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SKRIFTER

Nr. 100

NOTES ON SOME CORALS
FROM LATE PALEOZOIC ROCKS
OF INNER ISFJORDEN, SPITSBERGEN

BY
PETER PADGET



I KOMMISJON HOS
BRØGGERS BOKTRYKKERIS FORLAG
OSLO 1954

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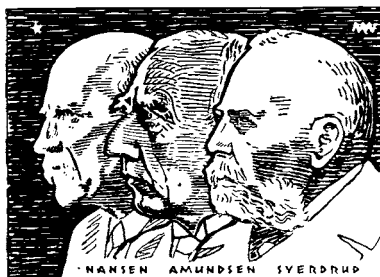
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A. W. BROGGER'S BOKTRYKKERI A. S.

Introduction.

The small number of corals considered in this paper were collected from different exposures in the inner part of Isfjorden, Vestspitsbergen (text-fig. 1). They form part of a collection made by T. Winsnes during the course of his geological investigations on behalf of the Norsk Polarinstitut during 1948 and 1949. Associated fossils, including brachiopods, bryozoa and foraminifera, will be dealt with in a further report on the geology of the area by Winsnes himself at a later date.

The corals are now kept in the Palæontological Museum, Oslo.

All the corals were collected from beds whose age is thought to be Upper Carboniferous-Lower Permian though the lowermost layers may be Middle Carboniferous. They do not throw much light on the problem of where the boundary between Carboniferous and Permian should be drawn in Isfjorden. (In this paper it is taken at the base of the *Spirifer* Limestone, thus following the practice of the Norsk Polarinstitut.)

Particular attention has been paid to careful localisation of the material both geographically (text-fig. 1) and stratigraphically (text-fig. 2). It is hoped, therefore, that some at least of the corals discussed below will have greater value for correlation studies with comparable strata elsewhere in Svalbard.

The relevant details of the stratigraphy of the region (kindly supplied by Winsnes) are shown in text-fig. 2. The two sections emphasise the greater thickness of the Carboniferous-Permian beds towards the north-east. The increased thickness of the limestone (e. g. the *Cyathophyllum* Limestone) and the reduced number of evaporite layers (represented by anhydrite and gypsum) in that direction may be noted.

Recently new names have been proposed (Gee, Harland, McWhae, 1952) for some of the stratigraphical units in central Vestspitsbergen and these are shown in text-fig. 2.

Previous Work.

Among the first to describe corals from Spitsbergen was Toula (1875). Later, some of the more characteristic corals from the *Cyathophyllum* Limestone were described by Holtedahl (1913). Later still, Heritsch (1939) made an exhaustive study of a large number of forms

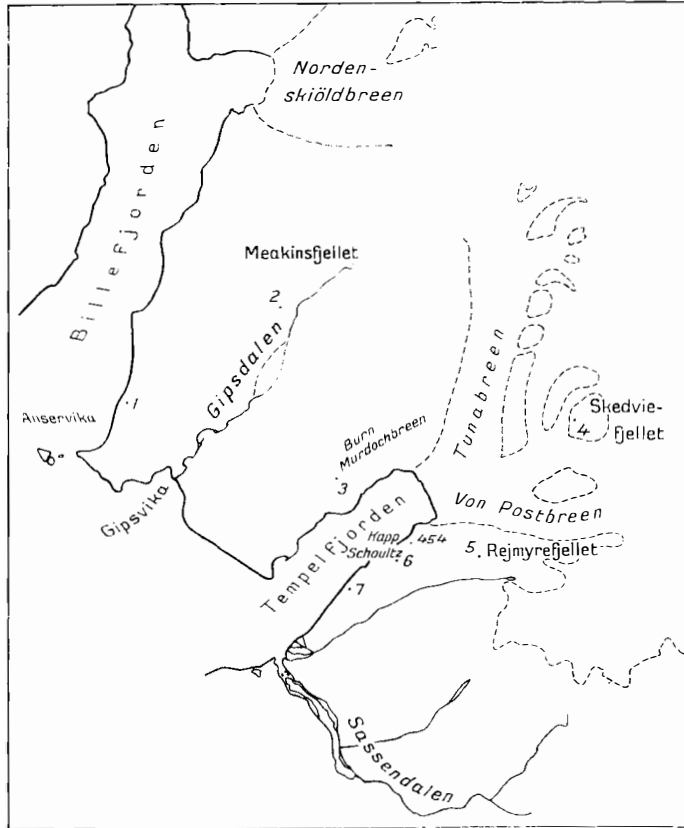


Fig. 1. Inner part of Isfjord, Vestspitsbergen.
Fossil localities Nos. 1—7.

collected over the years by numerous expeditions to Svalbard. His work forms a convenient basis for all later studies though much of his material was inadequately localised and consequently has limited stratigraphical value.

Paleontology.

cf. *Campophyllum kieri* Høltedahl, 1913.

Nos. A 26520, A 26521, A 26523.

Locality. 3 on map. Stream flowing from Murdochsbreen, Tempelfjorden.

Horizon. Near a zone with *Triticites arctica*, Fusulina Limestone, 475 metres below the Spirifer Limestone.

Remarks. A number of corallites in a greyish limestone. Some are contiguous but not confluent. They may be crushed slightly from side to side. Cylindrical but perhaps conical in early growth stage. In transverse sections, septa have a caninoid arrangement with a distinct cardinal fossula. Septal thickening visible in some corallites when it is largely

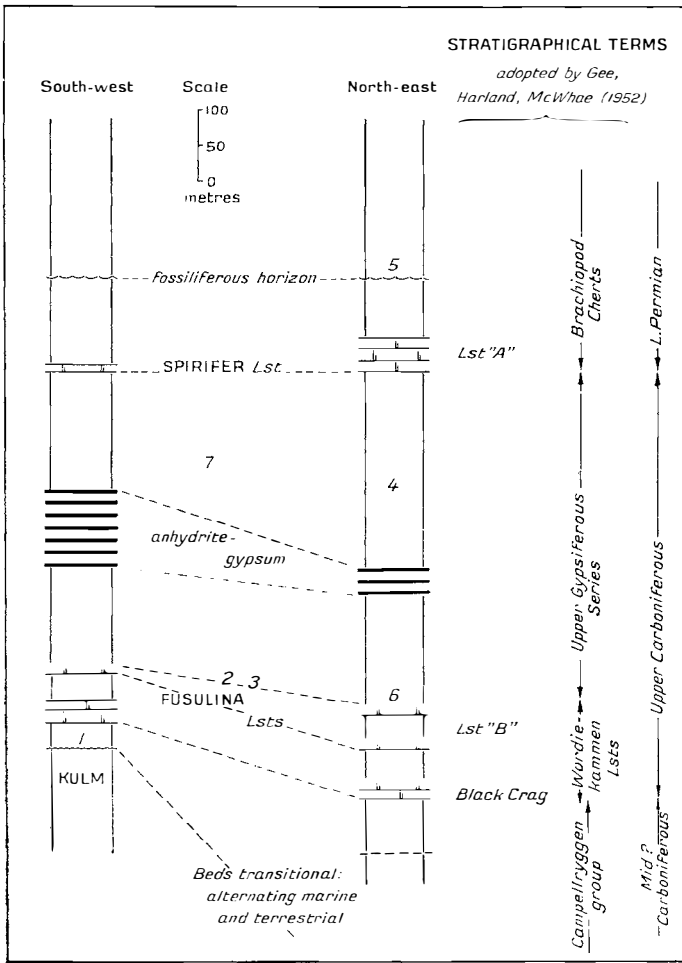


Fig. 2. Sections showing main lithological features in the south-west and north-east of the area shown in Fig. 1. Fossil localities Nos. 1—7 arranged stratigraphically.

confined to the dissepimentarium of the cardinal quadrants. There is no trace of any axial structure.

The form is very close to *C. kiæri* in the details of its internal structure but Høltedahl's form (1913, Plate 11) has the appearance of a compound coral. If so, then *C. kiæri* is hardly referable to the genus *Campophyllum* — a solitary coral. There is, however, no trace of structural confluence of the corallites and clarification of this problem must await better material.

Caninia holtedahli Heritsch, 1939.

Nos. A 26454, A 26452.

Locality. 6 on map. SW of the top of hill 454 and close to the shore. Rejmyrefjellet, Tempelfjorden.

Horizon. A little above the main Fusulina Limestone.

Remarks. Numerous cylindrical corallites, partly silicified, in pale grey limestone. No young stages preserved and some corallites decorated with partial removal of the dissepimentarium.

25 to 27 major septa reaching only about half-way to the centre and leaving an open tabulated space. The narrow dissepimentarium is crossed by both major and minor septa. About 16 tabulæ in every 10 mm.

The holotype (K 0028 in Paleontologisk Museum, Oslo) came from a block found loose in scree (Heritsch, 1939, p. 66) and said to be derived from the Cora-horizon of the Cyanthophyllum Limestone according to the collector (A. Hoel).

Caninia cf. *calophylloides* (Holtedah).l).

No. A 26107.

Locality. 2 on map. Gipsdalen. 485 m above sea-level.

Horizon. Near the top of the Fusulina Limestones.

Remarks. Heritsch (1939, pp. 37—39) records many specimens of this species from Svalbard collections. Most of them seem to belong to the Cyathophyllum Limestone. He referred the species to *Siphonophyllia* Scouler, MS in M'Coy but this genus seems to be a synonym of *Caninia* according to Lang, Smith and Thomas (1940, p. 120).

Caninoid Corals.

Nos. A 26026, A 26034.

Locality. 1 on map. Shore north of Anservika, Billefjorden.

Horizon. Lowest part of the Cyathophyllum Limestone. Exact horizon in the sequence difficult to assess due to faulting. Probably about 50 m above the Kulm and about 500 m below the Spirifer Limestone.

Rotiphyllum geinitzi (Toula).

No. A 26468.

Locality. 5 on map. West of the top of hill 656, Rejmyrefjellet. 475 metres above sea-level.

Horizon. 120 metres above the Carboniferous-Permian border, i. e. above the base of the Spirifer Limestone.

Remarks. An almost complete cone. In early stages, a dense and prominent stereocolumn or pseudocolumella is present. This feature is retained into the adult stage when it projects into the calicular cavity forming a distinct knob or protuberance. Only at this late stage do the major septa (33—34 in number) leave the central area.

The form is closely similar to *Clisiophyllum geinitzi* Toula. This species must, however, be referred to another genus as its central column does not show a true clisiophyllid structure. This much was pointed out

by Heritsch (1939, p. 83) who was disposed to assign it to *Bradyphyllum* Grabau. In the light of more recent studies on the streptalesmoid corals as a whole this also seems to be untenable since the cardinal and counter septa are not aborted in their development as is diagnostic for *Bradyphyllum* (Grabau, 1928, pp. 35—36). The streptalesmoid thickening around the distal ends of the septa forming the pseudocolumella is also retained to a much later stage of development than in say, the genotype of *Bradyphyllum* (*B. bellicostatum*). Hudson (1942, p. 258), however, described a group of corals like *Bradyphyllum* but having a more persistent pseudocolumella and proposed the genus *Rotiphyllum* for their reception. Though such forms are generally of Lower Carboniferous age in England, Hill (1952, pp. 19—20) has recently described a new species of this genus from the Permian (Artinskian) of New Zealand.

Rotiphyllum geinitzi (Toula)?

No. A 26463.

Locality and Horizon. As for A 26468.

Remarks. Only the early growth stages of a form resembling *R. geinitzi* are preserved. 29 major septa are present at a diameter of 9 mm. Pseudocolumella prominent but stereoplasmic thickening not so complete and the cardinal and alar fossulæ are clearly visible. Persistence of the pseudocolumella into the calicular cavity of the adult stage cannot be proved owing to the poor state of preservation.

Hapsiphyllum ? svalbardicum Heritsch, 1939.

No. A 26465.

Locality. 5 on map. West of the summit of hill 656, Rejmyrefjellet, Tempelfjorden.

Horizon. 120 metres above the base of the Carboniferous-Permian border, i. e. above the base of the *Spirifer* Limestone.

Remarks. A solitary, conical coral whose major septa (32—33 in number) have a palmate grouping. Many, especially those in the counter and alar segments, are slightly swollen and fused together distally forming a kind of stereocolumn of arcuate shape. The cardinal and adjacent septa are not affected in this way and fail to reach the centre. Some disruption of the septa has taken place in the specimen but not sufficient to prevent comparison with Heritsch's figured holotype (1939. Plate 11, fig. 2): Both have the same number of septa at corresponding growth-stages and the same grouping. The locality and horizon of Heritsch's form are, however, unknown.

Various distinctive genera occur among the zaphrentoid corals and one of the first to be isolated was *Hapsiphyllum* (Simpson, 1900) to include forms having a well-marked, pyriformshaped wall to the cardinal

fossula. There is, however, some doubt as to the identity of the genotype (Moore and Jeffords, 1945, p. 125) but it is evident that neither Heritsch's form nor the present one have the type of axial structure characteristic of the genus. They probably belong instead to one of the other genera contained within the Family *Hapsiphyllidæ* Grabau, 1928. Further material is necessary to decide their true genetic affinities but the form of their fossulæ agrees with those of genera such as *Triplophyllites* Easton, 1944, or *Euryophyllum* Hill, 1937.

Lithostrotion (= *Petalaxis*) *timanicus* (Stuckenberg).

Nos. A 26490, A 26531, A 26532.

Locality. 7 on map. SW of Kapp Schoultz, 140 metres above sea-level, Tempelfjorden.

Horizon. 135 metres below the Spirifer Limestone.

Remarks. Three fragments, possibly from the same colony. They each show 3—5 rows of dissepiments and a thin but persistent columella. They closely resemble Stuckenberg's figured form (1895, Plate 12, fig. 5).

It has been pointed out (Lang, Smith and Thomas, 1940, p. 97) that *Petalaxis* Edwards and Haime, 1852 has the same genotype as *Nemathophyllum* M'Coy, 1851 and the same authors (op. cit. p. 88) consider the latter to be synonymous with *Lithostrotion* Fleming, 1828 (op. cit. p. 88). Hill (1940, p. 167) adopted the same course in her own studies of rugose corals from Scotland.

Lithostrotion (= *Petalaxis*) sp.

No. A 26482.

Locality. 4 on map. Skedviefjellet, Von Postbreen. 715 metres above sea-level. Specimen found in scree of local origin, i. e. blocks nearly in situ.

Horizon. Cyathophyllum Limestone, about 90 metres below the Spirifer Limestone.

Remarks. Both transverse and longitudinal sections show that there are many structural layers additional to the normal set of septa, tabulæ, dissepiments etc. These layers are irregular or rudely parallel to the normal set, and but for them the coral resembles *Orionastræa brevisseptata*. In some sections, however, an upturning of the tabulæ is discernible and the successive apices are both regularly aligned and slightly thickened. This is interpreted as an incipient columella and hence the form is referred to the genus *Lithostrotion*. Those parts of the corallites with flat tabulæ are interpreted as a diphystrotionid feature of morphology.

Cladoconchus aff. *bacillaris* M'Coy, 1844.

Nos. A 26458, A 26461.

Locality. 5 on map. West of the summit 656, Rejmyrefjellet, at 475 metres above sea-level, Tempelfjorden.

Horizon. 120 metres above the Carboniferous-Permian border, i. e. above the base of the Spirifer Limestone.

Remarks. The form shows the characteristic trumpet-shaped corallites arranged in a zig-zag fashion. They have a very thick epithecal wall and seem to be larger than figured specimens of *C. bacillaris*.

Roemeripora wimani Heritsch, 1939.

No. 26113.

Locality. 2 on map. South of Meakinsfjellet, NW of Stenhousebreen, Gipsdalen. 500 metres above sea-level.

Horizon. Near the top of the Fusulina Limestone.

Remarks. A flat, discoidally shaped colony. Steeply inclined tabulæ.

Syringopora ramulosa Goldfuss, 1826.

No. A 26516.

Locality. 3 on map. Stream flowing from Murdochbreen, Tempelfjorden. About 74 metres above sea-level.

Horizon. Near a zone with *Triticites arctica*, Fusulina Limestone.

Syringopora cf. *reticulata* Goldfuss, 1826.

No. A 26453.

Locality. 6 on map. East of Kapp Schoultz, Tempelfjorden.

Horizon. Cyathophyllum Limestone and about 20 metres above the uppermost layer of the Fusulina Limestone. Anhydrite-gypsum layers present about 140 metres above.

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