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By G. Playford¹ and M. S. Barss

INTRODUCTION

The fossil spore assemblage recorded and discussed in this paper has provided the first palaeontological evidence for the existence of Mississippian strata in the Canadian Arctic Archipelago. Stratigraphic and tectonic implications of the age, as indicated by the microflora, were stated earlier by Kerr and Trettin (1962)². The purpose of this paper is to document the specific composition of the microflora and to indicate its affiliations with spore florules known from Lower Carboniferous strata of other regions.

The sample is a black, micaceous, shaly siltstone, containing numerous plant remains. It was collected by J. W. Kerr of the Geological Survey of Canada from Svartevaeg (GSC Plant Loc. No. 5822), on the northern extremity of Axel Heiberg Island, facing Nansen Sound. The sampled horizon is in the lowermost part of the Sverdrup Basin sequence, which, according to Kerr and Trettin (1962), comprises sandstones, siltstones, and carbonaceous shales, and rests unconformably upon Lower Palaeozoic rocks of the Franklinian eugeosyncline. As discussed by Kerr and Trettin, these oldest beds of Sverdrup Basin were considered by previous workers to be of Middle Pennsylvanian, not Mississippian, age.

Hueber (1962) has identified the following plants from locality 5822:

Lepidodendron volkmannianum Sternberg

Knorria sp. (lepidodendroid form)

³Cyclopteris frondosa Goepfert = Cardiopteris frondosa
(Goepfert) Schimper

Rhodea tenuis Gothan

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²Dates and/or names in parentheses refer to publications listed in the References.

³A new name has recently been proposed to replace Cardiopteris which had proved to be a later homonym (Wolfe, J. A., 1962, Taxon 11 (4): 141). The new name, Fryopsis, in combination with the above species will become Fryopsis frondosa (Goepfert). This does not validly establish the new combination but rather is a note to indicate an awareness of the taxonomic change.

Hueber regarded this florule as of Mississippian age, but stated that "no refined dating (Tournaisian or Viséan) can be given, for there are too few species of megafossils represented in the collection".

The sample was treated according to conventional maceration procedures (hydrofluoric and hydrochloric acids, Schulze reagent, and very dilute ammonium hydroxide). The majority of the miospores recovered were sufficiently well preserved to permit their identification at either specific or generic level.

COMPOSITION OF THE MICROFLORA

The following spore species were identified:

- Leiotriletes inermis (Waltz) Ishchenko, 1952
- Punctatisporites glaber (Naumova) Playford, 1962
- Calamospora microrugosa (Ibrahim) Schopf, Wilson, and Bentall, 1944
- Convolutispora tuberculata (Waltz) Hoffmeister, Staplin, and Malloy, 1955
- Convolutispora cf. clavata (Ishchenko) Hughes and Playford, 1961
- Reticulatisporites cancellatus (Waltz) Playford, 1962
- Reticulatisporites peltatus Playford, 1962
- Murospora aurita (Waltz) Playford, 1962
- Murospora intorta (Waltz) Playford, 1962
- Murospora sublobata (Waltz) Playford, 1962
- Anulatisporites anulatus (Loose) Potonié and Kremp, 1954
- Densosporites bialatus (Waltz) Potonié and Kremp, 1956
- Densosporites dentatus (Waltz) Potonié and Kremp, 1956
- Densosporites rarispinosus Playford, 1963
- Knoxisporites literatus (Waltz) Playford, 1963
- Lycospora uber (Hoffmeister, Staplin, and Malloy) Staplin, 1960
- Lycospora cf. lobulata Staplin, 1960
- Camptozonotriletes velatus (Waltz) Playford, 1963
- Diatomozonotriletes saetosus (Hacquebard and Barss) Hughes and Playford, 1961

In addition, specifically indeterminable representatives of the following genera occur: Leiotriletes, Punctatisporites, Granulatisporites, Cyclogranisporites, Verrucosisporites, Lophotriletes, Apiculatisporis, Camptotriletes, Convolutispora, Microreticulatisporites, Anulatisporites, and Densosporites.

Quantitatively, the most important forms are Murospora aurita (Waltz), Densosporites bialatus (Waltz), and Lycospora uber (Hoffmeister, Staplin, and Malloy).

Table I

Stratigraphically Significant Spore Species Present in the Axel Heiberg Sample, and Their Occurrence as Recorded Elsewhere in Viséan or Upper Mississippian Strata

Species	Spitsbergen	U. S. S. R.	CANADA	
			S. Nahanni River, N. W. T.	Alberta
<u>Murospora aurita</u> [†]	X	X	X	X
<u>Convolutispora clavata</u>	X	X		
<u>Reticulatisporites cancellatus</u> [†]	X	X	X	
<u>Reticulatisporites peltatus</u>	X		X*	
<u>Densosporites bialatus</u> [†]	X	X	X	
<u>Densosporites dentatus</u>	X	X	X*	
<u>Densosporites rarispinosus</u>	X		X*	
<u>Lycospora uber</u> [†]	X	X	X	X
<u>Camptozonotriletes velatus</u>	X	X		
<u>Diatomozonotriletes saetosus</u> [†]	X	X	X	

[†]Note synonymy listed in Playford (1962, 1963).

*Occurrence indicated by investigation subsequent to Hacquebard and Barss (1957).

CORRELATION AND AGE

The spore assemblage detailed above is strikingly similar to certain Lower Carboniferous (Mississippian) microfloras recorded previously from the U. S. S. R. (Luber and Waltz, 1938, 1941; Ishchenko, 1956, 1958; and others); from Canada (Hacquebard and Barss, 1957, and unpublished data; Staplin, 1960); and from Spitsbergen (Hughes and Playford, 1961; Playford 1962, 1963).

From previously documented occurrences (see Table I), the following species are of particular stratigraphical significance: Murospora aurita (Waltz), Convolutispora clavata (Ishchenko), Reticulatisporites cancellatus (Waltz), R. peltatus Playford, Densosporites bialatus (Waltz), D. dentatus (Waltz), D. rarispinosus Playford, Lycospora uber (Hoffmeister, Staplin, and Malloy), Camptozonotriletes velatus (Waltz), and Diatomozonotriletes saetosus (Hacquebard and Barss). This spore association is indicative of a Viséan age, according closely at specific level with the Aurita assemblage, which Playford (1963) delineated in the upper horizons of the Lower Carboniferous succession of Spitsbergen. Within Canada, significant microflorally-based correlation can be made with the South Nahanni River coal (of probable middle Chester age) investigated by Hacquebard and Barss (1957); and to a lesser extent with the Golata Formation (lower Chester) of west-central Alberta, studied by Staplin (1960).

A sample obtained from near Cape Bourne in northern Ellesmere Island has yielded a similar assemblage of spores; further collections from the Canadian Arctic may well reveal an extent of Mississippian strata hitherto unrecognized in the region.

The microfloral evidence clearly suggests that Arctic Canada formed part of an extensive floral province which also embraced Spitsbergen and the Soviet Union during Viséan times.

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