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COMBINED AIRBORNE GEOPHYSICS
Canso Aircraft,
Electromagnetic Survey

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GEOPHYSICS

Combined Airborne Geophysics -
Canso Aircraft, Electromagnetic Survey

L.E.G. 1/8/58

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1st August, 1958.

To: Mr. G.F. Hudspeth.

Combined Airborne Geophysics -Canso Aircraft, Electromagnetic Survey1. Introduction

On 17th May, the Canso aircraft returned to Sydney for reasons which are given in a letter to the Electrolytic Zinc Company of A'asia Ltd. from Adastra Hunting Geophysics Pty. Ltd., dated 17th June, 1958. Briefly, the reasons were that at this date the geophysical company considered that part of the area which we had requested them to traverse with their aircraft might be too rugged to survey effectively. They considered that under these rugged conditions, for the aircraft to maintain a reasonable measure of safety, it would have to fly either at too high an altitude (i.e. above 500 feet) or to undertake manoeuvres (i.e. banking or steep climbs or descents). This latter factor could lead to abnormal variations in the orientation of the transmitting and receiving coils, which in turn could give spurious electromagnetic anomalies. Consequently, the aircraft was withdrawn pending a fuller evaluation of existing results.

2. Causes of Electromagnetic Anomalies

At this stage, it is worth considering the causes of electromagnetic anomalies. These are:

- A. Manoeuvring of the aircraft whilst in flight;
- B. Variations in altitude of the aircraft;
- C. Nature of the geological and surface conditions below the

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aircraft.

A. Manoeuvre

In order to investigate this effect, a repeat flying panel was installed in the Canso and photographed at intervals of $2\frac{1}{2}$ seconds. The recorded manoeuvres of the aircraft were then compared with the electromagnetic results: the area chosen for this test was the east-west runs over the De Witt Range, near Port Davey. This Range rises from sea level to 2,500 feet, to sea-level again at Port Davey over a distance of four miles and consequently was an ideal test location.

The results are given in a letter from A.H.G. Pty. Ltd. dated 22nd July and they have been analysed by this Company's geophysicist, H.S. Hancock. In his opinion there is far from sufficient correlation in the results to establish a particular manoeuvre as the cause of a spurious anomaly. Also it must be realised that apart from manoeuvre, variations in altitude and ground conditions were contributing to the production of the anomalies recorded in this test.

B. Variation in Altitude

Variations in the altitude of the aircraft will cause variations in the response of the electromagnetic detecting equipment. According to "Adastra", the effect is as follows:

Assuming the response at 500 feet as unity, the corresponding responses (at either 400 or 2300 cps) based on vertical sheet experiments are:

TABLE I

<u>Altitude of Aircraft</u>	<u>Response in terms of response at 500 ft.</u>
400 ft.	2.28
500	1.00

Altitude of AircraftResponse in terms of
response at 500 ft.

550	0.63
575	0.50
600	0.41
650	0.25

From these figures it can be seen that the response rapidly decreases with increasing altitude.

Electromagnetic overlays for sheets 5, 6, 9, 10, 13, 14, 15, 17 and 18 of the Gordon area have been examined; on these sheets the lengths of flight line flown above 550 feet are indicated. At this altitude the response would be equivalent to less than 0.63, as in Table I. The altitude control in sheets 5, 6, 9, 10, 13, 14 and 17 is reasonable and variations do not materially alter the position or detection of conducting zones. However, the control on sheets 15 and 18 is poor and the greater part of the area has been flown above 550 feet, with some flight lengths above 600 feet. These two sheets cover the rugged D'Aguilar Range and Mount Lewis and the reason for maintaining this high altitude can readily be appreciated but the fact remains that an effective survey of this area has not been carried out. Consequently, it is open to question whether the full charge, or any charge, made by A.H.G. Pty. Ltd. for this portion of the flying is fair and reasonable.

It is considered that this factor of keeping a reasonable altitude above the ground will be accentuated in the Arthur area: there is no point whatsoever in flying if the greater part of the traverse lines are above 575 feet in elevation. Consequently, this point must be stressed to Adastral and that as an added incentive an agreement should be made with this Company in that no charge is made for line miles flown above an altitude of 575 feet above ground level.

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C. Nature of Geological and Surface Conditions below the Aircraft

The electromagnetic anomalies on the sheets examined have been compared with the airborne magnetic results, and the geological maps for the same area. With the one exception of the anomaly on the western edge of sheet 14, all the major anomalies are directly associated with well defined magnetic anomalies and with regional geological features, primarily major faults.

Also worthy of note is that an electromagnetic response has been detected along major faults which are covered by the Tertiary sands and gravels, south of Birch Inlet.

Some criticism has been made of this airborne method of prospecting in that the biggest response, or anomaly, need not indicate the largest or even the best conductor. This feature is common to most types of geophysical surveying whether on the ground or from the air, and it is a quantity which can be largely eliminated by an intelligent interpretation of the results.

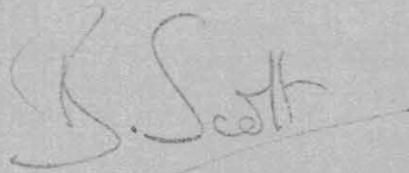
3. Recommendations

(a) It is recommended that the "Canso" aircraft returns to Tasmania as soon as possible in order to complete the survey of the Arthur area. Some 1400 line miles remain to be completed, this should take about 6 flyable days.

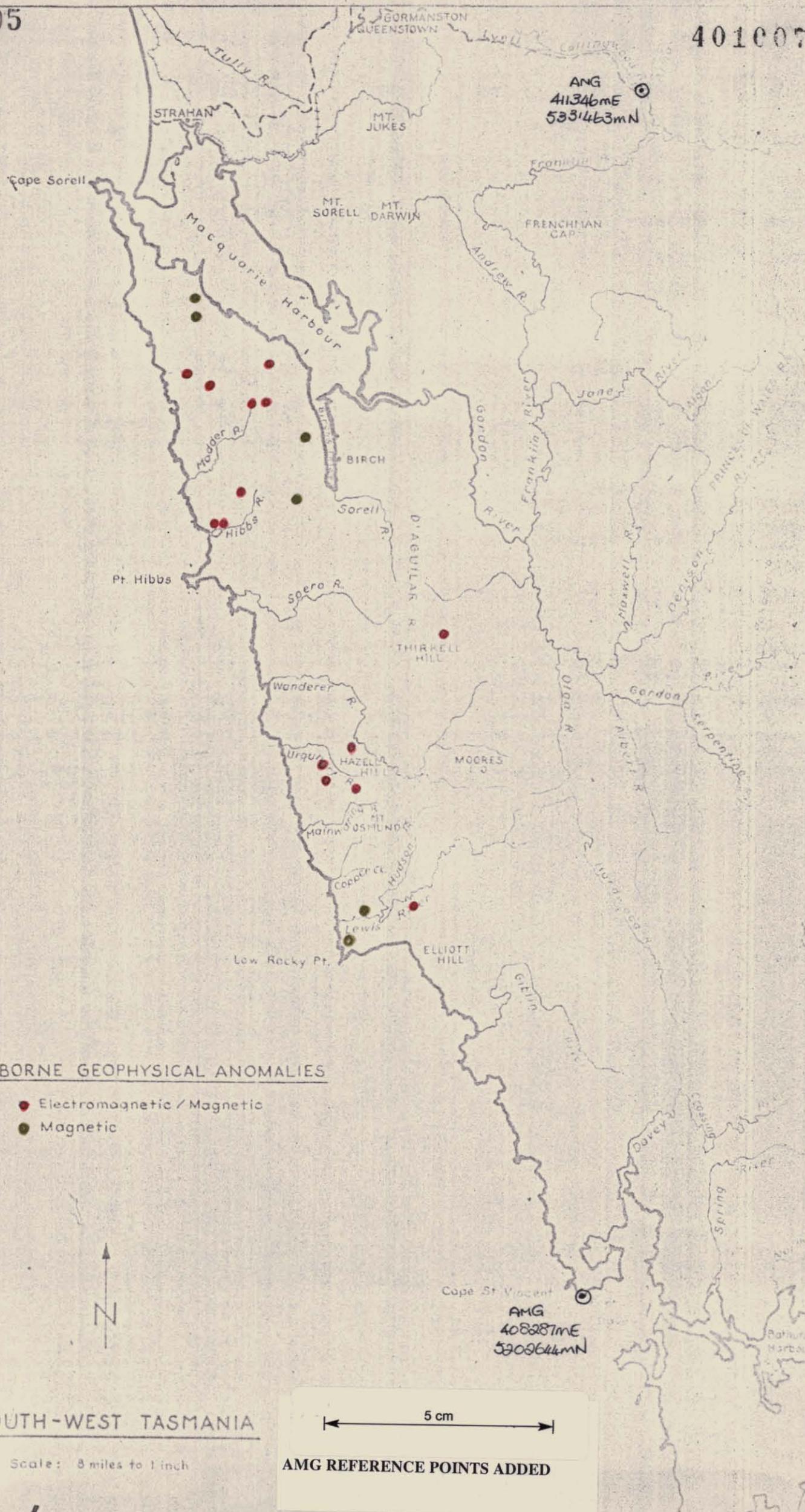
(b) An agreement is reached with the A.H.G. Pty. Ltd. with regard to the cost of line miles which are flown at a height of 575 feet or more above ground level.

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(c) As soon as possible a representative of the Company should come to Queenstown in order to discuss the area and the orientation of the flight lines which can be flown in the Arthur concession, and the possibility of re-flying certain sections of overlays 15 and 18 of the Gordon concession.

A handwritten signature in dark ink, appearing to read "B. Scott". The signature is written in a cursive style with a horizontal line underneath the name.

Geologist-in-Charge.

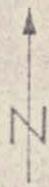


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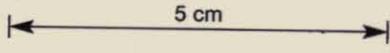
AIRBORNE GEOPHYSICAL ANOMALIES

- Electromagnetic / Magnetic
- Magnetic



SOUTH-WEST TASMANIA

Scale: 8 miles to 1 inch



AMG REFERENCE POINTS ADDED