

TWO COMPOUND CORALS FROM THE TRETASPIS BEDS OF THE OSLO — ASKER DISTRICT

By

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Abstract: Two new species of compound corals — *Cyathophylloides kiaeri* and *Propora askerensis* — are described from zone 4c β (Tretaspis Series, Upper Ordovician) of the Oslo—Asker District. They show affinity to the uppermost Ashgillian coral faunas of the Oslo region, and that of the Caradocian Kalstad Limestone (Trondheim Region), but are not related to corals found in the Caradocian of the Oslo Region. The growth zonation in *P. askerensis* is not biologically equivalent to the zonal crowding of tabulae interpreted as annual growth-lines in many recent and fossil corals.

Introduction

Compound corals are very common in the youngest beds of the upper Ordovician (zones 5a and 5b) of the Oslo Region, but they have previously not been reported from the older part of the Upper Ordovician or the Middle Ordovician of the Oslo—Asker District. In the rest of the Oslo region, compound corals are known from the uppermost part of the Middle Ordovician in the Mjøsa and Langesund—Skien Districts (cf. HILL 1953). Also in the other districts of the Oslo Region compound corals are very scarce in the lower part of the Upper Ordovician (the Tretaspis beds).

The presence of two species of compound corals in the Tretaspis limestone in the Oslo District therefore bridges the gap between the Middle Ordovician and the high Upper Ordovician coral faunas in the Oslo Region.

The corals are very rare. In spite of rather intensive collecting, only two specimens have been found, belonging to different species. Both were found in the Tretaspis Limestone (zone 4c β), which is developed as a nodular limestone. The specimens were collected during student excursions in 1957 and 1962 on the islands in the Asker District. The specimens are preserved in Paleontologisk Museum, Oslo.

Description of species

Cyathophylloides kiaeri sp. n.

Textfigs. 1—2.

Type data: The holotype, PMO 69929, is a large colony from the NE-ern part of Kalvøya, Bærum in the Oslo—Asker District. It comes from the lowest part of the Tretaspis Limestone (zone 4c β).

Diagnosis: *Cyathophylloides* species with short secondary septae and stright tabulae.

Description: The holotype is a fragment of a large, possibly flat, discoid colony. It is up to 21 cm long, 11 cm wide and 5 cm thick. The ceroid corallites are about 3 mm in diam., and have 13—16 primary septa. The secondary septa are small, generally only 0,15 mm long, but in some corallites they are most half as long as the primary ones. The septa meet in the middle, in an irregular way (Textfig. 1). Some septa join, but other remain separate. In many specimens the median septum is not involved in this structure, but in others it is. The tabulae are simple, stright, or curved sliightly up at the edges (Textfig. 2).

Remarks: This species seem to be intermediate between *Cyathophylloides* and *Favistella*. The septal arrangement is that of *Cyathophylloides*, the tabulae resemble those of *Favistella*, and the length of the secondary septa are intermediate. There seems to be some doubt about the typical structure of the tabula in these two genera. HILL (1956, p. F296, fig. 202) described the tabulae of *Cyathophylloides* as „highly domed and incomplete”, and of *Favistella* as flat with downturned edges. DUNCAN (1956, p. 225, pl. 24, figs. 5—6) regarded the latter type to be that of *Cyathophylloides*, and figured *Favistella* with stright tabula. *C. kiaeri* is refered to *Cyathophylloides* because of the conformity in septal structure. The structure of the tabulae is regarded to be

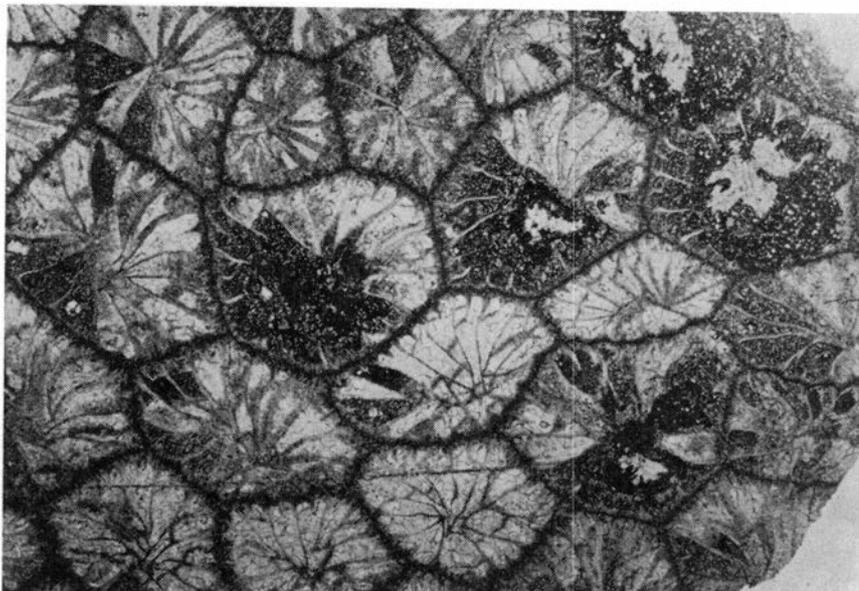


Fig. 1. *Cyathophylloides kiaeri* sp. n. Tangential section of holotype. Zone 4c β at Kalvøya, Bærum, Oslo—Asker District. PMO 69929. 9 \times .

of minor importance, and the stright tabulae in *C. kiaeri* might be a primitive feature.

C. kiaeri is older than most other species of *Cyathophylloides*. (Zone 4c β corresponds probably to the lowest part of the Ashgill or the highest Caradoc). The other species known are generally referred to as „Upper Ordovician”, and most of them seem to come from the upper Ashgill.

The type species *C. kassariensis* was referred to the Ordovician by HILL (1956, p. F296), but both in the original description, and in the modern stratigraphic litterature (i.a. AALOE 1960, p. 32) the species is recorded from the Llandovery (Tamsalu beds, G II) of Esthonia.

KIAER (1932, p. 112, pl. 15, fig. 2) described a species called *Columnaria* cf. *kassariensis* from the Kalstad Limestone in the Trondheim region. This form is rather similar to *C. kiaeri*, and might be conspecific. The tabulae are not known in the Trondheim material. The age of the Kalstad Limestone is regarded to be contemporaneous

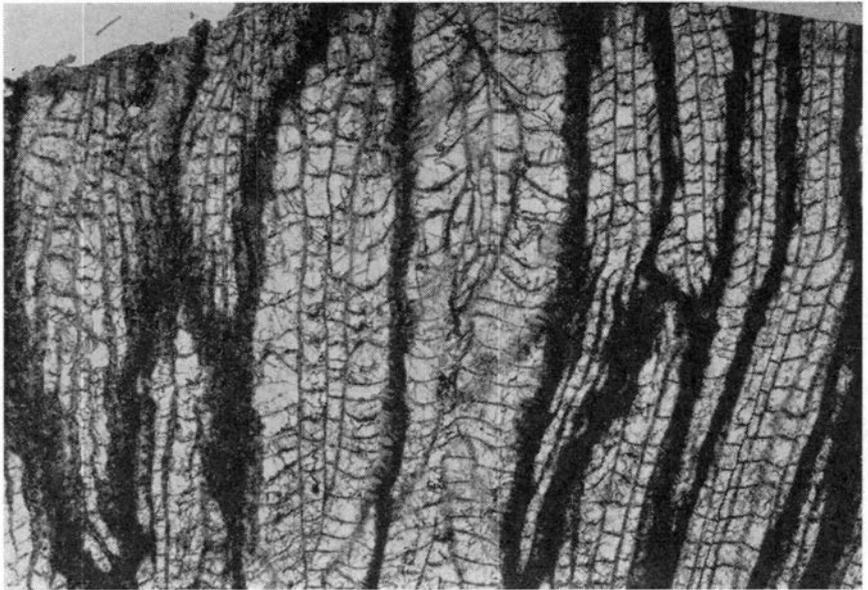


Fig. 2. *Cyathophylloides kiaeri* sp. n. Longitudinal section of the holotype. Zone 4c β at Kalvøya, Bærum, Oslo—Asker District. PMO 69929. 9 \times .

with the Craighead Limestone in the Girvan District, Scotland, and the Mjøsa Limestone (s. 1.) in the Oslo Region. Both these formations are regarded to be of Caradocian age.

Propora askerensis sp. n.

Textfigs. 3—5.

Type data: The holotype, PMO 69930, is a colony from the transitional beds between the Tretaspis Limestone (zone 4c β and the upper Tretaspis Shale (zone 4c γ) at Bjerkøya, Asker.

Diagnosis: *Propora* species with closely set corallites and distinct growth-zones, without isolated trabeculae and septal spines.

Description: The holotype is an almost complete colony, 9 cm long, 6 cm wide. It is irregularly ellipsoidal, and is partly overgrown with bryozoans. In cross-section, the colony shows four distinct growth-lines, with irregular intervals.

These growth-lines consist of darker zones, differing in structure from the rest of the colony. Because the septa are restricted to these

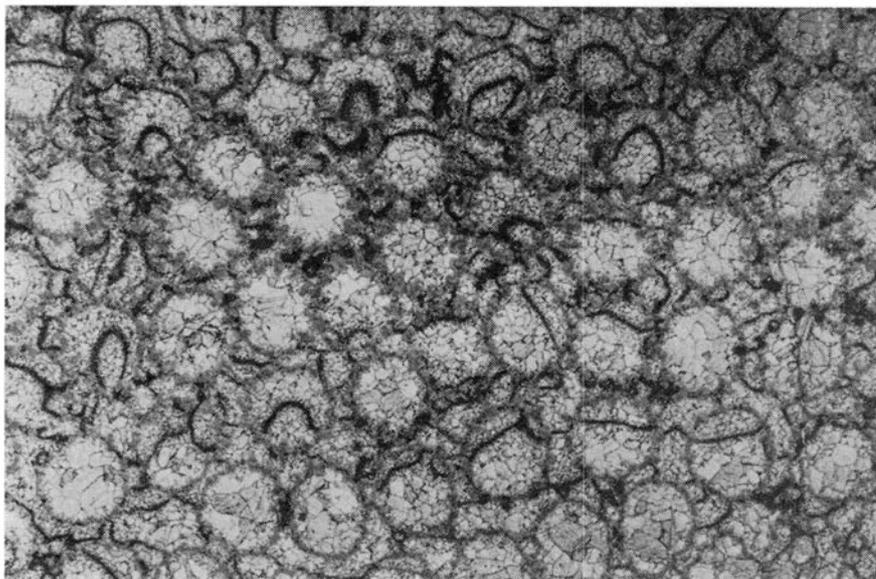


Fig. 3. *Propora askerensis* sp. n. Tangential section of the holotype, showing septae only in the cortical region. Zone $4c\beta-\gamma$, Bjerkøya, Asker, Oslo—Asker District. PMO 69930. $9 \times$.

zones, they are regarded as the corical part of successive overgrowths of the same species.

The corallites are circular in cross-section, 1,3—1,4 mm in diameter — and indented by 12 septa in the cortical region only (Textfig. 3).

The tabulae are rather flat and stright, and crowded (2—3 in 1 mm). The coenenchym, which is rather restricted, because the corallites are so closely packed, consists of short, upwards curved dissepiments (Textfig. 4).

As usual in heliolitid corals, two different types of calcareous tissue is found. The septa and the corallite walls are made up of finely fibrous, yellow tissue (trabecular tissue), and the horizontal elements (tabula and coenenchym) are made up of thinly laminated, darker tissue (Textfig. 5). The septa did protrude over the surface of the colony as spines, but where united by a continous, unperforated wall of trabecular tissue in the upper part of the growth zone. Lower down in the corallites, the septa disappears, and the corallite consited

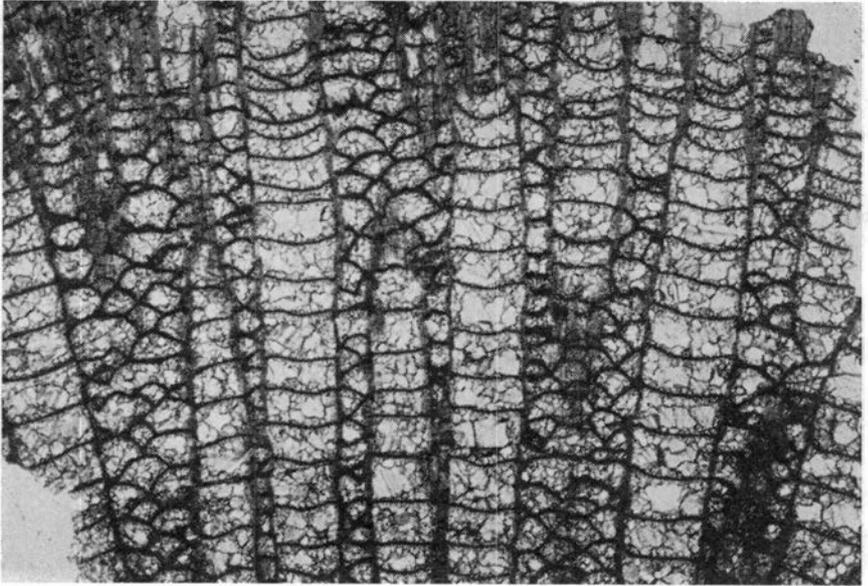


Fig. 4. *Propora askerensis* sp. n. Longitudinal section of the holotype, showing cortical zone with septae. Zone $4c\beta-\gamma$, Bjerkøya, Asker, Oslo—Asker District. PMO 69930. $9\times$.

of a thin, circular wall of trabecular tissue. This indicates that the septa were developed either when the animal reached maturity, or at a certain season of the year. Four such cortical zones are found in the holotype. In most cases, the corallites do continue straight through all the growth zones, without signs of new budding, and without having the tabulae much more closely spaced in the cortical zone.

The septa penetrate not only into the corallites, but also to the same degree into the coenenchym (cf. Textfig. 5). This is the reason why the tangentially cut septa are visible in the coenenchym as „isolated trabeculae”. In all cases where longitudinal elements corresponding histologically to the septa and walls are found, they seem to be tangential sections of these structures.

Remarks: This species differs from most other of the genus in the absence of septal spines and isolated trabeculae. It differs from the species described from the Kalstad Limestone by KIAER (1932, pp.

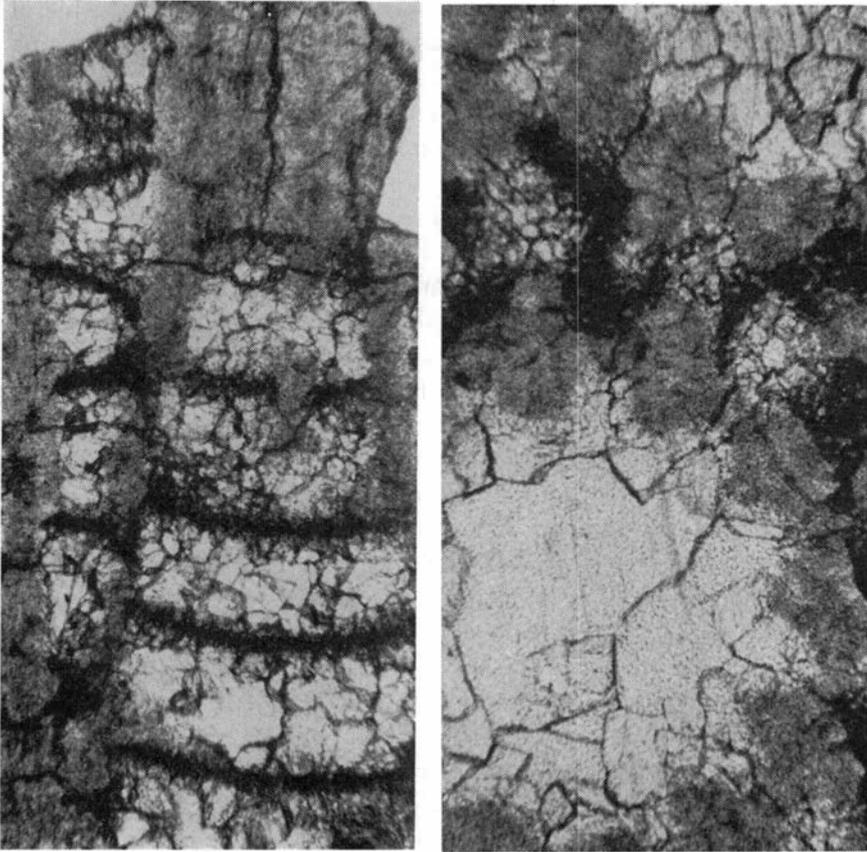


Fig. 5. *Propora askerensis* sp. n. Longitudinal and tangential section of the holotype, showing wall structure and structure of septae. Zone 4c β - γ , Bjerkøya, Asker, Oslo—Asker District. PMO 69930. 50 \times .

109—10, pl. 14, figs. 1—3), in septal structure and in having coarser and less closely placed corallites.

It resembles *Plasmoporella* in the structure of the septa, but differs from this genus in having a complete wall consisting of trabecular tissue, and in not having domed tabulae. It is quite similar to *P. speciosa* (BILL) (= *P. stellata* KIAER 1899) in septal structure and structure of coenenchym. KIAER (1899, p. 31) indicates that species similar to *speciosa* might occur already in the Caradoc.

The growth-zones probably indicate that the colonies consisted of thin crusts, which by repeated incrustation, and possibly regeneration produced the present shape of the mass.

A similar mode of growth is found in many Stenolematous bryozoans, but this sharp discrimination between a cortical and an axial zone in repeated overgrowths appear to be rare in other corals.

The annual growth zones found in several recent and fossil corals consist of intervals with crowded tabulae. Structures like the ones described here might also be annual growth zones, but they are not biologically equivalent to the normal type, and might have a different origin.

It resembles the type material of *speciosa* (LINDSTRÖM 1899, pl. 9, figs. 41—42) except that *askerensis* has no isolated trabeculae, and has more closely set corallites. The material from the Silurian (LINDSTRÖM l.c.) is rather different. The types of *P. stellata* KIAER (1899), which is referred to *speciosa* do not have isolated trabeculae, but have smaller and less closely placed corallites than *askerensis*, which differ from these species also in its growth zones.

In the initial stages of development of the heliolitids, there are no septa in the trabecular tissue, but septae are generally found in specimens much smaller than even the first aseptate zone in *P. askerensis* (cf. LINDSTRÖM 1899, pl. 1, figs. 25—27 and pl. 4, fig. 15).

LINDSTRÖM (1899, p. 44) has referred to a case where the septa are not found in the deeper part of a corallite, but this he ascribed to resorption. The structure in *P. askerensis* can hardly be explained in this way, because it is unlikely that the septae were resorbed both within the corallite and in the coenenchym at the same time.

It is therefore difficult to estimate the systematic value of this feature before its distribution among the heliolitids is better known. Further studies might show that it is not unique to *P. askerensis*.

According to HILL (1956, p. F460) *Propora* is known from the Middle Ordovician into the Silurian. The author has not been able to locate some published evidence of Middle Ordovician species of the genus, except for the species mentioned by KIAER (l.c.) from the Kalstad Limestone in the Trondheim Region, and the Upper Ordovician ones are, at least in Scandinavia and Britain, found in the uppermost part of the Upper Ordovician, in beds considerably younger than zone 4c β .

Stratigraphic remarks

Zone 4c β , in which both the corals described here are found, is referred to the Upper Ordovician in the Norwegian stratigraphic standard. The border between the Middle and Upper Ordovician do, however, not coincide with the border between Caradoc and Ashgill. The uppermost graptolite zone of the Caradoc, that of *Pleurograptus linearis* is included in the Upper Ordovician in Norway (cf. STØRMER 1953, p. 130). The black Tretaspis shale (zone 4ca) is generally regarded to correspond to the zone of *Pleurograptus linearis*, and the higher beds (zones 4c β and 4c γ) are regarded to correspond to the zone of *Dicellograptus anceps*. Very few graptolites are known, however, from the Tretaspis in the Oslo Region, besides the ones mentioned by STØRMER (1945, p. 384) from the black Tretaspis Shale at Lunner. Prof. O. M. Bulman has identified (in museo) *Dicellograptus morrisoni* in a material collected by the author from the lower part of the black Tretaspis shale at Billingstad in the Asker District. The graptolite evidence is not conclusive, the shale could belong either in the zone of *Pleurograptus linearis* or in that of *Dicranograptus clingani*. In Sweden the black Tretaspis shale is shown to belong in the zone of *Pleurograptus linearis*, but it is not evident that the black shale facies was isochronous all over Scandinavia. In the Oslo—Asker District, the black shale facies goes progressively deeper into the Chasmops beds towards the east, and the Tretaspis Limestone, which in the type area (Oslo) is the zone 4c β , loses its lithologic identity rapidly towards the west. Towards the east it thins, and possibly occur deeper in the sequence. In Nittedal, NE of Oslo, the typical Tretaspis Limestone is only 1/2 m thick, and the guide fossil for zone 4ca, *Tretaspis seticornis* (determined by prof. L. Størmer) is found above it. *Tretaspis granulata*, the guide fossil for zone 4c β is not found here.

The age of the beds from which the two corals described here have been collected, is therefore somewhat uncertain. Until further detailed stratigraphic studies are made, it is hardly possible to determine if they belong to the zone of *Pleurograptus linearis*, (and therefore are Caradocian) or to the zone of *Dicellograptus anceps* (Ashgillian).

The corals described here seem to resemble the coral faunas of the uppermost Ordovician (zones 5a and 5b) in the Oslo region, since *Protopora* is very common in both these zones, and *Cyathophylloides* is

found in 5b. These two genera are not found in Middle Ordovician coral faunas in the Oslo Region (HILL 1953), and this might reflect a considerable difference in age, or a sharp distinction between the Middle and Upper Ordovician coral faunas.

Both genera mentioned here are, however, found in the presumably Caradocian Kalstad Limestone together with corals also reported from the Middle Ordovician of the Oslo Region such as *Nyctopora parvotabulata* and *Eofletcheria subparallela*. Both because of this, and because only one specimen of each species is present, stratigraphical conclusions based on this material are not warranted.

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