

SECTIONS OF SOME SPORES FROM THE LOWER CARBONIFEROUS OF SPITSBERGEN

by MARY E. DETTMANN and G. PLAYFORD

ABSTRACT. Sections of four Lower Carboniferous dispersed-spore species, *Labiadensites fimbriatus* (Waltz) Hacquebard and Barss, *Cristatisporites echinatus* Playford, *Camptozonotriletes velatus* (Waltz) Playford, and *Spinozonotriletes uncatius* Hacquebard, are discussed and illustrated.

IN a recent paper, Hughes, Dettmann, and Playford (1962) discussed and illustrated sections of selected Carboniferous spore species and demonstrated the usefulness of sections in the morphological interpretation of spores with equatorial wall thickenings. The present paper incorporates sections of four of the microspore species which Playford (1962—this volume) described from the Lower Carboniferous succession of Spitsbergen. Two of these species are cingulate, one is zonate, and one, provisionally assigned to *Incertae Sedis* by Playford, shows wall features similar to those of mesospore types.

All the sections illustrated in Pl. 96 were cut at 3μ intervals transverse to the equatorial plane; the sectioning technique is described in Hughes, Dettmann, and Playford (1962). For each illustrated specimen, the preparation and slide number, followed by the reference co-ordinates of Leitz Laborlux microscope no. 1, and registered numbers (prefixed L) of the Sedgwick Museum, are stated. Precise locality and stratigraphical details are given in Playford (1962).

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SYSTEMATIC SECTION

Anteturma SPORITES H. Potonié 1893

Turma ZONALES (Bennie and Kidston) R. Potonié 1956

Subturma ZONOTRILETES Waltz 1935

Infraturma CINGULATI Potonié and Klaus 1954

Genus LABIADENSITES Hacquebard and Barss 1957

Labiadensites fimbriatus (Waltz) Hacquebard and Barss 1957

Plate 96, figs. 1, 2

Discussion. Sections clearly show the differentiated cingulum, which consists of a relatively wide, thick, non-tapering inner portion and a narrow, 'frilled' outer portion. Inner and outer portions connected only at the proximal and distal surfaces of the cingulum. Exine one-layered; forms the broad, flat, laesurate lips.

[Palaeontology, Vol. 5, Part 4, 1962, pp. 679-81, pl. 96.]

Genus CRISTATISPORITES Potonié and Kremp 1954

Cristatisporites echinatus Playford 1962

Plate 96, figs. 3-5

Discussion. The exoexine, which envelops the thin homogeneous intexine, forms the wedge-shaped cingulum, the laesurate lips, and the distal spinose sculptural elements. The sections also show an inner differentiated zone of the exoexine, but this may be due to corrosion.

Infraturma ZONATI Potonié and Kremp 1954

Genus CAMPTOZONOTRILETES Staplin 1960

Camptozonotriletes velatus (Waltz) Playford 1962

Plate 96, figs. 10-12

Discussion. The zona of this species is relatively thin, and near the equator it appears to enclose a cavity. Exine two-layered; exoexine forms zona and surrounds the thinner intexine (Pl. 96, fig. 12).

INCERTAE SEDIS

Genus SPINOZONOTRILETES Hacquebard 1957

Spinozonotriletes uncatus Hacquebard 1957

Plate 96, figs. 6-9

Discussion. Sections show that the exoexine, which is composed of granules, loosely envelops the homogeneous intexine. Exoexine shows spinose sculpture and forms the elevated lips of the laesurae.

Conflicting interpretations of the wall stratification of this species have been presented by previous authors. Hacquebard (1957) designates the outer sculptured layer as a perispore, whereas Potonié (1960) suggests that the thin inner layer is a mesospore. Some

EXPLANATION OF PLATE 96

All figures $\times 500$ unless otherwise specified; from unretouched negatives.

Figs. 1, 2. *Labiadensites fimbriatus* (Waltz) Hacquebard and Barss 1957. Sections of specimen with one-layered exine showing differentiated cingulum. Preparation P148/S45b/3-4. 1, 32.9 125.1 (L.1270h); 2, 27.0 123.0 (L.1270i).

Figs. 3-5. *Cristatisporites echinatus* Playford 1962. Sections of specimens with two-layered exine consisting of an inner homogeneous intexine and an outer differentiated exoexine which forms the wedge-shaped cingulum and distal spinae. 3, Preparation P148/S46b/2, 26.8 115.1 (L.1271e); 4, Preparation P148/S46c/2, 61.4 122.7 (L.1272d); 5, $\times 1,000$, Preparation P148/S46c/2, 47.3 122.2 (L.1272g).

Figs. 6-9. *Spinozonotriletes uncatus* Hacquebard 1957. Sections showing exine consisting of an inner, homogeneous intexine and an outer, sculptured exoexine which is composed of granules and forms the elevated lips of the laesurae. Preparation P148/S44a. 6, 44.9 113.0 (L.1273c); 7, 54.8 115.3 (L.1273f); 8, 9, Polar section 59.1 118.2 (L.1273g), 9, $\times 1,000$.

Figs. 10-12. *Camptozonotriletes velatus* (Waltz) Playford 1962. Sections of specimen showing zona and distal muri. Preparation P164/S39a. 10, 52.7 120.2 (L.1274f); 11, 29.7 121.3 (L.1274c); 12, $\times 1,000$, showing two-layered exine, the outer layer (exoexine) forms 'cavate' zona. 48.7 120.1 (L.1274e).

evidence for the latter interpretation is provided by the Spitsbergen specimens. The spores figured by Playford (1962, pl. 94, figs. 4-6) and the sections, illustrated herein, clearly show that the inner wall layer is loosely enveloped, particularly in the equatorial region, by the outer wall layer. Such a wall feature is characteristic of described mesospore forms, for example *Duosporites congoensis* Høeg, Bose, and Manum 1955 and *Grandispora spinosa* Hoffmeister, Staplin, and Malloy 1955 (see Potonié 1958).

Furthermore, as discussed by Playford (1962, p. 657), the thick, sculptured outer wall layer, which forms the conspicuously elevated laesurate lips, shows little morphological or structural resemblance to either the bladder of typical Palaeozoic monosaccate spores or the, usually filmy, perispore of perinate spores.

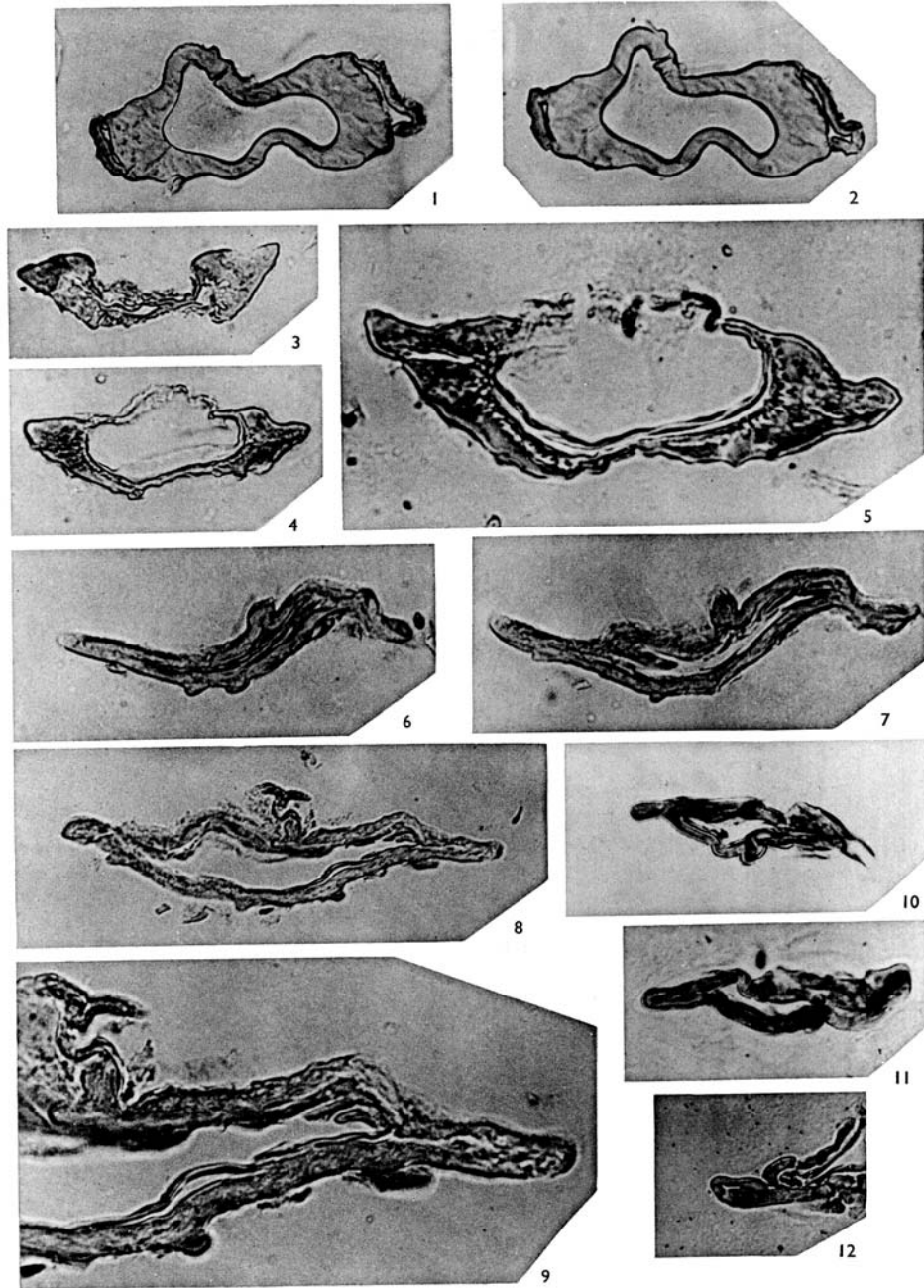
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MARY E. DETTMANN
Department of Geology,
Sedgwick Museum,
Cambridge

GEOFFREY PLAYFORD
Department of Geology and Mineralogy,
University of Queensland,
St. Lucia, Brisbane, Australia

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