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A Preliminary Report on a Palynological and Planktonic Examination of Western District Deep Bores.

Recent deep drillings by the Department in the Nelson, Port Fairy and Portland district have been supplemented by shallower holes in the Dergholm Soldier Settlement area.

Corings and screen samples taken from these bores have provided much new evidence as to the age of the Tertiary and Mesozoic sediments in the South-West of the State. This evidence is in the form of lithological samples, and fossil remains enclosed therein. Shelly fossils and foraminiferal tests have been found from a few isolated localities but fossil plant spores and Protistal remains are relatively abundant throughout the geological column in all localities.

It is proposed, by a study of these plant and planktonic microfossils to -

1. Establish an accurate geological age for the strata intersected by the bore holes
2. Correlate the strata in the different districts.

Published papers on Victorian plant and Protistal microfossils have been largely undertaken by Dr. I. Cookson, of the Melbourne University and her students. Most of her papers have been concerned with the taxonomic study of an hitherto unknown fossil flora. She has however aroused some controversy by the geological dating of certain strata principally on the basis of correlation of microfloras with overseas material. Using as a basis the taxonomic work of Dr. Cookson it is proposed to examine the complete series of cores in all the above bores, and to arrive at an accurate dating of the sequence.

It is emphasised however, that the reliability of dating solely from plant microspores and Protistal remains is as yet unproven, and would best be used in conjunction with lithological and other palaeontological (including macrofloral) evidence.

It is in the case of 2 above that microfloral and Protistal examination is invaluable, for other accurate Palaeontological means of correlation are absent.

It is proposed then to examine all bore cores from the one district (Nelson has only one) correlate them with each other, and then to correlate each district. An experimental schedule has already been undertaken with Portland No.2 bore, all the core here being readily available from the drills store. A precis of the work undertaken reads as follows :

Samples were taken from the deepest corings. Screen samples were neglected as the chance of contamination from above is greatly increased in this method of sampling.

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After pulverization each sample of coring^e examined was treated with macerating agents over a period of 3-4 days. Slides were then prepared for examination under the microscopes.

As ten preparations in all were made, and the equipment available could handle only six at a time some 10 days elapsed before the ten were finished. Some 75 slides were made in all, about 30 of these meriting a close examination, which entailed discovery of microfossil, identification, and determination of stratigraphic value.

Three main points arise from the examination of the above samples :

1. A complete palynological examination of South Western Victorian bores would take some considerable time.
2. Portland Bore No.2 did not penetrate the Mesozoic sediments.
3. Coring did not take place often enough to enable the method of palynological correlation to be reliably tested.

#3 Elaborating point 3, (1 & 2 do not affect the basic issues of this report).

When cores were sought for sampling it was found that between 3080' and 4720' and the bottom of the well only seven separate corings were taken. For age determination this may suffice if the corings happen to intersect with index fossil horizons, but the chancy nature of the coring precludes any accurate correlation of strata.

However as the holes at Port Fairy are thought to run into Mesozoic strata at a much higher level it is suggested that a thorough palynological and protistal examination of all cores here would be thoroughly worthwhile. A definite establishment of the Tertiary-Jurassic boundary, and zonation of the microfloras would be invaluable for future stratigraphical studies in the area. Enough could probably be got out of the three Portland bores for a correlation between the two districts, and a departmental palynological investigation seems to be a necessary part to the geological work at present being carried out in the area. Taxonomic studies of the Port Fairy bore material could be carried out by those qualified when Departmental interest in the material had temporarily ceased.

In addition to the Portland No.2 material, one sample from the Belfast No.4 (Port Fairy) bore was treated. This sample had been forwarded from the drill site ahead of the main footage of core because it contained macroscopic plant remains. No microfossil remains were noted in the preparation from this sample.

More bore core has recently arrived from Port Fairy, and a program of close sampling commenced.

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RESULTS OF EXAMINATION OF SLIDES FROM PORTLAND NO.2 DEEPEST CORES.

3078'5" - 3058'2½" (1 sample)	No microfossils noted.
3425'10" - 3437'3" (2 samples- Top & Bottom)	Dicotyledonous pollens of great variety with Podocarpaceous Gymnosperm pollens (Middle-Lower Tertiary)
4073' (1 sample)	Dicotyledonous pollens, with Hystrichosphaerideans (Protista) of the genus Hystrichosphaeridium (Lower Tertiary)
4275' (1 sample)	No microfossils
4443' - 4459' (1 sample)	No microfossils
4675' (1 sample)	Fungi and a few plant spores
4682'10" (1 sample)	Pollens (Tertiary)
4711'0" - 4719'5" (2 samples)	Dicotyledonous pollens. No older than Lowest Tertiary.
