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Microscopic examination of  
bore samples from Maree,  
South Australian

by

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MINERAL RESOURCES SURVEYMICROSCOPIC EXAMINATION OF BORE SAMPLES FROM MARREESOUTH AUSTRALIA.

(Report No. 1945/3).

Marree is situated 441 miles north of Adelaide, on the Central Australia Railway and is 30 miles east-southeast of Lake Eyre South. The bore under discussion is the first of a series which is being examined for a microfauna from the Great Artesian Basin in South Australia.

The samples examined were collected from the surface to the depth of 380 feet. Howchin (1884, 1893, 1895) reported on material from two bores at Hergott Springs (now Marree), the depth of these being No. 1, 309 feet and No. 2, 342 feet. He listed a microfauna from both bores. He has given a detailed account of his examination of samples from No. 1 Bore (1884) and reference will be made to this later. He considered the age of the foraminifera to be Cretaceous.

Howchin in his notes on No. 2 Bore, Hergott Springs (1895) commented that "a very strong artesian spring has been tapped", but he does not say at what depth in the bore. It is assumed that it occurred directly beneath the sample taken at 342 feet. According to sections given by Jack (1930), the main aquifer occurs in the Jurassic just below its contact with the overlying Lower Cretaceous. In his Section CC (Lake Torrens to Goyder's Lagoon) the Marree Bore at present under consideration, is shown near the western limit of the Lower Cretaceous in the Great Artesian Basin in South Australia. Jack interpreted the Marree bore as having proved a relatively thin development of Lower Cretaceous overlying a very thin section of Jurassic, which in its turn overlies the basement rock. The basement rock outcrops about 4 miles to the west of this bore and its age, according to Jack, is Cambrian or older.

From the surface down to 290 feet in the present bore, the samples consist of grey shale and sandstone, with a little mica and a few fine fragments of carbonaceous material. These sediments contain a micro-fauna consisting of numerous foraminifera and a few ostracoda, together with a few fragments of molluscan shells. The foraminifera and ostracoda are referable to Cretaceous species and the assemblage is similar to that of the Lower Cretaceous beds of similar lithology examined from bores in the Great Artesian Basin of northern New South Wales. (Crespin, 1944).

Howchin (1884) stated that three-fourths of the whole number of foraminifera recorded from No. 1 Bore, Hergott Springs (Marree) belonged to the arenaceous type, but in the present bore the tests show some variation in character. Arenaceous forms predominate over hyaline down to 140 feet but from 150 feet down to 250 feet, the majority of the tests are hyaline and belong mainly to the Family Lagenidae. The small rotaline genus Anomalina is also common. Many of the arenaceous tests are crushed or broken and difficult to determine. The abundance of species referable to the Lagenidae indicates deposition under shallow water conditions.

Fragments of a pelecypod indeterminate and of Dentalium sp. are also present. Howchin noted these forms in bores examined by him from Marree.

At 300 feet the sample consists of grey shale with numerous quartz and glauconite grains.

From 310 feet down to 330 feet the samples contain a mixture of grey shale and hard greenish calcareous rock, with numerous angular quartz grains and some glauconite.

From 340 feet down to the base of the bore at 380 feet, the samples consist entirely of hard greenish calcareous rock which forms the basement rock in the area.

The admixture of the two rock types in samples from 310 feet to 330 feet is probably due to the method of drilling used and it is probable therefore that bedrock was entered at about 310 feet. There is no direct evidence in the samples examined to suggest that rocks of ages other than Cretaceous (and Cambrian or older) are present in the sequence. However, Jack considered that the aquifer which was penetrated is in the Jurassic. It is possible therefore that the quartz and glauconite grains recorded in association with the fragments of grey shale at 300 feet may be of Jurassic age.

A detailed report of the microscopic examination of the bore samples is given below:

0 - 40 feet - Grey shale, with foraminifera (Ammodiscus sp., Trochammina sp.).

40-110 feet - Grey sandstone, with foraminifera, arenaceous genera being common.

FORAMINIFERA: Ammodiscus sp., Reophax sp., Haplophragmoides chapmani, Ammodiscus sp., Bigenerina sp., Spiroplectammina cushmani, Bathysiphon sp., Lenticulina sp., Planulina cretacea.

120 feet - Grey shale, with numerous foraminifera, chiefly arenaceous forms, and ostracoda.

FORAMINIFERA: Haplophragmoides chapmani, H. sp., Ammodiscus australe, cf. Spiroplectammina sp., Trochammina raggatti, Marginulina sp., Lenticulina warregoensis, Anomalina rubiginosa.

OSTRACODA: cf. Cytheropteron (filled with calcite).

130 feet - Grey sandy shale with foraminifera (Haplophragmoides sp., cf. Bathysiphon, Ammodiscus sp., cf. Ammodiscus sp., Spiroplectammina sp., Lenticulina spp., Anomalina rubiginosa).

140 feet - Grey shale with foraminifera (Haplophragmoides spp., Bathysiphon sp., cf. Ammodiscus sp., Spiroplectammina sp., Marginulina cf. texana, Lenticulina gunderbockaensis.)

150 feet - Grey shale, with foraminifera, hyaline tests predominating, fragments of pelecypod and ostracoda.

FORAMINIFERA: Haplophragmoides sp., Trochammina sp., Nodosaria limbata, Marginulina spp., Lenticulina warregoensis, L. sp., Anomalina rubiginosa, Patellina jonesi.

OSTRACODA: Cytheropteron sp.

160 feet - Grey shale, with numerous foraminifera, arenaceous forms being very scarce.

FORAMINIFERA: Reophax sp., Spiroplectammina sp., Marsson oxycona, Haplophragmoides sp., Bulimina reussi, B. cf. guembelina sp., Lagena apiculata var. elliptica, Pseudoglandulina lagenoides, Marginulina austinana var. dir

160 feet (foraminifera continued). Marginulina sp., Lenticulina gunderbookaensis, L. gibba, L. grata, L. warregoensis, L. crepidula, Saracenaria acutauricularis, Planulina cretacea, Patellina jonesi, Anomalina rubiginosa, Globulina laerima, Pyrulina cylindroides.

170-190 feet - Grey shale with foraminifera, fragments of pelecypod, ostracoda and pyrites.

FORAMINIFERA: Haplophragmoides sp., Marssonella oxycona, Spiroplectammia sp., Marginulina sp., M. austinana var. directa, M. elongata, Lenticulina cf. discrepans, L. cf. gibba, L. cf. truncata, L. gunderbookaensis, L. warregoensis, L. sp., Globulina laerima, Patellina jonesi, Anomalina rubiginosa, Planulina cretacea.

OSTRACODA: Bythocypris sp., Gytheronteron sp.

200-210 feet - Grey shale, with a few foraminifera (Lenticulina gunderbookaensis, L. sp., Marginulina sp., Anomalina rubiginosa).

220 feet - Grey shale, with foraminifera scarce (Planulina cretacea), fragments of pelecypoda indeterminate, Dentalium sp., and pyrites.

230 feet - Grey shale, with a few particles of carbonaceous material, mica, foraminifera scarce (Marginulina sp., Anomalina rubiginosa), and fragments of pelecypoda indeterminate.

240 feet - Similar to 230 feet but with no foraminifera.

250 feet - Grey shale, with a few tests of foraminifera, somewhat decomposed, and with some broken and filled with calcite.

FORAMINIFERA: Haplophragmoides sp., Ammobaculites cf. australe, cf. Dentalina, Marginulina sp., Lenticulina gunderbookaensis, L. crepidula, L. gibba, L. warregoensis, Saracenaria acutauricularis, Globulina exserta, cf. Pyrulina cylindroides, Planulina cretacea, Anomalina rubiginosa.

OSTRACODA: Pontocypris sp. nov.

260 feet - Grey shale, with foraminifera scarce (Lenticulina sp.).

270 feet - Grey shale, with foraminifera scarce and poorly preserved.


290 feet - Grey shale, with foraminifera scarce (Haplophragmoides sp.) fragment of pelecypoda indeterminate, a little glauconite, and a few quartz grains.

300 feet - Grey shale with some glauconite and quartz grains more abundant, but no foraminifera.

310-330 feet - Particles of shale, and hard greenish calcareous rock, with angular to subangular quartz grains.

340-380 feet - Hard, greenish, calcareous rock.

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