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Palynological Examination of Samples from the Beaver Lake Area, Prince Charles Mountains, Antarctica

by

Elizabeth M. Kemp

PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE BEAVER LAKE AREA, PRINCE CHARLES MOUNTAINS, ANTARCTICA.

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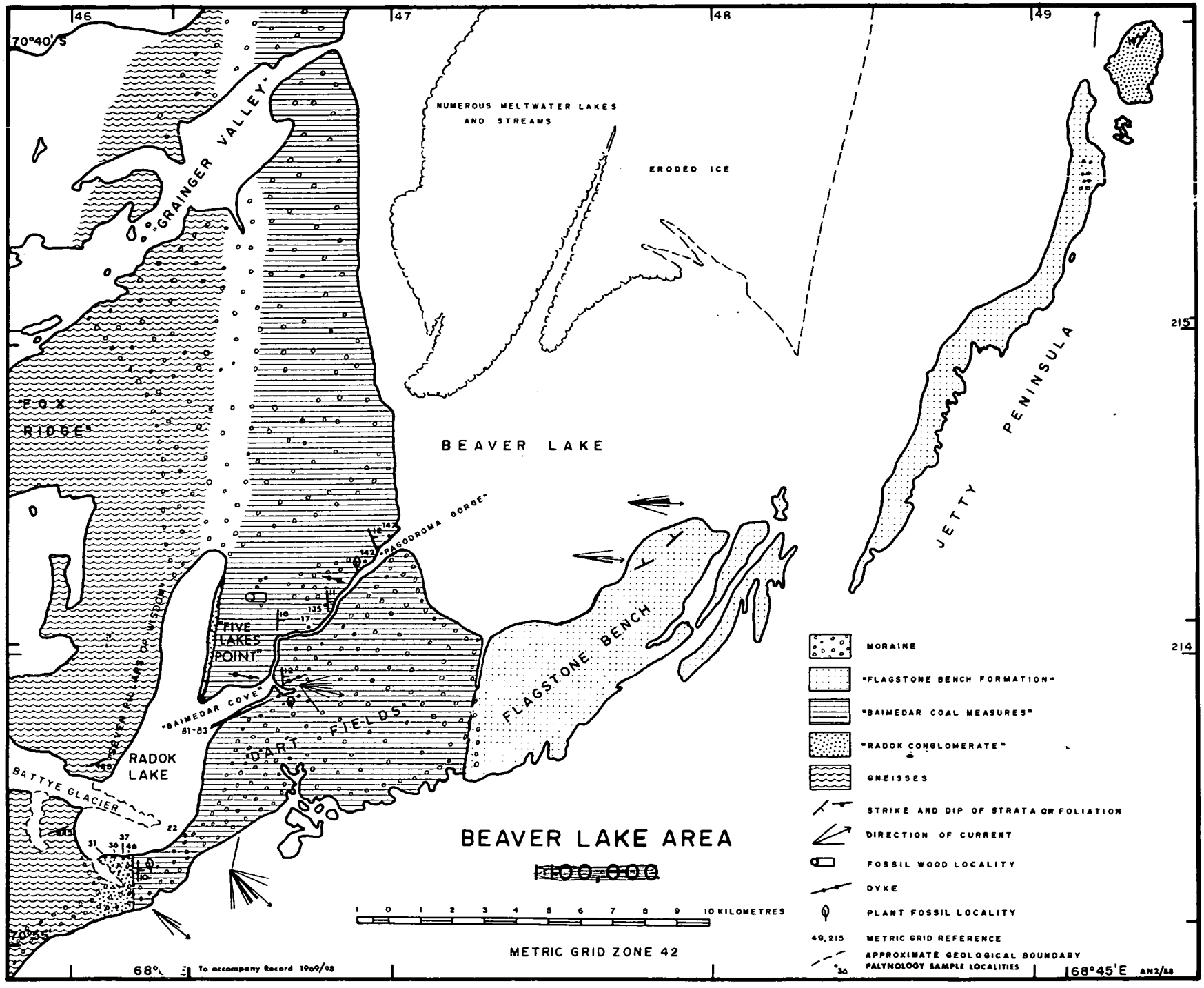
RECORDS 1969/98


46
47
48
49
70°40'S
70°55'
68°
68°45'E
215
214
NUMEROUS MELTWATER LAKES AND STREAMS
ERODED ICE
"GRAINGER VALLEY"
"FOX RIDGE"
BEAVER LAKE
"PAGODROMA GORGE"
"FIVE LAKES POINT"
"BAIMEDAR COVE"
"BAIMEDAR FIELDS"
FLAGSTONE BENCH
JETTY PENINSULA
RADOK LAKE
BATTYE GLACIER
BEAVER LAKE AREA
1:100,000
1 0 1 2 3 4 5 6 7 8 9 10 KILOMETRES
METRIC GRID ZONE 42
MORAINE
"FLAGSTONE BENCH FORMATION"
"BAIMEDAR COAL MEASURES"
"RADOK CONGLOMERATE"
GNEISSES
STRIKE AND DIP OF STRATA OR FOLIATION
DIRECTION OF CURRENT
FOSSIL WOOD LOCALITY
DYKE
PLANT FOSSIL LOCALITY
49,215 METRIC GRID REFERENCE
APPROXIMATE GEOLOGICAL BOUNDARY
PALYNOLOGY SAMPLE LOCALITIES
To accompany Record 1969/98
AN2/88

PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE BEAVER LAKE AREA, PRINCE CHARLES MOUNTAINS, ANTARCTICA

Summary

A palynological examination has been made of ten surface samples from outcrops at the southern end of the Beaver Lake area, Prince Charles Mountains, Antartica. The samples were collected from the 'Radok Conglomerate' and the 'Baimedar Coal Measures', which form part of the unit previously referred to as the Amery Formation (Crohn, 1959). Results of the study suggest that both the 'Radok Conglomerate' and the 'Baimedar Coal Measures' are of Upper Permian age. The Upper Permian age, first determined for the upper part of the Amery Formation by Balme and Playford (1967), is reinforced by the discovery of additional species with known Upper Permian ranges.

Introduction

The samples examined were collected by Bureau of Mineral Resources geologist A. Medvecky during the 1969 summer field season. They come from the unit previously referred to as the Amery Formation (Crohn, 1959). Crohn proposed the name Amery Formation for a series of flat-lying arkosic and calcareous sandstones and grits, which contains coal seams. Samples from the Amery Formation at two sites, the 'Amery Locality' of Crohn, and from the mouth of 'Pagodroma Gorge'** formed the basis of the palynological work of Balme and Playford (1967). On the evidence of assemblages recovered from these sampling sites, these authors concluded that the upper part of the Amery Formation is of Upper Permian age.

In 1969 the Beaver Lake area was mapped as part of the Prince Charles Mountains exploration programme. As a result of this recent work it is proposed that the Amery Formation be raised to group status (McLeod et al., in prep.). Three formational subdivisions have been recognized: from the base upwards these are; the 'Radok Conglomerate' which consists of conglomerates and associated

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** Topographic names in inverted commas have not yet been approved by the Antarctic Names Committee, Australia.

sandstones and siltstones; the 'Baimedar Coal Measures', a sequence of arkosic sandstones and shales with coal seams, and the 'Flagstone Bench Formation', a light-coloured feldspathic sandstone containing iron concretions.

In this investigation, samples were examined from the 'Radok Conglomerate', and from the sequence of the 'Baimedar Coal Measures' in 'Pagodroma Gorge', in the hope of establishing the range of time during which deposition occurred.

Preservation of spores, however, was too poor for this end to be fulfilled in more than a general way. Spores were thinned and corroded, but did not show the darkening which is the result of carbonisation. Preservation was poorest in samples low in the sequence; those from the 'Radok Conglomerate' yielded few specimens which could be identified to species level. The poor preservation may be related to the proximity of igneous intrusions - dykes have been reported from both the 'Radok Conglomerate' and the 'Baimedar Coal Measures'. In the latter case, severe baking of adjacent sediments has been noted (Medvecky, unpublished data).

The position of all samples examined is shown in the sketch map, Text-figure 1.

Age of the Assemblages

There appears to be little difference in the composition of assemblages throughout the sequence examined, although this generalisation is made with reservation in view of poor preservation. All assemblages, with the exception of that from AM22.409 are characterised by a high relative frequency of striatitid, bisaccate pollens. Most contain rare monosaccates, chiefly Parasaccites sp. although Densipollenites is also present. (The composition of Sample AM22.409, which has a high relative frequency of trilete, spinose spores, is regarded as being of local significance only).

Balme and Playford (1967) referred the upper part of the Amery Formation to the Upper Permian. The basis of this determination was the presence, in samples from the Amery Locality and Beaver Lake, of such species as Gretaceaepollenites sinuosus, Densipollenites indicus, Microbaculispora villosa, Bascanisporites undosus and Anapiculatisporites ericianus.

The first two of these species, i.e. Gretaceaepollenites sinuosus, and a form close to Densipollenites indicus, were identified in the lowest productive sample studied in the present survey, i.e. AM46 in the Radok Conglomerate. G. sinuosus first appears in Eastern Australia probably in the late Artinskian, and characterises the Stage 5 palynological unit of Evans (1967). Densipollenites indicus has an Upper Permian range in India, the Salt Range of West Pakistan (Balme, in press) and in the Perth Basin of Western Australia. On this evidence it seems likely that the lower part of the sequence in the Beaver Lake area may also be referred to the Upper Permian.

Most of the forms reported by Balme and Playford have been observed in the present study (Bascanisporites undosus is a notable exception). Sample AM135 yielded two species not previously reported, which may have considerable stratigraphic value. These forms are Indospora clara Bharadwaj, and a form very close to Guttulapollenites hannonicus Goubin.

Evans (1967) reports the first appearance of Indospora in the upper part of his Stage 5 (Upper Permian) this part of the unit probably corresponds with the range of I. clara. Balme (1966) reports I. clara from the Chhidru Formation (U. Permian) of the Salt Range and from the Wagina Sandstone in the Perth Basin.

Published data also indicate that the morphologically distinctive form Guttulapollenites hannonicus Goubin has an Upper Permain range in several localities. From Madagascar Goubin (1965) described the form from Lower Sakamena (Upper Permian) sediments, and Hart (in Goubin, 1965) recorded it from the Upper Permian of South Africa. Balme (in press) reported the species from the Salt Range, where it occurred in greatest abundance in the Wargal Limestone and lower Chhidru Formation (?Lower - Upper Permian). In the

one sample from which it is reported in the present study, G. hannonicus was fairly common, occurring in an abundance of approximately 1%.

Composition of Assemblages

Details of samples are listed below, in order from the base of the sequence upwards. Both field numbers and palynology collection numbers are given.

Field No.		MFP No.	
AM31. 412	-	5058	'Radok Conglomerate' Black indurated siltstone with white crystal growths. Barren of spores. Much finely divided vitrinite.
AM36 - 413	-	MFP. 5059	'Radok Conglomerate' Black siltstone with fine coaly bands and fragments of wood; this is very carbonised in appearance. Barren of spores; abundant woody fragments and tracheids with bordered pits.
AM37	-	MFP. 5122	'Radok Conglomerate'. Brownish grey fissile, micaceous siltstone. Preservation of spores very poor; sample yielded abundant fine vitrinite. Microfloral list: Parasaccites sp. Striatopodocarpites sp. ?Densipollenites Bisaccate striatiti indet
AM46	-	MFP.5123	'Radok Conglomerate'. Grey micaceous siltstone. Preservation very poor; grains thinned, extremely corroded, non staining. Cuticle fragments are common.

Microfloral list:

Protahaploxypinus amplus
cf. Densipollenites indicus
Apiculatisporis sp.
Parasaccites sp.
Gretaceaepollenites sinuous
Marsupipollenites triradiatus
Sulcatisporites sp. indet

AM22 - 409 MFP.5057 'Baimedar Coal Measures' Dark grey micaceous shale. Sample yielded much fine organic debris; relatively rare spores. The assemblage is characterised by relatively few bisaccate pollens and by an unusual concentration of small apiculate trilete spores.

Microfloral list:

Protohaploxypinus amplus
Apiculatisponis cf. levis
A. sp. indet
Gretaceaepollenites sinuosus
Leiotriletes directus
Lophotriletes sp.
Paravittatina sp.
cf. Densipollenites indicus

AM81/83-433 MFP.5060. 'Baimedar Coal Measures' Dark grey, indurated, micaceous shale. Much woody debris present, little with any cellular organization remaining. Spores not abundant, preservation only fair. Sexine of most specimens corroded, with loss of surface detail.

Microfloral list:

Protohaploxypinus limpidus
P. amplus
P. sp. indet
Striatopodocarpites cf. fusus
Sulcatisporites sp.
Gretaceaepollenites sinuosus
Apiculatisporis sp.
Densipollenites indicus
Marsupipollenites triradiatus
Microbaculispora villosa

AM17 - 407 MFP.5056 'Baimedar Coal Measures'. Very fissile, dark grey micaceous shale. Sample yielded abundant tracheids and other plant tissues, all much degraded. Spores fragmentary and thinned, bisaccates predominate.

Microfloral list:

Protohaploxypinus spp.
Protohaploxypinus amplus
Striatopodocarpites sp.
Parasaccites sp.
Leiotriletes directus

AM135 - 441 MFP.5061 'Baimedar Coal Measures'. Dark grey carbonaceous siltstone. Spores diverse, preservation fair.

Microfloral list:

Protohaploxypinus limpidus
P. amplus
Striatopodocarpites sp.
Parasaccites sp.
Paravittatina cf. lucifer
Marsupipollenites triradiatus
Guttulapollenites hannonicus
Indospora clara
Leiotriletes directus
Gretaceaepollenites sinuosus
Sulcatisporites sp.
Entylissa sp.

AM.142 - 443 MFP.5062 'Baimedar Coal Measures'. Grey micaceous siltstone. Spores rare, poorly preserved.

Microfloral list:

Protohaploxypinus limpidus
P. amplus
Striatopodocarpites sp.
Marsupipollenites triradiatus
Gretaceaepollenites sinuosus
Entylissa nitidus
Granulatisporites micronodosus

AM.147 - 445 MFP.5063 'Baimedar Coal Measures'. Carbonaceous black shale. Spores very rare, abundant fine organic debris.

Microfloral list:

Leiotriletes sp.
Sulcatisporites sp.
Striatites indet.

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