SPARE

Rept.Bk. No. 754
G.S. No. 4082
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DEPARTMENT OF MINES
SOUTH AUSTRALIA
GEOLOGICAL SURVEY

CONTINENTAL - SUN - EXOIL - TRANSOIL MUNYARAI NO.1 WELL
PALYNOLOGICAL EXAMINATION OF CORES

by

W.K. HARRIS
PALYNOLOGIST
PALAEONTOLOGY SECTION

S.R. 11/5/293

20th September, 1968

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ABSTRACT

Palynological examination of cores from Continental-Sun-Exoil-Transoil Munyarai No. 1 Well in the northern part of the Officer Basin has revealed a variety of acid resistant microfossils including fungal hyphae, pitted tracheidal wood fragments, spores, Chitinozoa and pseudochitinous linings of probable foraminifera. The presence of Chitinozoa indicate an age of Ordovician to late Devonian and the presence of pitted tracheidal wood suggests a Devonian or younger age. The evidence therefore points to a Devonian age for the sediments at the total depth up to and including Core 6. Sediments above this core cannot on the palynological evidence be dated more accurately than Devonian or younger.

INTRODUCTION

Continental Oil Co. of Australasia Ltd., operators on O.E.L. 28 in the Officer Basin, drilled Munyarai No. 1 Well to a total depth of 9,510ft. The well, located approximately 450ft. east of the eastern boundary of the Aboriginal Reserve at Latitude 27°41'53" South, Longitude 132°00'03" East, penetrated a sequence of sandstones and shales, dominantly red-brown in colour, to about 5,200ft. and continued to the total depth through a monotonous section of grey shales generally calcareous and with occasional thin limestone beds.

The purpose of this report is to present the palynological data obtained from an examination of all available core samples and to derive an estimate of the age of the sediments. Some of the microfossils are illustrated in the accompanying plates.

METHODS OF INVESTIGATION

All cores processed and examined for acid insoluble microfossils are listed in the appendix. The samples were processed by two techniques: the first, a routine palynological preparation for pollen and spores, consisted of boiling about 5gms.wt. of carbonate free sample with 67% hydrofluoric acid until only a sludge remained. The residue was then washed repeatedly and then boiled in 50% Hydrochloric acid, washed again and finally treated with Schultze's Solution for 5-10 minutes to remove amorphous organic matter. It was not necessary to treat the residue with an hydroxide.

In some cases, it appeared worthwhile to repeat the preparation of the sample specifically for Chitinozoa. This decision was based on the presence or otherwise of adequate carbonaceous matter in the residues.

Preparation for Chitinozoa followed in part a similar routine described by Jenkins (1967). About 150 to 200gms.wt. of sample was crushed to about 1cm. particle size, treated with hydrochloric acid to remove carbonates and allowed to stand in hydrofluoric acid for 16hrs. The remainder of the procedure follows the routine palynological processing. Even after processing large quantities of sediment, the remaining residue amounted to less than one gram. The residue was searched for Chitinozoa under a stereoscopic binocular microscope and fossils removed by either a pipette or a dissecting needle and mounted individually.

RESULTS AND CONCLUSIONS

It is a fact that in general, recognisable fossils were extremely rare and only after a large quantity of sediment was prepared was there sufficient organic material in the residues for study. All cores with the exception of some red

sandstone lithologies, yielded organic matter showing some relict cell structure together with non-septate fungal hyphae, and fragments of wood generally only one or two tracheids in width. Wood fragments are present in the last core at 9,510ft. and occur as high as Core 3. Generally only a few cells wide, they show tracheids with conspicuous large bordered pits and on some specimens, medullary ray cells. The medullary rays appear to be several cells high and generally one cell wide. A few rays are in part biseriate. Wood of this type indicates the presence of vascular plants. It is a generally held belief that vascular plants did not evolve until the Devonian although Andrews (1961 p. 48) illustrates a tracheid fragment from the Silurian of New York State. Thus the evidence from wood points to a Devonian or younger age.

Spores were extremely rare and were only isolated from Core 3. Two specimens of a Leiotriletes type were isolated but do not provide any evidence as to the age of the sediments.

Rare and poorly preserved Chitinozoa were recovered from Cores 6, 14 and 15, and identification is difficult. They may be related to the genera Shaerochitina, Desmochitina and Lagynochitina. In view of the lack of systematic work on Australian Chitinozoan assemblages the stratigraphic position of the species isolated from this well cannot be ascertained. They would appear to be distinct from those occurring in the Silurian Bunyarra Formation in N.S.W. (Mr. R. Helby of the Geological Survey of N.S.W. kindly provided comperative material from this formation). Thus the evidence from Chitinozoa indicates an Ordovician to late Devonian age, the total range of the group.

The only other fossil of note is the probable pseudochitinous lining of a foraminifera from core 6. Alone, this would indicate a Palaeozoic or younger age.

In summary the evidence available from the acid resistant microfossils points to a Devonian age for the

sediments below and including core 6 whilst it is acknowledged that those sediments above could be younger.

Finally, it is of interest to note that there is little or no metamorphism affecting the rocks. The poor preservation of some of the microfossils can be explained by other means such as oxidation. There is in particular no apparent carbonisation of the wood tissued.

REFERENCES

ANDREWS, H.N. 1961 Studies in Palaeobotany. John Wiley & Sons, New York. 487 pp.

JENKINS, W.A.M. 1967 Ordovician Chitinozoa from Shropshire. Palaeontology 10(3): 436 - 488.

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APPENDIX

DATA ON SAMPLES EXAMINED

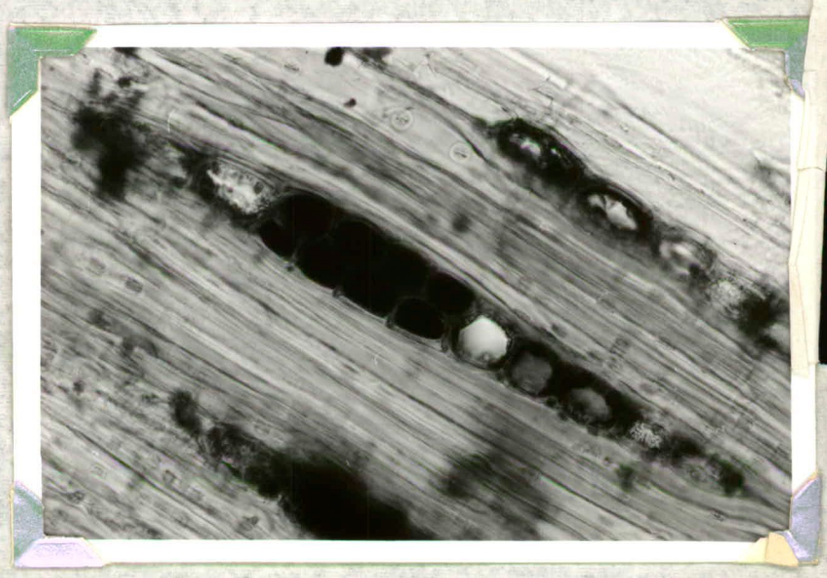
Core No.	Depth in feet	Sample No.
1	830	S1651
2	1800	S1652
3	2074	S1626
3	2077	S1625
*3	2080	S1624
*4	2847	S1630
5	3023	S1670
*6	3930	S1671
7	4856	S1640
*8	5564	S1639
*9	7002	S1672
*11	7507	S1661
*12	8006	S1660
*13	8311	S1659
*14	8563	S1663
*15	9038	S1662
*16	9505	S1666
*16	9510	S1667

*Denotes sample prepared for Chitinozoa.

No examination was carried out on Core 10 due to insufficient recovery.

A. Tracheidal Wood fragments showing large bordered pits. x400. Core 14 at 8563 ft.

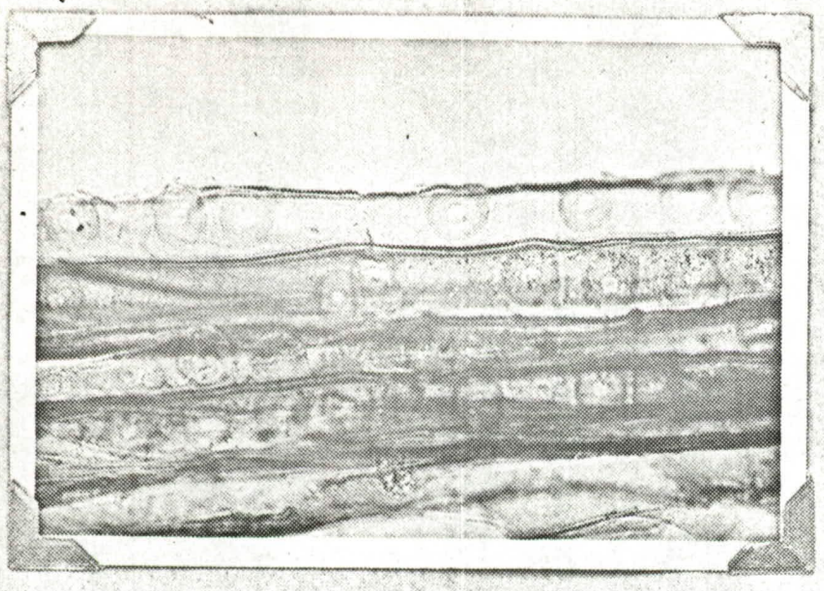
B. Tracheidal wood fragment showing medullary rays and small bordered pits. X400 Core 15 at 9038 ft.



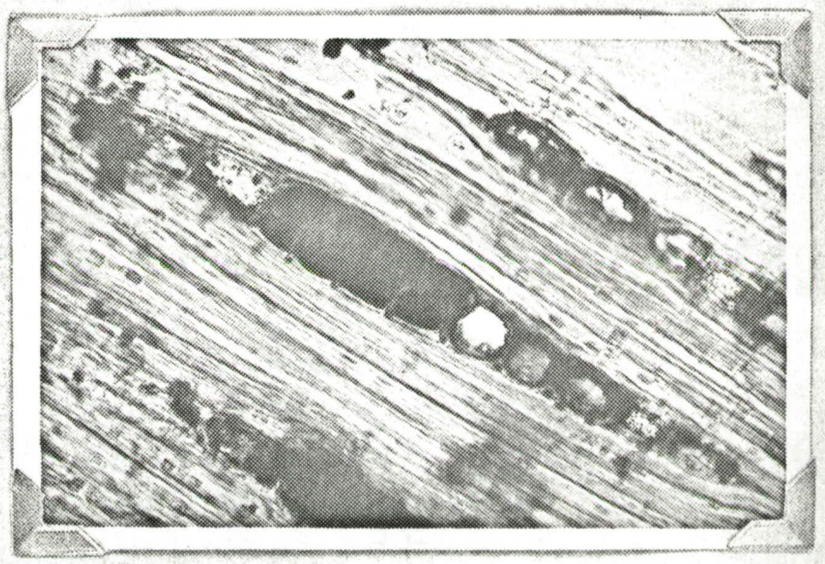
C. Probable chitinous lining of a Foraminifera X400. C. High Focus, D. Mid Focus Core 6 at 3930 ft.

D.

E. Chitinozoan - Core 6 at 3930 ft. X250



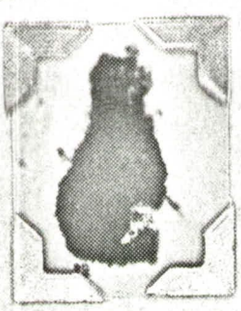
A. Tracheidal Wood fragments showing large bordered pits x400. Core 14 at 8563 ft.



B. Tracheidal wood fragment showing medullary rays and small bordered pits. X400 Core 15 at 9038 ft.

C. Probable chitinous lining of a Foraminifera X400. C. High Focus, D. Mid Focus Core 6 at 3930 ft.

D.



E. Chitinozoan - Core 6 at 3930 ft. X250