COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1962/132

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FRANCES CREEK MAGNETIC SURVEY, NT 1961

by

J. Ashley

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SUMMARY

A magnetic survey was made over the haematite deposits in the Frances Creek area, Northern Territory, to determine the applicability of the magnetic method in detecting such deposits.

The haematite is non-magnetic and the small, very local anomalies detected are attributed to thin beds of high magnetic susceptibility. If geological mapping can establish a definite relation between these magnetic beds and the iron deposits, some useful information might be obtained from future surveys. Surveys to detect similar 'marker beds' would require great detail and would not be practicable on a reconnaissance scale.

The magnetic data obtained are insufficient to determine whether or not an aeromagnetic survey is warranted.

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1. INTRODUCTION

Several outcrops of high grade ironstone were discovered in the Frances Creek area, NT (Plate 1) in 1961 (Crohn, 1961). Mining leases over the deposits are held by the Northern Iron Mining Company. During the latter part of 1961, waggon and diamond-drilling was in progress to estimate the size of the deposit. At this time a request was submitted to the Bureau of Mineral Resources by the company for a survey to test the applicability of the magnetic method in delineating the deposits.

The Frances Creek area is situated about 140 miles south of Darwin and about 12 miles due east of the Burrundie railway siding. Two roads lead to the area from the Stuart Highway; one via Grove Hill and the Mount Wells Battery and the other from Pine Creek via Esmeralda Homestead. Both roads are impassable during the wet season.

The ironstone deposits, in which haematite is the dominant iron mineral, occur in the Lower Proterozoic Masson Formation and crop out along locally prominent ridges that trend north-west. The sediments are moderately folded and the deposits lie along the axes of synclinal structures.

The magnetic survey was made in September 1961 by geophysicist J. Ashley and geophysical assistant R. Toy. Relative measurements of the vertical magnetic field were made with the Milger and Watts vertical force variometer No. 69106. Seven outcrops were tested; the positions of the traverses are shown in Plate 1.

The magnetic results, corrected for diurnal variation, are presented as profiles, together with the available topographical cross-sections, on Plate 2.

2. DISCUSSION OF RESULTS, AND CONCLUSIONS

There is no direct correlation between the local magnetic variations obtained and the ironstone deposits; the haematite is therefore effectively non-magnetic. The sharp anomalies observed (Plate 2) are attributed to one or more thin beds of high magnetic susceptibility (10^{-3} to 10^{-2} c.g.s. units). At the Saddle Lease, such an anomaly can be traced over 250 ft; the beds that cause these anomalies could be useful as marker beds. However, geological mapping is necessary to establish the relation of these magnetic bodies to the ironstone deposits before the usefulness of these local anomalies can be assessed. Any further magnetic investigations would have to be made in considerable detail to detect similar magnetic beds, and therefore the method is hardly practicable for reconnaissance prospecting.

To aid in determining whether an aeromagnetic survey over the deposits is justified, regional magnetic contours were drawn (Plate 3). The differences in the vertical magnetic field between traverses were calculated. Assuming a zero value for the mean field along the Saddle Extension traverse, the other mean values adopted are:

Saddle	+ 160 gammas
Ochre Hill	+ 304 gammas
Jasmine	+ 440 gammas
Thelma	+ 96 gammas
Elizabeth Marion	+ 630 gammas
Helene South	+ 850 gammas

The tentative 'regional' field distribution (Plate 3) based on these values, indicates that anomalies could be detected by the airborne magnetometer but that there is no obvious relation between the magnetic field and geological structure. Two or three long traverses across the area would be required to give a more accurate picture.

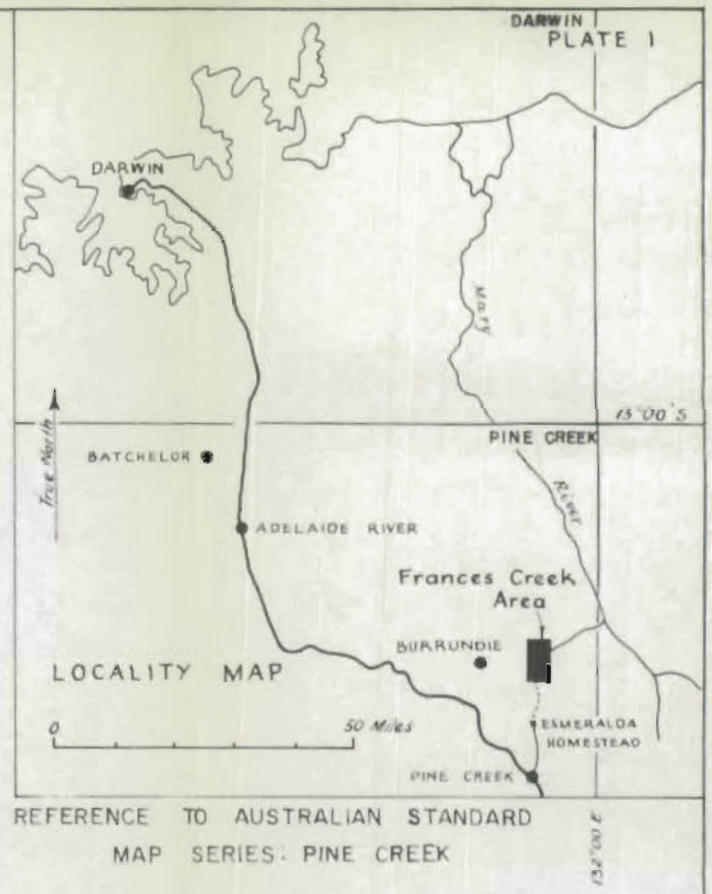
3. ACKNOWLEDGEMENT

The co-operation of the Company during the survey was greatly appreciated.

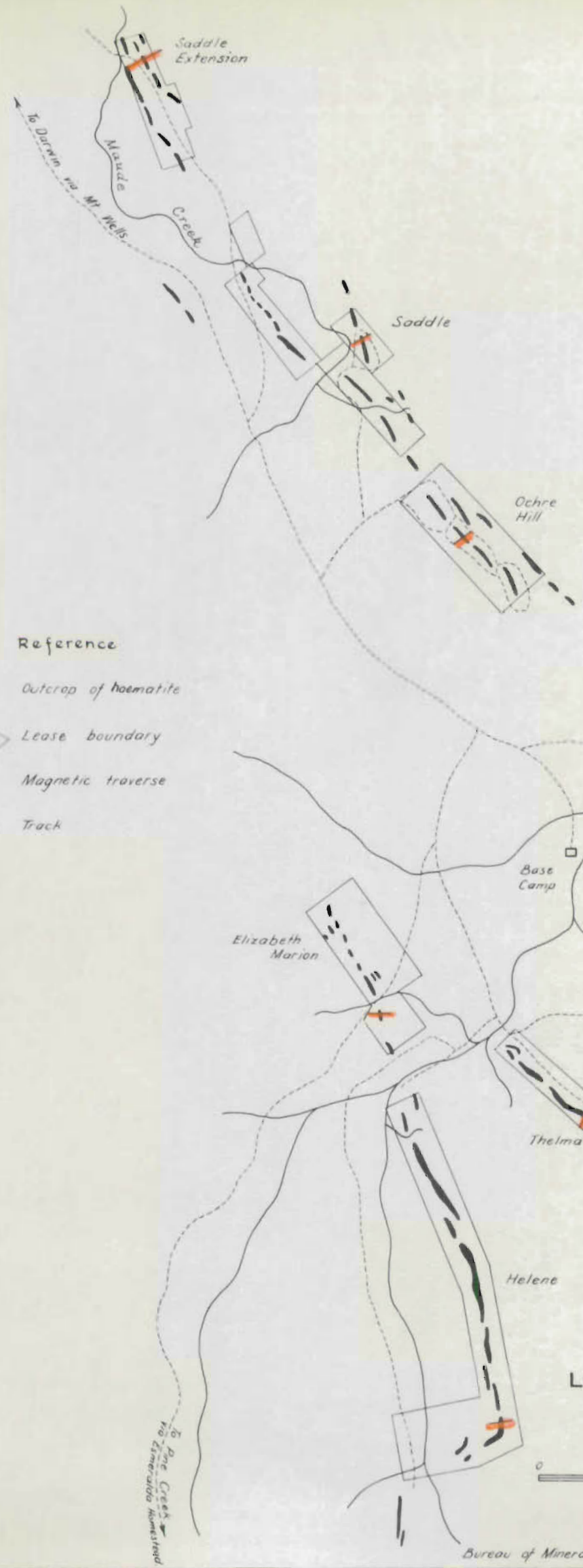
4. REFERENCE

CROHN, P.W., 1961 Preliminary report on iron ore deposits near Maude Creek and Frances Creek, Burrundie area, N.T. Bur. Min. Resour. Aust. Rec. 1961/108.

PLATE I



REFERENCE TO AUSTRALIAN STANDARD MAP SERIES: PINE CREEK



FRANCES CREEK NT, 1961

LOCATION OF HAEMATITE DEPOSITS AND MAGNETIC TRAVERSES

Scale

0 ½ 1 2 3 MILES

Bureau of Mineral Resources, Geology and Geophysics, Darwin N.T. February 1962

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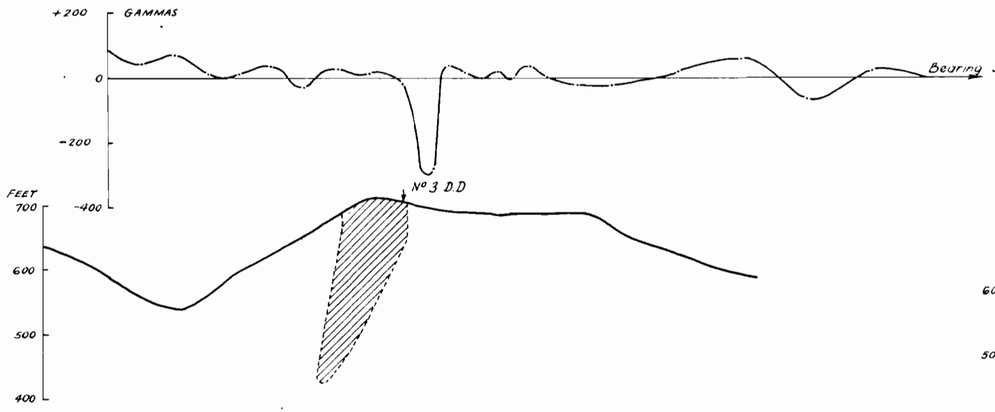
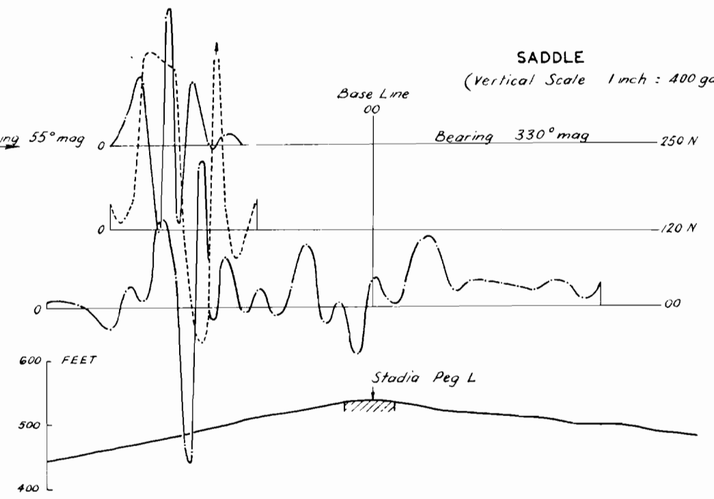
PLATE 2

OCHRE HILL

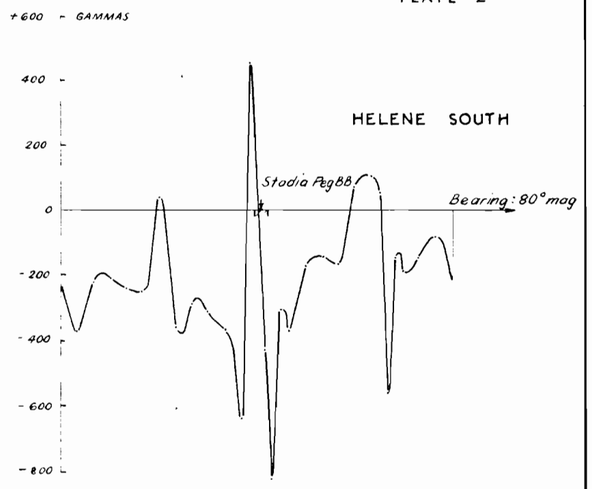


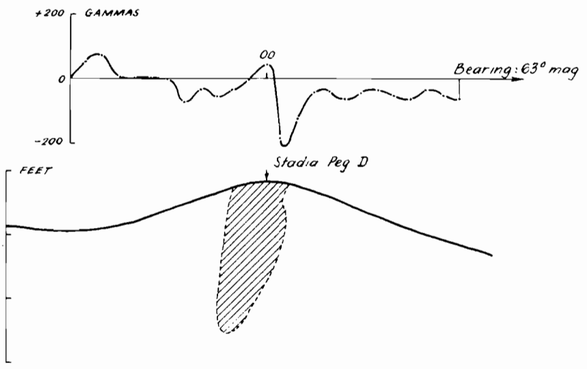
SADDLE

(Vertical Scale 1 inch : 400 gammas)

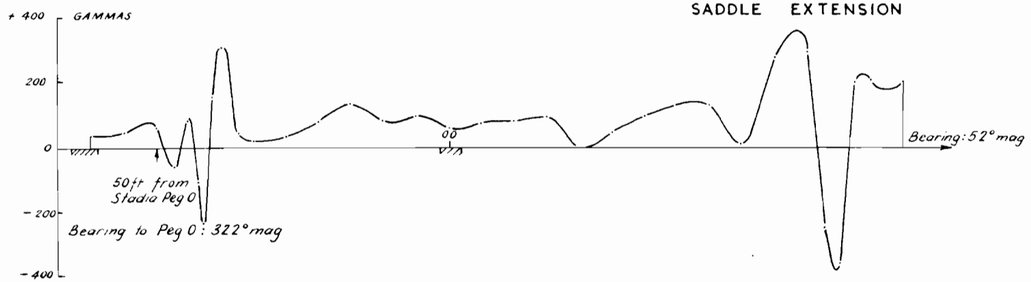


HELENE SOUTH

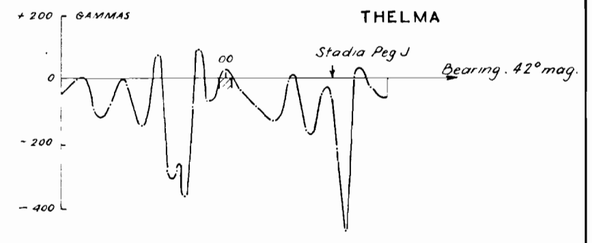




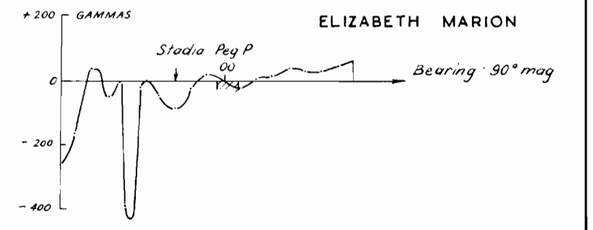
SADDLE EXTENSION



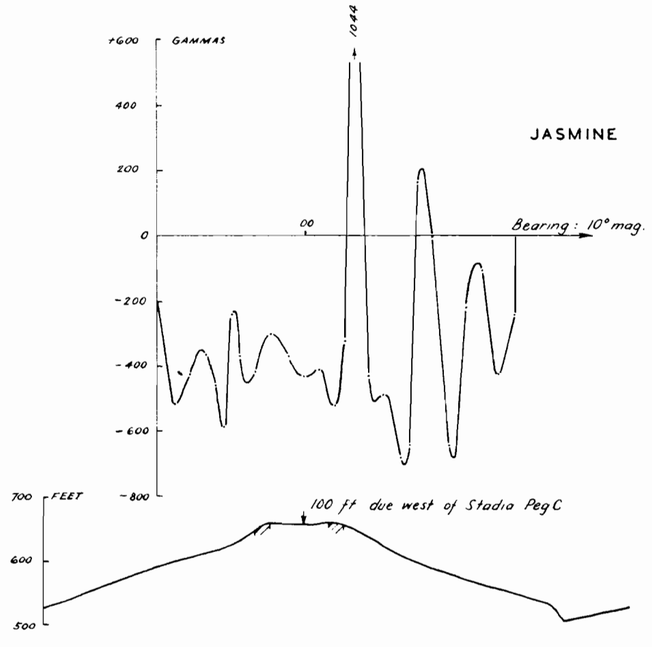
THELMA



ELIZABETH MARION



JASMINE



Reference

- Haematite (cross-sections inferred from drilling data)
- Magnetic profile
- Topographic profile (arbitrary datum)

FRANCES CREEK NT, 1961

VERTICAL MAGNETIC AND TOPOGRAPHIC PROFILES

FEET

200 0 200 400 600

(Vertical scales as shown)

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G424-2

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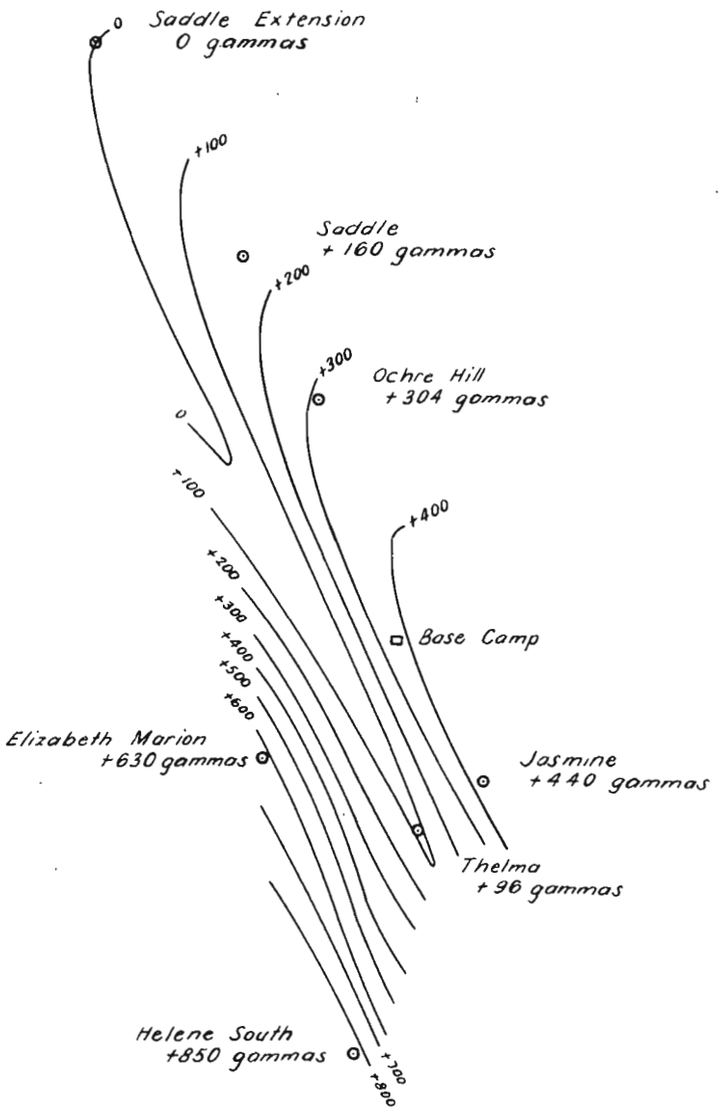
PLATE 3



FRANCES CREEK NT, 1961

REGIONAL MAGNETIC CONTOURS

Contour Interval : 100 gammas

Scale

1 0 1 2 3 4 5 MILES

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G 424-3.

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