DEPARTMENT OF MINES
SOUTH AUSTRALIA

POTASSIUM

SOUTH AUSTRALIA

by

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CHIEF GEOLOGIST

31st October, 1973

Rept.Bk.No. 73/257
G.S. No. 5259
D.M. No. 715/72

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INTRODUCTION

South Australia has no current production of potassium minerals. Attention was given to occurrence of alunite during World War I when supplies of potash from Germany and France were cut off and almost 400 tonnes were marketed. The deposits are generally quite insignificant and have no commercial value.

Investigation of lake brines indicate that there is no enrichment with respect to potash.

ALUNITE

Alunite has been discovered in a number of widely separated areas in a variety of sedimentary rocks which range from Quaternary to Adelaidean in age. They appear to be mostly of secondary origin derived by reaction between sulphur from pyrite and clay minerals in the host rocks. However, the deposits of Yorke Peninsula, Nepabunna and of Pidinga have a bedded character.

The deposits of Carrickalinga Head (Jack, 1917), Rapid Bay, Warnertown (Jack, 1915) and Wirrealpa (Ridgway, 1953) are similar in nature and comprise high grade irregular, sporadic nodules ranging up to several tonnes in weight, elongated along bedding planes in

shales of Cambrian and Adelaidean age. Potash contents of samples range up to 10%. Production derived from shallow pits, trenches, shafts and adits amounted to 250 tonnes from the Carrikalinga and 40 tonnes from the Warnertown deposits.

Alunite occurs in irregular concretions in marine siltstones of Cretaceous age within the Arckaringa Basin, southwest of Oodnadatta. At Coober Pedy sodium partly replaces potassium.

Prospecting by adits into the face of a seacliff and by thirty four shafts at the top of the cliffs has outlined reserves of 40 000 tonnes of alunite near Port Vincent locality. There it occurs in irregular horizontal layers up to 0.2 m thick and as nodules in red clays, about 1 m thick, interbedded with Quaternary sands. Samples taken by Jack (1919) showed potash contents ranging up to 10.1% K_2O.

Sporadic irregular concretions of natroalunite, containing 5.2% K_2O and 4.5% Na_2O, have been reported to occur in white clays of Tertiary age in dissected tablelands 6 km south of Nepabunna (Dickinson, 1944).

The most extensive alunite deposits occur in the beds of a chain of saline lakes at Pidinga where drilling has disclosed reserves of about 235 000 tonnes, averaging 7.33% K_2O, at depths up to 14 m. (Armstrong, 1950).

BRINES

Speculation concerning the possible occurrence of potash in the beds of the saline lakes of the interior of the State (Anon, 1915) has since been resolved when sampling undertaken by the Department of Mines demonstrated that the contained brines do not contain abnormal

concentrations (Johns, 1963, 1968). Furthermore, the potassium contents, which are fairly constant at about 0.15% are appreciably lower than in sea water (1%). Whereas the Na:K ratio in sea water is 28:1 the Lake Eyre brines showed 69:1.

Despite the fact that the floor of Lake Gairdner and the surrounding catchment area are underlain by igneous rocks (felspar porphyry) with potash contents exceeding 5% the lake brines do not reflect a markedly higher potash content than those of other inland lakes which are underlain by sedimentary rocks.

The possibility of potash enrichment in the bed of Lake Torrens depended on the concept that the Lake Torrens Sunkland is a former extension of Spencer Gulf to which the sea had restricted access. Drilling has, however, confirmed that, since inception in the early Tertiary, over 300 m of sediments accumulated in a lacustrine environment. Evaporite sequences, including dolomite and gypsum, are considered to represent arid episodes during its history, not related to marine incursion.

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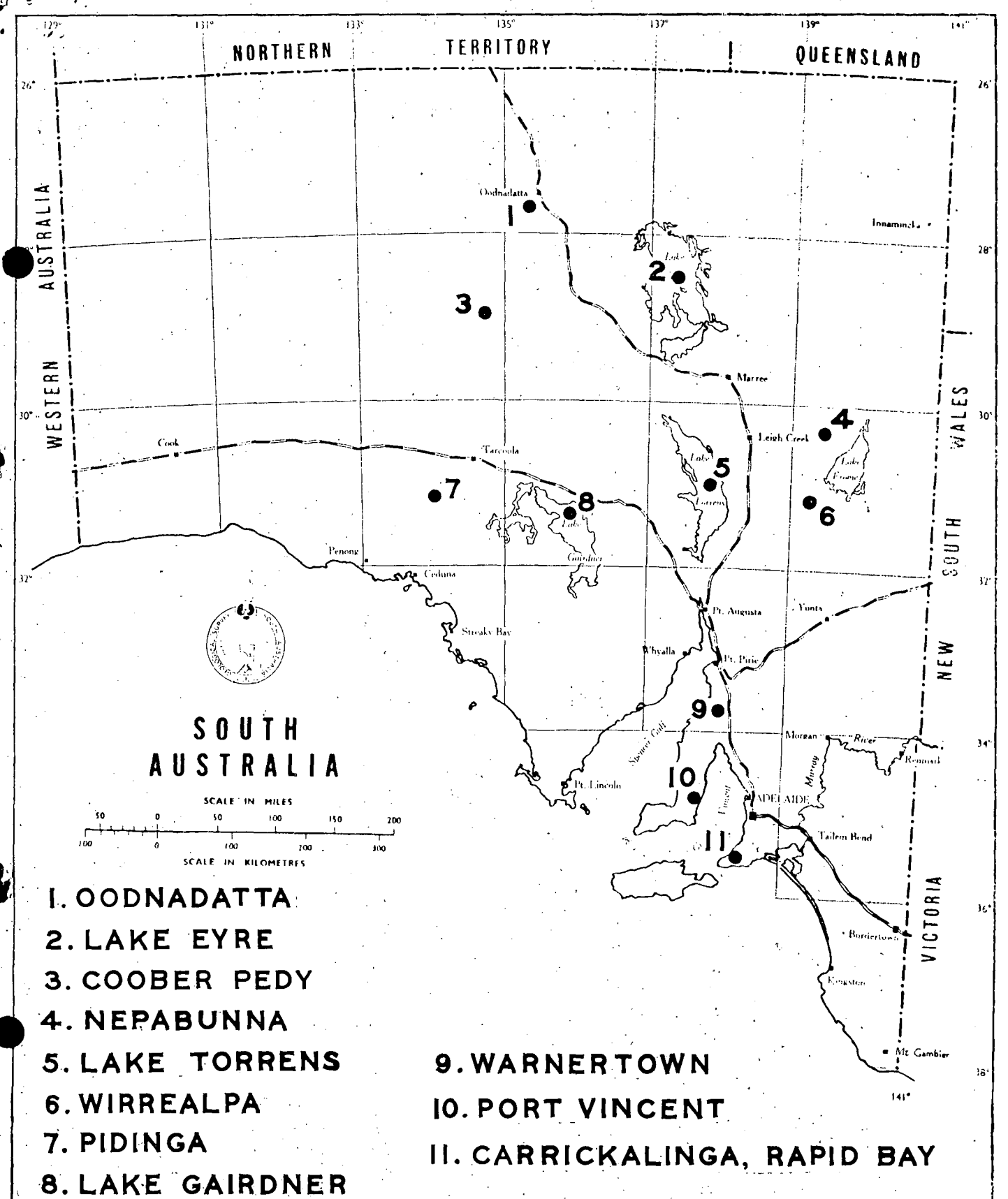

1. OODNADATTA
2. LAKE EYRE
3. COOBER PEDY
4. NEPABUNNA
5. LAKE TORRENS
6. WIRREALPA
7. PIDINGA
8. LAKE GAIRDNER
9. WARNERTOWN
10. PORT VINCENT
11. CARRICKALINGA, RAPID BAY

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