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PORT CAMPBELL NO.1 WELL.

Palaeontological Review of the Port Campbell No.1 Well "South Australia" by H.A.Leffingwell of Jersey Production Research Company, U.S.A.

I have read and digested the above report, and wish to bring the following facts to your notice.

(1) Although this work was conducted in America it cannot be regarded as an independent report. It is based on the study of acid insoluble micro-fossils. Leffingwell's determinations and stratigraphic ranges of these fossils rely entirely on the published works of Cookson and her co-workers. No overseas (apart from New Zealand) work is cited.

(2) Foraminiferal evidence is cited to verify the ranges of the micro-plankton. But I suspect that in most cases the author copied this evidence directly from Cookson's published work. One must dispute the fact that the author has read some of the evidence cited. For example two important papers of Glaessner's (1955 and 1956) were in the form of private consultations for WAPET. (Cookson apparently has acess to these two reports). There are also unpublished reports by Crespin and Belford (1956) and by Ludbrook (1956) that can only be obtained by special request.

(3) The author has quoted foraminiferal evidence from other areas but has ignored the substantial foraminiferal evidence now being assembled from material from Port Campbell No.1 and other bores in Western Victoria. At the time that Leffingwell furnished his report (8.8.60) Frome Broken Hill Co. Pty.Ltd., had reports and verbal opinions from me which contradict his views.

The three criticisms above are minor yet important in appreciating the evidence cited in Leffingwell's report.

I agree with Leffingwell that the top of the Cretaceous is around the 3997 foot level. However an Upper Turonian-Senonian age for the interval 3997-5662 feet is much younger than the age obtained from the examination of the foraminifera. My age determinations for this interval are (i) 5656-5030 feet is Middle Albian; (ii) 5025-4695 feet is Upper Albian; and (iii) 4695-4000 feet (approx.) is Upper Albian to immediate post Albian (e.g.Cenomanian)

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My age determinations are based on the world-wide distribution of pelagic and other selected foraminifera which are fully documented in overseas literature published since 1957. Also the Port Campbell fauna as a whole assemblage shows a remarkable resemblance to other Albian faunas in Australasia and elsewhere. The upper Albian determination for the interval 5025-4695 feet is the most reliable one and the other two determinations are based on it. Praeglobotruncana planispira (Tappan) and Pallaimorphina ruckeri Tappan both of which range from middle to upper Albian in North America and the former has a similar range in England (the Upper Cretaceous form described by Bolli (1959) as P.planispira is not conspecific), are restricted to the interval 5025-4695 feet in Port Campbell No.1. The occurrence of Pleurostomella and Eoguttulina in this interval rules out a pre-upper Albian age as the first appearance of both of these genera throughout the world is upper Albian.

The middle Albian age for the interval 5656-5030 feet is based on the absence of many upper Albian forms and the presence of Haplophragmoides gigas Cushman and Textularia washitensis Carsey (which persist to 4695 feet) whose North American range is middle to upper Albian. Above 4695 feet foraminifera are rare with diagnostic forms absent, but H.dickinsoni Crespin and T.anocooraensis Crespin continue from the definite upper Albian.

Thus I propose three consecutive ages for the marine cretaceous beds above 5656 feet in Port Campbell No.1 Well. Further more I find that these three "age assemblages" hold true for Port Campbell No.2 Well.

Referring back to the evidence cited by Leffingwell (in point of fact Cookson) I note that the stratigraphic range for his key fossils from the intervals 5705-5707 feet and 5931-5933 feet are based partly on the foraminiferal studies by Glaessner, Crespin, and Belford of the Gerle Siltstone. Thus Leffingwell concludes an Albian to Lower Turonian age (probably Albian for lower interval) for both these intervals in Port Campbell No.1 In a recent paper by Belford on the Stratigraphy and Micropalaeontology of the Upper Cretaceous of Western Australia (1958 - Geologishchen Rundschau Band 47, Heft 2, Seite 629-647 Belford gives evidence that the lower Gerle Siltstone is of Albian age whilst the upper is Cenomanian to lower Turonian age. It is extremely significant that Belford's faunal list for the lower Gerle Siltstone is very similar to mine for the interval from 5025-4695 feet in Port Campbell No.1. But in Port Campbell No.1 there is no interval which contains a fauna similar to the upper Gerle Siltstone (or any other Upper Cretaceous fauna) as Globotruncana (sensu stricto) is absent together with other diagnostic forms of the Upper Cretaceous.

Thus we must conclude that Leffingwell is using the similar evidence for the interval 5933-5705 feet as I am for the interval 5025-4695 feet; and that he is forced to combine the evidence from two definite foraminiferal horizons of precise and distinct ages. Moreover foraminifera are absent from the interval 5933-5705 feet in Port Campbell No.1 and I and fellow workers (including Evans - B.M.R.) suggest that there is a disconformity at 5656 feet. As the range of fossils occurring between 5025 and 4695 feet is restricted and verified I have no hesitation in assigning an age (upper Albian) older than that assigned by Leffingwell, and suggesting that the present knowledge of the range of Cretaceous micro-plankton in Australasia, indeed throughout the world, has not reached the point of crystallization that the study of Cretaceous foraminifera has reached. Anomalies which exist between evidence cited by Leffingwell and that cited by me are due to the differences in comprehension of the significance of the world wide distribution of foraminifera. In no place has Leffingwell cited the world wide distribution of micro-planktonic forms quoted. A close scrutiny of other faunal evidence cited by Leffingwell, may also show that it is applied erroneously.

In conclusion may I note that my age determinations for the Marine Cretaceous sediments in Western Victoria differ from those given by Cookson, and I can dispute her evidence on similar grounds to above. I also differ from the opinions of Kenley (1959) based on pieces of ammonite shell from the Belfast no.4 Bore. Kenley gives an Upper Cretaceous age for the interval which I assign to the upper Albian (Lower Cretaceous). I feel that the ammonite material is so fragmentary that any family of age determination is daring. As stated earlier, there is an absence of foraminifera below 5656 feet and a disconformity is supposed. Thus I cannot commit myself on the age below 5656 feet, except that it must be pre-middle Albian and probably Aptian and/or pre Aptian. One can mention the analogy with the sediments of the Great Artesian Basin of Australia where the upper Albian Tambo Formation rests disconformably on the Aptian Roma Formation which in turn rest on the Blythesdale Group (upper Jurassic to earliest Cretaceous) (refer Whitehouse 1954). At this stage comparison of the Mesozoic sediments of Western Victoria with those of the Great Artesian Basin is purely an analogy as only one restricted foraminiferal fauna gives direct correlation.

Sgd.David Taylor

Geologist.