

ON ORGANIC REMAINS IN THE EOCAMBRIAN OF NORWAY

By

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A b s t r a c t. Four spore-like bodies, *Trematosphaeridium* sp., *Monotrematum* sp., *Leioligotritetum* cf. *crassum* (NAUM.) TIM. and *Trachyoligotritetum* cf. *incrassatum* (NAUM.) TIM., as well as a fragment probably of an organic membrane are described from the Eocambrian of Finnmark. The author believes that much new evidence may be disclosed by further micropalaeontological analyses of the Precambrian deposits of Norway.

1. Introduction

Difficulties always arise upon attempting to correlate Precambrian formations, as they contain few or no organic remains. Consequently, the biostratigraphical method, which is used to such great advantage when studying deposits of the Cambrian age, has not been of much use for correlation of the Precambrian. However, research in recent years has given promising results. A most significant discovery has been that of sporelike bodies and other organic microscopic remains of problematic origin in the very old sediments, even in ones which have been considerably metamorphosed (TIMOFEEV & DJAKOV 1956; TIMOFEEV & LIPMANN 1957; TIMOFEEV 1958b, 1960 a, b, d).

In the USSR a considerable number of results of micropaleophytological analyses of the oldest sedimentary rocks have been obtained in recent years (OBRHEL 1958; TIMOFEEV 1956, 1958a, 1959). Especially successful investigations have been carried out in sections of the late Precambrian deposits in Karelia, South Ural and Eastern Siberia (TIMOFEEV 1955, 1957, 1958c, 1960d). The results show that distinct assemblages of microfossils distinguish the more comprehensive part of the Precambrian (TIMOFEEV 1960 a, b). In view of these results

an investigation of the Norwegian Eocambrian deposits was most desirable (HOLTEDAHL, O. 1953).

In 1959 I received for analysis some samples from the Eocambrian of Finnmark from Professor O. Holtedahl (through Professor V. D. Nalivkin). State Geologist O. A. Broch also sent me some samples of Brøttum sparagmite from SE Norway.

I studied the samples at the Micropalaeophytological Laboratory of the Oil Institute in Leningrad. Organic remains were found only in two of the samples from Finnmark, these being a dark grey to black aleurite-flinty banded slate and a black flinty argillite respectively.

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2. Methods of preparation

Fourty to fifty grams of the samples were thoroughly cleaned and then ground in a mortar and sifted through a 0.55 mm-mesh sieve. The powder was treated with hydrofluoric acid for six hours. The residue was washed repeatedly with distilled water, and then left for four hours in 60 per cent nitric acid. After washing the residue was transferred to a heavy liquid (HgJ_2 and KJ in water, sp. gr. 2.2) in order to separate the remaining mineral matter from the organic remains. The separation was carried out in a centrifuge. For preparation of the microscopic slides glycerol-jelly was used as a mounting medium. (TIMOFEEV, 1960 c).

3. Results of the investigation

Organic membranes of various kinds can stand a treatment with strong oxidizing acids are now known from late Precambrian and early Cambrian deposits from various parts of the world (TIMOFEEV 1960a, 1960b). Among the remains are spores with traces of triradiate scars, and spore-like bodies. At present, however, it is impossible to indicate the natural affinities of these very different organic remains, a great many of which are very problematic. They must be classified provisionally into artificial units, form-genera and -species according to

morphological characters. A classification of this kind established by the author (TIMOFEEV 1959, 1960a) is used in the following short description of the organic remains which were obtained from the examined material.

The size of the fossils varies from 18 to 98 μ . Membranes referred to the genus *Trematosphaeridium* TIMOFEEV (1959) are the most abundant. Figs. 1–4 show thick, smooth, spherical membranes with large rounded openings. The colour of the membranes is yellowish-grey to brown, the diameters range from 17 to 40 μ . This genus is very common in Cambrian deposits, but less frequent in the Eocambrian (TIMOFEEV 1959).

In Fig. 5 a thick, strong and smooth membrane with a large rounded opening is shown. It is of a dark brown colour. This form undoubtedly belongs to the *Leiosphaera*-group and is referred to the genus *Monotrematum* TIMOFEEV (1960a). The form is known from the Cambrian and Eocambrian of Eurasia.

Two forms are referred to the spherio-oligotrilete spores. Fig. 6 is of a smooth and strong, spherical body of a yellowish-grey colour. The fold is due to compression. This form shows a close relationship to *Leiologotriletum crassum* (NAUM.) TIM. (NAUMOVA 1949; TIMOFEEV 1959), which is characteristic of the Cambrian and Eocambrian. A similar form, but with a shagreen surface, is shown in Fig. 8. It may be compared with *Trachyoligotriletum incrassatum* (NAUM.) TIM. (NAUMOVA 1949; TIMOFEEV 1959) from Eocambrian and lower Cambrian deposits. The reference of the above-mentioned forms to oligotrilete spores is tentative since there is no sign of trilete rays. However, it must be pointed out that the triradiate marks are very faint in oligotrilete spores, and often they cannot be recognized at all.

In addition to these spore-like bodies, some more problematic fragments were discovered. One of these — a firm probably organic membrane is depicted in Fig. 7.

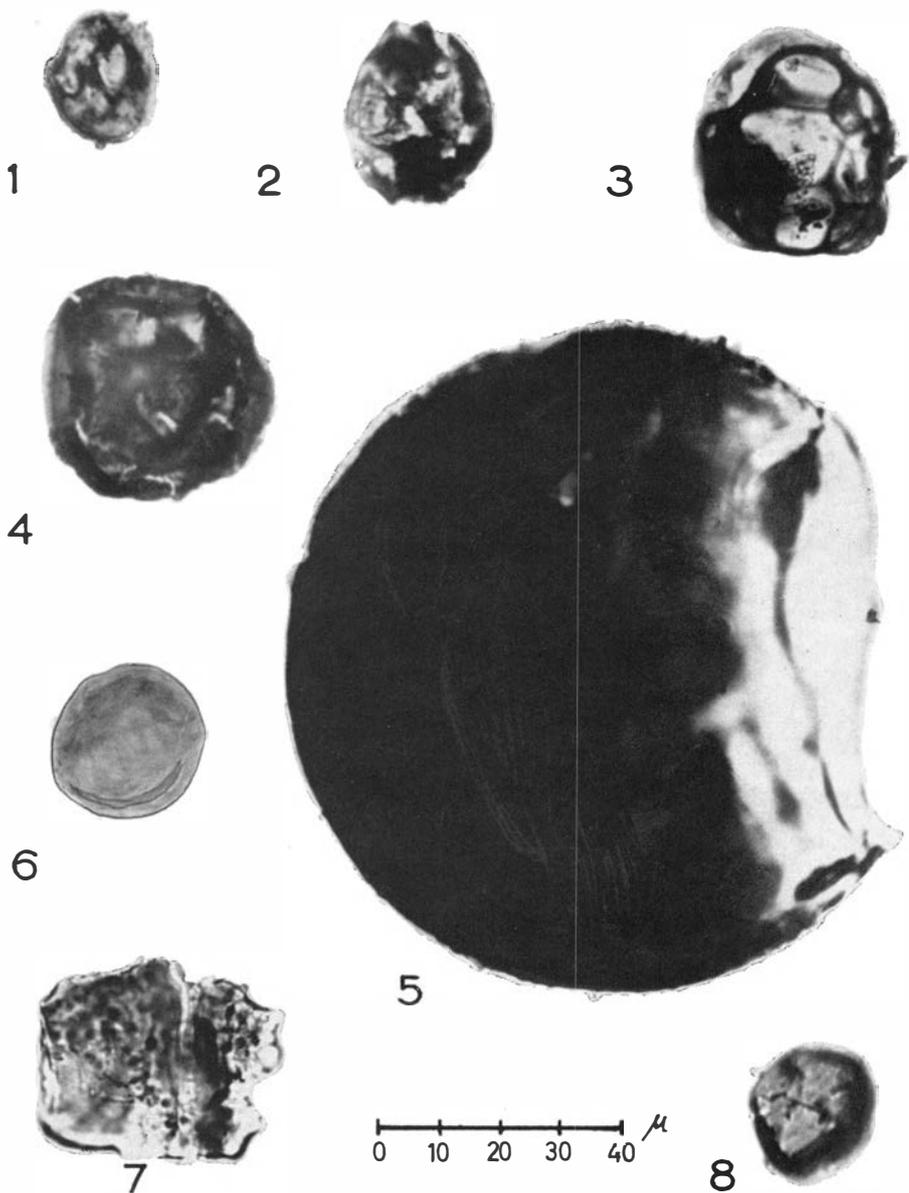
The finding of organic remains in Norwegian Eocambrian deposits is of great significance, and much new evidence may probably be disclosed by further investigations.

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Explanation of the plate.

- 1 to 4 — *Trematosphaeridium* sp. From flinty black argillite. Eocambrian, Finnmark, Norway. Size: 1) 17—20 μ , 2) 23—30 μ , 3) 31—36 μ and 4) 35—40 μ .
- 5 — *Monotrematum* sp. From aleuinite-flinty banded slate. Eocambrian, Finnmark, Norway. Size 87—98 μ .
- 6 — *Leiologotriletum* cf. *crassum* (NAUM.) TIM. From aleurite-flinty banded slate. Eocambrian, Finnmark, Norway. Size: 28—30 μ .
- 7 — Fragment of a firm organic membrane. From aleurite-flinty banded slate. Eocambrian, Finnmark, Norway. Size: 31—38 μ .
- 8 — *Trachylogotriletum* cf. *incrassatum* (NAUM.) TIM. From flinty black argillite. Eocambrian, Finnmark, Norway. Size: 18—21 μ .