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COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

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MAGNETIC SURVEY OF THE NATONE, BLYTHE RIVER-CUPRONA AND HIGHCLERE IRON ORE DEPOSITS NORTH-WESTERN TASMANIA

by

O.KEUNECKE

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ABSTRACT

An airborne magnetometer survey was made by the Bureau in 1955 and 1956 over selected areas of north-western Tasmania to aid in the search for deposits of iron ore.

Ground magnetic surveys were made in 1957 over promising anomalies near Natone, Blythe River-Cuprona and Highclere about 6 to 8 miles south and south-east of Burnie.

The most significant results were obtained in the Natone area, where a widespread anomalous area was found south of the former Rutherford's iron ore workings. The results indicate that magnetic bodies of moderate size exist at depth. Drilling is recommended to test their composition and extent.

In the Blythe River-Cuprona area no significant anomalies were found.

The survey in the Highclere area revealed several small, probably disconnected bodies and drilling is recommended to test their composition and economic value.

CONTENTS

LIST OF PLATES.

1. INTRODUCTION

At the request of the Director of Mines, the Bureau carried out an aeromagnetic survey over selected areas in north-west Tasmania, in 1955 and 1956. The purpose of the survey was to aid in the search for deposits of iron ore. The areas were selected to cover known iron ore occurrences, and it was envisaged that promising anomalies should be followed up by ground magnetic surveys. The present report deals with ground magnetic follow-up of the aeromagnetic survey in an area south of Burnie, covering the Natone, Highclere, Cuprona and Blythe River deposits.

The results of the aeromagnetic survey are shown on Bureau plan G218-3. The area generally shows a number of magnetic anomalies of complex shape. Most of these can safely be attributed to the Tertiary basalts, which cover a considerable portion of the country. However, well defined anomalies occur close to the position of the known ore deposits at Highclere, Natone and Blythe River and the surveys described in the present report were undertaken to determine whether these anomalies also were due to basalt or indicated the possibility of the presence of significant deposits of iron ore.

The work was performed by O.Keunecke and L.V. Skattebol, geophysicists, between January-April, 1957. The Department of Mines, Hobart, provided unskilled labour, and surveying and pegging of traverses was done by a surveyor of the Department of Interior. At Highclere and Natone, the country is generally gently undulating, and cleared for farming, but the Blythe River deposits occur on the banks of a steep, heavily timbered river valley.

2. GEOLOGY

(a) General

The existence of the various ore deposits has been known for many years, and they have been geologically examined on several occasions. General geological descriptions have been given by Twelvetrees and Reid (1919), Nye (1937), Thomas and Henderson (1943) and Blake (1957). From the purely economic aspect, the deposits have been critically examined by Boyd, Gibson and Young (1919) and Woolnough (1939). Authorities are not in full agreement on the geological questions involved, probably due to the fact that outcrops in the area are poor. However, the divergencies in geological opinion are of no significance for the purpose of the present report.

The deposits occur in sedimentary rocks, which have been described as pre-Cambrian quartzites and phyllites (Blake, 1957) or Cambrian slates, sandstones and mudstones. The strike of these rocks varies generally from N.30°E to N.50°E, and the dip from 45° to 80° to the south east. The structural relations of the rocks are difficult to determine, but it seems likely that they are sharply folded and faulted into a series of anticlines and synclines, with a north-easterly trend. They are unconformably overlaid by lower Owen conglomerates (Junee group of Ordovician age). They have been intruded by Devonian granites, which are considered to be genetically related to the ore deposits. Outcrops

of granite occur at Natone and Highclere, but none has yet been found in the Blythe River area.

All these rocks have been covered by basalt flows of Tertiary age. Extensive erosion has exposed sedimentary rocks and granite in places.

(b) Natone Area.

Surface geology and previous workings are shown on the plan (Plate 4). There has been no production from the deposit, previous workings having been purely for exploratory purposes. This work is described in detail by Thomas & Henderson (1943). The greatest depth reached by drilling and sinking was about 70 feet. No encouraging results were obtained and Woolnough (1939) summarised the work by saying that "the existence of a major deposit of iron ore at this point is definitely disproved". However, other opinion is that the exploration so far performed is not adequate to support such a sweeping statement.

The ore is mainly haematite, containing some magnetite, and appears to be connected with a fracture of shear zone striking north-east.

(c) Blythe River-Cuprona area.

The deposits in these areas lie on the same structure, but are separated by a hill of basalt.

The Blythe River deposits aroused great interest in the early stages due to the spectacular nature of the outcrops. Twelvetrees and Reid (1919) estimated reserves of possible ore at about 17,000,000 tons. In their report, it is stressed that this is possible ore only, as the authors were well aware that reserves might be reduced for the following reasons:-

(a) Their estimate was based on very little exploration work.

(b) It was known that some of the ore was highly siliceous. The possibility was recognised that the percentage of siliceous ore would be so high as to reduce the value of the deposit considerably.

Later investigators agree that these two factors actually reduce the economic value of the deposits practically to nothing. Nye (1937) considered that too much unreplaced quartzite is present to form an economic iron ore. Woolnough (1939) and Blake (1957) consider that the deposit is actually a secondary breccia, containing only small lenses of good ore, of which the economic value is neglibible.

The deposits are associated with a fracture zone which strikes north-north-east and dips steeply to the south-east. The ore is almost entirely haematite, with more or less silica, and is practically non-magnetic. Surface geology and workings are shown on the plan (Plate 6). The only production recorded from the deposits was in 1940-41, when about 2,600 tons of ore were mined for use

in the manufacture of ferrosilicon, for which the high silica content of the ore is no disadvantage.

(d) Highclere Area.

Surface geology is shown on the plan (Plate 7). There are no previous workings. The area is largely soil covered, and outcrops are few. No fracture or shear zone has yet been observed. The ore consists mainly of haematite, with some limonite and magnetite.

3. TECHNICAL MATTERS

The lay outs in the various areas were covered by readings of vertical magnetic intensity. The instruments used were the following:-

Askania type GF6 No. 521633

Askania type GF6 No. 541479

Sharpe type D1-M

The Sharpe magnetometer is a magnetic needle type of instrument of low sensitivity, which is used in areas in which very large magnetic anomalies are present.

The traverses in the various areas are shown on the plans (Plate 4,6,7). Station spacing along the traverses was generally 50 feet.

4. RESULTS AND DISCUSSION.

(a) Natone Area.

The results are shown as contours of vertical magnetic intensity on the plan (Plate 4). Selected profiles are shown on Plate 5. The main features of the results are the following.

(1) The main magnetic anomalies are considerably to the south-west of any previous testing.

(2) Although the profiles are somewhat disturbed by surface effects, the contours shown are well established. They indicate three possible orebodies of some size.

(a) A narrow anomaly with north easterly strike, centred at 2000S/200E, arises from a small magnetic body close to the surface. The depth to the top of the ore body might be about 30 feet.

(b) A slightly broader anomaly with north-westerly strike, centred at 2000S/400W, is caused by a magnetic body at a depth (to the top) of about 60 feet.

(c) A large anomaly centred at 2950S/0 is due to a rather large body at greater depth. The depth to the top of this body is estimated at 300 feet. On traverse 2600S, the centre of this anomaly is at about 200E, and the contours narrow, suggesting that the body responsible is here closer to the surface. It is probable that this part of the anomaly is due to a separate body.

(3) Near Rutherfords old workings, a few small sharp anomalies are present, due to small bodies close to the surface.

The general character of the results suggests a zone pitching to the southwest, containing a number of isolated magnetic bodies. The bodies generally appear to be about 400 feet long, and although it is impossible to make accurate calculations as to extent in depth, the results are consistent with the depth extent of the individual bodies being 100-200 feet. There is no evidence of magnetic material near Rutherford's copper workings.

(b) Blythe River-Cuprona Area.

Results are shown as contours of vertical magnetic intensity on the plan (Plate 6). The profiles in general are flat except for local disturbances caused by near surface material. The only area in which contours can be drawn is at the junction of the Cuprona and Blythe River layouts. Here, after drastic smoothing, a regular anomaly of more than 3,000 gammas is visible. Contours of this anomaly are shown on the plan. The anomaly coincides with a basalt-capped hill, and can be reasonably attributed to the basalt. No anomaly was found which could be attributed to an ironstone body at depth. This may be due to the fact that no such body exists or to the fact that such bodies as exist are composed of material practically non-magnetic.

(c) Highclere Area.

Results are shown as contours of vertical magnetic intensity on Plate 7. The general character of the results is similar to that at Natone, indicating a zone containing a number of small lenses of magnetic material. The individual magnetic lenses at Highclere are smaller but more strongly magnetic than those at Natone. As the profiles are disturbed by surface effects, it is difficult to make a reliable estimate of the depths of the bodies, but they are certainly quite shallow, and the tops should lie about 40-60 feet below surface.

5. CONCLUSIONS AND RECOMMENDATIONS

(1) In the Cuprona and Blythe River areas, no anomalies were found which could be attributed to magnetic bodies at depth. The survey results provide no basis for recommending any testing of these deposits.

(2) At Natone and Highclere, the results indicate the presence of magnetic bodies of moderate size at depth. As these areas are favourably situated as regards transport, it is recommended that the survey results be tested by drilling, to see if iron ore bodies of commercial value are present.

(3) The following drill holes are recommended to test the depths.

(a) Natone Area.

DDH. 1. Collar 2950S/150W
Bearing 144° (true)
Depression 80°
Length 500 feet.

This hole should intersect the magnetic body at about 200 feet vertical depth.

DDH. 2. Collar 3500S/200W
Bearing 144° true
Depression 80°
Length 500 feet.

This should enter the magnetic body at about 200 feet.

DDH. 3. Collar 2600S/100E
Depression Vertical
Length 500 feet.

This should intersect magnetic material at about 100 feet.

DDH. 4. Collar 2000S/150E
Bearing 144° (true)
Depression 80°
Length 200 feet.

DDH. 5. Collar 2175S/400W
Bearing 0° (true)
Depression 50°
Length 500 feet.

DDH. 6. Collar 2100S/400W
Depression Vertical
Length 500 feet.

(b) Highclere Area.

DDH. 1. Collar 500S/400W
Bearing 131° (true)
Depression 80°
Length 300 feet.

DDH. 2. Collar 150N/50W
Bearing 131° (true)
Depression 80°
Length 300 feet.

DDH. 3. Collar 500N/350W
Bearing 11° (true)
Depression 70°
Length 300 feet.

6. REFERENCES

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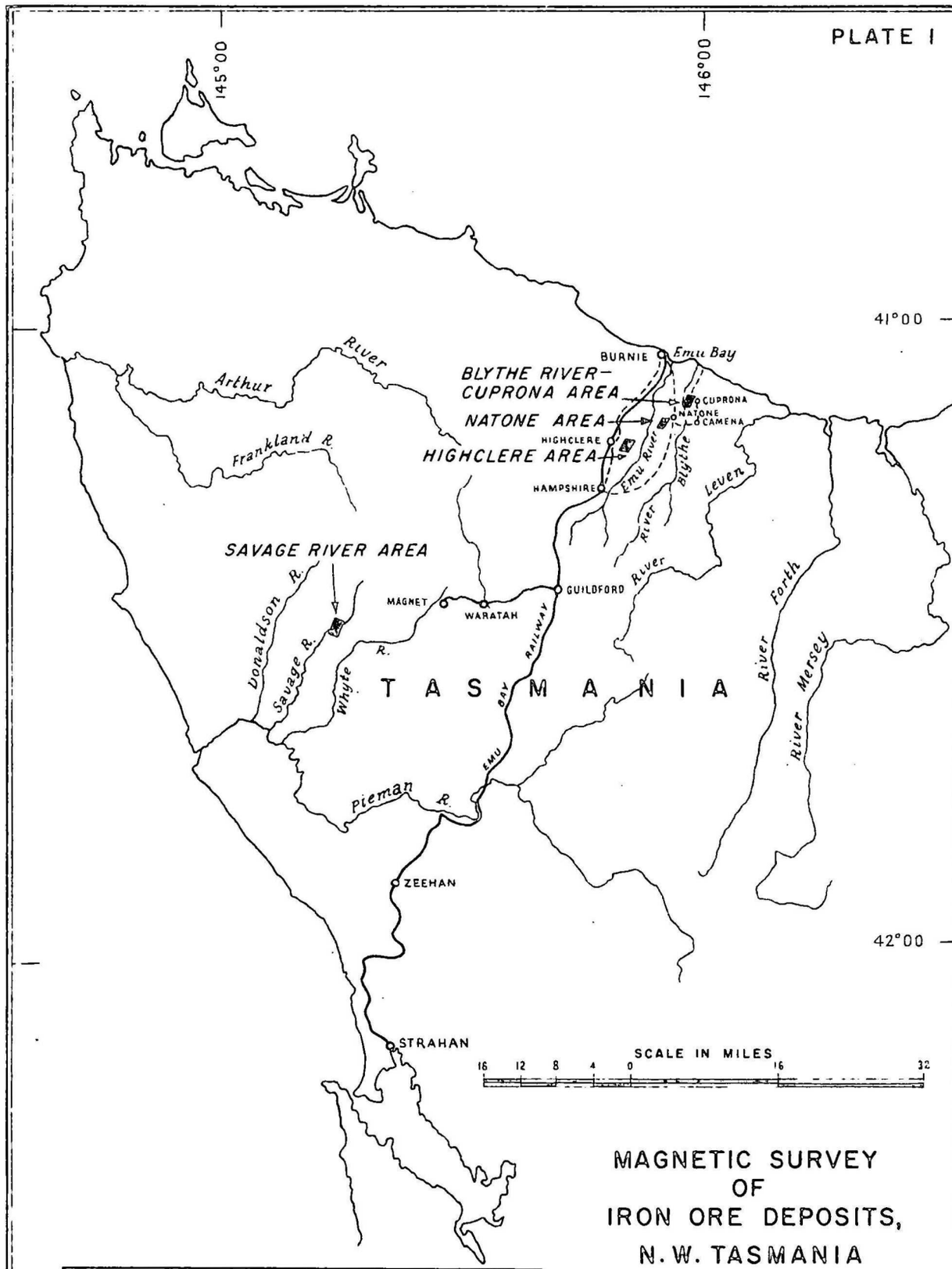
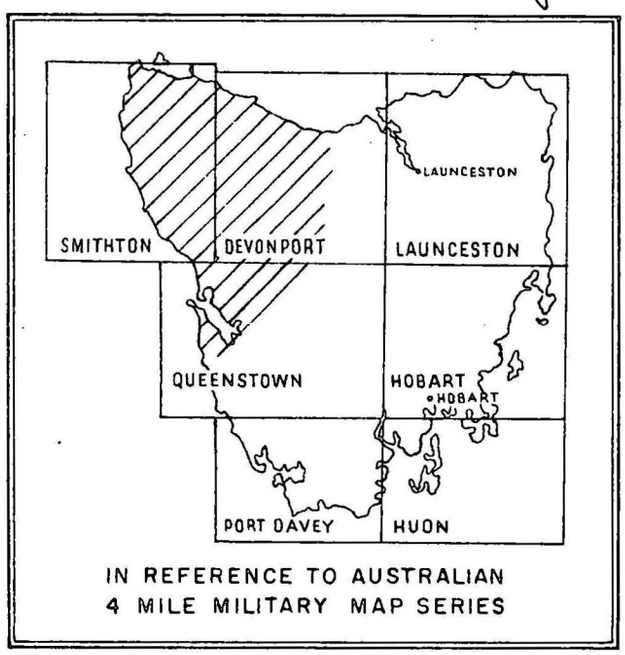
PLATE I



MAGNETIC SURVEY OF IRON ORE DEPOSITS, N.W. TASMANIA

LOCALITY MAP



IN REFERENCE TO AUSTRALIAN
4 MILE MILITARY MAP SERIES

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To Accompany Records 1959, No 11

PLATE 2

LEGEND

FLIGHT LINE WITH CHECK POINTS (SEE AEROMAGNETIC MAP G 218-3)

GROUND SURVEY TRAVERSE

MAGNETIC CONTOUR FROM GROUND MAGNETIC SURVEY

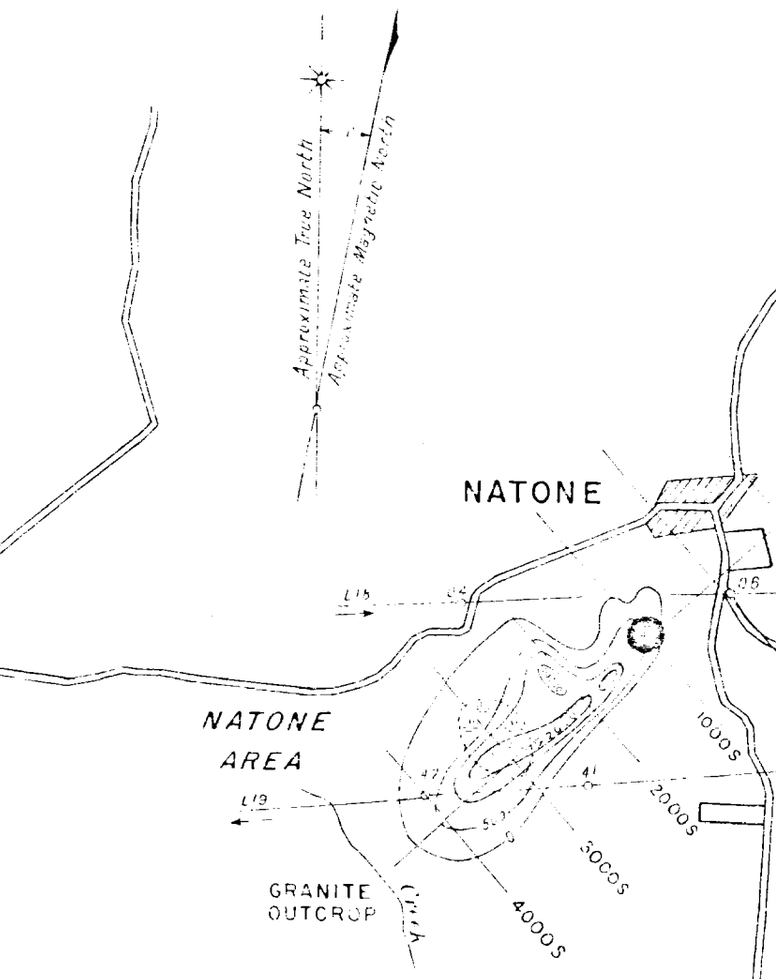
IRON OUTCROP

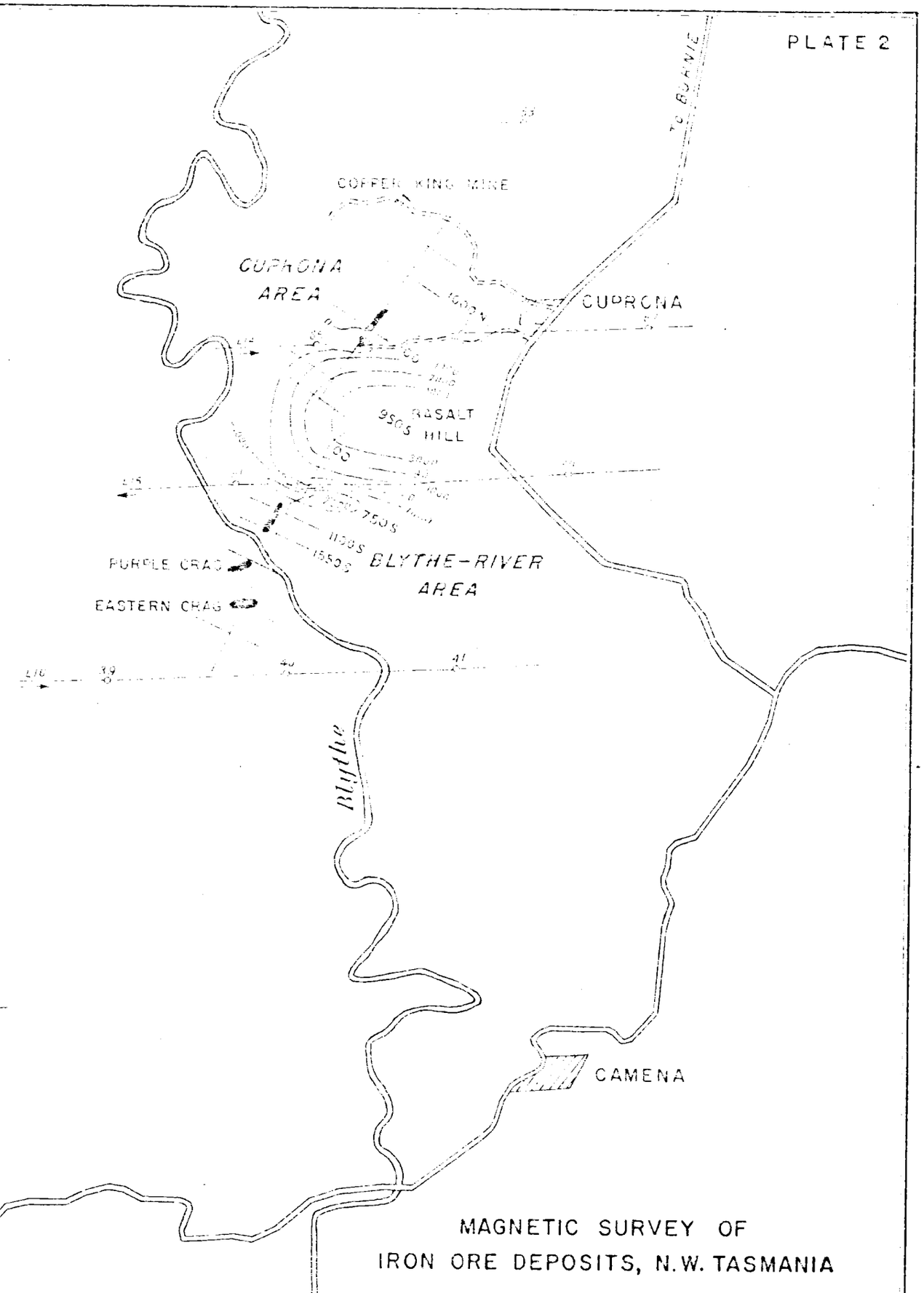
SWAMP

TOPOGRAPHICAL DETAIL FROM AERIAL PHOTOS BURNIE RUN 3, 43004, 05, 06
" " 4, 43166, 67, 68

APPROXIMATE SCALE IN CHAINS

30 15 0 30 60 90





MAGNETIC SURVEY OF IRON ORE DEPOSITS, N.W. TASMANIA

BLYTHE RIVER — CUPRONA AND NATONE AREAS

AREAS SURVEYED IN RELATION TO FLIGHT LINES

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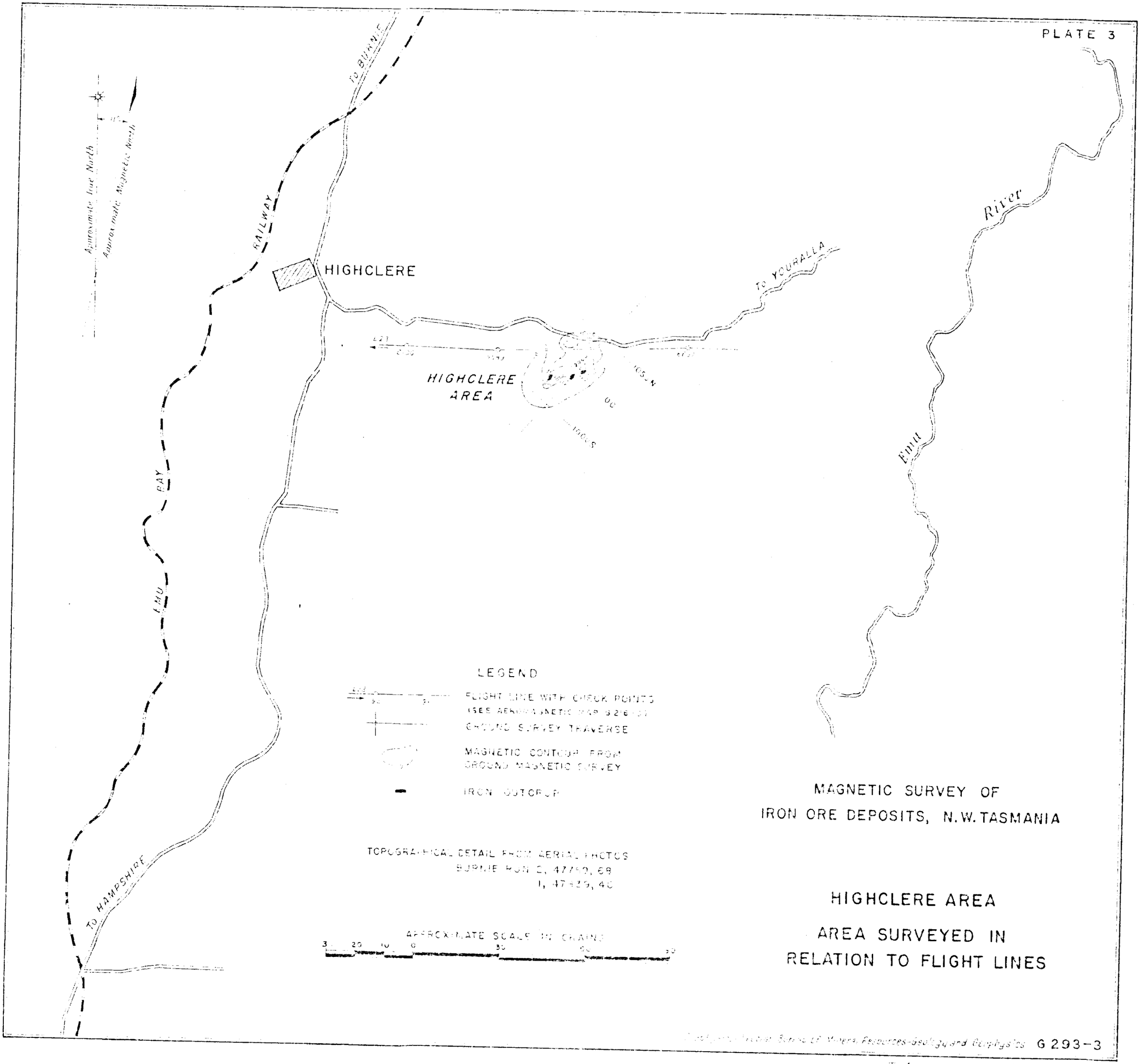
PLATE 3



MAGNETIC SURVEY OF IRON ORE DEPOSITS, N.W. TASMANIA

HIGHCLERE AREA

AREA SURVEYED IN RELATION TO FLIGHT LINES

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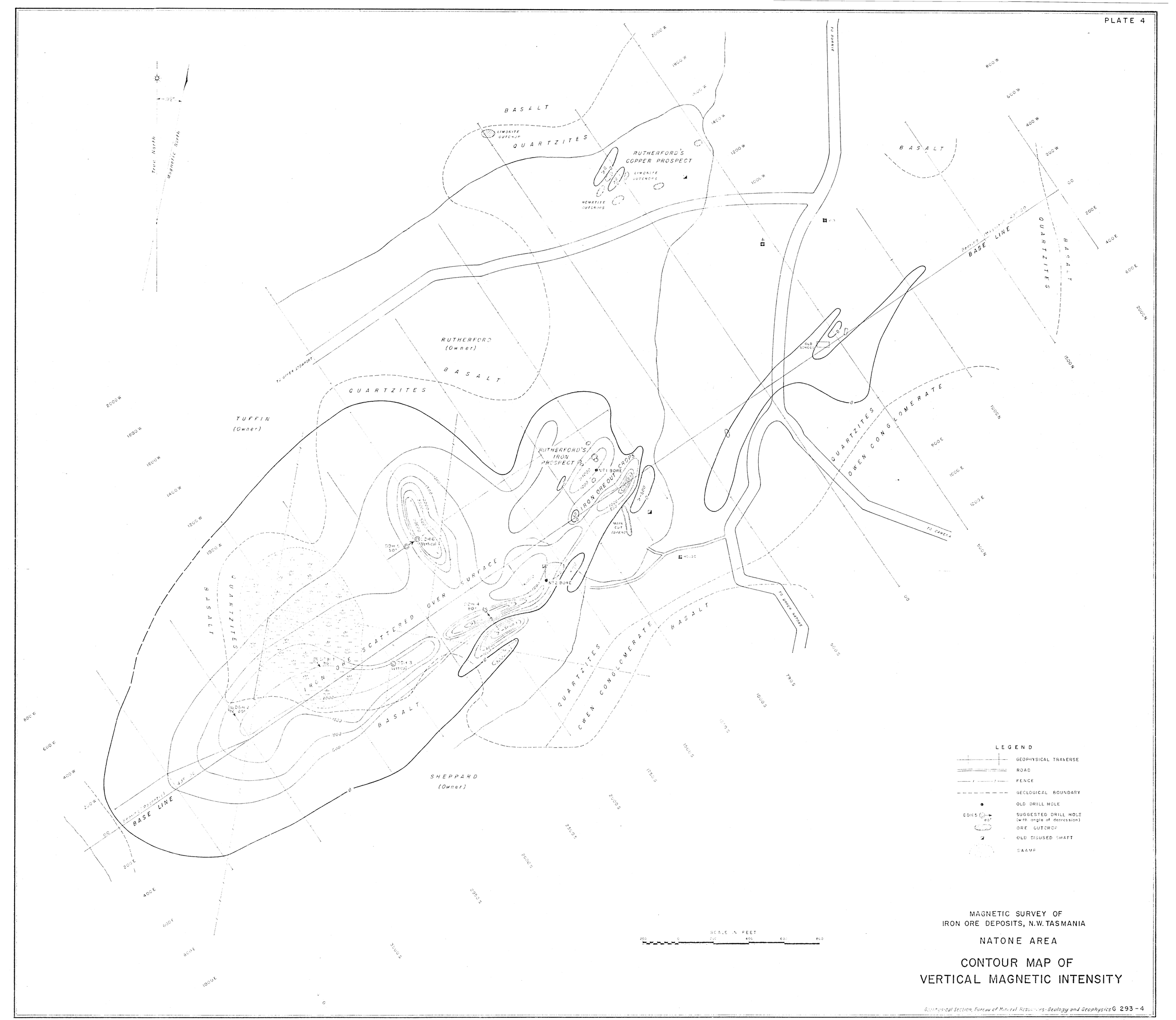
PLATE 4



LEGEND

- GEOPHYSICAL TRAVERSE
- ROAD
- FENCE
- GEOLOGICAL BOUNDARY
- OLD DRILL HOLE
- DDH5 50° — SUGGESTED DRILL HOLE (with angle of depression)
- ORE OUTCROP
- OLD DISUSED SHAFT
- SWAMP

MAGNETIC SURVEY OF
IRON ORE DEPOSITS, N.W. TASMANIA

NATONE AREA

CONTOUR MAP OF VERTICAL MAGNETIC INTENSITY

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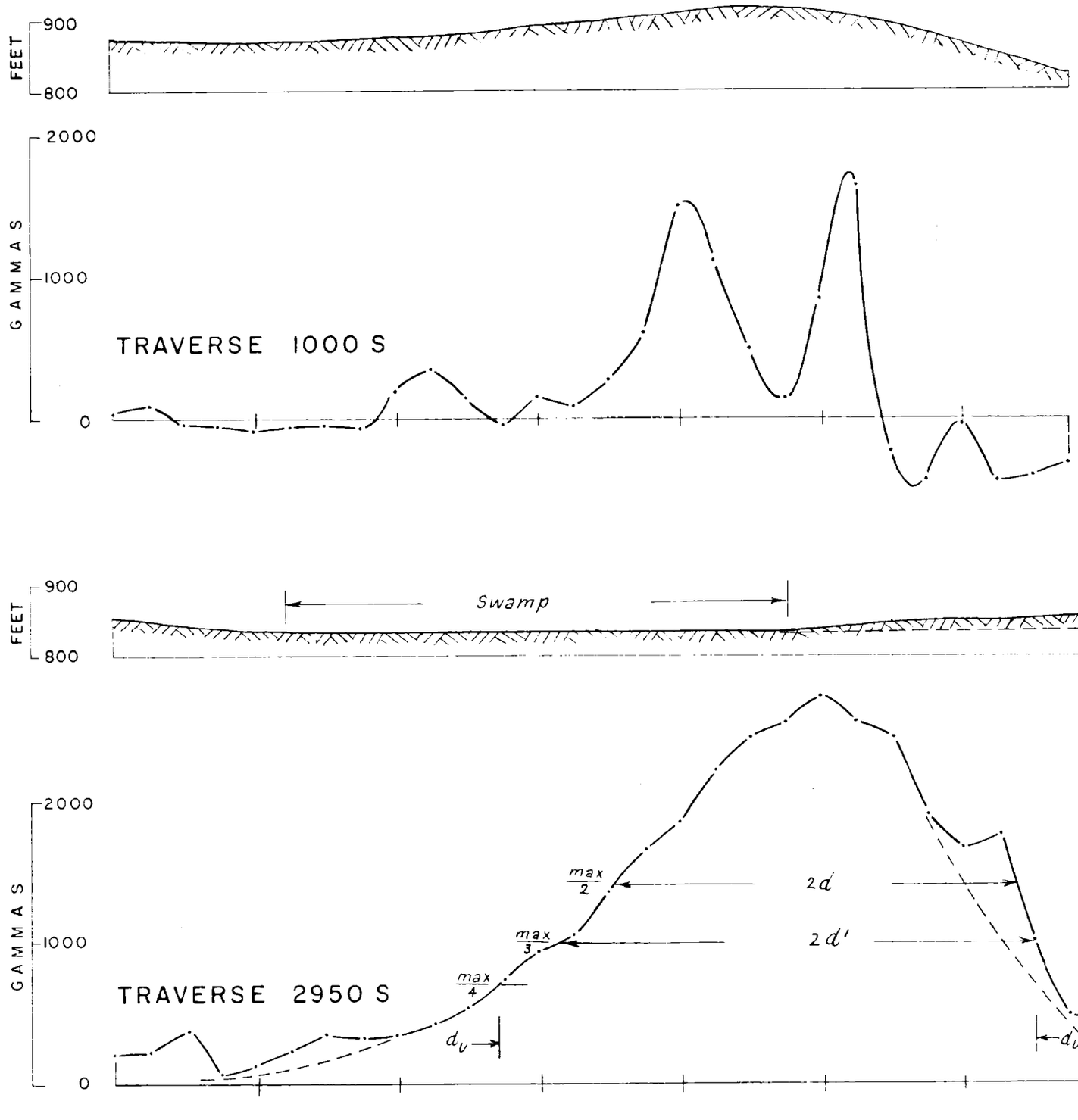
To Accompany Records 1955, N°11

PLATE 5
Sheet 1



HORIZONTAL SCALE IN FEET

200 100 0 200 400 600

VERTICAL SCALES AS SHOWN

MAGNETIC SURVEY
OF
IRON ORE DEPOSITS,
N.W. TASMANIA

NATONE AREA

MAGNETIC PROFILES
1000 S, 2950 S and 3500 S

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G 293-5

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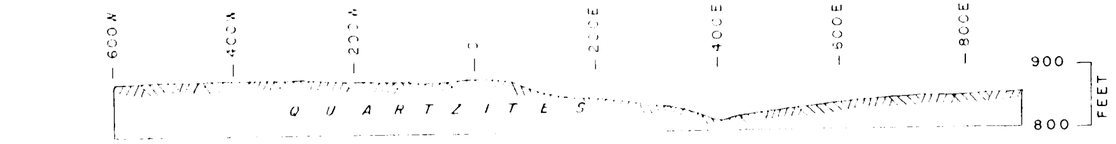
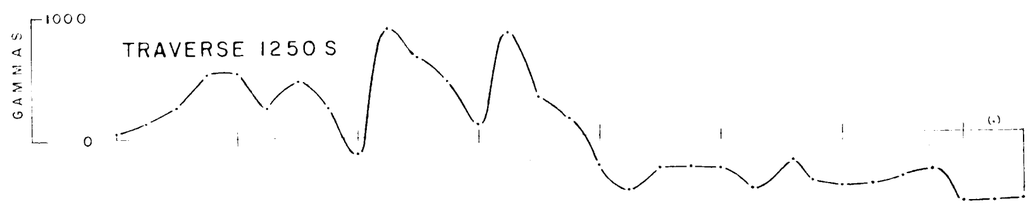
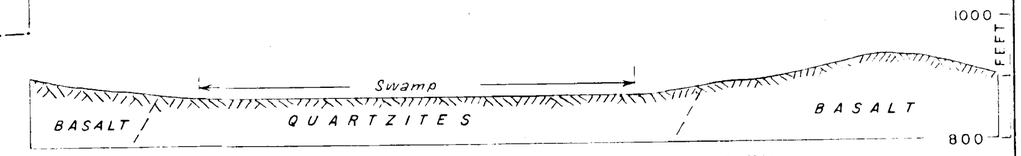
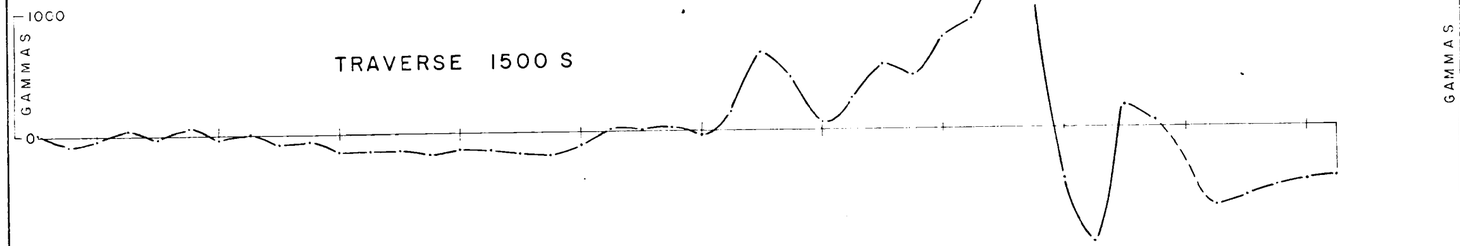
PLATE 5
Sheet 2

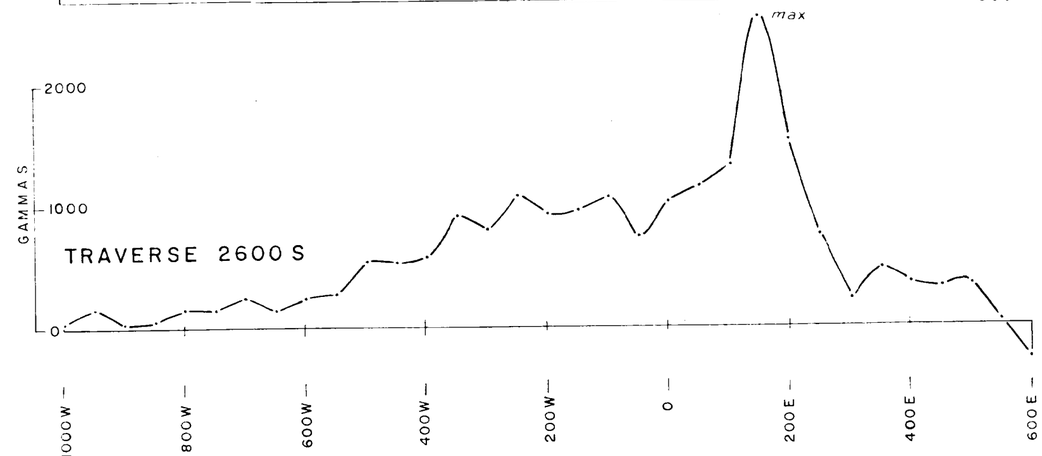


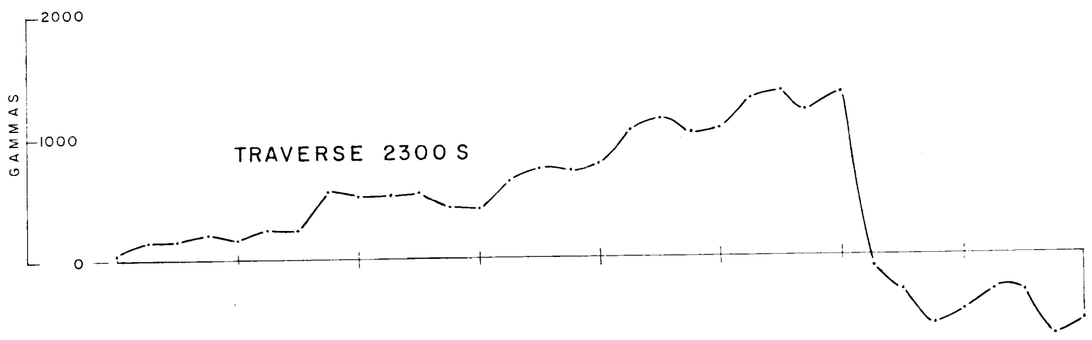


HORIZONTAL SCALE IN FEET
200 100 0 200 400 600 800
VERTICAL SCALES AS SHOWN









MAGNETIC SURVEY OF IRON ORE DEPOSITS, N.W. TASMANIA

NATONE AREA

MAGNETIC PROFILES
1250 S, 1500 S, 2300 S and 2600 S

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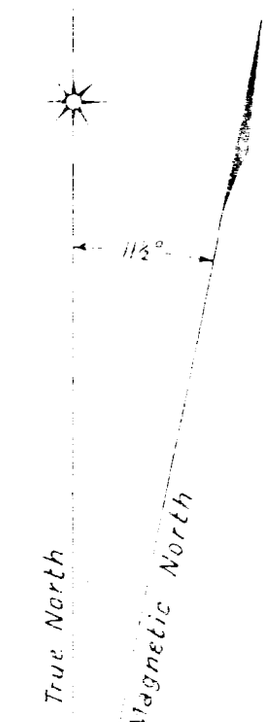
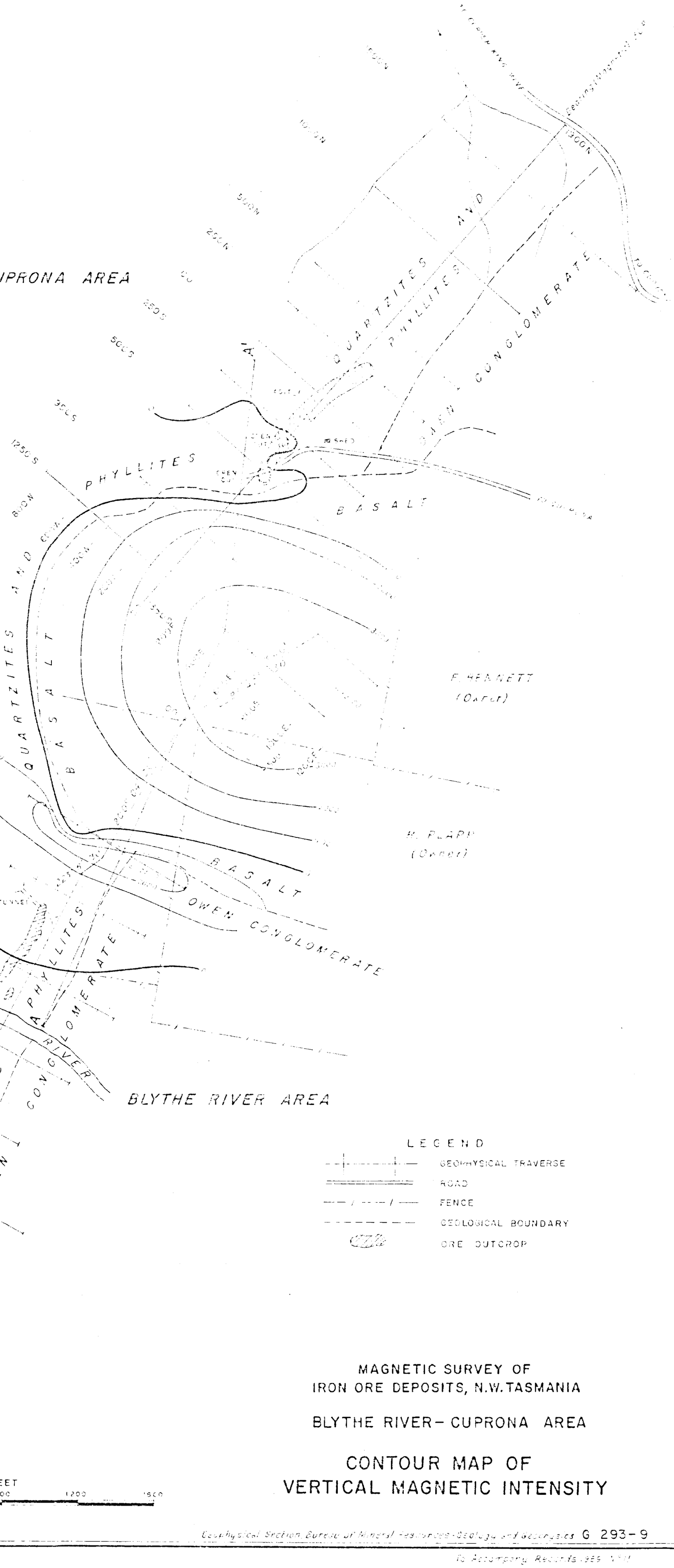
PLATE 6



CUPRONA AREA



LEGEND

- GEOPHYSICAL TRAVERSE
- ROAD
- FENCE
- GEOLOGICAL BOUNDARY
- ORE OUTCROP

SCALE IN FEET

400 0 400 800 1200 1600

MAGNETIC SURVEY OF IRON ORE DEPOSITS, N.W. TASMANIA

BLYTHE RIVER – CUPRONA AREA

CONTOUR MAP OF VERTICAL MAGNETIC INTENSITY

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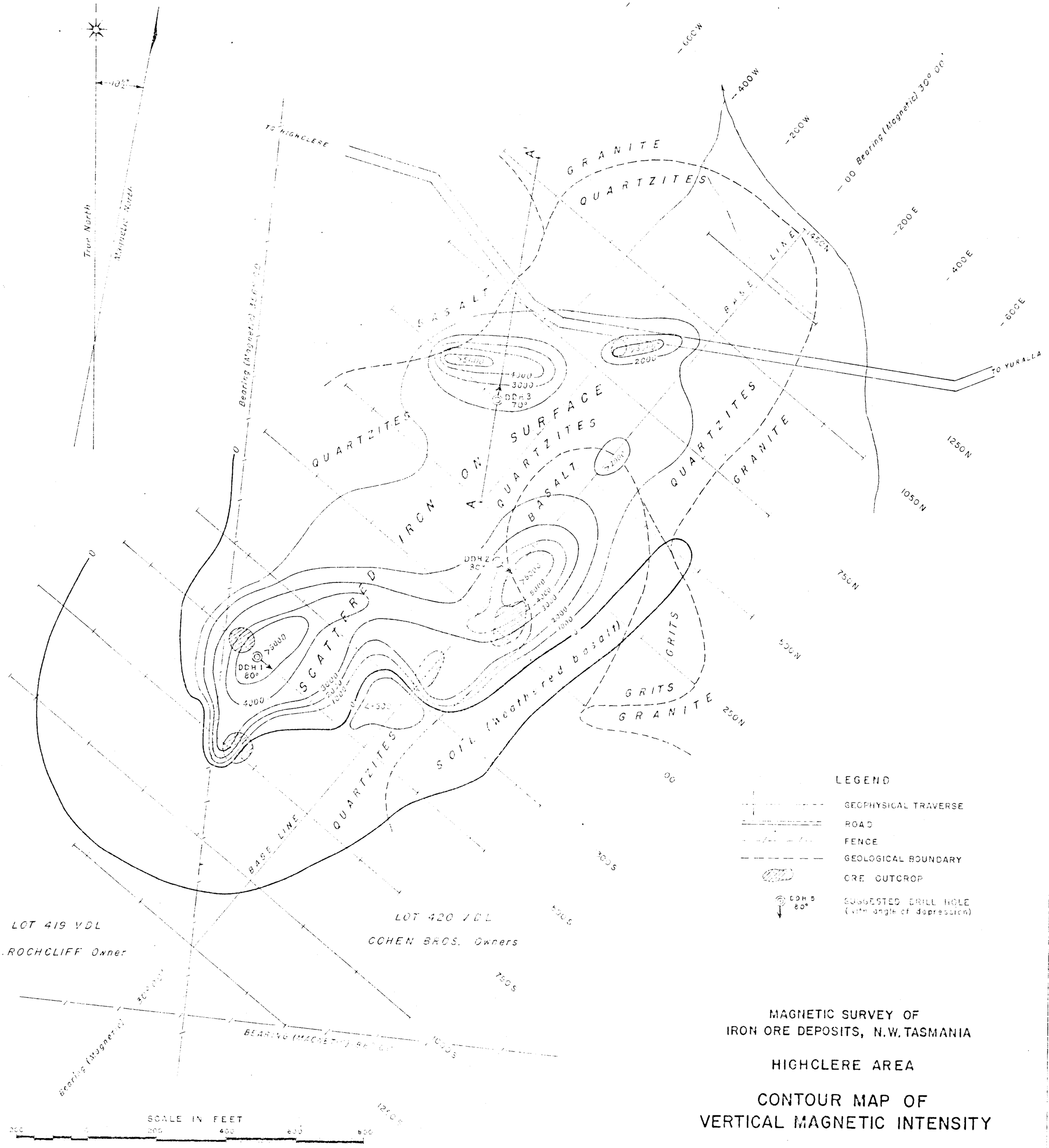
PLATE 7



LEGEND

- GEOPHYSICAL TRAVERSE
- ROAD
- FENCE
- GEOLOGICAL BOUNDARY
- ORE OUTCROP
- DDH 5 80° — SUGGESTED DRILL HOLE (with angle of depression)

MAGNETIC SURVEY OF IRON ORE DEPOSITS, N.W. TASMANIA

HIGHCLERE AREA

CONTOUR MAP OF VERTICAL MAGNETIC INTENSITY

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