DEPARTMENT OF MINES
SOUTH AUSTRALIA
GEOLOGICAL SURVEY

THE PROBABLE STRATIGRAPHY OF WATER BORES AT MURRAYVILLE, VICTORIA

by

N.H. Ludbrook
Palaeontologist

Rept. Bk. No. 47/28
G.S. No. 1099
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D.M. 1255/58

29th July, 1958.

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Water Bores in the Murrayville area mostly intersect only the late Tertiary sequence of the Loxton Sands and Bookpurnong beds. Mid Tertiary limestones are encountered only below depths of about 300 feet. A similar sequence, reported to carry large supplies of underground water, occurs in the Hundred of Peebinga.

1. INTRODUCTION

Eight samples from House Bore at Pomona, 2 miles north of Murrayville, Victoria, and 3 samples from No. 2 Bore, Pomona, were submitted by E.P. O'Driscoll for determination of the probable sequence in the area. Samples were collected from the bore drain and have been numbered in order downwards as well as can be inferred from knowledge of the Tertiary sequence in the Pinnaroo district.

2. PREVIOUS WORK AT MURRAYVILLE ("MALLEE BORES").

Results of palaeontological examination of 11 bores sunk in 1908 at 2-mile intervals eastward from about 6 miles east of Pinnaroo were published in 1916 (Chapman, F. Cainozoic Geology of the Mallee and other Victorian Bores, Rec. Geol. Surv. Vic. 3, (4) pp. 327-430, pls. 63-78). The fossil lists published by Chapman are informative and have enabled the sequence penetrated in these bores to be inferred in the light of present knowledge. Only Bore 11 appears to have gone any deeper than the top of the Pata Limestone. The estuarine sands with brackish water and marine shells interpreted as being of Lower Pliocene age appear to be Loxton Sands, overlying greensands and shell marls with Leiopyrga quadricinnulata, associated with a microfauna characteristic of the Bookpurnong Beds. Below 272 feet in Bore 11 the normal marine sequence is gradational downwards from Pata Limestone to equivalents of the Gambier Limestone. Above the greensands and glauconitic clays with Leiopyrga Bores 7 to 11 penetrated black and dark grey silts and sands that have not been observed elsewhere. These are believed to be non marine equivalents of the Loxton Sands which

are themselves of shallow water littoral to estuarine origin.

3. BORES AT POMONA, MURRAYVILLE.

As far as can be deduced from the limited amount of material available the Pomona bores passed through about 115 feet of Quaternary sands and ferruginous sandstones overlying about 60 feet of carbonaceous silty sands, apparently the same as those referred to above. Below 178 feet the glauconitic marls and sands of the Bookpurnong Beds continued to 303 feet with a highly glauconitic transitional bed at 300-303 feet. Below 303 feet the normal marine limestones gradational downwards from Pata Limestone were intersected to 800 feet.

These are mostly of Lower Miocene age, passing downwards to equivalents of the Gambier Limestone (Oligocene).

4. POMONA SAMPLES

Pomona House Bore

Sample 1. F 83/58

Brown clayey quartz sand. Correlation of the sample is doubtful.

Sample 2. F 84/58

Fine brown yellow and white clayey sand. No positive correlative evidence is available, but it may belong to the Quaternary.

Sample 3. F 85/58

Buff-brown clayey sand. Age doubtful.

Sample 4. F 86/58

Fine grey sand, with angular even grains. No positive evidence of the age was obtainable; suggested correlation is with the silts in the Mallee Bores referred to above.

Sample 5. F 87/58

Greenish grey clayey sand with Loiconyxra quadricirculata "Marginella" praeformicula, Elintina intermedia, Rotalia beccarii and Elphidium pseudonodosum.

Sample 6. F 88/58

Greenish grey shelly sand with Loiconyxra quadricinculata etc.

This and Sample 5 belong to the Bookpurnong Beds.

Sample 7. F 89/58

Highly glauconitic green marl with Austrotrillina, Orbulina, Quasculina and Cressinella. The age of this is very close to that of the Pata Limestone.

Sample 8. F 90/58

Light grey marly limestone - Pata Limestone.

Pomona Bore 2.

Sample 1. F 91/58

Carbonaceous quartz grit.

As suggested above, a possible non-marine equivalent of the Loxton Sands.

Sample 2. F 92/58

Green glauconitic sandy clay, equivalent to Sample 7 from house bore.

Sample 3. F 93/58

Light grey marly bryozoal limestone, with Globigerinoides triloba, Globigerinoides bisphaerica, Dyonides repandus, Cymbina globulus, Carpenteria rotaliformis, Calcarina verriculata, Amphistegina lessonii, Quasculina victoriensis.

This is of Lower Miocene age, at the level of the Morgan Limestone.

6. CORRELATION

An attempt has been made in Table I to correlate the Pomona Bores and Mallee Bores with a bore in Hundred of Peebinga, Section 27, samples from which were obtained by Mr. H.R. Webb, Boring Contractor, Pinnaroo. Here also only deeper bores appear to go below the top of the Pata Limestone. Mr. Webb reported abundant supplies of water in the area.

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HHL:AGK
29/7/58

TABLE I.

Composite log	Probable Formation	MALLEE BORES											POMONA BORES			BD. PEERINGA SEC. 27
		1	2	3	4	5	6	7	8	9	10	11	1	2	House	
Dark brown loamy sand		0-3	1-5			0-3	4-14	0-4	0-3	0-3	0-20	0-1	0-1			
Light brown clay and kunkar		3-22	5-29			3-11		4-33	3-22	3-14	20-21	1-28	1-10			
Ferruginous sandstone						11-22										0
Red ferruginous sand	Recent					22-31				14-18						to
White clay	to	22-41								18-45			10-40			73
Light red sand and clay	Late Tertiary					31-39	14-20				21-30		40-67			
Bright yellow sand	or	41-46						33-42		45-56						
White limestone	Pleistocene									56-69	30-45					
White quartz sand		46-89	29-99			39-62	20-43	42-71	22-70		45-58	28-45	67-75			
Fine brown and pink sand		89-140	99-109						70-71	69-73		45-130	75-115		2	
Green and brown sandy clay				No	No						58-85					
White chalky limestone and sandstone										73-90	85-87					
Fine yellow sand							43-56	71-78								
White micaceous sand						62-133		78-132								
Hard shelly limestone						133-138										
Yellow ochreous clay	Loxton					138-155										73
Grit and sand	Sands	140-141	109-110				56-104									to
Yellow ferruginous micaceous sandstone		141-154	110-157				104-114									135
Black silt				Samples	Samples						87-101		115-150		4	
Dark grey sand	? Loxton Sands							132-142	71-95	90-253	101-160		150-172	1		
Coarse grey sand and grit	Equivalents								95-160			130-148	172-178			
Light brown sand																
Green micaceous sand												148-175				
Glauconitic shelly clay and sand	Bookpurnong	154-210	157-198			155-159	114-154		160-204	253-263 263-273	160-195	175-199	178-247		5	135
Fossiliferous greensand	Beds	210-212	198-200	226		159-175	154-161	142-155	204-236	273-315	195-225	199-209	247-269			to
Soft blue clay					163-170	175-189					225-306	209-265	269-300		6	210
White to grey marl	Transitional	212-215	200-211		170-190	189-190				315-325	306-320					
Glauconitic calcareous sandstone	to Pata Limestone	215-244	211-240	260								265-272	300-303	2	7	
Light grey limestone	Morgan Limestone etc.											272-600	303-800	3	8	213