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THE MIDDLE DEVONIAN RUGOSE CORALS OF QUEENSLAND, I. DOUGLAS CREEK AND DRUMMOND CREEK, CLERMONT DISTRICT.

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The Middle Devonian Rugose Corals of Queensland, I. Douglas Creek and Drummond Creek, Clermont District.

BY DOROTHY HILL, M.Sc. (Qld.), Ph.D. (Cantab.).

[Read before the Royal Society of Queensland, 28th November, 1938.]

(Plates IV. and V.)

SUMMARY.—In this paper the Rugosa from the Clermont district, Queensland, are redescribed, and their age is deduced to be Middle Devonian, probably the upper part of the Lower Middle Devonian, i.e., Upper Couvinian. The paper includes a review of the Family Spongophyllidae, and supplementary remarks on the family Acanthophyllidae, and a new genus *Xystriphyllum* is founded.

Corals from the Clermont district were first recorded by Rands (1886, p. 4) from a bed of dark-coloured crystalline limestone outcropping close to Douglas Creek, about 3 miles below its junction with Drummond Creek, and about 4 miles south-east of Copperfield. Rands tentatively referred the limestone to the Devonian. Jack (1895, p. 10) mentioned an outcrop of limestone on Drummond Creek, about 3 miles south of Copperfield, containing *Heliolites* and other Devonian corals. Dunstan (1900, p. 3) and Morton (1931, MS map, Rockhampton Office, Geological Survey of Queensland) have since collected from the limestones, whose relation to the metalliferous mica and hornblende schists of the district is unproved. Dunstan gave their strike as N.N.E., S.S.W., and that of the schists as north-easterly, and (1901, pl. 1) regarded them as unconformable on the schists.

A study of Rands and Dunstan's texts and maps and the Lands Department map of the Parish of Copperfield, County of Clermont, in conjunction with Morton's MS map (by courtesy of Mr. J. H. Reid, District Geologist, Rockhampton), indicates that there are four limestone outcrops near Douglas Creek, as follows:—Portion 73, Parish Copperfield (Rands and Morton); Portion 85, Parish Copperfield (Rands and Dunstan), both on the left bank of the Douglas; Selection No. 75 (Dunstan, present portion number could not be traced by the Lands Department), on the right bank of the Douglas; and Portion 9, Parish Theresa (Morton). In addition there is Jack's locality on Drummond Creek, which appears not to have been visited subsequently.

Etheridge (1911) described the Rugosa collected by Rands and Dunstan, but did not determine the age of the limestones. Rands, Dunstan's, and Morton's material from Douglas Creek are used in the present work, with also one specimen from Drummond Creek, possibly collected by Jack. The three species, *Acanthophyllum clermontensis* (Etheridge), *Spongophyllum cyathophylloides* Etheridge, and *Xystriphyllum dunstani* (Etheridge), are common to the first three localities cited above from Douglas Creek, and *Spongophyllum cyathophylloides* occurs on Drummond Creek, so that these limestones might reasonably

be considered to be of the same age. One indeterminable Rugose coral was collected from Portion 9, Parish Theresa, by Morton. The specimens are in the Collection of the Geological Survey of Queensland and in the Australian Museum.

Age of the Limestones.—*Spongophyllum* is known from the Upper Silurian and the Middle Devonian; *S. cyathophylloides* possesses no feature which could serve to ally it with Middle Devonian rather than Upper Silurian species, or *vice versa*. *Xystriphyllum* has so far been recognised only from the Lower and Middle Devonian, and *X. dunstani* is closest to the New South Wales Lower(?) Middle Devonian *X. mitchelli* (Etheridge). *Acanthophyllum* extends from Lower to Upper Devonian, but from Wedekind's figures of the Rugosa of the Eifel we see that *A. clermontensis* has a morphology characteristic of the Upper Couvinian. On this somewhat limited evidence it is deduced that the Douglas Creek and Drummond Creek limestones are Middle Devonian, and that they probably represent the upper part of the Lower Middle Devonian, i.e., the upper part of the Couvinian.

Family ACANTHOPHYLLIDAE.

Acanthophyllidæ Hill, 1939.

Range.—Devonian.

Remarks.—The arrangement of the axial ends of their septa suggests that these further forms from the Eifel district in Germany belong to the Acanthophyllidae:—*Keriophyllum* Wedekind (1924, p. 69, Couvinian, including *Cyathophyllum cylindricum* Schulz); *Leptoinophyllum* Wedekind (1925, p. 4, genotype *Leptoinophyllum multiseptatum* Amanshauser MS, Wedekind *id.* figs. 1, 2, Lower Givetian); and a group consisting of the following:—*Trematophyllum* Wedekind (1924, p. 75, Couvinian), *Dohmophyllum* Wedekind (1924, p. 76, Couvinian, including *Cyathophyllum helianthoides* Goldfuss, Quenstedt), *Stenophyllum intermedium* and *Stenophyllum implicatum* Wedekind (1925, figs. 5-7, both Lower Givetian), and *Sparganophyllum* Wedekind (1925, p. 13, genotype *Sparganophyllum difficile* Borchers MS, Wedekind *id.* fig. 9, Lower Givetian).

The possibility that the new genus *Xystriphyllum* is a cerioid Acanthophyllid is discussed on p. 62.

Genus ACANTHOPHYLLUM Dybowski.

Acanthophyllum Dybowski, 1873, p. 339; 1874, p. 493.

Acanthophyllum Hill, 1939.

Ptenophyllum Wedekind, 1924, p. 36, Couvinian, Eifel.

Astrophyllum Wedekind, 1924, p. 46, Couvinian, Eifel.

Stenophyllum Amanshauser in Wedekind, 1925, p. 9, genotype *Stenophyllum diluvianum* Amanshauser in Wedekind *id.*, figs 3, 4, Lower Givetian, Eifel.

Genolectotype (chosen Schlüter, 1889, p. 38): *Cyathophyllum heterophyllum* Edwards and Haime.

Diagnosis.—Large, simple, or weakly compound Rugosa with a wide dissepimentarium of small, highly arched dissepiments, with shallowly concave, axially deepened tabulae, and with long but unequal major septa. The axial ends of the major septa are arranged in groups in the tabularium, and are straight, or curved vortically, the curvature differing

in degree from group to group; the cardinal septum is typically short, and one septum, not a proto-septum, extends to the axis. The septa show different types of modification; they are frequently much dilated, either in the dissepimentarium, or more rarely in the tabularium, or in both; towards the periphery they may be thin and lined with lateral dissepiments; in the tabularium they are sometimes waved and carinate.

Range.—Fairly common in the Lower Devonian of Europe, and very common in the Middle Devonian of Europe. Lower and Middle Devonian of Australia.

Remarks.—The following is added to previous remarks (Hill, 1939). I consider that Wedekind's (1924) genera *Ptenophyllum* and *Astrophyllum* from the Couvinian of the Eifel are better regarded as each forming single variable species of *Acanthophyllum;* also that the following are *Acanthophyllum*:—*Cyathophyllum* sp. Wedekind (1921, pl. 1, fig. 1, Couvinian, Eifel); *Mesophylloides richteri* Wedekind (1921, pl. 1, fig. 2, Couvinian, Eifel), *Stenophyllum diluvianum* Amanshauser (Wedekind, 1925, pl. 1, figs. 3, 4, Lower Givetian, Eifel, genotype of *Stenophyllum* Amanshauser, Wedekind, 1925, p. 9), and *Neostringophyllum* spp. Wedekind (1925, pl. 11, Upper Givetian, Eifel).

Acanthophyllum clermontensis (Etheridge).

(Plate IV., figs. 1, 2.)

Cyathophyllum ? clermontensis Etheridge, 1911, p. 5, pl. B, figs. 1, 2, pl. D., fig. 3, Douglas Creek, 7 miles S.S.W. of Clermont. [Lower] Middle Devonian.

Lectotype (here chosen): 2C, Geological Survey of Queensland Collection, being specimen figured Etheridge *loc. cit.* pl. D., fig. 3; portion is F 9487 in the Australian Museum.

Diagnosis.—Sub-compound *Acanthophyllum.*

Description.—The lectotype consists of a number of unequal corallites in a limestone block, suggesting by their manner of aggregation that they are parts of a compound corallum, though none can be seen to arise from another. A topotype collected by Morton, however, shows an offset arising by lateral increase, its diameter being enlarged fairly rapidly. Etheridge (1911, p. 5) noted corallites in contact and subpolygonal, but I have not seen such a specimen. The calice is the "Krempenkelch" of Wedekind; that is, the dissepimentarium has an almost flat surface, descending steeply into the concave surface of the tabularium. The diameter varies between 25 and 60 mm. (*fide* Etheridge). The septa are numerous and very long; the major septa extend unequally towards the axis, their axial ends usually being slightly curved, waved and carinate, and arranged in the manner described as diagnostic for the genus. The minor septa are three-quarters or four-fifths as long as the major septa. Dilatation is usually apparent in the septa, less in the minor than in the major; an irregular zone may occur near the inner third of the dissepimentarium; the septa may sometimes be dilated like spindles, so that they are thickest in the middle parts, thinning towards both axis and periphery. The tabulae are fine, close, incomplete, and the floor of the tabularium is slightly concave with a median depression. The tabularium may have as little as one-quarter the diameter of the corallum. The dissepiments are rather elongate; in a narrow zone near the inner edge of the tabularium they are inclined

vertically, but outside this zone the inclination decreases suddenly at first and then rather gradually, the dissepiments near the periphery being almost horizontal. Many dissepiments are geniculate in transverse section, while lateral dissepiments lining the sides of the septa are common.

Remarks.—Three individuals, illustrated on Plate IV., Figs 3-5, are placed, with some doubt, in this species. That figured 3a, b, has septa more openly spaced and a somewhat narrower tabularium than is typical, but it has the irregular zone of septal dilatation near the inner third of the dissepimentarium. The specimen figured 4 shows a different arrangement of the axial ends of the septa from that characteristic of *Acanthophyllum,* in that they are not all rotated in the same direction; that figured 5 may possibly be a young stage of *A. clermontensis;* the photograph falsely suggests that the ends of the septa in the tabularium are dilated (as in Wedekind's Lower Devonian *Ptenophyllum*).

I know of no other species of *Acanthophyllum* which has advanced from a solitary to a sub-compound habit. Wedekind's analysis (1924, 1925) of the *Cyathophyllum heterophyllum* group suggests that the "Krempenkelch" as possessed by *A. clermontensis* is characteristic of the lower part (Couvinian) of the Middle Devonian. The aspect of the Acanthophyllids from Clermont approaches very closely that of the Upper Couvinian forms from the Eifel, called by Wedekind (1924) *Astrophyllum* and *Rhopalophyllum.* According to Wedekind's observations, the Lower Couvinian Acanthophyllids (*Ptenophyllum* s.s. Wedekind) show, particularly in the young stages, great dilatation of the axial septal ends; the fact that such dilatation does not occur in the Clermont forms suggests that they are later than Lower Couvinian. Our species differs from the Givetian Acanthophyllids described by Wedekind in that the latter have a "Trichterkelch" rather than a "Krempenkelch" and have less dilated septa. In the absence of any evidence to the contrary, I consider that we may accept for the Clermont fauna the Upper Couvinian age suggested by *Acanthophyllum clermontensis.*

Family SPONGOPHYLLIDAE.

Type Genus. *Spongophyllum* Edwards and Haime.

Rugose corals in which the long major septa extend unequally towards the axis or the median plane; the minor septa are usually degenerate, and both orders may be discontinuous near the periphery where lonsdaleoid dissepiments may be developed; the tabularium is frequently bisymmetric, and the tabulae are close, parallel, and usually complete, concave without a median notch.

Range.—Upper Silurian of the Baltic States, Bohemia, and New South Wales, Lower Devonian of Styria and France, and Middle Devonian of Europe and Australia.

Remarks.—The boundaries of this family are not clearly defined. In *Spongophyllum* itself I include only those cerioid forms in which the tabularium is narrow and the tabulae close and but slightly concave, the minor septa degenerate, and in which lonsdaleoid dissepiments may be developed in an irregular peripheral zone when the major septa are discontinuous; that is, five Upper Silurian and six Middle Devonian species.

Three phaceloid species from the Middle Devonian of Germany have usually been regarded as *Spongophyllum.* These are *Spongophyllum torosum* Schlüter (1881, p. 211, pl. vi., figs. 1-5, Givetian) *S. elongatum*

Schlüter (1881, p. 213, pl. vii., figs. 1-5, Givetian) and *S. semiseptatum* Schlüter (1881, p. 215, pl. v., figs. 1-3). They have a wider tabularium than the cerioid genotype, and a peripheral border of very large lonsdaleoid dissepiments, and the septa are more noticeably arranged about a median plane. They should probably be regarded as a separate genus.

Four other groups have morphologies which make it reasonable to regard them as members of the Spongophyllidae. The first is of elongate, solitary or weakly fasciculate corals, like *S. sedgwicki* except that the minor septa may be well developed and lonsdaleoid dissepiments seldom appear. These were figured by Wedekind (1925) from the Givetian of Germany as *Grypophyllum gracile, G. normale, G. tenue, G. regressum, G.* sp., and *Leptoinophyllum* sp.

The second group is of solitary coralla, which have a less regular lonsdaleoid border than the phaceloid species of the *torosum* group, and in which traces of minor septa sometimes occur, and there is a tendency for the tabulae to be arranged in two series in the rather wide tabularium. They were described from the Lower Givetian of the Eifel by Wedekind (1925), e.g. *Loipophyllum kerpense* (genotype of *Loipophyllum* Wedekind (1925), *L. pilaeforme, L. sociale* (a compound form), *L. biradiatum, Neospongophyllum variabile* (genotype of *Neospongophyllum* Wedekind 1922), and *N. crassum.*

Another group of elongate, sometimes slightly branched, coralla has a rather marked bilateral symmetry; its major septa are but rarely broken by lonsdaleoid dissepiments, and the inner ends of the minor septa may be well developed. This group consists of the Givetian forms described by Wedekind (1925) as *Loipophyllum rotundum, L. acrophylloides, Grypophyllum isactis* (Frech) and *G. schwelmense.*

The fourth group is of large solitary forms from the Givetian of Germany, and has been regarded by Wedekind (1922, 1925) as constituting two new genera, *Schizophyllum* and *Stringophyllum*. These have a wide tabularium of very deeply concave tabulae, a wide lonsdaleoid border, and discontinuous septa in which, in some forms, the individual trabeculae may easily be distinguished.

From Jones' (1929) study of the tabularium of *Endophyllum* Edwards and Haime, it seems unlikely that this genus is a member of the Spongophyllidae, although Frech (1886, p. 87) merged *Spongophyllum* with *Endophyllum.* Stumm (1937, p. 435, pl. 55, figs. 5-6) has described two phaceloid species from the American Eifelian as *Spongophyllum.* These have well-developed, rather sinuous major septa, degenerate minor septa and a relatively wide tabularium, but there is a possibility that they may be members of the Disphyllidae.

A future, wider review of the Middle Palaeozoic Spongophyllidae should include a discussion of their possible relations to the Lower Palaeozoic Favistellidae (Columnariidae *auct.*) and the Upper Palaeozoic Lonsdaleiidae.

There are in the Devonian a number of cerioid corals which have the same type of tabularium as *S. sedgwicki,* but have perfectly developed minor septa, and only very rare lonsdaleoid dissepiments. They are discussed in this paper under the new genus *Xystriphyllum,* which is here doutbfully included in the Spongophyllidæ. But (see p. 62) they show certain resemblances to the group of *Cyathophyllum heterophyllum,* Edwards and Haime, and the possibility that they are related to the Acanthophyllidae rather than to the Spongophyllidae is regarded as quite a strong one.

Genus SPONGOPHYLLUM Edwards and Haime.

Spongophyllum Edwards and Haime, 1851, p. 425.

Spongophyllum; Jones, 1929, p. 88.

Genotype (by monotypy): *Spongophyllum sedgwicki* Edwards and Haime, 1851, p. 425; 1853, p. 242, pl. lvi., figs. 2, 2 a-e, Battersby Collection, Torquay. Devonian [Couvinian, Givetian, and Frasnian limestones occur at Torquay; the latest Geological Survey Memoir on the district (Explanation of Sheet 350) does not mention *Spongophyllum sedgwicki,* and so there is no evidence of its position in the limestones].

Diagnosis.—Cerioid rugose corals in which the tabularium is narrow and the tabulae close and slightly concave, the minor septa are degenerate, and lonsdaleoid dissepiments may be developed in an irregular peripheral zone when the major septa are discontinuous.

Remarks.—Frech (1886, pp. 89-90) considered Edwards and Haime's illustrations to represent two species, one with septa continuous to the epitheca, and the other with lonsdaleoid dissepiments. He equated a specimen from the *Stringocephalus* limestone (?) of Pelm with the figure 2d (with lonsdaleoid dissepiments) and others from Torquay and the *Stringocephalus* beds of Nismes with figures 2-2c. He placed the lonsdaleoid type in *Endophyllum,* and the other in *Cyathophyllum.*

Jones (1929, p. 89) considered these two morphologies to represent one species, and named as neotype British Museum Specimen R 4999, Beckles Collection, South Devonshire. He does not state, however, which morphology the neotype shows. Smith (*in litt.*) has examined several specimens, all of which fall between the extremes figured by Edwards and Haime, and he considers the figures to represent only one species.

I have before me Sedgwick Museum Slides H 138 from Mudstone Bay, Brixham (Couvinian, Givetian, or possibly Frasnian), and H 149 from Paignton. The former has a frequent development of irregular lonsdaleoid dissepiments correlated with vertical discontinuity in the septa, such as is illustrated in Edwards and Haime's fig. 2d. The vertical section of this specimen is quite similar to Edwards and Haime's figure 2e. The slide H 149 shows very few instances of discontinuity in the septa or irregular lonsdaleoid dissepiments, but the arrangement, length, and number of the septa and the irregular attitude of the dissepiments and their distance apart is the same as in H 138. It is unwise to argue on such scanty material either that there are two species or one only represented in *S. sedgwicki* Edwards and Haime, but in any case the resemblances between the two morphologies are so great that they must be of the same genus, and the generic diagnosis given above is based on both.

The species which appear to me to belong to *Spongophyllum* are the five Upper Silurian species *Spongophyllum rectiseptatum* Dybowski (1874, p. 479, pl. iv., figs. 3, 3a from Zone 3, Gotland), *Spongophyllum fritschi* Novak (Pocta, 1902, p. 152, pl. 102, figs. 6-8, Bohemia), *Spongophyllum spongophylloides* (Foerste; Jones, 1932, p. 52, pl. iii., figs. 3-4, New South Wales), *Spongophyllum inficetum* Pocta (1902, p. 153, pl. 102, fig. 1, Bohemia), and *Spongophyllum shearsbyi* Chapman (Jones, 1932, p. 51, pl. iii., figs. 1, 2, pl. iv., fig. 1, New South Wales), and six Middle Devonian species, *Spongophyllum ligeriense* Le Maitre (1934. pl. vi., fig. 14, Chalonnes, France), *Spongophyllum giganteum* Etheridge (1899, p. 158, pl. xx., figs. 1-3, pl. xxxviii., fig. 3, New South Wales),

Spongophyllum varians Schlüter (1889, p. 56, pl. v., figs. 1-3, Eifel), *Spongophyllum kunthi* Schlüter (1881, p. 217, pl. vii., figs. 4, 5, pl. viii., figs. 1, 2, Givetian, Eifel), *Spongophyllum parvistella* Schlüter (1889, p. 65, Givetian, Eifel), and *Spongophyllum cyathophylloides* Etheridge described herein. I have not found that any special feature distinguishes the Upper Silurian forms from the Middle Devonian species.

Stumm (1938, p. 482, pl. 59, fig. 5) gives no vertical section of his *Spongophyllum prismatophylloides* from the Middle Devonian of Nevada, but the species appears to me to be a *Prismatophyllum*.

Other groups of forms with somewhat similar morphologies and which are possibly related to *Spongophyllum* are discussed in the remarks on the Family Spongophyllidae.

Spongophyllum cyathophylloides Etheridge.

(Plate V., figs. 3, 4.)

Spongophyllum cyathophylloides Etheridge, 1911, p. 7, pl. A, fig. 3 pl. C. [Douglas Creek], Clermont, Queensland. [Lower] Middle Devonian.

Spongophyllum cyathophylloides; Jones, 1932, p. 55.

Spongophyllum cyathophylloides; Stumm, 1938, p. 482.

Lectotype: (chosen Jones, *loc. cit.*) Australian Museum F 9494-7, figured Etheridge, 1911, pl. A, figs. 3; pl. C, fig. 2. Part of this specimen is 26C in the Geological Survey of Queensland's Collection.

Diagnosis—Spongophyllum in which the peripheral half of the dissepimentarium consists of lonsdaleoid dissepiments, and in which the minor septa are usually as perfectly developed as the major septa.

Description.—The corallum is cerioid and large—one specimen (incomplete) was 14 x 10 x 6 cm. The corallites are unequal, varying from 2 to 9 mm. in diameter, usually 6 to 8 mm. They are three to six sided, and the sides are usually curved. Increase is peripheral and possibly intermural also. The wall between corallites is formed of septal bases, which are expanded so as to be in contact laterally, giving the wall a scalloped appearance. The septal bases may be opposite or alternate in neighbouring corallites. The fifteen to eighteen major septa are long, unequal, and slightly waved and carinate, seldom curved at their axial ends; the two longest are opposite and almost meet at the axis. Usually they are separated from their bases by one to three series of irregular lonsdaleoid dissepiments, but in some parts of some corallites they may proceed to the wall, when they may or may not increase slightly in thickness from the axis to the wall. The minor septa vary in development. In some corallites they are regularly present between the major septa, and are, like their neighbours, sometimes continuous to the wall, but are more often discontinuous; in others they are suppressed almost entirely, only bases on the wall and crests on the dissepiments being found; the major septa of such corallites usually extend to the wall, but may be discontinuous. Like the major septa the minor septa may be waved, and may increase in thickness towards the wall; they are always thinner than the major septa, and extend about two-thirds of the way to the axis. The tabulae are thin, slightly concave, and very closely placed, complete or incomplete. The tabularium has only one-third the diameter of the corallum. The dissepiments are usually large,

unequal, and lonsdaleoid, but rather irregularly arranged; when the septa are continuous to the wall of the corallite, however, the dissepiments are small and each is confined to one interseptal loculus, and has a concave upper surface. They are only slightly inclined at the periphery, but the inclination increases towards the axis.

Remarks.—The illustrations for this species were chosen to show its variability. Thus fig. 3a, from the lectotype, shows most corallites with the typical structure of the diagnosis; but one corallite shows both major and minor septa proceeding to the wall, unbroken by lonsdaleoid dissepiments. Figure 4 shows a portion of a corallum where most corallites have lost the minor septa, while in some cases the major septa are continuous to the wall so that the appearance of *S. sedgwicki* is obtained. The latter type of corallite sometimes arises in *Xystriphyllum dunstani,* described below, which occurs at the same locality, and leads to the supposition that *X. dunstani* is a member of the Spongophyllidae rather than the Acanthophyllidae, with which it has much in common.

The species occurs at Drummond Creek in addition to the type locality.

Genus *Xystriphyllum* nov.

(ξυστρις = a rake; φυλλον = a leaf, hence septum.)

Genotype.—*Cyathophyllum dunstani* Etheridge, 1911, p. 3, pl. A, figs. 1, 2; [Douglas Creek] Clermont. [Lower] Middle Devonian.

Diagnosis.—Cerioid Rugose corals with long major septa and well-developed minor septa, with close, concave tabulae and globose dissepiments.

Remarks.—The following species are also considered to belong to this new genus:—*Cyathophyllum ineguale* of Swartz (1913, p. 205, pl. xx., figs. 1-4, not necessarily of Hall; Keyser member, Helderberg formation, Lower Devonian, Maryland), *Cyathophyllum manipulatum* Poeta (1902, p. 103, pl. 104, figs. 6, 7, Lower Devonian, Bohemia), and *Cyathophyllum mitchelli* Etheridge (1892, p. 172, pl. xi., figs. 9, 10, pl. xii., fig. 4, Middle Devonian, New South Wales). A possible member is *Cyathophyllum hexagonum,* Frech (1886, pl. iii., figs. 20, from Refrath, near Cologne), not necessarily *C. hexagonum* Goldfuss, which (vide Lang and Smith 1935, p. 550) is a *Prismatophyllum.*

The genotype occurs with *Spongophyllum cyathophylloides* at Clermont in Queensland; some atypical corallites of *X. dunstani,* those from which the minor septa are absent, are indistinguishable from atypical corallites of *cyathophylloides,* in which the major septa are continuous to the wall, and minor septa are absent. The resemblance thus obtained may be homeomorphic only, but it supplies fair reason to place these two species provisionally in the same family. It is possible, however, that *Xystriphyllum* is a member of the family Acanthophyllidae, for the concave tabulae are usually incomplete, and especially in the older forms the concavity increases towards the axis. But the arrangement of the axial ends of the long major septa, so characteristic of *Acanthophyllum,* is not obvious in *Xystriphyllum.*

Xystriphyllum dunstani (Etheridge).

(Plate V., figs. 5-8.)

Cyathophyllum dunstani Etheridge, 1911, p. 3, pl. A, figs. 1, 2, [Douglas Creek] Clermont. [Lower] Middle Devonian.

? Cyathophyllum dunstani; Allan, 1935, p. 6, pl. v., figs. 4, 5, Middle Devonian, Lankey Gully Limestone, Reefton, New Zealand.

Lectotype (here chosen): Cl. 6, Geological Survey of Queensland Collection.

Diagnosis.—Xystriphyllum with long, unequal major septa interdigitating in the tabularium; in some corallites the minor septa may be lost and lonsdaleoid dissepiments may arise.

Description.—The corallum is cerioid and large, but fragments only are known. The corallites are unequal, varying in diameter between 2 mm. at origin, and a maximum of 11 mm., the average being 6 to 8 mm. They are three to six sided, and the sides may be curved or straight. Increase is peripheral, and possibly intermural also. The fairly thick wall between corallites is formed by the rapid wedge-like expansion of the septa, so that the inner margins of the wall appear zig-zag. The fifteen to eighteen long major septa extend from the wall to the axial region, where they interdigitate fairly deeply and without regularity, and may abut on one another. The minor septa are typically regularly developed, and are always thinner than and two-thirds to three-quarters as long as the major septa. Both orders have a slight and rather irregular sinuosity, and increase gradually in thickness from the axis until they suddenly expand to form the wall. In some corallites the minor septa may disappear except for their bases; sometimes also the major septa become discontinuous near the wall, and lonsdaleoid dissepiments may appear. Typically the dissepiments are globose and of moderate size; but when the minor septa are lost, larger, less globular dissepiments develop; and occasionally truly lonsdaleoid dissepiments occur when the major septa become discontinuous. The tabulae are incomplete, thin, and close, and arranged in floors that are slightly concave like saucers, or concave with the concavity increasing towards the axis. The tabularium is about one-third as wide as the corallite.

Remarks.—This species is very similar to *Xystriphyllum mitchelli* (*see* p. 62), differing only in the more persistent and deeper interdigitation of the septa in the axial region, the smaller number of the septa, and in the occasional appearance of corallites whose morphology is that of *Spongophyllum sedgwicki.*

See remarks on *Xystriphyllum* (p. 62) and on *Spongophyllum cyathophylloides.*

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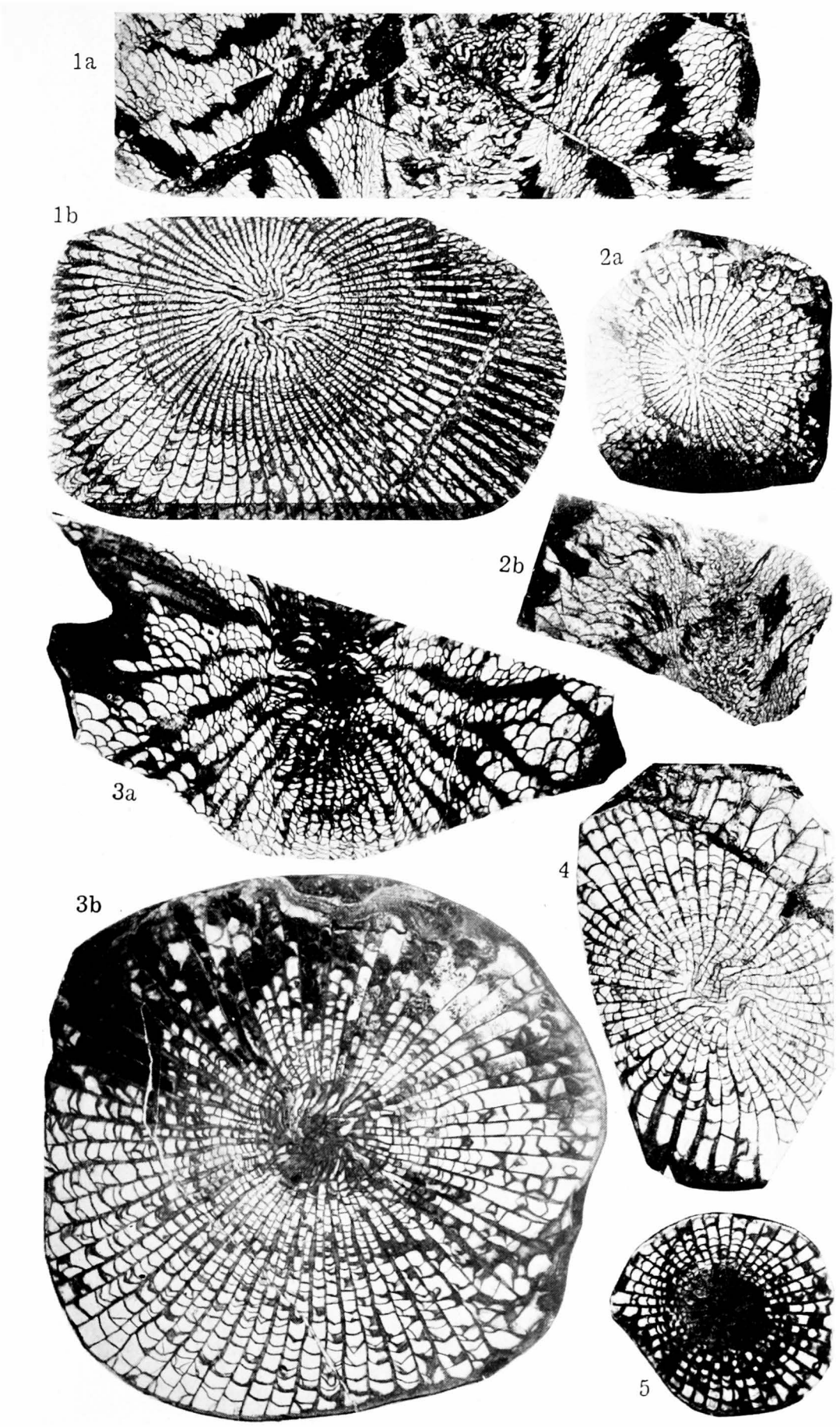
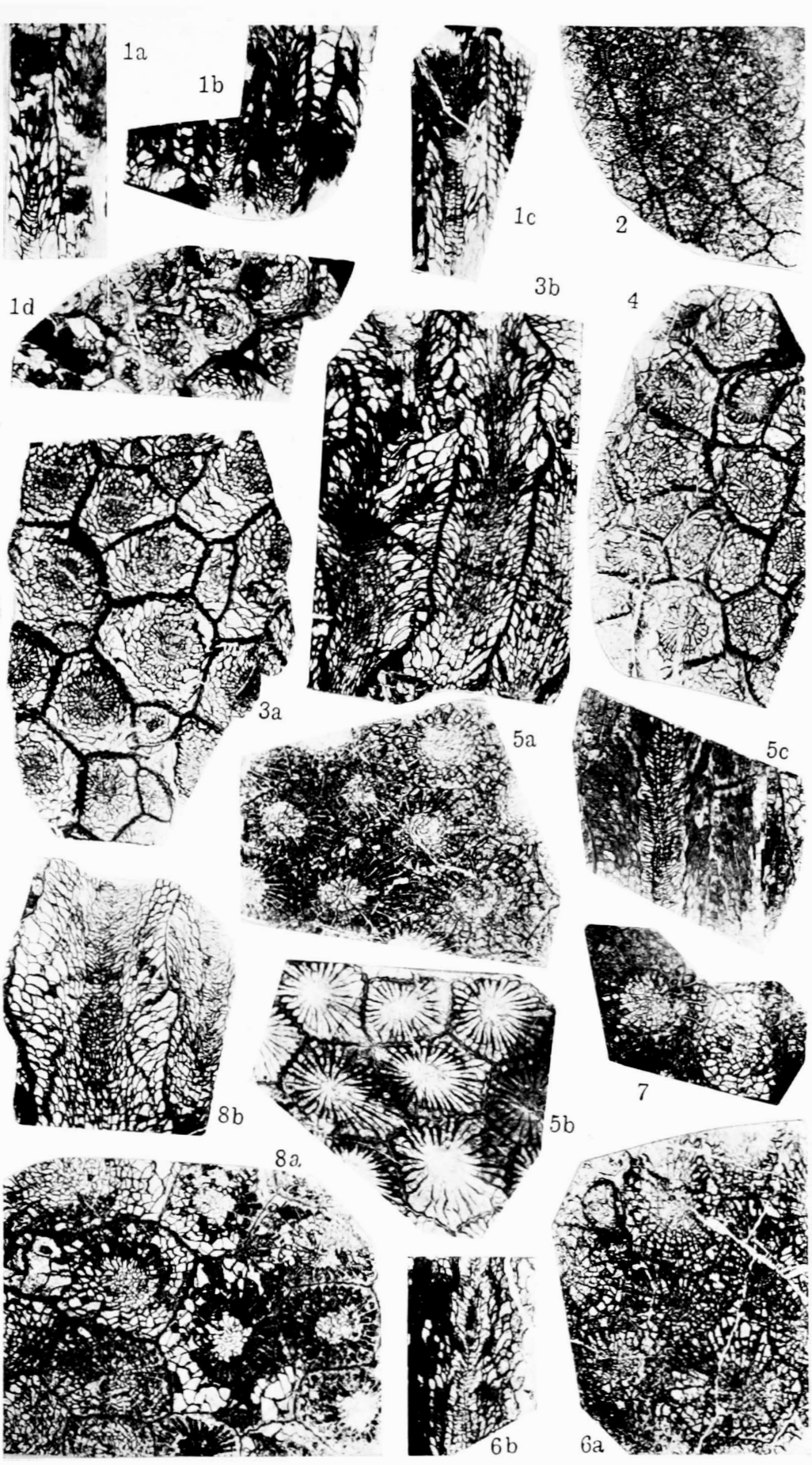


Middle Devonian Rugosa from Clermont. *Acanthophyllum.*



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EXPLANATION TO PLATES.

PLATE IV.

All specimens are from the Middle Devonian ((?)Upper Couvinian) of Douglas Creek, near Clermont, Queensland, and are now in the Collection of the Geological Survey of Queensland.

All figures approximately x 2 diameters.

Fig. 1. *Acanthophyllum clermontensis* (Etheridge). Syntype. 1A. Vertical section; 1B. Transverse section. Coll B. Dunstan.

Fig. 2. The same. Syntype 4C. 2A. Transverse section; 2B. Vertical section.

Fig. 3. *Acanthophyllum clermontensis* (?) (Etheridge). 3A. Vertical section; 3B. Transverse section. Coll. W. H. Rands.

Fig. 4. (?) *Acanthophyllum clermontensis* (Etheridge). Transverse section. Coll. W. H. Rands.

Fig. 5. *Acanthophyllum clermo* (?) (Etheridge). Transverse section. Coll. W. H. Rands.

PLATE V.

All specimens except those figured 1 and 2 are from the Middle Devonian ((?) Upper Couvinian) of Douglas Creek, near Clermont, Queensland, and are now in the Collection of the Geological Survey of Queensland.

All figures approximately x 2 diameters.

Fig. 1. *Spongophyllum sedgwicki* Edwards and Haime. H.138, Sedgwick Museum, Cambridge; Mudstone Bay, Brixham (Couvinian, Givetian, or possibly Frasnian). 1A-C. Vertical sections; 1D. Transverse section.

Fig. 2. The same. H. 149, Sedgwick Museum, Cambridge; Paignton. Transverse section.

Fig. 3. *Spongophyllum cyathophylloides* Etheridge. Lectotype, 26C. 3A. Transverse section; 3B. Vertical section.

Fig. 4. The same. Syntype, 28C. Transverse section showing some corallites without minor septa and with continuous major septa.

Fig. 5. *Xystriphyllum dunstani* (Etheridge). Syntype, Cl.41. 5A. Transverse section; 5B. The same photographed by reflected light, the peripheral parts of the septa show well, but the axial parts are lost; 5C. Vertical section.

Fig. 6. The same. Lectotype, Cl.6. 6A. Transverse section; 6B. Vertical section.

Fig. 7. The same. Syntype, Cl.33. T.S. showing a spongophylloid corallite.

Fig. 8. The same. Syntype, Cl.5. 8A. Transverse section showing several spongophylloid corallites; 8B. Vertical section.