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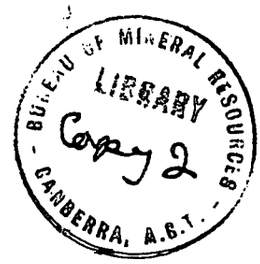

MICROPALAEONTOLOGICAL EXAMINATION OF SAMPLES FROM THE COOK BORE, NULLARBOR PLAINS, SOUTH AUSTRALIA.

by

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In 1944 Mr.L.C.Noakes collected samples for micropalaeontological examination from three of the many bores that had been drilled by percussion method for water on the Nullarbor Plains during the construction of the Trans-Continental railway line between Kalgoorlie and Port Augusta. These samples were housed in the Commonwealth Railway Stores at Port Augusta, South Australia. The bore at the settlement of Cook is situated 85 miles east of the boundary between Western Australia and South Australia and between the 520 and 510 mile posts. Mr. Noakes also managed to secure "Drawing No.593" dated 25.5.18, which bears the title "Commonwealth Railways, Kalgoorlie to Port Augusta, Plans and Sections of Bores" (Numbers obliterated). The section of the Cook Bore indicated that water was struck at 317 feet and 440 feet. The bore was drilled to the depth of 1,208 feet. The samples obtained by Mr. Noakes were small but were taken at regular intervals; the only major interval was between samples at 454 feet and 604 feet. However, foraminiferal assemblages, resembling those found in the Tertiary deposits of the Carnarvon Basin, Western Australia and in the Lower Cretaceous rocks of the Great Artesian Basin and in the Carnarvon Basin, have been recognised.

In the brief description given below, the samples have been grouped according to the different lithological characteristics.

0-112 feet.

Cream to pinkish crystalline limestone with poorly preserved foraminifera, echinoid spines and fragments of casts of molluscan shells. The foraminifera include Archais sp., Triloculina tricarinata, Quinqueloculina spp., Marginopora sp., Elphidium adelaidense, E.rotatum, Rotorbinella cycloclypeus, Operculina sp., "Rotalia" beccarii.

112-137 feet.

White to pinkish limestone rather chalky in texture with poorly preserved foraminifera, including Austrotrillina howchini, Elphidium sp., Patellina cf. corrugata, Globulina sp.

137-224 feet.

Friable white, chalky calcarenite with numerous glauconite grains, and bryozoa and many poorly preserved small foraminifera including Anomalina sp., Cibicides umbonifer, Eponides repandus, Eponides spp., Lagena hexagona, L.sulcata and Stomatorbina cf. torrei.

225-288 feet.

Sandstone with polished quartz grains, grains of green and brown glauconite, and small foraminifera, chiefly with tests infilled with glauconite. The species included Anomalina aff. midwayensis, Cassidulina inconspicua, Cibicides umbonifer and Stomatorbina cf. torrei.

288-346 feet.

Dark brown to black sandy carbonaceous claystone with fine glauconite grains and abundant pyrite in finest washings. Calcareous sponge spicules and a few radiolaria (Porodiscus and Cenosphaera) were present but they were almost completely replaced by pyrite.

346-409 feet.

Grey siltstone with poorly preserved tests of arenaceous foraminifera and radiolaria.

423-604 feet.

Grey sandstone with abundant pyrites and arenaceous foraminifera.

Ammodiscus cf. cretaceus (r) (432 feet)
Ammobaculites cf. minimus (r) (604 feet)
Spiroplectammina cushmani (c) (423 and 604 feet)
Spiroplectammina cf. edgelli (r) (423 feet)
Siphotextularia aff. washitensis (f) (423 feet)
Quinqueloculina sp. (r) (423 feet)
Verneuilinoides cf. schizea (r) (604 feet)

604-649 feet.

Quartz sandstone.

649-1208 feet.

Purplish red to green shales with fragments of siliceous rocks. A siliceous oolitic rock was present at 731 feet.

NOTE ON THE SAMPLES

Although the foraminifera in the samples from the surface down to 288 feet contain foraminifera which are not well preserved, the available evidence indicates that they are of Tertiary age. From the surface down to 112 feet, the foraminifera that have been determined suggest that the beds may be Lower Pliocene in age and are probable the equivalent of the Lower Pliocene deposits in the Adelaide Basin. Austrotrillina howchini is present in the sample from 112 feet down to 120 feet and the beds down to 137 feet are considered to be of Miocene age. A.howchini is well represented in the f1-2 beds in bores in the Adelaide Basin and it is a characteristic form in the limestones of the Trealla Formation in the Carnarvon Basin.

At 137 feet there is a marked change in lithology from the hard crystalline limestone of the Miocene to the friable chalky bryozoal calcarenite with numerous glauconite grains which is most probably Eocene in age. The foraminifera are all small species and because of the chalky preservation are difficult to determine specifically. However, Cibicides umbonifer, described by Parr from the Upper Eocene of the King's Park Bore, Perth, is represented by well preserved specimens whilst one of the species of Eponides is similar to an undescribed form common in the Eocene of Port Noarlunga and Aldinga, South Australia and southern Victoria. This bed suggests the equivalent of the Giralia Calcarenite of the Carnarvon Basin.

At 255 feet the bore passes into sandstone with abundant glauconite grains which continues down to 288 feet. Small foraminifera, with tests partially replaced by glauconite are present and the species are similar to those found in the

chalky calcarenite above. On available evidence, this sand is probably basal Tertiary in age.

At 288 feet there is another distinct change in lithology. A dark brown to black sandy carbonaceous claystone is present down to 346 feet. This bed in the bore log (25.5.18) is referred to as "black slushy clay with little sand and pyrite". According to the sections shown in "Drawing No.393" mentioned above this deposit was only recorded in the Cook Bore. In describing this rock as a sandy carbonaceous claystone, W.B.Dallwitz comments on the abundance of carbonaceous material present. This carbon can be easily oxidized in hydrogen peroxide. This bed most probably is of Lower Cretaceous age.

Grey siltstone is present from 346 feet down to 409 feet and the presence of a few arenaceous foraminifera and radiolaria suggest a Lower Cretaceous age. The rock is similar in lithology to Lower Cretaceous deposits in the Great Artesian Basin.

From 423 feet down to 604 feet, the bore passes into grey sandstone which contains foraminifera typical of the Lower Cretaceous deposits of the Great Artesian Basin. This sandstone closely resembles that found in the Birdrong Formation of the Carnarvon Basin.

The beds from 604 feet down to 666 feet consist of unfossiliferous sandstone and no age is suggested for them.

From 684 feet down the base of the bore at 1,208 feet, the beds are most probably of Lower Palaeozoic age. The samples consist of purplish-red to green shales and siliceous rocks. A siliceous rock showing perfect examples of oolitic structure was present at 731 feet.