COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1953/93

A RECONNAISSANCE MAGNETIC SURVEY OF AN AREA SOUTH-WEST OF BROWNS WORKINGS, RUM JUNGLE, N T

by

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REPORT OF A RECONNAISSANCE MAGNETIC SURVEY OF AN AREA SOUTH-WEST OF BROWN'S WORKINGS - RUM JUNGLE.

INTRODUCTION

During the 1952 field season a series of test traverses using magnetic and self-potential methods was carried out over the known radio-active deposits in the Rum Jungle area, to discover whether any definite anomalies were associated with surface showings of radio-active minerals. In the course of the magnetic work in Brown's area, a major magnetic anomaly was discovered south-west of the workings, and a reconnaissance magnetic survey was carried out in order to obtain information on its extent.

TECHNICAL DETAILS

The instrument used was the Watts vertical magnetic variometer, serial number 69140. Some doubt exists as to the precise scale value of the instrument during these tests. As the magnetic work was intended to be purely of a reconnaissance nature, no calibrating coils were taken to the area. It was intended to determine the scale value by the use of the auxiliary magnets, using the maker's figures for the magnetic moments. It was found quite impossible to obtain a consistent set of values using these figures. A value of 30.0 gammas per division for the instrument was assumed, and the values of the moments of the auxiliary magnets calculated to give a consistent set of readings. Such a process gives a true picture of the shape of an anomaly, but the whole scale of the anomaly may be in error by a constant factor. It is understood that later checks with a Helmholtz coil gave the scale value as 36 gammas per division. It is therefore probable that the vertical scale of the profiles should be increased uniformly by 20%.

The traverses were spaced 700 to 800 feet apart, and readings taken every 100 feet over the major anomaly. Surveying was by compass and pacing.

RESULTS

The observed profiles are shown on Plate 1. They have been plotted using the assumed scale value of 30.0 gammas per division. It was considered that no useful purpose would be served by making the correction mentioned above. The positions of the traverses with reference to the various workings on the area are shown on Plate 2.

RESULTS OF AIRBORNE MAGNETOMETER SURVEY

The results of the airborne magnetometer study are not yet available for publication. From preliminary results, it appears that the present anomaly is part of a line of magnetic anomalies. This line bends sharply to the north past the western end of the present layout, and runs almost due north, until it terminates abruptly in the neighbourhood of Mt. Fitch. At the eastern end another line of anomaly begins opposite the end of the present anomaly, displaced from it about 1 mile to the north. This line proceeds to the north-east, with a strike parallel to that of the present anomaly, for about 2 miles. Other similar lines occur on the field, in one

case being traceable for about 10 miles. It may be noted also that in at least two cases, these magnetic anomalies are associated with surface radio-active anomalies. No such association can be observed in the present case, since the area surveyed is masked by deep soil cover.

INTERPRETATION

No detailed interpretation is possible at the present stage. The following points may be noted :-

(1) The maximum intensity of the anomaly is not less than 5,000 gammas.

(2) The profiles show considerable variations in shape, which may be due to changes in the aspect of the body causing the anomaly, and on some traverses, to the presence of more than one body.

(3) The following possibilities are suggested for the nature of the magnetic bodies :-

(a) A series of lodes of strongly magnetic material, dipping generally to the north.

(b) A structure, such as a syncline, including a strongly magnetic bed, folded in a rather complicated fashion.

(c) A series of basic dykes.

The first possibility appears the most attractive, considering the intensity of the anomalies, and the causes of rather similar anomalies on the Tennant Creek field.

However, it has no support from present views on the geology of the Rum Jungle field. The second and third possibilities may be considered more attractive on general geological grounds, but the intensity of magnetisation required to account for the anomalies on these lines must be quite unexampled.

RECOMMENDATIONS

Whatever the nature of the bodies causing these anomalies, it is clear that they represent a major feature of the geology of the Rum Jungle field, and one which is yet unexplained. It is recommended, therefore, that tests by drilling be made as soon as possible, in order to ascertain the nature of the magnetic material. A suitable hole for preliminary testing would be one sited at 1100S on traverse zero, depressed at 60° to the south. Such a hole should encounter magnetic material at a depth considerably less than 200 feet.

If the results of such a hole indicate that the magnetic bodies are of no interest in connection with mining operations, location of them by means of the airborne magnetometer would probably be sufficient for geological purposes. If it is thought desirable to obtain more detailed information as to their structure and position, a ground survey using vertical and horizontal magnetic variometers will be necessary.

Proper coverage of an anomaly of this type would require traverses 100 feet apart, with stations every 50 feet along the traverses. It is considered that if the magnetic work were sufficiently detailed and information were available as to the nature of the magnetic material, a detailed interpretation could be made with some confidence, using the dipole potential methods employed by the Aerial, Geological and Geophysical Survey of Northern Australia on the Tennant Creek field.

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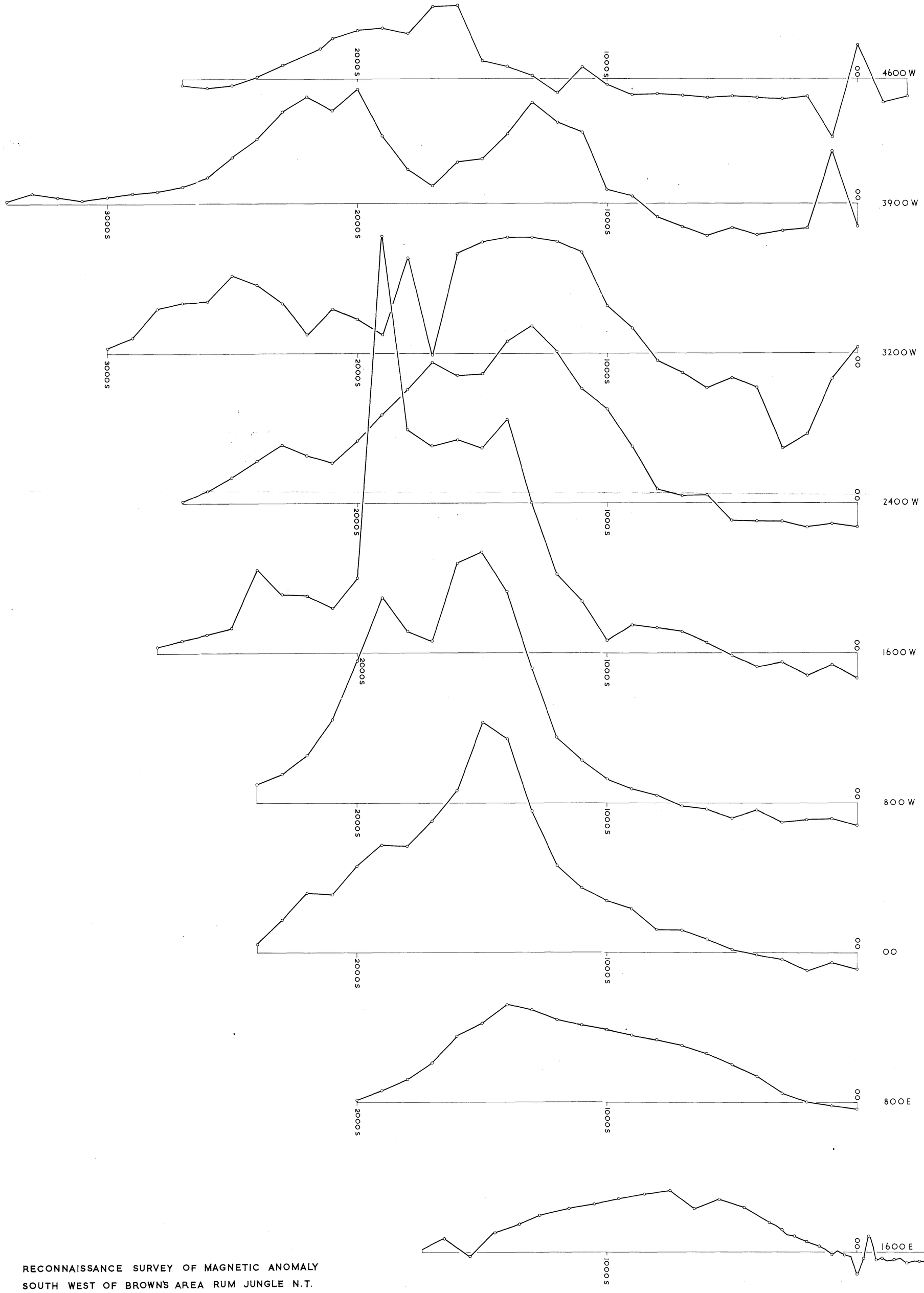

INTERMEDIATE TEST TRAVERSE

RECONNAISSANCE SURVEY OF MAGNETIC ANOMALY
SOUTH WEST OF BROWN'S AREA RUM JUNGLE N.T.

PROFILES OF VERTICAL MAGNETIC INTENSITY

SURVEYING BY COMPASS AND PACING

SCALE

HORIZONTAL	200	100	0	200	400	600	800	FEET
VERTICAL	1000		0	1000	2000	3000	4000	GAMMAS

NOTE: For location of Traverses refer G71-48

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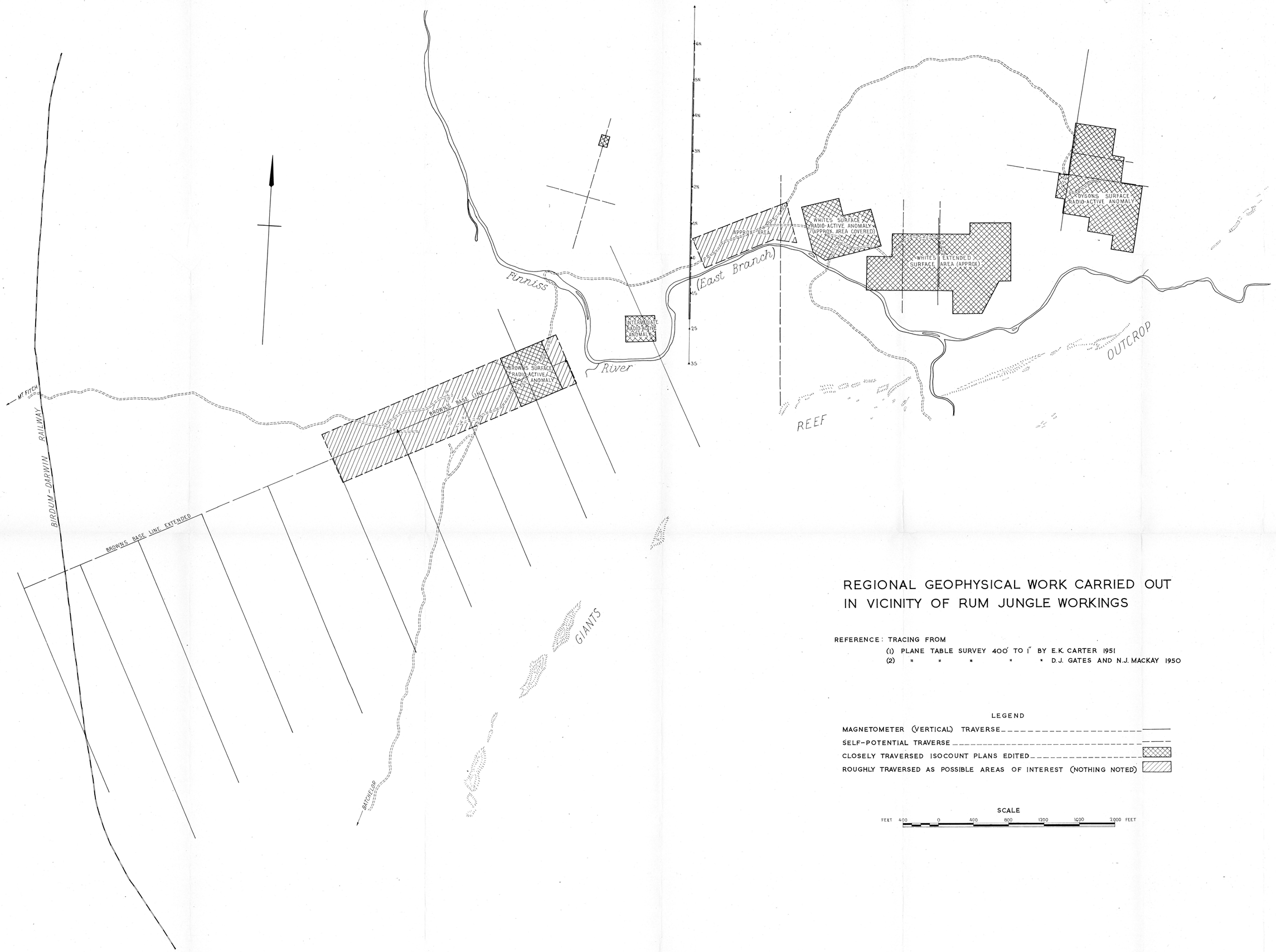

REGIONAL GEOPHYSICAL WORK CARRIED OUT IN VICINITY OF RUM JUNGLE WORKINGS

REFERENCE: TRACING FROM
(1) PLANE TABLE SURVEY 400' TO 1" BY E.K. CARTER 1951
(2) " " " " " D.J. GATES AND N.J. MACKAY 1950

LEGEND

MAGNETOMETER (VERTICAL) TRAVERSE _____

SELF-POTENTIAL TRAVERSE _____

CLOSELY TRAVERSED ISOCOUNT PLANS EDITED _____

ROUGHLY TRAVERSED AS POSSIBLE AREAS OF INTEREST (NOTHING NOTED)

SCALE

FEET 400 0 400 800 1200 1600 2000 FEET

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics