621001

ANOMALY 10 / 8

BIG CREEK

20th May 1960

Accompanying Maps:
Q 51 (1), (1a), (3), (3a)
Q 29 (2), (4), (10)

60_314

20th May, x60

To: Mr. D.F. Hudspeth

Anomaly 10/8

The accompanying reports describe the further work carried out recently in the area of airborne anomaly 10/8. This anomaly was first investigated in March, 1959 and a report (C86) issued in May of that year. In order to provide a complete coverage in this later report, relevant information provided in C86 has been included here.

The work has outlined a zone of massive hematite/magnetite mineralisation 1475 ft. in length with a maximum width of 170 ft. The field work and assays show that the mineralisation is iron oxide containing negligible quantities of base metals. Using a tonnage factor of 8 cubic feet/long ton, to a depth of 300 ft., 4,700,000 tons of iron oxide can be calculated.

In the absence of any encouragement of sulphide mineralisation within 100 ft. of the surface (as shown in the Deep Creek section) and its isolated position, no further work in recommended on this anomaly.

Chief Geologist, L.E.E.

Geology of Airborne Geophysical Anomaly 10/8. Big Creek

1. Dates of Investigation: 27th March to 4th April, 1960.

2. Man Days in the Field: 36

Personnel: Geologist/Geophysicist B. Scott
Bushmen J. Lang
D. Russell
H. Hooper

3. Location:

The location is 10 miles north-west of the old base camp at Birch Inlet and 1 mile east of Birthday Bay on the west coast. The anomaly is situated on a south bank tributary of Big Creek, named Deep Creek. Access is not possible from the sea coast: the easiest access by land would be along the strip of button grass that runs north-eastwards from the anomaly towards Macquarie Harbour. This route of 9 miles reaches the Harbour immediately north of Gravelly Beach, 2½ miles south of Double Cove.

The anomaly is covered by photograph 12/890/71, photomosaic 10.

4. Previous Work

The anomaly was investigated in the general campaign of the ground follow-up of anomalies in March 1959 and report 086 and Drawings Q29 contain the information gained during this work. As a result of the discovery of the hematite/magnetite mineralisation, further work was carried out during this field season — geological mapping, trenching and magnetic surveying.

5. Topography

The area forms part of the plain which covers all the peninsula between Macquarie Harbour and the sea; this plain is part of the yet wider Henty surface which is a conspicuous feature near Queenstown. The elevation of this surface at Deep Creek is approximately 150 ft. above sea level with the streams flowing in narrow, steep-sided courses some 50 to 100 ft. below this.

Typically the rocks correlated with the Dundas Group carry a cover of thick bush while those correlated with the Precambrian carry button grass.

6. Geology

A. Regional Geology

Plate Q51/1a shows that the mineralisation is located within the Dundas Group but approximately 700 ft. from the Precambrian/Dundas Group contact. Generally the bedding and strike of the mineralisation par-

the eastern contact but north of 4N the hematite/magnetite swings from the north-east to the north.

B. Local Geology (Q51/1)

Mapping in Deep Creek shows that two sedimentary associations are present. From B.L. to 8W the sediments consist of (I) a black shale/grey sandstone/dolomite/chert association which strikes NW and dips steeply, above 70 degrees. West of 8W the strike of the sediments is generally NE and they consist of an association of (II) mudstone/grey sandstone/black shale. The dip is variable, steep or vertical, to the south of the hematite/magnetite mineralisation, but generally at an angle of less than 60° west of the hematite outcrop.

From the regional mapping the Dundas Group/Precambrian contact should proceed through the grid from approximately 4S/7W north-easterly to 4N/4E. Although the actual contact was not seen the lithology and distribution of the two associations as outlined above would agree with this structural interpretation with association I being correlated with the Precambrian and II with the Dundas Group.

C. Mineralisation

Hematite or hematite/magnetite mineralisation has been traced continuously from 3S/12W to line 8N; it is absent on line 12N and its outcrop on plan Q51/1 has consequently been taken to 10N, a total length of 1475 ft. The mineralisation reaches a maximum width of 170 feet on line 8N and gradually decreases southwards to 55 ft. on line 00 to a final termination at approximately 3S/12W. The best exposure is in Deep Creek near line 00 where the mineralisation forms part of the 100 ft. high, near vertical, sides of the Creek; the dip of hematite body here is either vertical or very steep (+70 degrees) to the east or west. From the field mapping, and the magnetic results, the mineralisation consists of massive hematite south of 2N and massive hematite/magnetite north of this line; no sulphide mineralisation was seen and copper staining was only observed at one exposure (on line 00) and in insignificant quantities. Assays of the material are given in Table I.

TABLE I

Assays of Hematite/Magnetite Mineralisation from Deep Creek Prospect

No.	Fe	Cu	Pb	Zn	S	P	Ti	SiO_2
930	69.16%	0.03%	0.03%	0.14%	0.41%	0.01%	Nil	1.96%
929	68.06	0.03	0.01	0.21	0.46	0.01	Nil	0.72
928	68.63	0.03	0.01	0.41	0.53	0.02	Nil	1.04
931	64.81	0.05	0.01	0.24	0.59	0.01	Tr.	4.66
Average of four	67.67%	0.04%	0.02%	0.25%	0.50%	0.01%	Nil	2.10%

Assays by Mt. Lyell Assay Office, Queenstown.

930 18/10W South side of Deep Creek
929 00/10W North side of Deep Creek
928 Exposures on line 4N
931 Exposures on line 8N

Trenching on lines 4N and 8N show that for several hundred feet east of the main body of mineralisation the area contains narrow veinlets ($\frac{1}{8}$") of magnetite/hematite/quartz which appear to parallel the dip and strike of the bedding. They form 5 to 10% of the rock, their distribution is best seen on the magnetic sheet 951/3.

7. Conclusions

A body of massive hematite/magnetite mineralisation has been outlined 1475 ft. in length with a maximum width of 170 ft. Field examination and assays show it to consist practically entirely of iron oxides with insignificant quantities of base metals. Allowing a tonnage factor of 8 cu. ft./long ton, this mineralisation contains 15,672 tons per ft. depth, or 4,700,000 tons to a depth of 300 ft.

Geochemistry

1. Introduction

No further soil sampling was undertaken in the present investigation. The summary below is a copy of the section appearing in the first report on anomaly 10/8 (G86) and dated 22nd May, 1959. The sampling was carried out by I.M. Paltridge.

2. Sampling

Soil Samples 1444 to 1506, lot 21, were collected from this grid and analysed for Cu, Pb, Zn ~~and Mn~~.

3. Comments

(a) Negligible copper was recorded from these samples.

(b) Some small zinc concentrations were recorded from line 00 where peaks of 500 ppm were obtained. One peak in the eastern end of this line is inexplicable. The peaks on the western end of the line are on either side of the mineralised outcrops. Notice that no zinc is concentrated on the north line where the mineralised zone widens but a small peak is found on the southern line. The peaks in all cases are displaced either side of the actual zone of hematite mineralisation.

(c) Insignificant Pb concentrations (20 ppm) were recorded from line 4N and the western end of line 00, but it should be noted that these concentrations are displaced on 4N in a similar manner to the zinc.

4. Conclusions

(a) The concentrations are not suggestive of ore grade mineralisation, although they indicate that Pb and Zn minerals are present and may be expected at depth.

(b) It seems unlikely that Cu mineralisation of economic significance will be found.

(c) Further geochemical work of a reconnaissance nature should be considered before any drilling is decided upon.

Geophysics

1. Introduction

The anomaly was investigated last season by ground geophysics and a report issued within GSS by J.B. Boniwell. The description below relating to electromagnetic and gravimetric cover, which were not extended during the present investigation, is a summary of the information contained in this report.

2. Airborne Response (Lines 641, 642 and 643)

The airborne response consists of a magnetic disturbance of a maximum of 300 gammas on line 642 which is centred near the Dundas Group/

Precambrian contact. The electromagnetic response is shown on all three lines with the best response on line 642 with a phase shift of 0.6 degrees at 570 ft. and a ratio of 1.00. There is a displacement between the magnetic and electromagnetic responses of 350 ft., as shown on plan 951/1a.

In an examination of the electromagnetic trace this response shows a fairly faithful relationship to the altimeter record.

3. Ground Geophysics

A. Electromagnetic

Line 4W was run with the large vertical loop with the transmitter set up at 4S/10W. The centre line was covered by the E.E.M. using the broadside technique with the transmitter on line 4S. Several conductors were detected and their position is shown on the accompanying plan 929/10. A zone of conduction approximately 250 ft. wide is indicated between 4N/4W to 4N/6W and a definite conductor at 0 /9W; these conductors are placed on the immediate easterly edge of the hematite/magnetite mineralisation. Trenching at 4N/4W and 00/9W demonstrated the presence of sheared rock containing wet clay and hydro-micas. Consequently it appears as if the eastern edge of the zone of massive mineralisation is a shear zone containing the usual quantities of clay gouge and hydro-micas which here caused the response. The electromagnetic profiles indicate an easterly dip to this zone.

The massive mineralisation itself is apparently not conductive.

B. Gravimetric (929/4)

Gravimetric coverage of the grid demonstrated the presence of excess mass in correlation with the massive mineralisation on lines 4N and 00. The shape of gravimetric profile on 4N indicates an easterly dip to the hematite/magnetite mineralisation.

C. Magnetic (951/3)

The magnetic survey completed last season covered lines 4N, 00 and 4S. In the recent survey lines 00 and 4S were extended westwards, lines 8N and 12N were examined and the baseline taken to 16N.

The magnetic disturbance is bounded by lines 12N and 4S and is contained within the 900 gamma contour. It shows a strong negative centre on lines 8N and 4N which is followed immediately to the east by a strong positive centre, weaker negative and weaker positive centre. These anomalies indicate the presence of two broad sub-parallel magnetic zones which have a steep dip to the east.

On section Q51/13a the magnetic profiles on lines 4N and 8N are shown in relationship to the massive mineralisation. On line 4N the mineralisation is placed in the magnetic low whilst on 8N it is in the magnetic high. This apparent discrepancy can be followed in that whilst the hematite mineralisation strikes north-south the magnetite mineralisation, although locally following the bedding, trends as a zone NNW-ly from the hanging wall side of the massive oxides on 4N to form an integral part of the iron mineralisation on 8N. According to Boniwell (G86) the magnetic disturbances on 4N could be caused by a magnetite content of 10% in the country rock which is approximately the maximum quantity seen in the trenches.

D. Summary and Conclusions

(a) Ground Geophysics

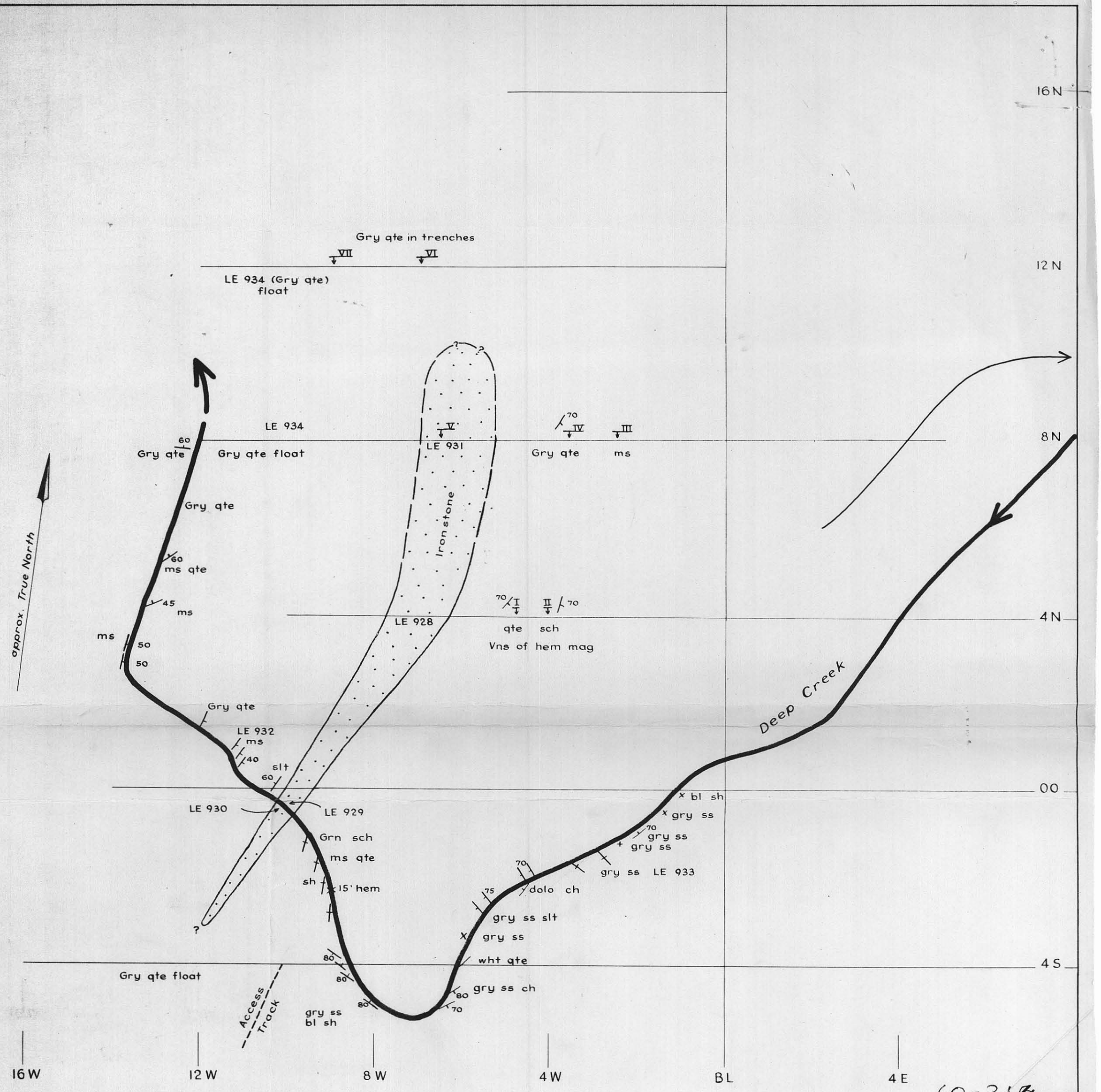
All of the ground results have been identified with their cause and agree with the geological picture of a zone of massive hematite flanked on its eastern side by a shear zone which parallels this feature. Mineralisation of up to 10% magnetite also occurs on this eastern side; it has a slightly transgressive trend to that of the hematite, being on its hanging wall on line 4N but an integral part of it on 8N. The gravimetric data shows as easterly dip to the hematite mineralisation, this direction is also indirectly shown by the electromagnetic and magnetic results.

Boniwell (G86), on the basis of the residual gravity anomaly and using a strike length of 1600 ft., calculated a figure of approximately 2 million tons of iron ore for the massive mineralisation.

(b) Airborne Response

The intense magnetic disturbance on the ground can be correlated with the airborne magnetic anomaly. Plan Q51/1a shows that there is a displacement of approximately 350 ft. in the direction of flight (easterly) from the cause of the anomaly and its plotted position.

The correlation of the airborne and ground electromagnetic disturbances is not so clear. If the conductor on the hanging wall side of the hematite mineralisation is the cause of the airborne anomaly, then there is a displacement of about 700 ft. in the direction of flight of the airborne response.



I/V = Trench and number

References

Note book № 29

60-314

CYPRUS EZ EXPLORATIONS
QUEBEC STOCK

621009

ANOMALY 10/8

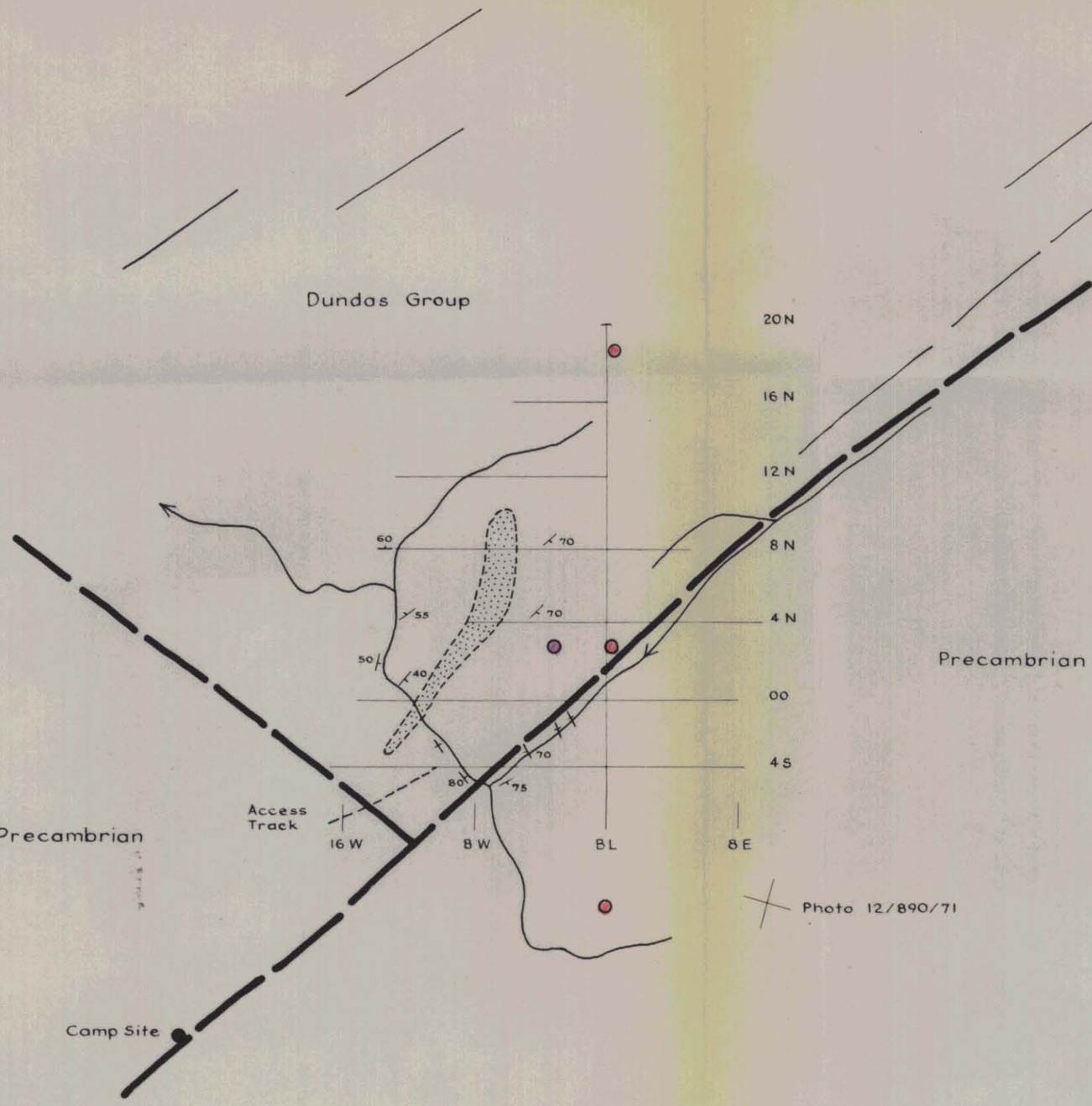
Survey		
Geology	B.S.	1960
Geophysics		
Geochemistry		
Drawn	B.S.	1960
Traced	D.S.	1960

5 cm

200 ft. to 1 inch

Q51 1

60-314 2362



approx. True North

Photo 12/890/71

LEGEND

- Photo fault
- Photo bedding
- Ironstone
- EM response
- Air magnetic response

5 cm

60-314

LYELL E.Z. EXPLORATIONS
QUEENSTOWN

ANOMALY 10/8

621010

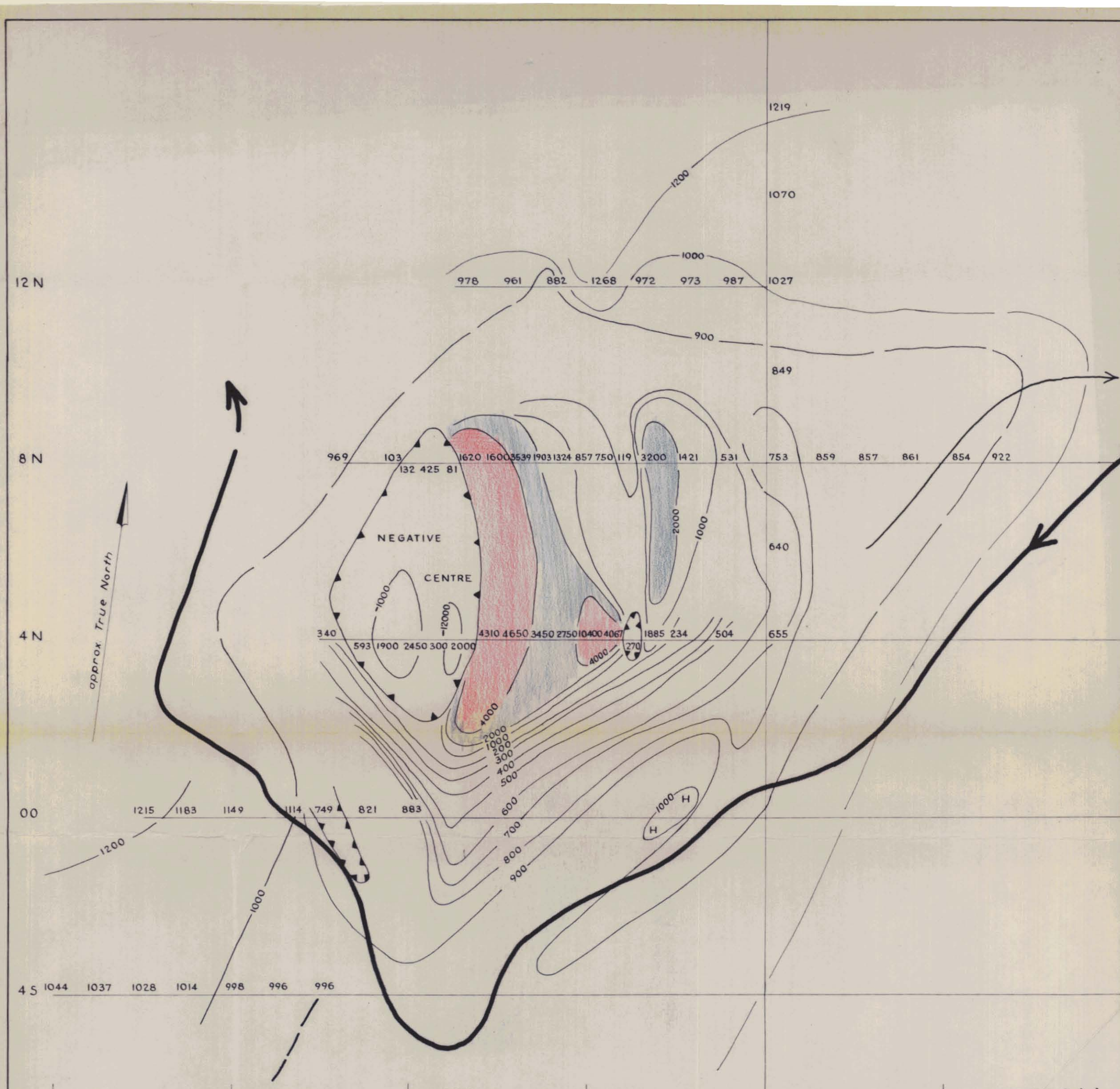
Survey			
Geology	B.S.	1960	750 ft to 1 inch
Geophysics			
Geochemistry			
Drawn	B.S.	1960	
Traced	D S	1960	

2363

Q51 Sheet No. 1a

P. Rodda
June 2, '6

60-314



621011

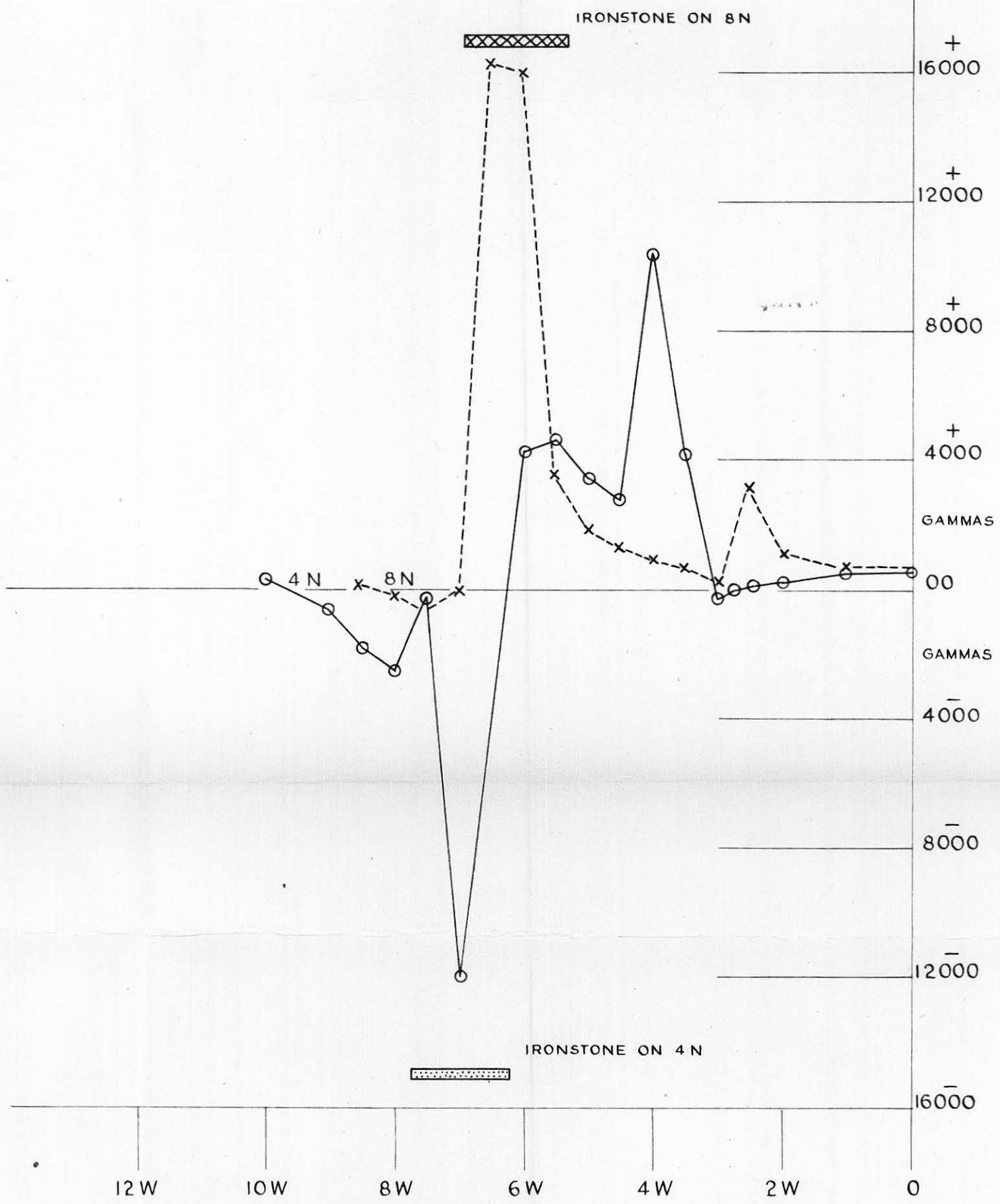
60-314

LYELL EZ EXP
QUEENSTO

5 cm

ANOMALY 10/8

Survey			Scale	2364
Geology				
Geophysics	I.M.P., B.S.	1959/60	200 ft. to 1 inch	Q51 Sheet No. 3
Geochemistry				
Drawn	B.S.	1960		
Traced	D.S.	1960		60-314



60-314

Survey 1959 4 N

Survey 1960 8N

5 cm

ANOMALY 10/8

621012

Survey			Scale
Geology			
Geophysics	I.M.P., B.S.	1959/60	200 ft. to 1 inch
Geochemistry			
Drawn	B.S.	1960	
Traced	D.S.	1960	

2365

Q51 Sheet No 3a

60-314

12W 8W 4W 00 4E 8E

4N

.0001 .0003

00

.02 .05 .05 .05 .009 .05 .04

4S

.02 .005 .0003

True North (approx.)

5 cm

621013
60-31

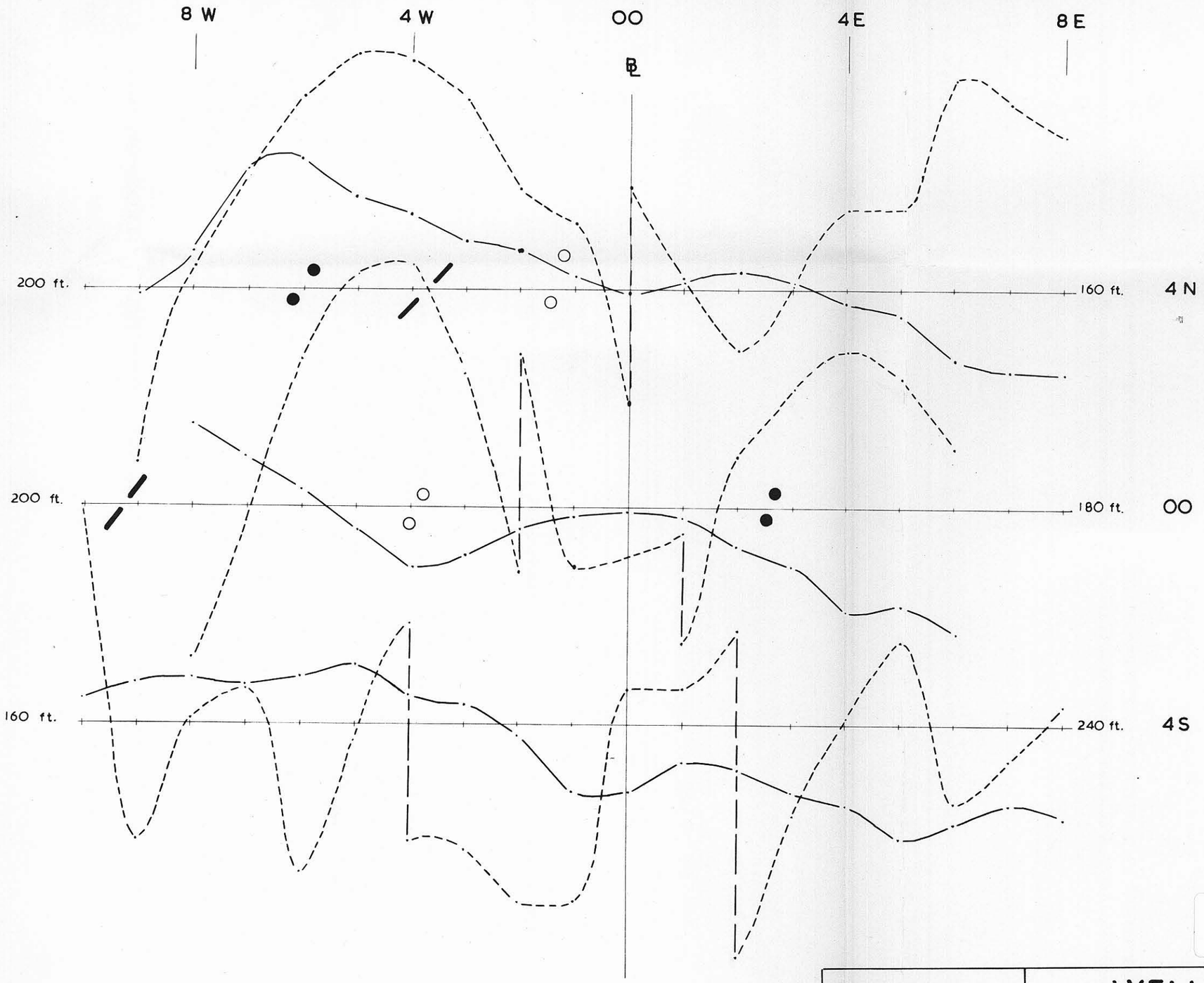
References
Zn

LYELL E.Z. EXPLORATIONS
QUEENSTOWN

ANOMALY 10/8

Survey			Scale	2366
Geology			.1%	
Geophysics				Q 29 Sheet No 2
Geochemistry	I.M.P.	Apr. '59	to	
Drawn	I.M.P.	Apr. ' 59	1 inch	Checked
Traced	D.S.	May 5		Date 14·7·59

GEOCHEMISTRY



5 cm

621014

60-31

References:

——— Bouguer Gravity

- - - - Topography

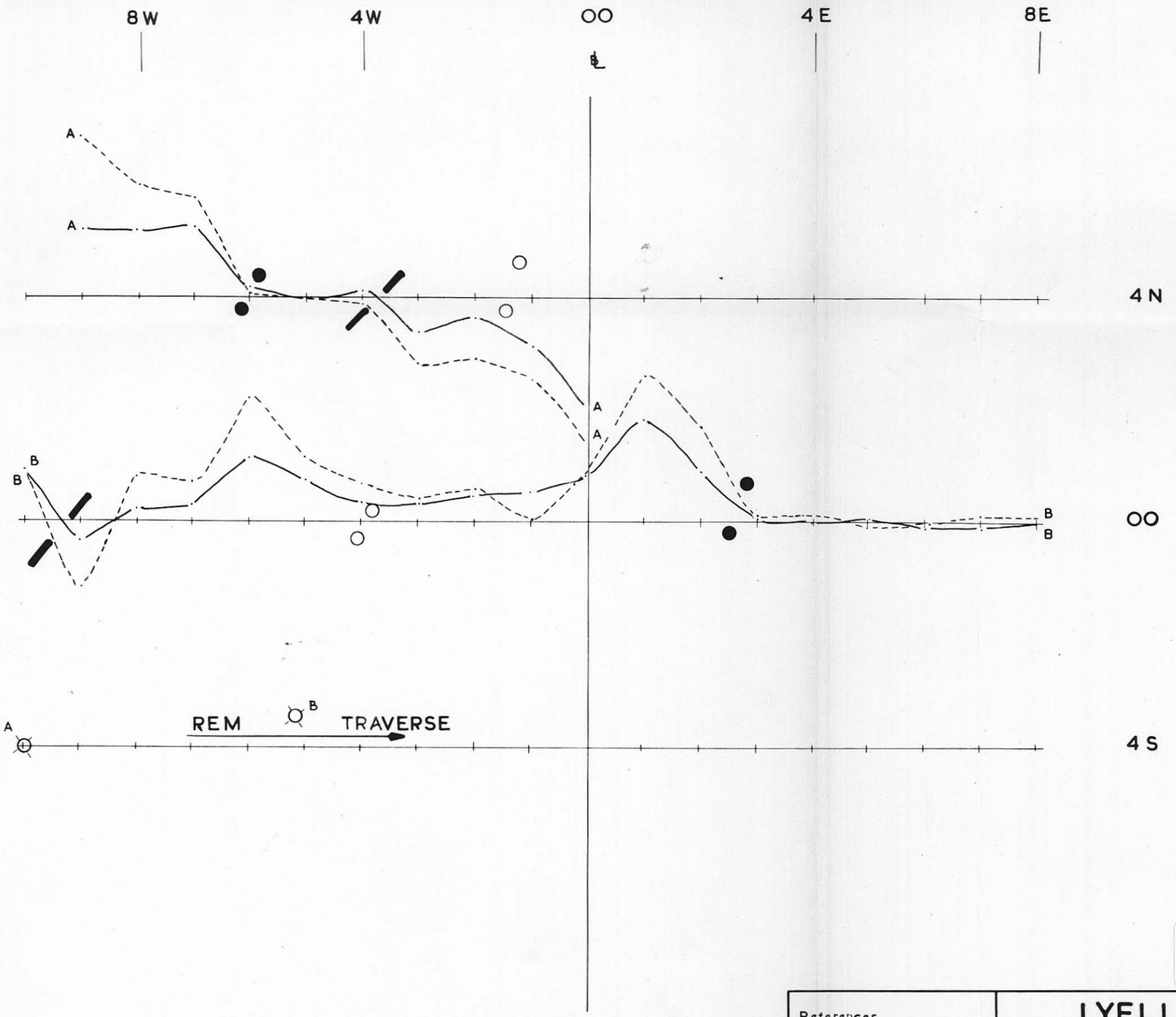
E.M. Axes

LYELL E Z EXPLORATIONS

QUEENSTOWN

ANOMALY 10/8

Survey			Scale	2367
Geology			Hor 200' to 1"	
Geophysics	I.M.S.	Apr. '59		Q29 Sheet No 4
Geochemistry			Vert 20' to 1"	
BOUGUER GRAVITY	J.B.B.	Apr. '59	Δg 1" = 10 mgal	Checked:
	D.S.	May '59		Date: 4-7-59



60-31

References

1000 cps

5000 cps

VERTICAL COIL

LYELL E Z EXPLORATIONS

QUEENSTOWN

ANOMALY 10/8

621015

2368

			Scale
Survey			Hor. 200 ft. to 1 inch Vert. 20° to 1 inch
Geology			
Geophysics	T. N. B.	Apr '59	
Geochemistry			
Drawn	J. B. B.	Apr '59	
Traced	D. S.	May '59	

Q29 | | 10

Checked

Date 14 · 7 · 59