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DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

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RADIOMETRIC INVESTIGATION OF MINERAL DEPOSITS ON MOUNT DOREEN PASTORAL LEASE, N.T.

by

D.F. DYSON

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ILLUSTRATIONS

1. INTRODUCTION

As part of a systematic testing of all regions in Australia likely, because of favourable geological conditions, to contain uranium minerals, a brief investigation of several mineral deposits on Mt. Doreen pastoral lease was made in 1949 by an officer of the Geophysical Section of the Bureau of Mineral Resources.

The general result of the investigation was that although radioactivity was present in some of the localities visited, the areas of activity were small and the intensity of radioactivity was low. As none of the localities was likely, therefore, to become a producer of radioactive minerals, the report was not published at the time, but it is advisable that an account of the investigation should be placed on record.

Mt. Doreen Homestead is about 220 miles north-west of Alice Springs, and is adjacent to the Mt. Doreen wolfram field. In company with Mr. W. W. Braitling (discoverer of the Mt. Hardy copper deposits), whose services as guide were greatly appreciated, the author visited the following localities :-

(i) Mt. Singleton Range wolfram field.
(ii) Mt. Hardy copper field.
(iii) Mt. Doreen wolfram field.
(iv) Two small copper deposits west of Mt. Doreen.

An Austronic PRM200 ratemeter was used, and the following methods of investigation were employed :-

(a) Readings were taken at intervals of about three feet on the dumps adjacent to workings; where necessary, readings were taken in the actual workings.

(b) Surface readings were taken where mineralisation is present but where no prospecting has been carried out.

2. MT. SINGLETON RANGE WOLFRAM FIELD.

The field is about 55 miles west of Mt. Doreen and about 10 miles north-west of Whittington Soak, on the northern side of Mt. Singleton Range. The workings consist of numerous near-parallel trenches, mostly about 2 feet deep, but in places up to 10 feet deep and 6 feet wide, extending north and north-west from the foot of the ridge, which strikes approximately east. The trenches follow the ore-bearing shoots, which consist of quartz and pegmatite veins passing through the altered sedimentary rocks. The latter have been subjected to granitisation.

Tungsten (in the form of wolfram) and copper mineralisation were observed, the latter being evident mainly by staining, although small fragments of chrysocolla were also identified.

Systematic testing of the dumps was carried out and, where it was considered advisable, of the trenches. Readings were also taken on granite outcrops near some of the workings. Throughout the area investigated, no indication was observed of the presence of radioactive minerals. There was, in general, an increase of up to 40 per cent above background count in the granitised areas, the increase being nearly proportional to the degree of granitisation.

3. MT. HARDY COPPER DEPOSITS.

The geology of the Mt. Hardy copper field has been

described in detail by Kiek (1941), and use was made of the illustrations in Kiek's report to ensure that most of the copper deposits were tested for radioactivity. The only prospecting work which had been done up to the time of the investigation was the sinking of shallow test holes.

In general, the activity associated with the mineralised zones was up to 30 per cent above background count, but in many places greater radioactivity was observed. These can be satisfactorily grouped under the following headings :-

(i) Shear zones. At deposits Nos. 2 and 10, for example, readings of up to 30 per cent above background were recorded along shear zones.

(ii) Fault zones. Along part of Deposit No. 1, for example, readings of twice background were obtained along the fault zone.

(iii) Impregnated schists. These generally showed higher activity than the mineralised veins, and at Deposits Nos. 4, 9, and 11, readings of 60 per cent above background were obtained.

In addition to the above, higher radioactivity was observed in two specific places at Deposits Nos. 2 and 14. At Deposit No. 4, surface readings were more than three times background, and just below the surface readings of up to six times background were obtained. This was the only locality on the field where a specific radioactive sample could be collected. The sample was tested at the Bureau's laboratory in Melbourne, and assayed 0.017 equivalent U_3O_8.

At the northern end of Deposit No. 14, readings of 90 per cent above background were obtained. These were probably due to the massive nature of the outcropping reef which probably accentuated the slight trace of radioactivity associated with the general mineralisation.

4. MT. DOREEN WOLFRAM FIELD.

The geology of the Mt. Doreen wolfram field is described in a half-yearly report prepared by the Mineral, Geological and Geophysical Survey of Northern Australia (1940-41).

Extensive mining has been carried out at the field, the mineralisation being mainly tungsten (wolfram, with a little scheelite) and, to a lesser extent, copper. Although readings of up to 60 per cent above background were obtained, no evidence of radioactive minerals was revealed. The higher readings were associated mainly with the schists and spotted schists, with a possible contribution from some of the mineralised rock. Readings were slightly above background over the whole area, but, in general, were proportional to the intensity of metamorphism of the country rock and the concentration of mineralisation.

5. OTHER COPPER DEPOSITS.

(a) About 10 miles west of Mt. Doreen Homestead is a small deposit of copper in association with silver and lead. The mineralisation occurs in pockets and seams in sandstone. Some development work has been carried out in the form of three small shafts and numerous small trial holes.

Readings generally ranged between background and 20 per cent above background, with a maximum of 30 per cent above background. No material giving a definite high count could be identified.

(b) About 16 miles west of Mt. Doreen Homestead and 3 miles north of the Mt. Singleton road, a quartz reef, with pockets of copper ore, lies concordant with the east-west strike of outcropping schists. The primary copper ore is accompanied by secondary minerals.

No readings above background were obtained along the reef, but readings up to 20 per cent above background were obtained over the adjoining schists, which show evidence of shearing along the contact with the reef.

6. CONCLUSIONS.

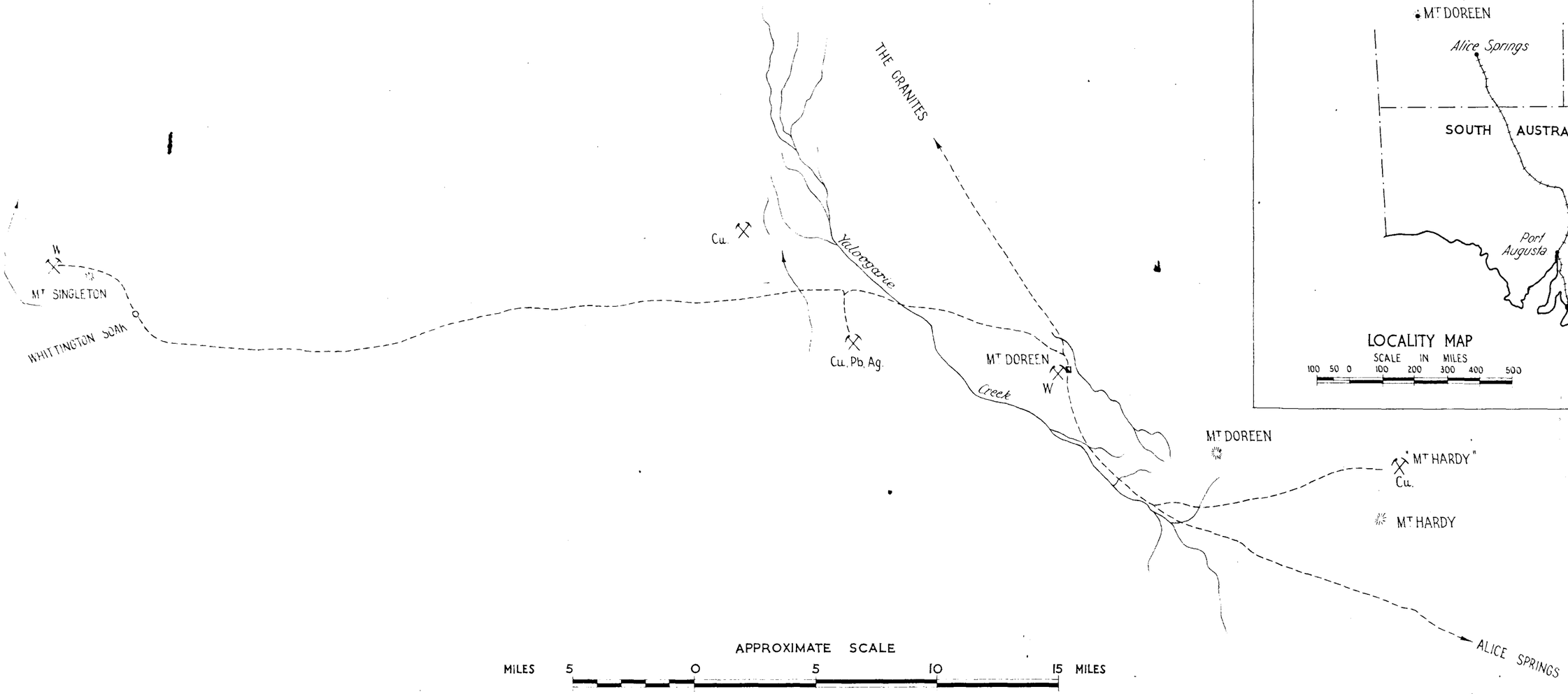
The only promising indications of radioactivity were those obtained at the Mt. Hardy copper deposits, and even there, only one specific point (Deposit No. 4) is really worthy of note. No recommendations were therefore made for further investigations, but should the Mt. Hardy field be opened for commercial production of copper, further radioactive investigations may be desirable.

7. REFERENCES.

A.G.G.S.N.A., 1940 - 41 - Report for Period ending 31st December, 1940.

Kiek, S. F., 1941 - The Mount Hardy Copper Field A.G.G.S.N.A. Report, Northern Territory No. 55.

PLATE I.



RADIOMETRIC SURVEY OF MINERAL DEPOSITS ON MOUNT DOREEN PASTORAL LEASE

MAP SHOWING MINERALISED AREAS VISITED

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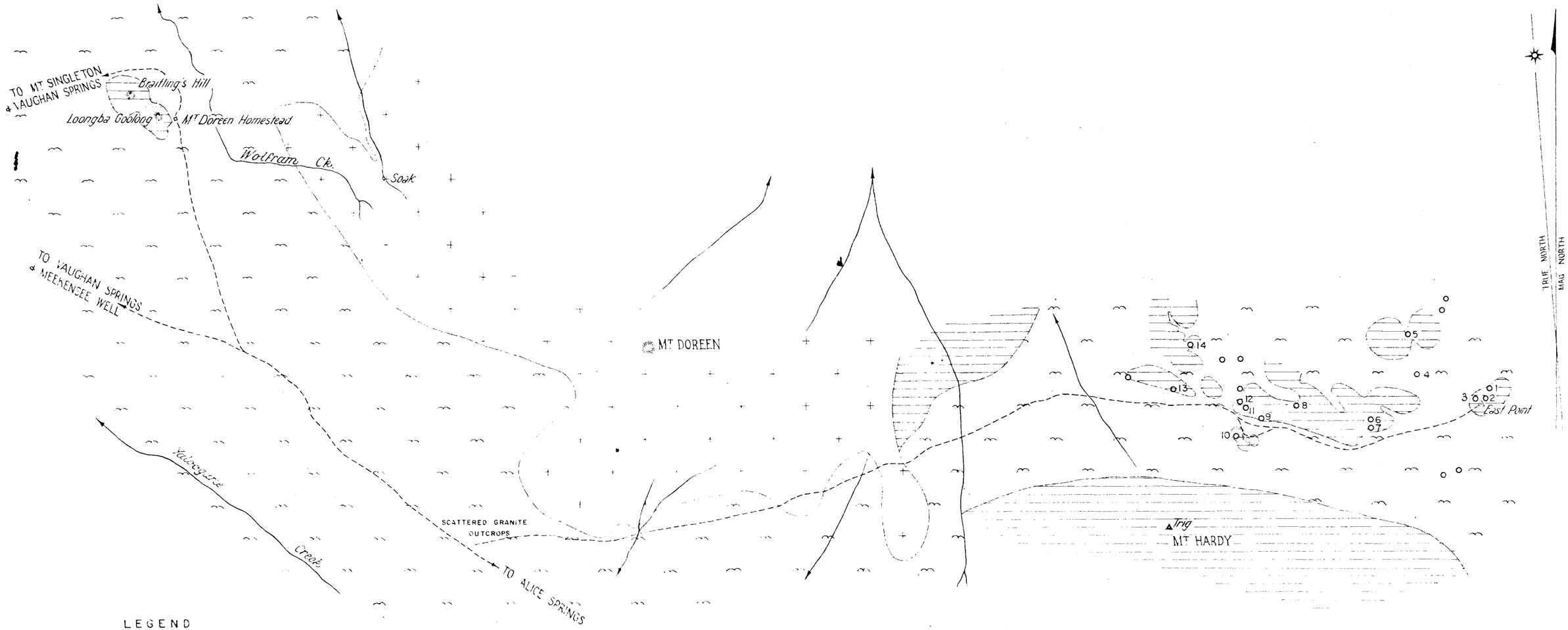
PLATE 2.



LEGEND

- COPPER LODE
- TRACK
- GEOLOGICAL BOUNDARY
- ALLUVIUM
- GRANITE
- SCHIST

SCALE IN MILES

1 0 1 2 3

MAP OF MT HARDY – MT DOREEN AREA

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