitude, 100°35'45"W longitude; UTM Zone 14x, 449700 mE, 8156750 mN. Collected by R. Thorsteinsson, 1970. **Favosites** sp., **Tryplasma** sp., **Lythophyllum thorsteinssoni** Pedder. Samples (GSC loc. C-8214, C-8215) from 17-18 m below have yielded **Protocortezorthis carinatus** Smith?, **Schizophoria** sp., **Plicogypa thorsteinssoni** (Johnson), **Iridistrophia** (?) sp., **Cymostrophia**(?) sp., **Machaeraria** sp., **Atrypa** sp., **Ozarkodina remscheidensis remscheidensis** (Ziegler), **Pedavis pesavis** subsp. n. A sample (GSC loc. C-8219) from 4 m above has yielded **Schizophoria** sp., **Plicogypa thorsteinssoni** (Johnson), **Leptaena** sp., **Cymostrophia** sp., **Machaeraria** sp., **Atrypa** sp., **Nucleospira** sp., **Undispirifer** sp., **Ozarkodina remscheidensis remscheidensis** (Ziegler).

GSC loc. C-8234. Drake Bay Formation, Upper member, approximately 6.0-7.5 m above base of section, 4.5-6.0 m below top of section; **eurekaensis** or **delta** Zone. Unnamed creek between Cape John Dyer and Harrison Point, northwestern Prince of Wales Island; 73°26'15"N latitude, 101°17'30"W longitude; UTM Zone 14x, 427250 mE, 8150850 mN. Collected by R. Thorsteinsson, 1970. **Adinophyllum smithi** Pedder, **Protocortezorthis quadriforma** Smith, **Gypidula dyerensis** Smith, **Iridistrophia thorsteinssoni** Smith, **Mesodouvillina** sp., **Cymostrophia** sp., **Asymmetrochonetes spinalonga** Smith, **Ancillotoechia magnaplica** Smith, **Atrypa** sp. cf. **A. nieczlawiensis** Kozlowski, **Howellella** sp., **Cyrtina maclennani** Smith, **Basidechenella laticaudata** Ormiston, **Pedavis pesavis** subsp. n., **Pelekysgnathus** sp. n., **Ozarkodina wurmi** (Bischoff and Sannemann), **O. remscheidensis remscheidensis** (Ziegler), **O. remscheidensis** cf. **repetitor** (Carls and Gandl) form approaching **Pandorinellina optima** Moskalenko.

GSC loc. C-26912. Drake Bay Formation, Upper member, 3.5 m above base of section, 8.0 m below top of section; **eurekaensis** or **delta** Zone. Same geographical location as GSC loc. C-8234. GSC loc. C-26912 collected by R.E. Smith, 1973. **Adinophyllum smithi** Pedder. A sample (GSC loc. C-26911) from 2.5 m below has yielded **Crania** sp., **Schizophoria protonevadensis** Smith, **Salopina submurifer** Johnson, Boucot and Murphy, **Skenidioides** sp., **Gypidula dyerensis** Smith, **Iridistrophia thorsteinssoni** Smith, **Mesodouvillina** sp., **Asymmetrochonetes spinalonga** Smith, **Machaeraria obesa** Smith, **Ancillotoechia magnaplica** Smith, **Spirigerina** sp., **Atrypa** sp., **Nucleospira** sp., **Undispirifer laeviplicatus** (Kozlowski), **Cyrtina maclennani** Smith, **Ambocoelia** sp., **Ozarkodina remscheidensis remscheidensis** (Ziegler), **O. remscheidensis** cf. **repetitor** (Carls and Gandl), **Pedavis** sp. A sample (GSC loc. C-26913) from 2.5 m above has yielded **Protocortezorthis quadriforma** Smith, **Schizophoria protonevadensis** Smith, **Gypidula dyerensis** Smith, **Iridistrophia thorsteinssoni** Smith, **Mesodouvillina** sp., **Cymostrophia** sp., **Leptaena** sp., **Ancillotoechia magnaplica** Smith, **Atrypa** sp., **Nucleospira** sp., **Undispirifer laeviplicatus** (Kozlowski), **Cyrtina maclennani** Smith, **Ambocoelia** sp., **Ozarkodina remscheidensis remscheidensis** (Ziegler), **O. remscheidensis** cf. **repetitor** (Carls and Gandl), **Pedavis** sp.

GSC loc. C-91484. Sophia Lake Formation, near base of middle unit; **eurekaensis** Zone equivalent. Unnamed stream, 1.7 km inland from the east coast of Baillie Hamilton Island and 11 km south of Surprise Point; 75°53'05"N latitude, 94°28'00"W longitude; UTM Zone 15x, 460100 mE, 8423500 mN. Collected by A.E.H. Pedder, 1983. **Amphipora** sp., undet. bulbous stromatoporoid, **Favosites** sp., **Cladopora** sp., **Alveolites** sp., **Aulopora** sp., **Stylopleura julli** Pedder, **Mochlophyllum** sp., **Lekanophyllum** sp., **Lyrielasma** sp., undet. trepostomatous bryozoan, **Conocardium** sp., **Ozarkodina remscheidensis remscheidensis** (Ziegler), **Oulodus** sp.

References

Barrois, C.E.
1889: Faune du calcaire d'Erbray (Loire Inférieure); Société géologique du Nord, Mémoires, tome 3, pt. 1. p. 1-348.

Birenheide, R.
1964: Die "Cystimorpha" (Rugosa) aus dem Eifeler Devon; Senckenbergischen Naturforschenden Gesellschaft, Abhandlungen 507.

1968: Die Typen der Sammlung Wedekind aus der Gattung **Plasmophyllum** (Rugosa; Mitteldevon); Senckenbergiana lethaea, Band 49, p. 1-37.

Bradley, G.M.
1982: Elmside Formation; in The Silurian System in New South Wales, ed. J.W. Pickett; Geological Survey of New South Wales, Bulletin 29, p. 49-50.

Bul'vanker, E.Z., Goryanov, V.B., Ivanovskiy, A.B., Spasskiy, N.Ya., and Shchukina, V.Ya.
1968: Novye predstaviteli chetyrekhluchevykh korallovykh polipov SSSR; in Novye vidy drevnikh rasteniy i bespozvonochnykh SSSR, vypusk 2, chast' 2, ed. B.P. Markovskiy; Vsesoyuznyy Nauchno-Issledovatel'skiy Geologicheskiy Institut (VSEGEI), Izdatel'stvo "Nedra", Moskva, p. 14-45, 304-343.

Cao Xuan-duo
1975: Rugosa; in Early Paleozoic stratigraphy of the western part of Dabashan, ed. The Geological Press; Geological Publishing House, Beijing, p. 179-195, 298, 300-321, 323 (Chinese).

Chapman, F.
1925: New or little-known fossils in the National Museum. Part XXVIII. – Some Silurian rugose corals; Royal Society of Victoria, Proceedings, new ser., v. 37, p. 104-118.

Cherepnina, S.K.
1967: Novye vidy srednedevonskikh rugoz Gornogo Altaya; in Nekotorye voprosy geologii zapadnoy Sibiri, ed. V.A. Khakhlov; Izdatel'stvo Tomskogo Universiteta, Tomsk, p. 168-175.

1970: Novye rugozy iz nizhnedevonskikh otlozheniy Gornogo Altaya; in Novye vidy paleozoyskikh mshanok i korallov, ed. G.G. Astrova and I.I. Chudinova; Izdatel'stvo "Nauka", Moskva, p. 112-116, 165.

Chlupáč, I. and Turek, V.
1983: Devonian goniatites from the Barrandian area, Czechoslovakia; Ustředního Ustavu Geologického, Rozpravy, svazek 46.

Flügel, E. and Flügel, H.
1961: Stromatoporen und Korallen aus dem Mittel-Devon von Feke (Anti-Taurus); Senckenbergiana lethaea, Band 42, p. 377-409.

Ge Zhi-zhu and Yu Chang-min
1974: Silurian corals; in A handbook of the stratigraphy and paleontology in southwest China, ed. Nanking Institute of Geology and Paleontology Academia Sinica; Science Press, Beijing, p. 165-173 (Chinese).

Guo Sheng-zhe
1978: Late Silurian tetracorals from northern Bailingmiao of the Autonomous Region of Inner Mongol; Professional Papers of Stratigraphy and Palaeontology, no. 6, p. 50-68 (Chinese).

He Yuan-xiang
1978: Subclass Rugosa; in Atlas of fossils of southwest China. Sichuan volume, Part 1. From Sinian to Devonian, ed. Chengdu Institute of Geology and Mineral Resources; Geological Publishing House, Beijing, p. 98-179, 555-568 (Chinese).

Hill, D.
1939: The Devonian rugose corals of Lilydale and Loyola, Victoria; Royal Society of Victoria, Proceedings, new ser., v. 51, p. 219-256.

1981: Treatise on invertebrate paleontology. Part F. Coelenterata. Supplement 1. Rugosa and Tabulata, ed. C. Teichert; Geological Society of America and University of Kansas Press, Boulder and Lawrence, xl + 762 p. (2v.).

Ivanovskiy, A.B. and Shurygina, M.V.
1975: Reviziya rugoz Urala; Akademiya Nauk SSSR, Sibirskoe Otdelenie, Instituta Geologii i Geofiziki, Trudy, vypusk 218.

1980: Reviziya devonskikh rugoz Urala; Akademiya Nauk SSSR, Paleontologicheskogo Instituta, Trudy, tom 186.

Jackson, D.E., Lenz, A.C., and Pedder, A.E.H.
1978: Late Silurian and Early Devonian graptolite, brachiopod and coral faunas from northwestern and arctic Canada; Geological Association of Canada, Special Paper no. 17.

Jin Shan-yu and He Jin-han
1982: The Devonian rugose corals of Guangxi, their sequence and systematic descriptions; in The Devonian biostratigraphy of Guangxi and adjacent area, ed. Bai Shun-liang, Jin Shan-yu and Ning Zhong-shan; Beijing University Press, p. 109-148, 160-165, 188-202.

Johnson, J.G.
1975: Devonian brachiopods from the **Quadrithyris** Zone (Upper Lochkovian), Canadian Arctic Archipelago; Geological Survey of Canada, Bulletin 235, p. 5-57.

Kerr, J.W., McLaren, D.J., and Thorsteinsson, R.
1977: Canadian Arctic Archipelago; in The Silurian-Devonian Boundary, ed. A. Martinsson; International Union of Geological Sciences, ser. A, no. 5, p. 281-288.

Khodalevich, A.N., Breyvel', M.G., Antsygin, N.Ya., Bogoyavlenskaya, O.V., Breyvel', I.A., Zenkova, G.G., Nasedkina, V.A., Petrova, L.G., Shurygina, M.V., and Yanet, F.E.
1982: O granitse nizhnego i srednego devona na vostochnom sklone Urala; in Biostratigrafiya pogranichnykh otlozheniy nizhnego i srednego devona. Trudy polevoy sessii Mezhdunarodnoy podkomissii po stratigrafii devona Samarkand, 1978, ed. B.S. Sokolov and M.A. Rzhonsnitskaya; Nauka, Leningradskoe Otdelenie, p. 148-151.

Klapper, G. and Johnson, J.G.
1980: Endemism and dispersal of Devonian conodonts; Journal of Paleontology, v. 54, p. 400-455.

Lang, W.D., Smith, S., and Thomas, H.D.
1940: Index of Palaeozoic coral genera; British Museum (Natural History), London, vii + 231 p.

Lavrusevich, A.I.
1968: Rugozy postludlovskikh otlozheniy doliny r. Zeravshan (Tsentral'nyy Tadzhikistan); in Biostratigrafiya pogranichnykh otlozheniy silura i devona, ed. B.S. Sokolov and A.B. Ivanovskiy; Akademiya Nauk SSSR, Sibirskoe Otdelenie, Institut Geologii i Geofiziki, Izdatel'stvo "Nauka", Moskva, p. 102-130.

Lonsdale, W.
1845: Description of some characteristic Palaeozoic corals of Russia. Appendix A, p. 591-634; in Murchison, R.I., de Verneuil, E. and von Keyserling, A.; The geology of Russia in Europe and the Ural Mountains, v. 1, John Murray, London, 700 p.

Mamedov, A.B.
1983: Zonal'noe raschlenenie srednego devona Zakavkaz'ya po brakhiopodam; in Nizhniy yarus srednego devona na territorii SSSR, ed. V.N. Dubatolov; Akademiya Nauk SSSR, Sibirskoe Otdelenie, Institut Geologii i Geofiziki, Trudy, vypusk 562, p. 112-130.

Mayr, U.
1978: Stratigraphy and correlation of Lower Paleozoic formations, subsurface of Cornwallis, Devon, Somerset, and Russell islands, Canadian Arctic Archipelago; Geological Survey of Canada, Bulletin 276.

McLean, R.A.
1976a: Genera and stratigraphic distribution of the Silurian and Devonian family Cystiphyllidae Edwards and Haime; in Report of Activities, Part B, Geological Survey of Canada, Paper 76-1B, p. 295-301.

1976b: Middle Devonian cystiphyllid corals from the Hume Formation, northwestern Canada; Geological Survey of Canada, Bulletin 274.

Meek, F.B.
1873: Preliminary paleontological report, consisting of lists and descriptions of fossils, with remarks on the ages of the rocks in which they were found, etc., etc.; United States Geological Survey of the Territories, embracing portions of Montana, Idaho, Wyoming, and Utah, Annual Report 6 (1872), p. 429-518.

1877: Palaeontology; in Report of the geological exploration of the fortieth parallel, Clarence King, Geologist-in-Charge; Government Printing Office, Washington, v. 4, pt. 1.

Merriam, C.W.
1974: Silurian rugose corals of the central and southwest Great Basin; United States Geological Survey, Professional Paper 777 (imprint 1973).

Müller, J.P.
1858: Einige neue bei St. Tropez am Mittelmeer beobachtete Polycystinen und Acanthometren aus den Abbildungen. Königliche Preussische Akademie der Wissenschaften zu Berlin, Monatsberichte, Gesammtsitzung vom 11. Februar 1858, p. 154-155.

1859: Über die Thalassicollen, Polycystinen und Acanthometren des Mittelmeers. Königliche Preussische Akademie der Wissenschaften zu Berlin, Abhandlungen, Physikalisch-Mathematische Klasse, 1858, p. 1-62.

Murphy, M.A. and Matti, J.C.
1982: Lower Devonian conodonts (**hesperius-kindlei** Zones), central Nevada; University of California Publications in Geological Sciences, v. 123.

Oliver, W.A., Jr.
1960: Devonian rugose corals from northern Maine; United States Geological Survey, Bulletin 1111-A.

Ormiston, A.R.
1967: Lower and Middle Devonian trilobites of the Canadian Arctic Islands; Geological Survey of Canada, Bulletin 153.

1969: A new Lower Devonian rock unit in the Canadian Arctic Islands; Canadian Journal of Earth Sciences, v. 6, p. 1105-1111.

Pedder, A.E.H.
1967: **Lyrielasma** and a new related genus of Devonian tetracorals; Royal Society of Victoria, Proceedings, new ser., v. 80, p. 1-29.

1985: Lower Devonian rugose corals of Lochkovian age from Yukon Territory; in Current Research, Part A, Geological Survey of Canada, Paper 85-1A, p. 587-602.

Pedder, A.E.H. and McLean, R.A.
1982: Lower Devonian cystiphyllid corals from North America and eastern Australia with notes on the genus **Utaratuia**; Geologica et Palaeontologica v. 16, p. 57-110.

Philip, G.M.
1962: The palaeontology and stratigraphy of the Siluro-Devonian sediments of the Tyers area, Gippsland, Victoria; Royal Society of Victoria, Proceedings, new ser., v. 75, p. 123-246.

Philip, G.M. and Pedder, A.E.H.
1967: The age of the Lilydale Limestone (Devonian), Victoria; Journal of Paleontology, v. 41, p. 795-798.

Rosen, B.R. and Wise, R.F.
1980: Revision of the rugose coral **Diphyphyllum concinnum** Lonsdale, 1845 and historical remarks on Murchison's Russian coral collection; British Museum (Natural History), Bulletin, Geology ser., v. 33, p. 147-155.

Sapel'nikov, V.P. and Mizzens, L.I.
1980: Novoe b probleme granitsy nizhnego i srednego devona na Urale; in Paleontologiya i biostratigrafiya srednego paleozoya Urala, ed. G.N. Papulov and V.P. Sapel'nikov; Academiya Nauk SSSR, Ural'skiy Nauchnyy Tsentr, Sverdlovsk, p. 23-38.

Schlüter, C.A.F.
1882: Neue Korallen des Mitteldevon der Eifel; Verhandlungen des Naturhistorischen Vereines der Preussischen Rheinlande und Westfalens, Jahrg. 39 – Sitzungsberichte der niederrheinischen Gesellschaft für Natur- und Heilkunde in Bonn, p. 205-210.

1889: Anthozoen des rheinischen Mittel-Devon; Geologischen Specialkarte von Preussen und den Thuringischen Staaten, Abhandlungen, Band 8, Heft 4, p. 259-465 (reprint pagination 1-207).

Smith, R.E.
1980: Lower Devonian (Lochkovian) biostratigraphy and brachiopod faunas, Canadian Arctic Islands; Geological Survey of Canada, Bulletin 308.

Soshkina, E.D.
1936: Korally Rugosa srednego devona Severnogo Urala; Akademiya Nauk SSSR, Polyarnoy Komissii, Trudy, vypusk 28, p. 15-76.

1937: Korally verkhnego silura i nizhnego devona vostochnoga i zapadnogo sklonov Urala; Akademiya Nauk SSSR, Paleozoologicheskogo Instituta, Trudy, tom 6, vypusk 4.

1949: Devonskie korally Rugosa Urala; Akademiya Nauk SSSR, Paleontologicheskogo Instituta, Trudy, tom 15, vypusk 4.

1952: Opredelitel' devonskikh chetyrekhluchevykh korallov; Akademiya Nauk SSSR, Paleontologicheskogo Instituta, Trudy, tom 39.

Spasskiy, N.Ya.
1955: Korally Rugosa i ikh znachenie dlya stratigrafii srednego devona zapadnogo sklona Urala; in Stratigrafiya paleozoyskikh otlozheniy Timana i zapadnogo sklona Urala, ed. M.V. Kulikov; Vsesoyuznogo Neftyanogo Nauchno-Issledovatel'skogo Geologo-Razvedochnogo Insituta (VNIGRI), Trudy, novaya seriya, vypusk 90, p. 91-224.

1983: Analiz rasprostraneniya srednedevonskikh rugoz Zakavkaz'ya; in Nizhniy yarus srednego devona na territorii SSSR, ed. V.N. Dubatolov; Akademiya Nauk SSSR, Sibirskoe Otdelenie, Institut Geologii i Geofiziki, Trudy, vypusk 562, p. 164-170.

Strusz, D.L.
1972: Correlation of the Lower Devonian rocks of Australasia; Geological Society of Australia, Journal, v. 18, p. 427-455.

Stumm, E.C.
1949: Revision of the families and genera of the Devonian tetracorals; Geological Society of America, Memoir 40.

Sytova, V.A.
1968: Tetrakorally skal'skogo i borshchovskogo gorizontov Podolii; in Siluriysko-devonskaya fauna Podolii, ed. Z.G. Balashov; Izdatel'stvo Leningradskogo Universiteta, Leningrad, p. 51-71.

Sytova, V.A. and Ulitina, L.M.
1966: Rugozy isen'skoy i biotarskoy svit; in Stratigrafiya i fauna siluriyskikh i nizhnedevonskikh otlozheniy Nurinskogo sinklinoriya, ed. A.A. Bogdanov; Materialy po geologii Tsentral'nogo Kazakhstana, tom 6, p. 198-253.

Thorsteinsson, R.
1984: A sulphide deposit containing galena, in the Lower Devonian Disappointment Bay Formation on Baillie Hamilton, Island, Canadian Arctic Archipelago; in Current Research, Part B, Geological Survey of Canada, Paper 84-1B, p. 269-274.

Thorsteinsson, R. and Kerr, J.W.
1968: Cornwallis Island and adjacent smaller islands, Canadian Arctic Archipelago; Geological Survey of Canada, Paper 67-64.

Thorsteinsson, R. and Uyeno, T.T.
1981: Stratigraphy and conodonts of Upper Silurian and Lower Devonian rocks in the environs of the Boothia Uplift, Canadian Arctic Archipelago; Geological Survey of Canada, Bulletin 292 (imprint 1980).

Ulitina, L.M.
1963: Korally podotryada Cystiphyllina iz devona Zakavkaz'ya (semeystva Zonophyllidae, Dansikophyllidae i Digonophyllidae); Akademiya Nauk SSSR, Paleontologicheskiy Institut, Moskva, 18 p.

1968: Devonskie korally tsistifilliny Zakavkaz'ya; Akademiya Nauk SSSR, Paleontologicheskogo Instituta, Trudy, tom 113.

Vollbrecht, E.
1926: Die Digonophyllinae aus dem unteren Mittel-Devon der Eifel. Eine morphologisch-chronologische Studie. I. Teil; Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, Abteilung B, Beilage-Band 55, p. 189-273.

Wedekind, R.
1923: Die Gliederung des Mitteldevons auf Grund von Korallen; Gesellschaft zur Beförderung der gesamten Naturwissenschaften zu Marburg, Sitzungsberichte, 1922, no. 4, p. 24-35.

1924: Das Mitteldevon der Eifel. Eine biostratigraphische Studie. I. Teil. Die Tetrakorallen des unteren Mitteldevon; Gesellschaft zur Beförderung der gesamten Naturwissenschaften zu Marburg, Schriften, Band 14, Heft 3.

Wedekind, R. (cont.)
1925: Das Mitteldevon der Eifel. Eine biostratigraphische Studie. II. Teil. Materialien zur Kenntnis des mittleren Mitteldevon; Gesellschaft zur Beförderung der gesamten Naturwissenschaften zu Marburg, Schriften, Band 14, Heft 4.

1937: Einführung in die Grundlagen der historischen Geologie. II. Band. Mikrobiostrigraphie die Korallen- und Foraminiferenzeit; Ferdinand Enke Verlag, Stuttgart, viii + 136 p.

Wedekind, R. and Vollbrecht, E.
1931: Die Lytophyllidae des mittleren Mitteldevon der Eifel. I. Teil. Das Tatsachenmaterial; Palaeontographica, Band 75, p. 84-110.

1932: Die Lytophyllidae des mittleren Mitteldevon der Eifel. II. Teil. Die systematische Erfassung des Tatsachenmateriales; Palaeontographica, Band 76, p. 95-115.

Weyer, D.
1971: Nomenklatorische Bemerkungen zum Genus **Plasmophyllum** Dybowski, 1873 (Anthozoa, Rugosa, Silur). Deutsche Gesellschaft für geologische Wissenschaften, Berichte, Reihe A, Band 16, p. 13-17.