DEPARTMENT OF MINES
SOUTH AUSTRALIA

GRAPHITE

SOUTH AUSTRALIA

by

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Rept.Bk.No. 73/253
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INTRODUCTION

The principal disseminated flake graphite deposits, located on central and southern Eyre Peninsula, occur in schists and gneisses within Cleve Metamorphics of the Lincoln and Cleve uplands (Johns, 1961). These beds form a distinct stratigraphic unit, closely associated with jaspilites near the base of the Hutchison Group. They are traceable discontinuously, because of poor outcrop conditions, from the coast, to Uley, Koppio and over a wide area between Darke Peak and Cowell.

Graphite of the Lincoln Uplands occurs in finely disseminated folia or aggregations of coarse flake with quartz, felspar, biotite and haematite; magnesite is often intimately associated. At the surface of the various deposits graphite, being physically and chemically stable, is discernible in the commonly developed lateritic, ferruginous, magnesitic or clayey cappings. Most outcrops have been superficially prospected with shallow pits and trenches but mining has been confined to ground carrying 8% or more of flake graphite at the Uley and Koppie prospects.

In the Cleve Uplands the known graphite deposits are very fine grained and are of too low grade to be economic.

ULEY DEPOSIT

The Uley graphite mine, 22 km southwest of Port Lincoln, is based on a bed of graphite schist 2 to 10 m thick and enclosed by graphite quartz felspar gneisses at the crest of an anticlinal fold that pitches northerly at 25°.

The mine was opened in 1866 and a flotation mill was erected at the mine in 1928. The recorded production of 700 tonnes, most of which was recovered in the period 1941 to 1950, carried from 58% to 84% carbon.

The workings consist of an open cut and eight shafts. Up to 1920 the principal workings were on No. 2 shaft where cross cuts were opened on the 12 m, 15 m and 20 m levels. In 1920 stripping of overburden over an area of about 40 m square was commenced to enable the bed of graphite proven in No. 3 shaft cross-cuts to be worked by means of open cut. Graphite was extracted above the 20 m level by square-set stoping and from the open cut, above the 12 m level, by means of an incline which extended into the ore body as an inclined shaft to the 20 m level. A winze connected the 20 m level to the 35 m level which had been driven from the main two-compartment shaft. The weighted average assay value of samples from the 35 m level is 15.4% carbon and from the 20 m level 15.9% carbon.

Seven vertical diamond drill holes totalling 258 m were sunk by the S.A. Department of Mines in 1926 to outline 63 000 tonnes of ore from which it was estimated that 7 000 tonnes of flake graphite could be recovered.

High production costs made operations uneconomic in the face of restored overseas supplies after World War II and mining was suspended.

An electromagnetic survey was undertaken in an effort to detect

possible extensions of the known graphitic zones (Milton and McMutrie, 1960). Drilling, based on those results, intersected very finely divided graphite of too low grade to encourage hopes of extraction of easily won ore from extensions of the bed under shallow cover (Johns, 1961).

KOPPIO DEPOSIT

The Koppio mine, 45 km north of Port Lincoln, was opened on a bed of graphite schist 13 m thick that dips easterly at 35° to 85°. Little mining was carried out prior to 1917 when the ore was recovered from an open cut and several shafts. The mine was closed in 1917 and re-opened in 1941 when an adit 38 m long was connected to the old shaft. Drives were opened adjacent to the hanging and foot wall contacts and connected by two short cross cuts.

A diamond drill hole disclosed a thinning of the graphite bed and a steepening in dip of the strata at a depth of 40 m below the level of the adit. Assays of the drill core averaged 14.3% carbon.

Recorded production of concentrate during the period 1943 to 1946 amounts to 100 tonnes assaying 90% carbon. Magnesite is a common associate.

Proven reserves above the adit have been put at 4 000 tonnes of 12.2% ore with probable further reserves of 15 000 tonnes; these would be readily increased by further exploration along the strike of the bed.

CLEVE UPLANDS OCCURRENCES

Fine grained graphite schists have been disclosed at a number of localities in association with magnesite in close proximity to beds of ferruginous chert. Those have been prospected by means of trenches or shafts.

The Miltalie deposit, situated 19 km northwest of Cowell, was tested by diamond drilling in 1952. The graphite content of samples taken from the surface ranged from 15% to 23% but metallurgical tests showed that the grain size of the flotation concentrate was too fine to make a commercial product, as grinding to minus 200 mesh was required to free the graphite from the quartz gangue.

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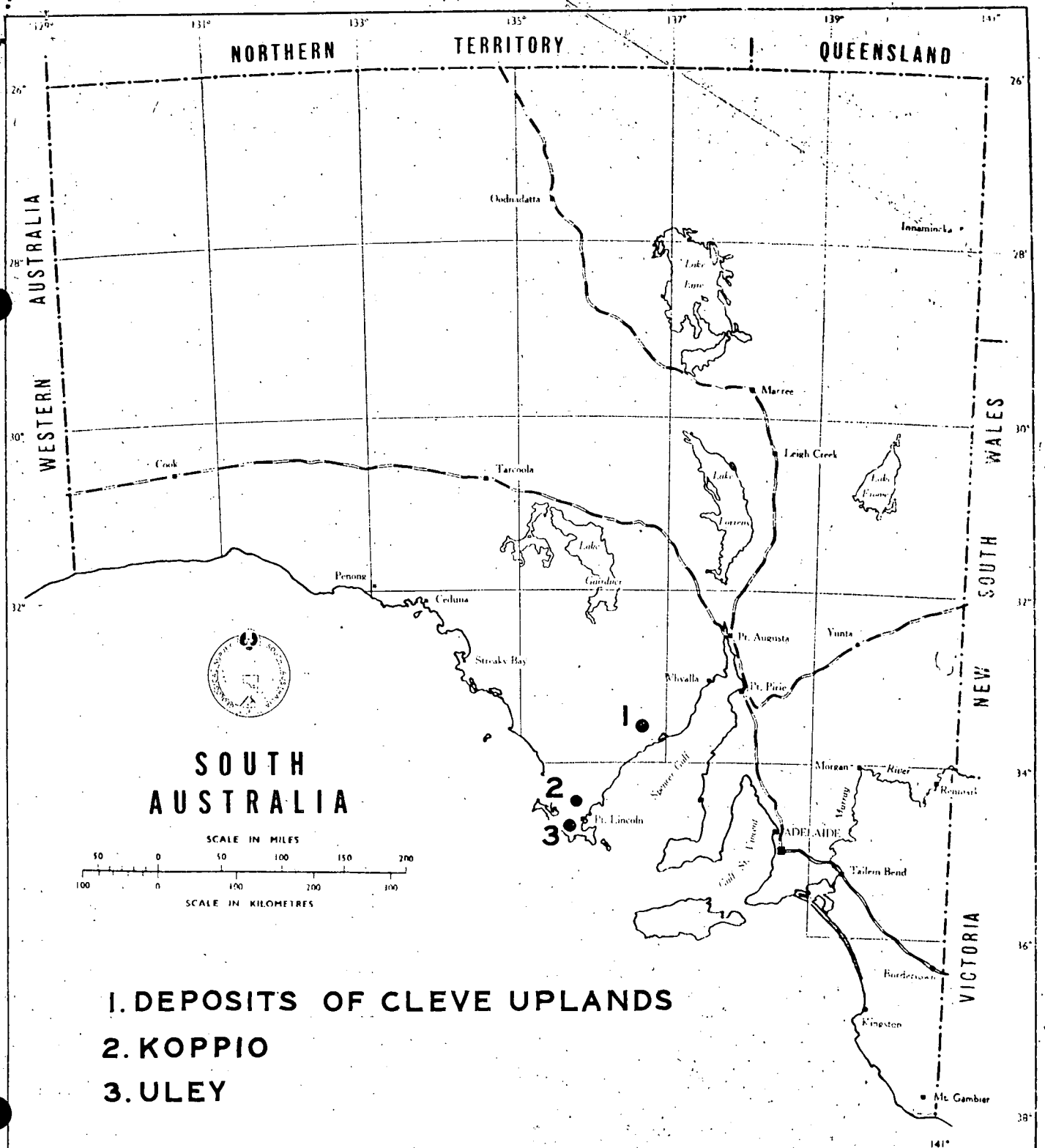
REFERENCES

Johns, R.K., 1961. Geology and Mineral resources of southern Eyre Peninsula. Geol. Surv. S. Aust. Bull. 37: 102 p.

_____ , 1961. Uley graphite deposits; report on drilling operations. Min. Rev., Adelaide, 112: 79-83.

Milton, B.E. and McMutrie, I.H., 1960. Electromagnetic prospecting for graphite - Uley mine area. Min. Rev., Adelaide, 109: 67-77.



1. DEPOSITS OF CLEVE UPLANDS
2. KOPPIO
3. ULEY

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