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DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

PALAEONTOLOGY SECTION

MELTON PASTORAL COMPANY BORES - STRATIGRAPHIC CORRELATION

by

T. M. Steel
Geologist

15th March, 1963

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ABSTRACT:

Eight bores drilled in the Eucla Basin for the Melton Pastoral Company have been examined. The most easterly bore, number 3A, intersected the most complete marine sequence encountered in the area, passing through Miocene (Nullarbor Limestone) and Eocene (Wilson Bluff Limestone) before bottoming in black shales of Cretaceous Age. These marine beds progressively wedge out toward the northwest, and in bores 45 and 46, no marine sections were encountered, recent sands apparently resting directly on non marine sediments which may be of Mesozoic age.

1. INTRODUCTION:

A further eight of the bores drilled in the Western Australian portion of the Eucla Basin for the Melton Pastoral Company have been submitted for examination and stratigraphic correlation. Particular interest was expressed in the presence or otherwise of Cretaceous sediments. Samples were taken at somewhat infrequent intervals and stratigraphic boundaries are therefore approximate in some cases.

2. STRATIGRAPHY:

1. Surface clays and sands

A layer of redbrown sandy clays and sands forms a thin surface cover. The sands are composed of fine wellrounded ironstained quartz grains of probably aeolian origin.

2. Miocene (Nullarbor Limestone)

Light yellow brown and reddish slightly ironstained crystalline limestone was intersected in all but bores 45 and 46, varying in thickness from 37 feet in bore No. 52 to a maximum of about 100 feet in bore No. 58. Fossils are rare, probably due to the extensive recrystallisation. One specimen of *Marginopora vertebralis* was identified.

3. Eocene (Wilson Bluff Limestone)

White bryozoal limestones of Eocene age containing an abundant fauna were intersected in bore No. 58 at 101 feet and in bore 3A at 60 feet. This limestone has been extensively recrystallized and preservation of the fauna is poor, but foraminifera identified include *Maslinella chapmani*;

Dorothia sp B; Stomatorbina concentrica; Cassidulina sp. Cibicides umbonifer and Lenticulina sp.

Gyroidina soldanii, which was recorded from bore 23 in an earlier report (Pal. Rep. 17/62) was misidentified and should be recorded as Gyroidina octocamerata. Maslinella chapmani can also be added for this interval.

4. Cretaceous

At a depth of 106 feet in bore 3A, a sequence of black sandy and glauconitic clays was intersected. This contained an abundant fauna, including cf. Haplophragmoides sp. 1; Haplophragmoides sp. 10; Textularia sp. 7; Ammobaculites sp.; and Bathysiphon sp.

This material continued to the bottom of the bore at 200 feet, and is Cretaceous in age.

5. ?Mesozoic (Sands and grits)

Bores 45 and 46 penetrated a sequence of clayey fine to coarse sands and grits with occasional gravels, becoming micaceous and felspathic near the base, and probably representing a bedrock derivative. There is no sign of marine sedimentation in these two bores, which are the most northwesterly of those drilled. The age is uncertain, but the kaolinitic gritty nature of some of the material is reminiscent of sediments intersected in the Maralinga area, the age of which is post Permian and pre-Cretaceous. (Ludbrook 1961a & 1961b).

3. CONCLUSIONS:

Bore 3A, which is the most easterly of the bores drilled, intersected a sequence of Recent, Miocene and Eocene sediments before bottoming in clays of Cretaceous age. The older sediments wedge out progressively toward the northwest, and bores 45 and 46, which intersected no marine horizons, represent the probable edge of the marine sedimentary basin.

REFERENCES:

LUDBROOK, N.H. 1961a. Subsurface Stratigraphy of the Maralinga Area, South Australia. Trans. Roy. Soc. S.Aust. (1961) Vol. 84, pp. 51-59. figs. 1, 2.

LUDBROOK, N.H. 1961b. Permian to Cretaceous Subsurface Stratigraphy between Lake Phillipson and the Peake and Denison Ranges, South Australia. Trans. Roy. Soc. S.Aust. (1961) Vol. 85 pp. 68-80. Fig. 1.

4. LOGS

Bore No. 52

17.75 miles Nth. of 192.5 mile peg T.C.R. East of Kalgoorlie

0 - 5'	Red brown very fine sandy surface clay - sand composed of wellrounded ironstained quartz grains.
5' - 27'	Very light yellow brown crystalline limestone.
27' - 42'	Offwhite crystalline limestone.
42' - 60'	Greenish grey and redbrown slightly sandy clay with abundant small crystalline limestone rubble.
60' - 70'	Light yellowbrown and grey slightly sandy clay with some fine limestone rubble.
70' - 75'	Grey slightly clayey fine to coarse angular to wellrounded quartz sand with some small limestone fragments.
75' - 78'	Light yellow brown clayey fine to medium angular to subrounded quartz sand with a few limestone fragments - slightly micaceous.
78' - 100'	Grey very slightly clayey fine to medium sand with a few small limestone fragments. Sand consists of angular to subrounded slightly ironstained quartz grains - slightly micaceous.
100' - 200'	Yellow brown clayey very fine to medium angular quartz sand - slightly micaceous. Quartz grains occasionally ironstained.

Bore No. 66A

14 miles North of 198 mile peg T.C.R. East of Kalgoorlie

0 - 14'	Redbrown very fine to medium sandy clay with some limestone rubble. Sand fraction composed of very angular to wellrounded ironstained quartz grains.
14' - 70'	Light yellow brown slightly sandy crystalline limestone, becoming clayey from 38 feet.
70' - 81'	Pale brown very clayey fine to coarse quartz sand and grit with limestone fragments and abundant pellets of limonitic clay or brown glauconite.
81' - 120'	Light brown and grey fine to coarse angular to wellrounded quartz sand and grit with some small limestone fragments.
120' - 200'	Yellow brown very fine sandy clay with some larger wellrounded quartz grit and a few limestone fragments. Some small mica flakes are present.

Bore No. 3A

5.5 miles North of 207.5 mile peg T.C.R. East of Kalgoorlie

0 - 12'	Redbrown sandy clay soil - sand grains wellrounded, fine to medium ironstained quartz - a very little limestone is present.
12' - 30'	White and light yellowbrown crystalline limestone
30' - 43'	White and light yellow brown crystalline limestone, becoming slightly ironstained in parts.
43' - 60'	White and light yellow brown crystalline limestone, containing one specimen of Marginopora vertebralis.
60' - 82'	White crystalline limestone containing common bryozoa and rare foraminifera, including cf. Cibicides umbonifer.
82' - 90'	Offwhite crystalline limestone. Bryozoa are abundant and small brachiopods are common. Foraminifera common, and include Maslinella chapmani and Stomatorbina concentrica.
90' - 106'	Greenish grey slightly sandy clay with abundant limestone fragments, and well rounded ferruginous grains (? limenite). Broken bryozoa are common, brachiopods are frequent and foraminifera abundant but poorly preserved. Forms present are Cibicides umbonifer; Dorothia sp. B; Cassidulina sp. and Lenticulina sp.

Bore No. 3A (Contd.)

106' - 200' Black slightly sandy and glauconitic clay with much wellrounded ferruginous material (? limonite). A few limestone fragments probably cavings from above.

Foraminifera are abundant, and include several species of Haplophragmoides, also Textularia sp. B; Bathysiphon sp. and Ammobaculites sp..

This clay is Cretaceous in Age.

Bore No. 45

30 miles Nth. of 189 mile peg T.C.R. East of Kalgoorlie.

0' - 8' Redbrown clayey soil with some very fine to coarse wellrounded and angular ironstained quartz grains. A little plant material.

8' - 10' Fine to coarse angular and wellrounded sandy and gravelly clay. Sand and gravel fraction composed mainly of quartz with a little quartzite.

10' - 70' Light brown slightly clayey kaolinitic fine to coarse quartz sand and gravel, generally angular and clear, but with some smoky quartz.

70' - 144' Very slightly clayey fine to coarse angular clear quartz sand. Some minor ferruginous cementing and staining.

144' - 146' Slightly clayey fine sand and silt consisting of very angular clear quartz and small mica flakes with occasional pieces of felspar.

Probably a bedrock derivative.

Bore No. 46

27 miles North of 188 mile peg T.C.R. East of Kalgoorlie

0' - 6' Red brown slightly sandy clay soil. Sand fraction composed of very fine to medium rounded often ironstained quartz grains. Some larger grit size quartz and small fragments of soft kunkar (up to ¼") are present.

6' - 75' Light brown slightly clayey kaolinitic fine to coarse angular and wellrounded quartz sand, the grains often pitted and ironstained.

75' - 151' Slightly clayey fine to medium sand, composed of clear angular quartz, with mica and minor felspar and small black crystals (? hornblende or augite). Probably a bedrock derivative.

Bore No. 24A

7 miles North of 193 mile peg T.C.R. East of Kalgoorlie

0'	- 1'	Greenish grey clay containing very abundant gravel size fragments of white and light-brown crystalline limestone.
1'	- 27'	Light yellow brown crystalline and chalky limestone, the chalky pieces generally porous.
27'	- 42'	Light yellow brown crystalline limestone with patches of fine sandy clay.
42'	- 50'	Light yellow brown slightly sandy clayey crystalline limestone gravel. One gastropod cast and one recrystallised foraminifer, both too poorly preserved to identify.
50'	- 70'	Light redbrown crystalline limestone with occasional ironstaining.
70'	- 80'	Light grey slightly clayey fine to medium angular quartz sand with very abundant subrounded clear quartz grit.

Bore No. 53

16.5 miles North of 195 mile peg T.C.R. East of Kalgoorlie

0	- 11'	Redbrown slightly sandy surface clay - sand composed of fine well rounded ironstained quartz grains.
11	- 35'	Light red andyellow brown crystalline limestone. Some parts kunkarised and ironstained, probably from near surface.
35'	- 60'	Red, brown and greenish grey slightly clayey and sandy rubbly limestone, the rubble consisting of white crystalline limestone, and the sand of very fine angular clear quartz grains.
60'	- 84'	Light yellow brown crystalline limestone with common angular to subrounded clear quartz grains and rare calcite crystals.
84'	- 200'	Light yellow brown very clayey very fine to medium clear angular to subrounded quartz sandstone with a few limestone fragments.

Bore No. 58

8 miles North of 193.5 mile peg T.C.R. East of Kalgoorlie
9 (30 yards N.W. of bore 24)

0' - 14'	Redbrown slightly sandy clay, the sand fraction composed of fine to medium wellrounded iron-stained quartz grains.
14' - 28'	Light yellow brown crystalline limestone - occasional small wellrounded ironstained quartz grains.
28' - 57'	Pinkish and light redbrown crystalline limestone with some redbrown calcareous clay lenses or pockets.
57' - 90'	Light yellow brown crystalline limestone with abundant calcite crystals.
90' - 101'	Light redbrown and white crystalline limestone with redbrown sandy clay pockets.
101' - 112'	White crystalline limestone with common bryozoa and echinoid spines. Some ironstaining. Occasional small pockets of redbrown clayey sand. Foraminifera common, and include Maslinella chapmani, Dorothia sp. B and Stomatorbina concentrica.
112' - 115'	White crystalline limestone with abundant bryozoa and echinoid spines. Foraminifera abundant, but not very well preserved, include Stomatorbina concentrica; Dorothia sp. B and Cibicides cf. umbonifer.

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