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A PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE MERINO GROUP, VICTORIA

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SUMMARY

Nine samples from outcrops of the Mesozoic Merino Group of south-western Victoria and collected by Frome-Broken Hill Co. Pty. Ltd., were examined for their spore content. Four contained sufficient spores to determine their Lower Cretaceous (? Albian) age; three were fossiliferous but lacked diagnostic species; two were barren. The determinable samples contain assemblages similar to ones in the Waarre Formation and top of the Otway Group of Port Campbell Nos. 1 and 2 and Flaxman's Hill No.1, but a closer comparison with subsurface horizons at Dergholm, Robe and Penola to the north-west of the Merino area is possible.

INTRODUCTION

Nine samples from outcrops of the Merino Group in western Victoria were submitted by Frome-Broken Hill Co. Pty. Ltd., for palynological analysis to test whether the average outcrops in the area contained microfossils suitable for detailed or semi-detailed correlations with the subsurface sections of Port Campbell Nos. 1 and 2 and Flaxman's Hill No.1.

Samples W-12, W-37, W-55, W-139, contained adequate Lower Cretaceous microflora assemblages; W-40, W-147, W-174 contained only a few specimens, insufficient for adequate stratigraphic determinations; W-32, W 141 were devoid of microspores.

TREATMENT

Chemical treatment of the samples was standardized so that the states of preservation and abundances of microfossils could be assessed. Twelve samples were examined, duplicates had been taken where differing degrees of weathering or lithology were apparent in the hand specimen. 5 - 10 gm. of each sample were digested serially in 5% Potassium Hydroxide, 30% Hydrofluoric Acid and 10% Hydrochloric Acid: organic tissue was finally separated in a Bromoform/Alcohol mixture, S.G. 2.2. No oxidation stage was included, but W-12 and W-37 (see below) would probably have benefited from gentle oxidation.

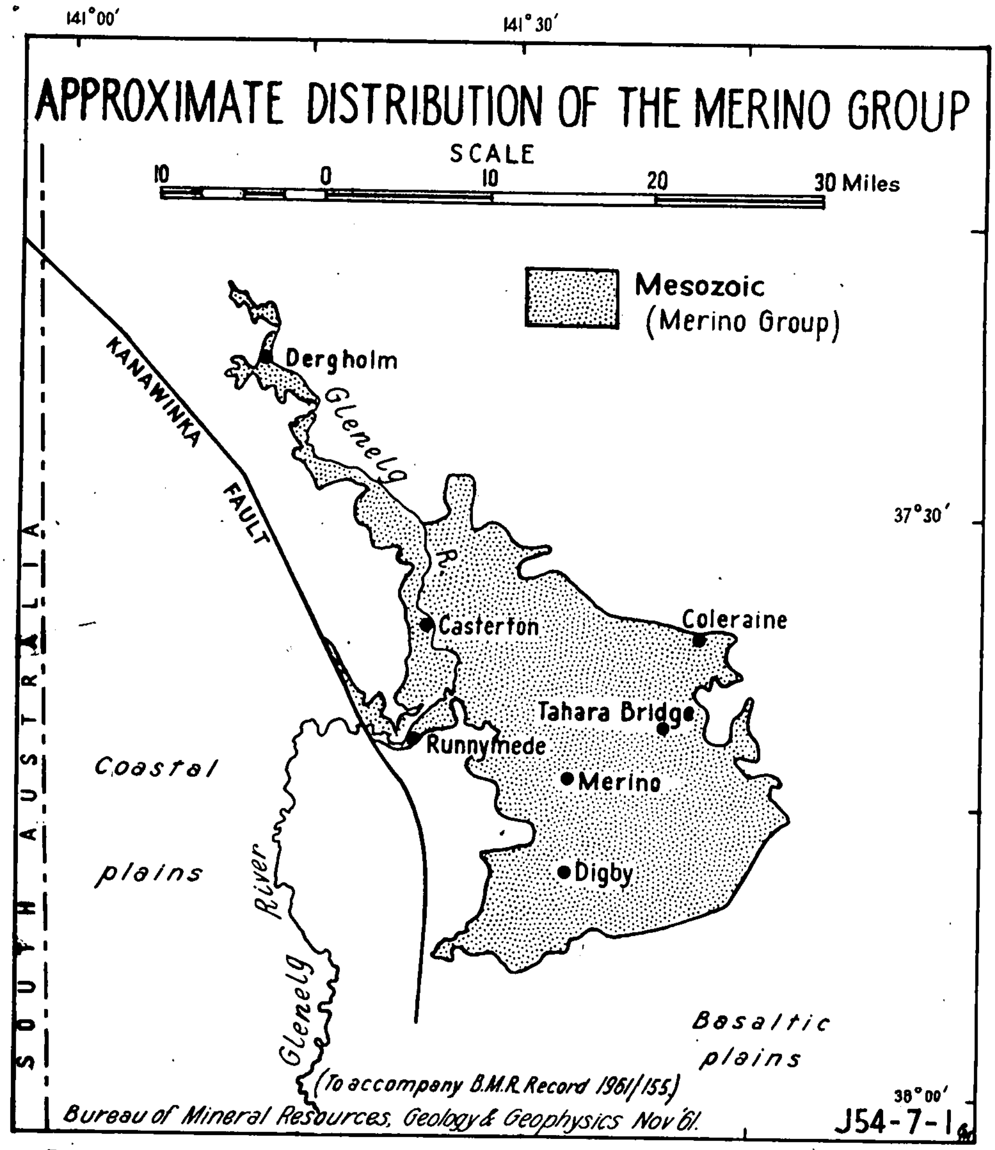

Fig. 1. Distribution of the Merino Group in south-western Victoria (Adapted from Kenley, 1954.) showing reference localities.

NOTES ON INDIVIDUAL SAMPLES

W-12 (MFP 1702, 1703)*. Three miles W.N.W. of Casterton. (see fig.1)

Medium grey, silty shale. Brown bands (signs of weathering) followed some laminae. Both samples gave a big yield of well preserved microspores (see Table I). Cyathidites minor, Podocarpidites ellipticus, Inaperturopollenites spp. and Microcachryidites antarcticus dominate the assemblage, but among the less abundant species Cicatricosisporites australiensis indicates the sample was no older than the Cretaceous (Balme, 1957, Evans, 1961a), Apiculatisporis wonthaggiensis, Trilobosporites trioreticulatus Balmeisporites holodictyus and Cirratriradites spinulosus indicate a Lower Cretaceous, approximately Albian age (Cookson and Dettmann, 1958, Evans, 1961 a & b).

* B.M.R. palynological collection sample number.

W-32 (MFP 1704). Three miles S.S.W. of Casterton.

Brown grey claystone with coaly flakes and plant impressions, barren of spores. Only opaque black fragments were present.

W-37 (MFP 1705). Merino.

Light grey silty mudstone with an ochreous weathered surface. A sample from the fresher part of the hand specimen gave a moderate yield of well preserved spores. C. australiensis and Cyathidites minor were very abundant but bisaccate forms were absent (in contrast to W-12). Associate species, e.g., C. spinulosus suggest a Lower Cretaceous age.

W-40 (MFP 1706). Digby.

One specimen of Cirratriradites spinulosus was extracted, indicating a Lower Cretaceous age.

W-55 (MFP 1707, 1708). Five miles north of Casterton.

Light grey calcareous siltstone with ochreous weathering along the bedding. A low yield of a variety of species was obtained, among which Granulatisporites cf. G. dailyi and Schizosporis reticulatus suggest a Lower Cretaceous age. Neither species was observed in the more productive W-12 and W-37.

W-139 (MFP 1709, 1710). (? Merino Group). Tahara Bridge.

Light buff-grey fine grained sandstone with carbonaceous fragments on some bedding planes. Weathered surfaces penetrating about $\frac{1}{4}$ inch were present. Spores were rare, but the assemblage, including Cyathidites australis, Cicatricosisporites australiensis and Balmeisporites cf. B.holodictyus, resembles those from W-12 and W-37 of Lower Cretaceous age.

W-141 (MFP 1711). Tahara Bridge.

Buff very light grey white siltstone with olive-yellow bands and carbonaceous flakes, barren of spores.

W-147 (MFP 1712). Three miles N.W. of Merino.

Speckled grey and buff calcareous sandstone. Some organic tissue and one indeterminate microspore were recovered.

W-174 (MFP 1678, 1713). Eleven miles S.S.W. of Coleraine.

Brown-grey silty mudstone with coaly flecks. A very low yield was obtained. The specimens identified as Podocarpidites cf. P. ellipticus and Ginkocycadophytus cf. G. nitidus were not sufficient to determine the age of the sample, although both species were generally common in the more fossiliferous Cretaceous samples described above.

CONCLUSIONS ON STATE OF PRESERVATION

As these nine samples of the Merino Group are regarded by geologists of Frome-Broken Hill Co Pty. Ltd., as typical of outcrop sections of the area, a moderately high number of palynologically fossiliferous localities should be present elsewhere in western Victoria. Although the outer surface of every hand specimen showed signs of weathering, the spore content has not always been attacked sufficiently to be destroyed. Those samples with a low spore content may have always been so. Fresh material from cores of comparable age in O.D. Penola No.1 behaved in a similar manner: several cores contained very few microspores.

STRATIGRAPHIC IMPLICATIONS

Since these samples were neither intended nor sufficient for ... detailed stratigraphic analysis it would be premature to do more than generalize on their significance, but the following points may be relevant to future work.

1. Kenley (1954) outlined the distribution of the Merino Group and discussed the first localities at which Cretaceous plants, described by Medwell, (1954 b) were discovered. Kenley also listed previous references to fossils from the area. No stratigraphic comparisons within the Group were possible. Medwell regarded most of the Victorian Mesozoic (including parts of the Merino Group) as Lower Jurassic in age, but Cookson and Dettmann (1958) pointed out that the Rajmahal Beds of India, with the flora of which Seward (1904) compared the Victorian species, contained Lower Cretaceous ammonites (Arkell, 1956). Only Cookson and Dettmann have described Cretaceous microspores from the Merino area, from Dergholm No.1 bore, 532 feet, and Dergholm No.2 bore, 329 feet.

2. No microplankton were observed in the samples.

3. The fossil microspores were in excellent condition and were much better preserved than their equivalents in the Port Campbell Nos. 1 and 2 and Flaxman's Hill No.1 wells. In preservation and assemblage they compare more closely to subsurface sections known to the north-west of Merino as in the Robe bore (Cookson & Dettmann, 1958) and Penola No.1 (Evans, 1961c).

4. Where sufficient microspores were available only a Lower Cretaceous age could be determined. The assemblages are comparable with ones below core 24 (5932 feet) in Port Campbell No.1, between c.8 (8100-8102 feet) and c. 18 (8630-8632 feet) in Port Campbell No.2 and between c.25 (6902-6913 feet) and (?) c.27 (7212-7222 feet) in Flaxman's Hill No.1. Species common to the Merino Group and Port Campbell samples are marked in Table I with their reference number on the Port Campbell distribution chart (Evans, 1961b). Those of stratigraphic significance include Cicatricosisporites australiensis (48), Balmeisporites holodictyus (44), Trilobosporites trioreticulatus (61).

The diverse assemblages of W-12 and W-37 were not matched in variety at Port Campbell or Flaxman's Hill, but they compare with ones known at Penola, regarded for the present as Albian in age and including Apiculatisporis wonthaggiensis, Cingulatisporites paradoxus, Cirratriradites spinulosus, Perotrilites striatus, Pityosporites grandis and Schizosporis reticulatus.

5. The microspore sequence in Penola No.1 confirmed that suggested for the Robe bore by Cookson and Dettmann so that the presence of Granulatisporites dailyi in W-55 suggests that the sample is somewhat older than W-12 and W-37, but the characteristic Lycopodiumsporites circolumenus, Cicatricosisporites cooksoni, Callialasporites (al. Zonalapollenites) dampieri which mark a lower section of the Lower Cretaceous of the Artesian Basin and the Penola well, still have to be found. G. dailyi has not yet been recorded from Flaxman's Hill No.1 or Port Campbell Nos. 1 and 2, although a poorly preserved specimen possibly of C. dampieri was present in c.27, 7212-7222 feet of Flaxman's Hill No.1.

6. There is no palynological evidence therefore of a great time interval being covered by the samples: where determinable they are of Lower Cretaceous, approximately Albian age. Although Kenley (1954) and Medwell (1954 a,b) recognized Lower Jurassic, Upper Jurassic (?) and Lower Cretaceous horizons in the Merino Group, these provisional results support the regional implications of the work of Cookson and Dettmann(1958) that the bulk of the outcrop Mesozoic sediments of western Victoria were deposited in Cretaceous times. The existence of Jurassic sediments in the Otway Basin has yet to be proved. Outcrop equivalent of the Upper Cretaceous of the Nelson bore, Flaxman's Hill No.1 and Port Campbell No.1 have yet to be recognized.

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TABLE I

SPECIES DISTRIBUTION.

Ref.	Species (in taxonomic order)	12	32	37	40	55	139	141	147	174
		Sample number (W-)								
43*	Cyathidites minor	fc		c						
45	C. australis	+		+			+			
	C. australis rimalis			+						
	C. crassiangulatus	cf								
51	Gleicheniidites circinidites			+						
89	Concavisporites cf. C. juriensis			+						
56	Sphagnumsporites australiensis	+		+						
	Granulatisporites dailyi					+				
	Apiculati, granulate sp.	+								
69	Leptolepidites verrucatus	+								
	Apiculatisporis wonthaggiensis	+		aff						
	Baculatisporites comaumensis	+								
	Apiculati, baculate sp.	+								
	Neoraistrickia truncatus	+								
	Cingulatisporites paradoxus	+								
62	C. euskirchenoides	+								
	Microreticulatisporites parviretis	aff		aff						
	M. pudens	+								
	Murornati sp.	+								
	Lycopodiumsporites austroclavidites	+								
	L. rosewoodensis	aff								
	Lycopodiumsporites spp.	+		+						
48	Cicatricosisporites australiensis	+		vc			+			
61	Trilobosporites trioreticulatus	+								
	Zonati sp.	+								
	Cirratriradites spinulosus	+		vc	+		+			
	Styxisporites linearis	cf								
	Perotrilites striatus	+								
	Perinotriliti sp.	+								
44	Balmeisporites holodictyus	+					cf			
49	Polypodiaceaeidites sp.			+						
	Pinosacciti sp.	+								
58	Podocarpidites ellipticus	fc								cf
	P. grandis	+				+	+			
	Disaccites spp.					fc	+			
46	Microcachryidites antarcticus	fc				+	+			
	Inaperturopollenites cf. I. turbatus			+						
	Inaperturopollenites spp.	fc		+		+				
81	Podosporites micropterus						+			
67	Araucariacites australis	fc		+						
75	Ginkocycadophytus nitidus	+		+		+				cf
	G. deterius	+								
	Corollina torosus	+		+						
	Schizosporis reticulatus			+						

* Reference number of the species on the Port Campbell Nos. 1 & 2 distribution chart (Evans, 1961b).

Note vc = very common; c = common; fc = fairly common, + = present.