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PALYNOLOGICAL EXAMINATION OF LIGNITES FROM WESTRALIAN OIL

COMPANY YARRAM No 1 BORE

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PALYNOLOGICAL EXAMINATION OF LIGNITES FROM WESTRALIAN OIL COMPANY YARRAM NO. 1 BORE, AND A COMPARISON WITH FROME LAKES LTD. LIGNITE FROM GIPPSLAND NO. 2 BORE AT 613 FEET.

Localities:

Ph: Devon	Balloong
Bore: Yarram No. 1	No. 2.
Depth: 240'-250', 320'-330', 980'-990', 1150'-1160', 1282'	613'
Rock Types: Lignite, or lignitic clays and gravels.	Lignitic clay with vari- sized quartz pebbles.
Supplier: Westralian Oil Co.	Frome Lakes Gippsland Pty. Ltd.

Samples from the Yarram No. 1 bore were taken from the five above specified horizons and treated by the Hydrofluoric acid - Schulze's Soln. method.

These preparations were then examined under the microscope, and sporal assemblages compared.

In particular a comparison was made between the Nothofagus pollens present in each horizon and those present in a previously treated preparation from Frome Lakes Bore No. 2, Ph. Balloong at 613'.

This site is some 20 miles to the East of the Yarram site.

The Nothofagus specimens in this previous preparation having been designated as species 1, 2, 3 and 4, new species found in the Yarram preparation were given numbers from 5 to 15 consecutively.

Further study of these 15 species reduced the number actually present to 8.

A tentative correlation with Cookson's species "a" - "j" was made (see Table No. 1).

An examination and study of the Nothofagus species present in the Frome Lakes slide has been described in a previous report (attached) and a predominance of Cookson's species "e" and "f" reported.

Studies of preparations from the Yarram horizons were made in an attempt to correlate one or more of these with the 613' bed of Frome Lakes.

Examination of Samples

1. 1282'

Lithology: Lignite

From this material some extremely rich spore preparations were made, all free from curicular and other masking vegetable remains.

The wide range of Nothofagus species present (at least 6 of Cookson's species "a" - "j" were observed occur in such frequencies as to preclude any possibility of correlation with the Frome Lakes 613' preparation.

Table No. 2 below, lists the percentage frequency of Nothofagus pollen species in the various Yarram horizons, and a comparison is made with frequencies of similar Nothofagus pollens at 613', in the Frome Lakes Bore No. 2.

The presence of species No. 6 which has been related to Cookson's Nothofagus species "g" found at Moorlands S.A. in the Lower Tertiary is an indication of a similar age for this horizon.

2. 1150'-1160'

Lithology: Lignite with a little pebbly quartz.

Spores occurred too infrequently here to warrant any comparison with other assemblages.

3. 980'-990'

Lithology: Lignitic clay with vari-sized quartz pebbles.

Lithologically this sample shows a marked similarity to the Frome Lakes 613' sample. Slight textural differences are noticeable but basically they are remarkably similar.

However, palynologically an important difference exists. In this Yarram sample a large proportion (40%) of Nothofagus "sp." 5 pollens is present.

No specimens of this pollen "species" has been found in the Frome Lakes preparation.

The preparation from this horizon was much contaminated with extraneous cuticular matter and cellular debris.

4. 320'-330'

Lithology: Lignite with some clay and quartz pebbles.

In the preparation from this horizon the percentages of "species" 1 and 2 pollens begin to approximate those of these "species" in Frome Lakes 613' horizon.

However, in this Yarram preparation once again the presence of "species" absent from Frome Lakes preparation makes no direct correlation possible.

A feature of this horizon was the appreciable number of 5-pored specimens present.

Table 3 below lists the percentage of five pored pollens for each horizon.

5. 240'-250'

Lithology: Clay with lignite and vari-sized quartz pebbles.

This preparation contains Nothofagus "species" 1 and 2 in proportions very similar to that of Frome Lakes Bore No. 2 613' preparation.

No other species are present in any quantity, and of all the horizons examined this is palynologically the closest equivalent to the Frome Lakes assemblage.

Conclusions:

1. The 240'-250' horizon in Yarram No. 1 bore when compared on a basis of Nothofagus species present bears a close relationship to the 613' horizon in Frome Lakes No. 2 bore.

This conclusion does not necessarily mean that both bores cut this bed at these depths.

Factors affecting the floral composition of samples received for examination are:-

- (a) Contamination of sample due to dangers inherent in ditch sampling methods.
- (b) Environmental changes which may have occurred in the 20 miles or so between the two drill sites. New Nothofagus species may become introduced into an area over this distance, and naturally affect the floristic composition of the sample examined. Environment may later change to that existing in the first area examined, thus leading to false correlation of two horizons studied.

2. That when available, samples from different horizons in localities between these two drill sites should be examined to see if any gradation in Nothofagus fossil pollen assemblages in the one bed does exist.

References:

See attached report on Frome Lakes No. 2 Bore, 613'.

TABLE NO. 1 Tentative Correlation of Nothofagus species examined with Dr. Cookson's species "a" - "j".

Original Nothofagus species	No. referred to above.	Correlated with Dr. Cookson's species
1, 3, 9, 12, 14	1	"e"
2, 4, 11	2	"f"
5, 10	5	"b"
6	6	"g"
7	7	?
8	8	?
13	13	"d"
15	15	"e"

TABLE NO. 2 Nothofagus species pollens in Yarram and Frome Lakes bores at various horizons.

Nothofagus sp.	Frome Lakes Bore No. 2		Yarram Bore No. 1							
	613'		1282'		980'		320'		240'	
	1st Count %	2nd Cnt %	1st Cnt. %	2nd Cnt. %	1st Cnt. %	2nd Cnt. %	1st Cnt. %	2nd Cnt. %	1st Cnt. %	2nd Cnt. %
No. 1	60	65	45	40	50	47	46	57	50	55
No. 2	40	35	14	20	12	2	30	26	50	45
No. 5			30	25	28	40	8	5		
No. 6			6	8						
No. 7				1	10	11				
No. 8			2	2			3	1		
No.13							12	15		
No.15			2	3						

Note 1 Fifty pollens were examined in each count.

2 Percentage figures refer to Total Nothofagus species.

TABLE NO. 3 Percentages of 5 pored Nothofagus pollens.

	Frome Lakes Bore No. 2		Yarram Bore No. 1			
	613'		1282'	980'	320'	240'
5 pored Nothofagus Pollens	23%		8%	7%	52%	35%

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PROGRESS REPORT ON PALYNOLOGICAL EXAMINATION OF
LIGNITIC CLAY SAMPLE SUBMITTED BY
FROME LAKES PTY. LTD.

Locality

Ph: Balloong
 Bore: No. 2
 Depth: 613'
 Rock Type: Lignitic clay with vari-sized quartz pebbles.
 Supplier: Frome Lakes Gippsland Pty. Ltd.

A representative sample of this material was macerated and treated by the Hydrofluoric acid - Schulze's Soln. method.

This preparation was then examined under the microscope to determine the presence or absence of plant remains.

Result of Examination

A large number of microspores embracing many plant species were noted.

To facilitate a more rapid dating of the microflora a study was made of four species of Nothofagus pollens here designated as species 1, 2 3 and 4.

A comparison can be made between species 1 and 2, and

(i) Cookson's * Nothofagus sp. e and f.

(ii) Couper's + Nothofagus (cranwellae group).

(i) These comparisons are set out below in tabular form.

	Nothofagus sp. e (Cookson)	Nothofagus sp. 1
Exine thickness	1u	less than 1u
Grain	Strongly angular Diam. 18.6 - 42.5u	Strongly angular Diam. 25 - 30u

b.

	Nothofagus sp. f (Cookson)	Nothofagus sp. 2
Exine thickness	2u	less than 1u
Grain	Very strongly angular Diam. 26 - 47u	Very strongly angular 35u Average.

Cookson states that the association of sp. e with sp. f is common, with sp. e predominating in number, as also does sp. 1 above.

Species e and f are not classified by Cookson in either of the present day groups (Menziesii group or fusca group) of *Nothofagus pollens*.

(ii) Later, Couper in New Zealand proposed a term "cranwellae" for a group of extinct *Nothofagus pollens* with the following diagnostic features:-

"Ora functional, clearly rimmed, no pronounced thickening of exine around ora; In polar view grain usually angled, straight to concave between ora; Exine usually 1u or less with the sharp papillae of the Menziesii type.

A comparison of the properties of sp. 1 and 2 with the above description indicates that they belong to this cranwellae group.

A relationship of sp. 3 with any of Cookson's sp. a - j has not yet been established.

Species 4 may be an aberrant form as only one specimen has been found.

Age of Sample.

Nothofagus sp. e pollens have a wide range in the Middle Tertiary Period, and the same can be said to a lesser extent of sp. f pollens.

However, New Zealand species of the cranwellae group showing closest affinities to sp. 1 and sp. 2 have, according to Couper, a time range from the Upper Miocene through the Pliocene.

These pollens by comparison are probably of Upper Miocene to Upper Pliocene in age.

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References:

- * Cookson, Dr. I.
Pollens of *Nothofagus* Blume from Tertiary Deposits in Australia.
Proc. Linn. Soc. N.S.W. V. LXXI pts 1 - 2 p.49 1946.
- + Couper, R. A.
Upper Mesozoic and Cainozoic Spores and Pollen Grains from N. Zealand.
N.Z.G.S. Palaeont. Bull. 22 1953.

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