

9/24/59

377001

GEOLOGICAL & GEOPHYSICAL
SETTING OF
AIRBORNE ANOMALY 9/4

59-265

MICROFILMED

Anomaly 9/4
Lee
(+ ATTACHED FIGURES)
28/4/59.

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Q64

28th April,

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To: Mr. G.F. Hudspeth

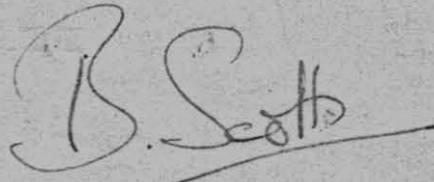
Anomaly 9/4

The accompanying reports describe the geological and geophysical setting of airborne anomaly 9/4.

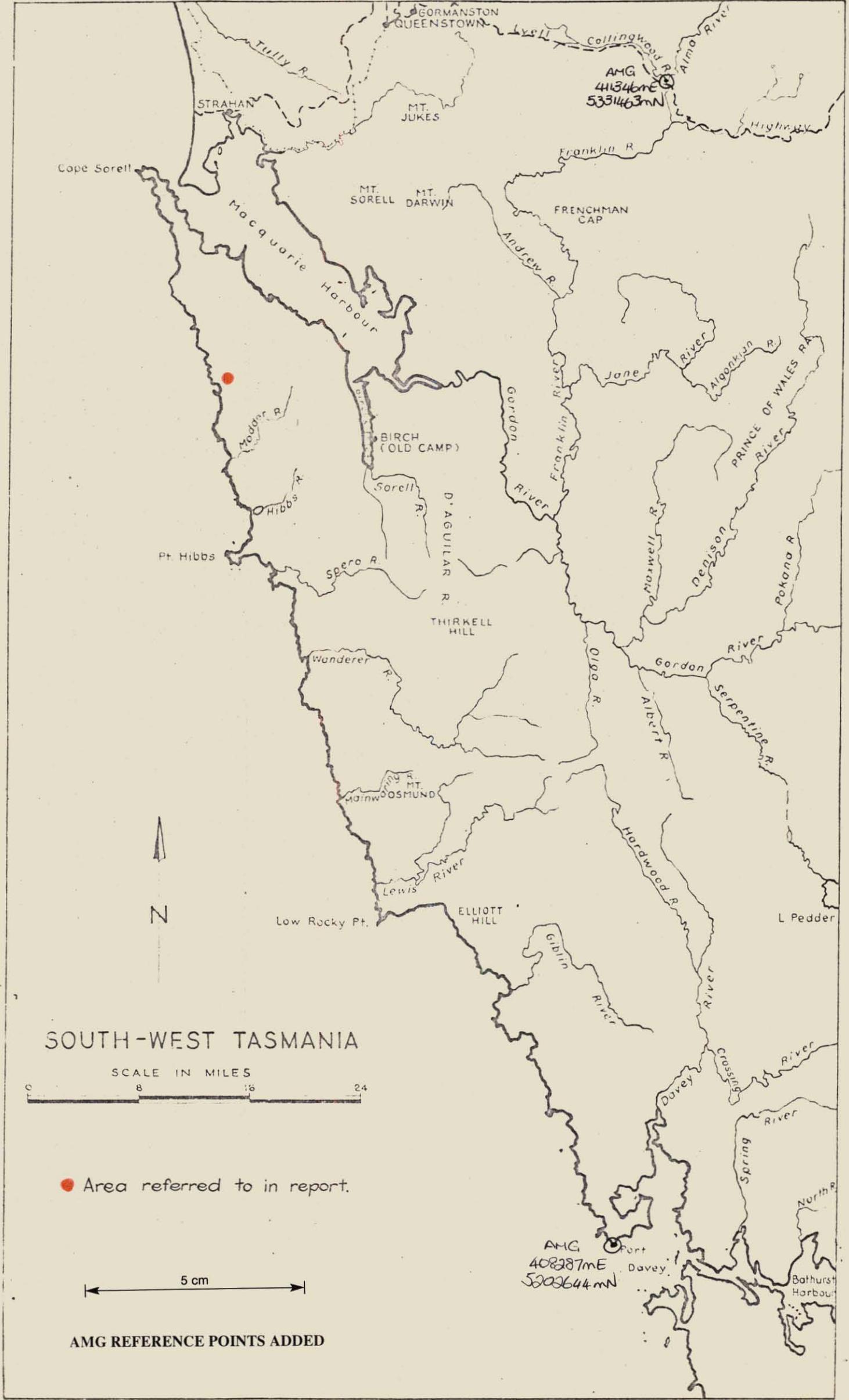
This electromagnetic anomaly occurs within a Precambrian succession of carbonaceous shales and metaquartzites with associated strike faulting. With the noted exception at grid location 8S/55E, there is no clear gravity association with any of the electrical horizons and on this basis the conductors can be related to the presence of thin selvages of graphite within the carbonaceous area.

Conclusions

With the exception of the trenching at 8S/55E, no further work is warranted.



Chief Geologist, L.E.E.



I. GEOLOGY SECTION - ANOMALY 9/4

1. Dates of Investigation: 26th February to 11th March
(Preparation & Geological)
2. Man Days in the Field: 42
- Personnel: Geologist: R.G. Elms
Bushmen: G. Seymour
H. Hoefferer
M. Maywood
3. Location: The area investigated was about 1 mile inland (east) of Birthday Bay. The centre of 9/4 grid lies at 4200' on a photo-bearing of 125° from photo-centre 11/889/129.

4. Topography:

The low rounded hills were of gentle slope and the valleys, although steep, were shallow.

On areas where bedrock was close to the surface, button grass was prevalent. In sandy areas, gaa scrub occurred, as it did in the valleys.

5. Geology:a. Lithology

From weak fragmental evidence the general inferred Carbine sequence in the grid area is from oldest to youngest (or west to east): quartzite, siltstone, grey shale, black shale.

Brief comments on each rock type follow.

The quartzite is a hard fine grained light grey siliceous arenite, showing evidence of silicification and quartz veining particularly in the proximity of fold axes where it is better classed as a metaquartzite.

The siltstone members (e.g. LE1134) are mid grey in colour, being soft and flakey at times.

The grey shale has a colour varying from light to dark grey, and at times contains some carbonaceous material.

The black (carbonaceous) shale is soft and very flakey, approximating a graphitic schist where slippage has occurred within the bed.

The fine grained sediments described are not metamorphosed to any degree, but it is noteworthy that each type of sediment, in varying amount, has carbonaceous material present.

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b. Structure

The grid area of 9/4 is located symmetrically about the north easterly trending axes of an anticline and possible syncline of northerly plunge. The bedrock along Lines 4S and 8S is almost entirely obscured by dune sands of unknown thickness.

Geophysics places 50' SE of the anticlinal axis crossing the grid, a strike slip dip fault of unknown displacement. However, no geological confirmation of this is available.

ADDITIONAL AREA INVESTIGATED

Location of Area: From 4N/0 peg of the 9/4 anomaly grid, the distance is approximately 5600 feet bearing N45°E to the CL/0 peg of the grid of this area.

Geology

a. Lithology

The reconstructed Carbine sequence would appear to be as follows, oldest to youngest.

Black pyritic shales, thin banded and thin bedded ($\frac{1}{8}$ "). Some transported limonite was found associated with these shales, no doubt derived from the contained syngenetic pyrite.

Black slate and ferruginous quartzite, occurring in alternating beds of 3' width. At times, small white quartz veins which are concordant with bedding occur in the slate.

Hard grey slate.

Shale and siltstone, which form an alternating thin bedded ($\frac{1}{16}$ ") facies.

Limestone, no outcrop of which was found. Boulders of this limestone were noted at only one point in the creek bed. This being so it was assumed they had not been transported very far, and thus the limestone can be approximately placed in the stratigraphical column. The limestone was a hard, grey, fine grained rock, occurring in a bed of presumed small thickness (less than 50').

Siltstone, a massive, light grey to very dark grey fine grained sediment. Siltstone was the largest unit in the sequence, being possibly in excess of 100' thick.

Hard grey slate.

Dolomitic slate, a hard, fine grained, thin banded, dark greyish-brown

rock. The colour banding was an alternation of brownish greys and dark greys. The dark grey bands were dominant, being 1/10" in thickness, the brownish grey bands being only 1/40" thick.

Shale, fine grained, light grey and pyritic.

Chert and sandstone. Only fragments were found, but in a position suggesting little movement. The sandstone was coarse grained and very friable.

LE1128 is a milky coloured, cryptocrystalline, apparently thin bedded chert.

The position of the last member of the sequence is doubtful.

b. Structure

This is an area of observed anticlinal structure in Carbine rocks. The anticline trends and plunges north-easterly. The total thickness of the described sequence is slightly more than 300'.

c. Mineralisation

Limonite was observed in association with the black pyritic shales at the bottom of the sequence. This limonite is almost certainly derived from the syngenetic pyrite contained in the shales, and therefore of no importance.

Robert G. Elms.

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II. GEOCHEMICAL SECTION - ANOMALY 9/4

1. Sample and Lot Numbers

Soil samples 4247 to 4281, forming Lot 19, were analysed for lead, zinc and copper.

2. General Comments

The spectrographic results show a complete absence of metal content, all assays being below 1 ppm.

3rd April, 9

A.E.M. Anomaly 9/4

The airborne response is of large magnitude - best line 647: 2.2 degrees phase on the low frequency - but is quite broad, and, on the high frequency, poorly resolved. Moreover, some dependence on the altimeter trace is manifest, so that, although the low frequency response peaks nicely to allow the existence of an anomaly superimposed on an anomalous "background", recorded magnitudes must be considered to contain background "noise", and should be viewed accordingly.

The results of the ground electromagnetic survey are marked by a series of conductor indications, none of them particularly well-defined, many not even resolved. In some cases, resolution may have been adversely affected by misorientation, an effect peculiar to the vertical loop method, in others, by the conditions of coupling, and in all of them, by poor conductivities. However, electrical strikes appear to be consistently grid NE, and indicated dips SE approximately 70 degrees. The cover is variably thin, ranging from 10'-30' over the conductors.

It is evident from this work that the airborne anomaly must represent an integration of a series of closely set conductor horizons acutely angled to the flight path which the aircraft equipment could not resolve.

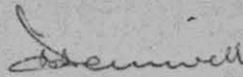
Coverage by gravimeter was affected by a unique circumstance: sand, occurring variably within the grid area. Bouguer profiles, based on the more or less standard figure for West Coast conditions of 2.65 gms./cc.,

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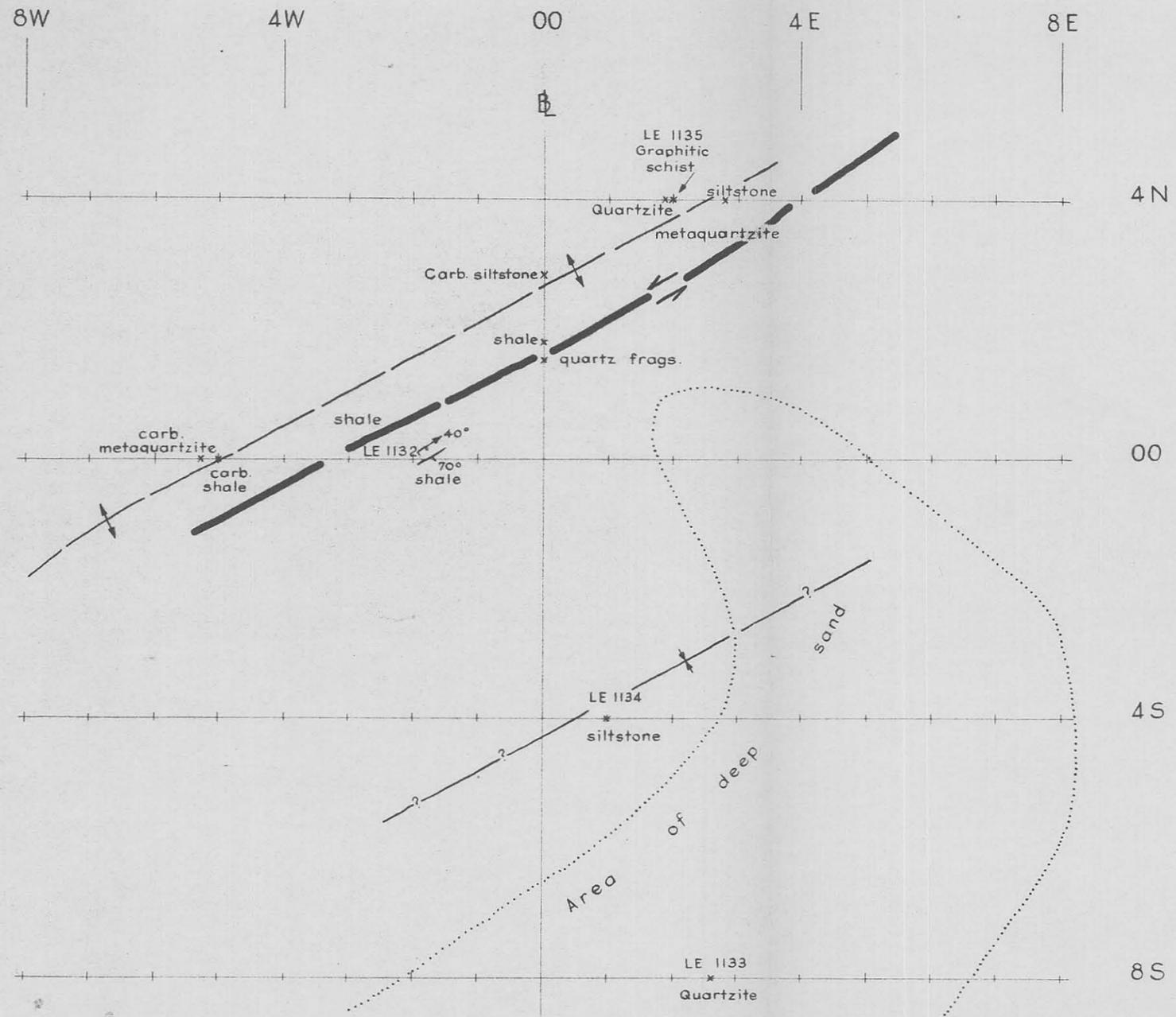
near-surface density, displayed an inverse relationship with topography at several points, and were, consequently, re-corrected. The indicated density pertinent to these points was found to be approximately 1.70 gms./cc., and is implicit to areas of deep sand, say greater than 20'. Hybrid curves of gravity were constructed, therefore, from the two density figures as applicable. This procedure, necessarily empirical, may introduce some distortion in the regional sense, but can be relied upon not to eliminate genuine anomalies due to local bedrock causes. Thus, it is clear that no positive gravity is to be associated with any of the electrical horizons with the possible exception of that at 8S/55 ϕ E. Here, a contact association seems probable, but this should be checked by blasting.

A structural axis, perhaps a strike fault, is inferred across the north half of the grid. The postulated movement, however, is highly speculative.

The grid area occurs entirely within the Precambrian. Graphitic or otherwise carbonaceous beds have been recognised in widespread incidence in a series of meta-quartzites. No mineralisation is evident. The lack of economic interest thus indicated is now more generally applicable to the setting in view of the gravimetric and featureless magnetic evidence.



J.B. BONIWELL.

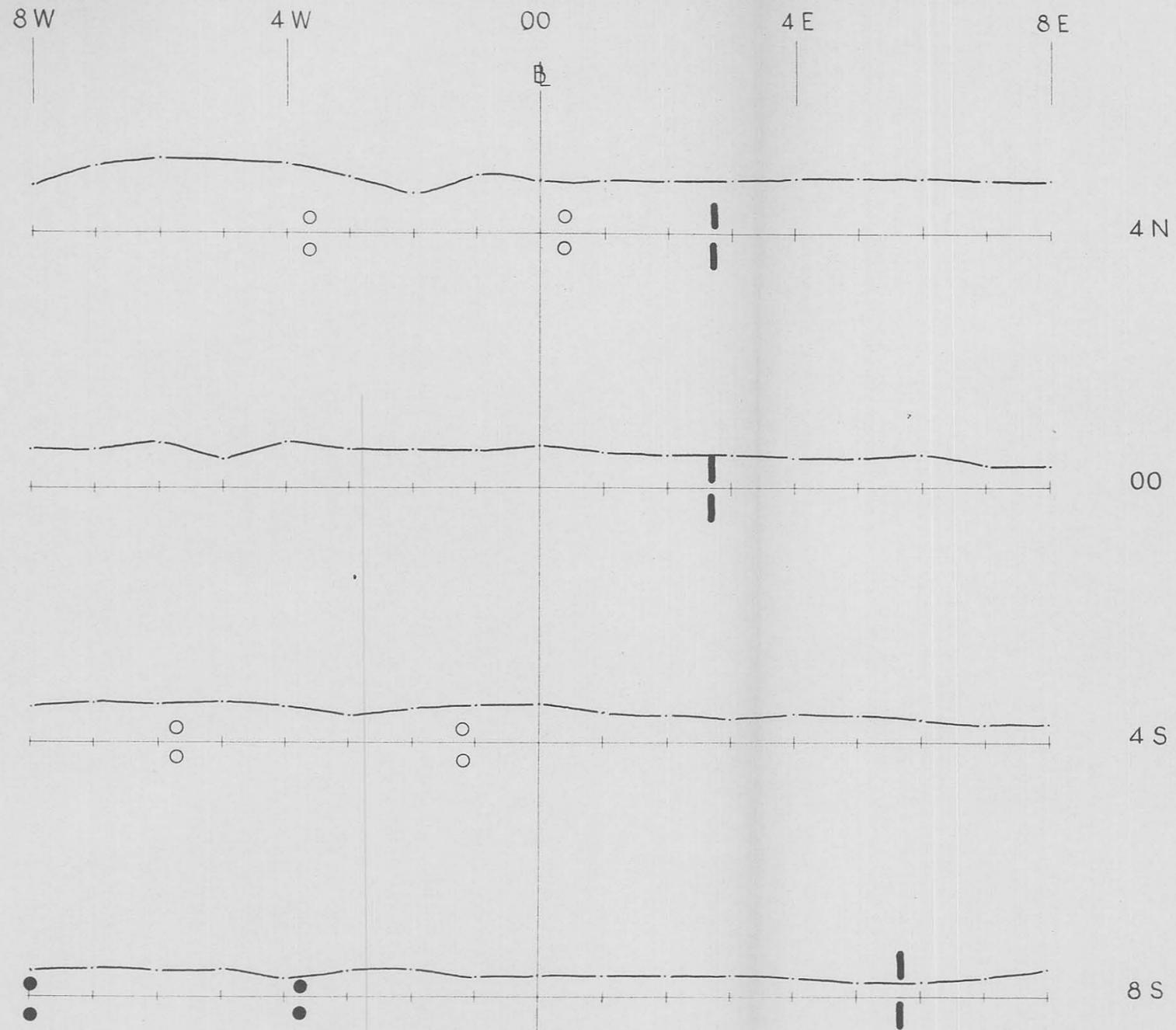


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5 cm

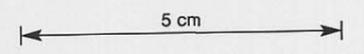
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References	LYELL E.Z. EXPLORATIONS QUEENSTOWN				
	ANOMALY 9/4				
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Geology	R.G.E.	Apr.'59	200 ft. to 1 inch		
Geophysics					
Geochemistry					
Drawn	R.G.E.	Apr.'59	Q27	Sheet	1
Traced	D.S.	Apr.'59		No.	
			Checked	Date 14.7.59	
			Date		
GEOLOGY					



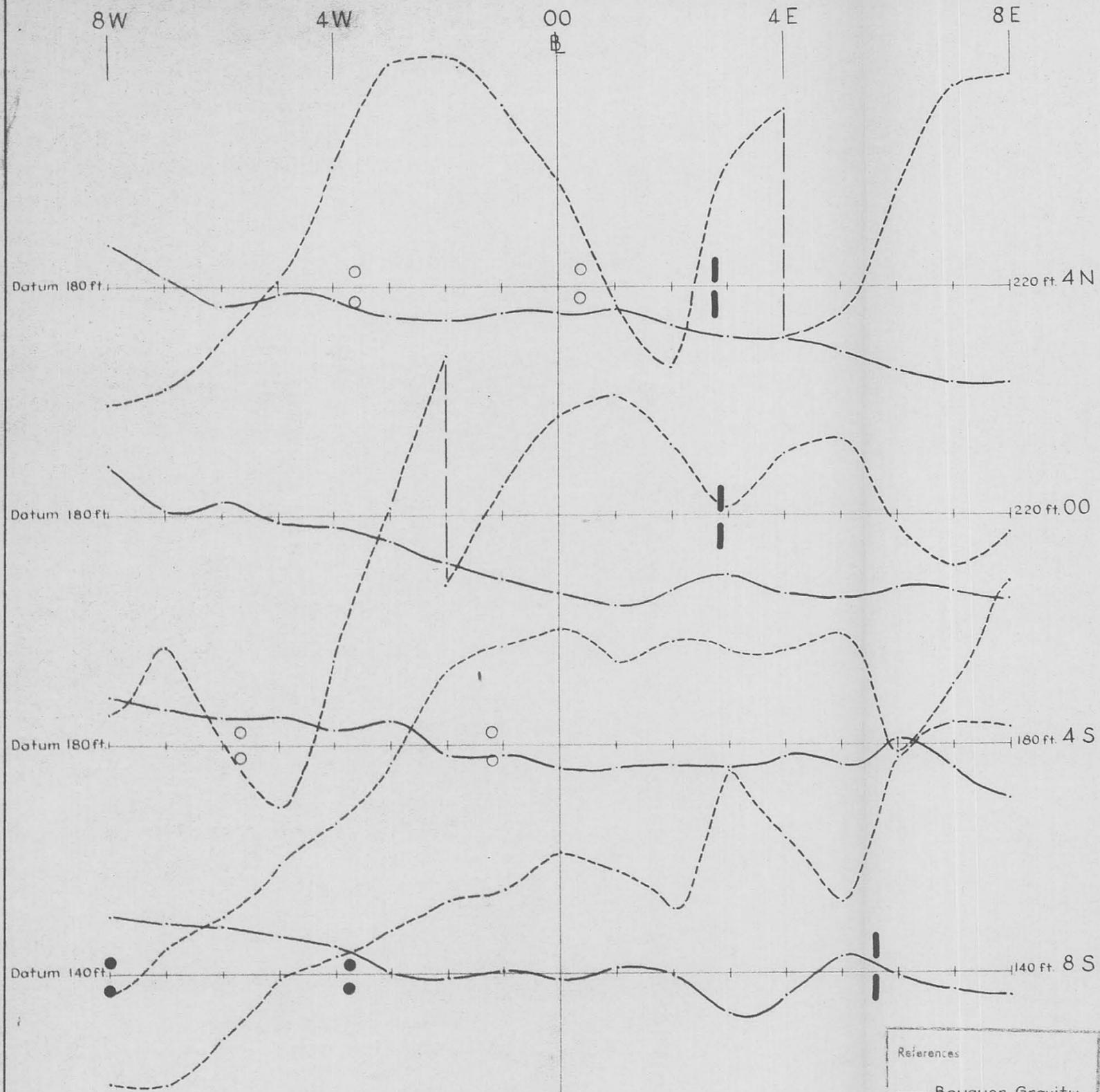
North (true)

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References		LYELL E.Z. EXPLORATIONS		QUEENSTOWN	
E.M. Cross-over Point		ANOMALY 9/4			
Survey		Scale	2306		
Geology		Hor. 200 ft. to 1 inch Vert.	Q27	Sheet	3
Geophysics	I.M.S., I.M.P., R.G.E.			No.	
Geochemistry		100 ft. to 1 inch	Checked by <i>[Signature]</i>		
Drawn	I.M.P.	Apr. '59	Date 14.7.59.		
Traced	D.S.	Apr. '59			
MAGNETIC					

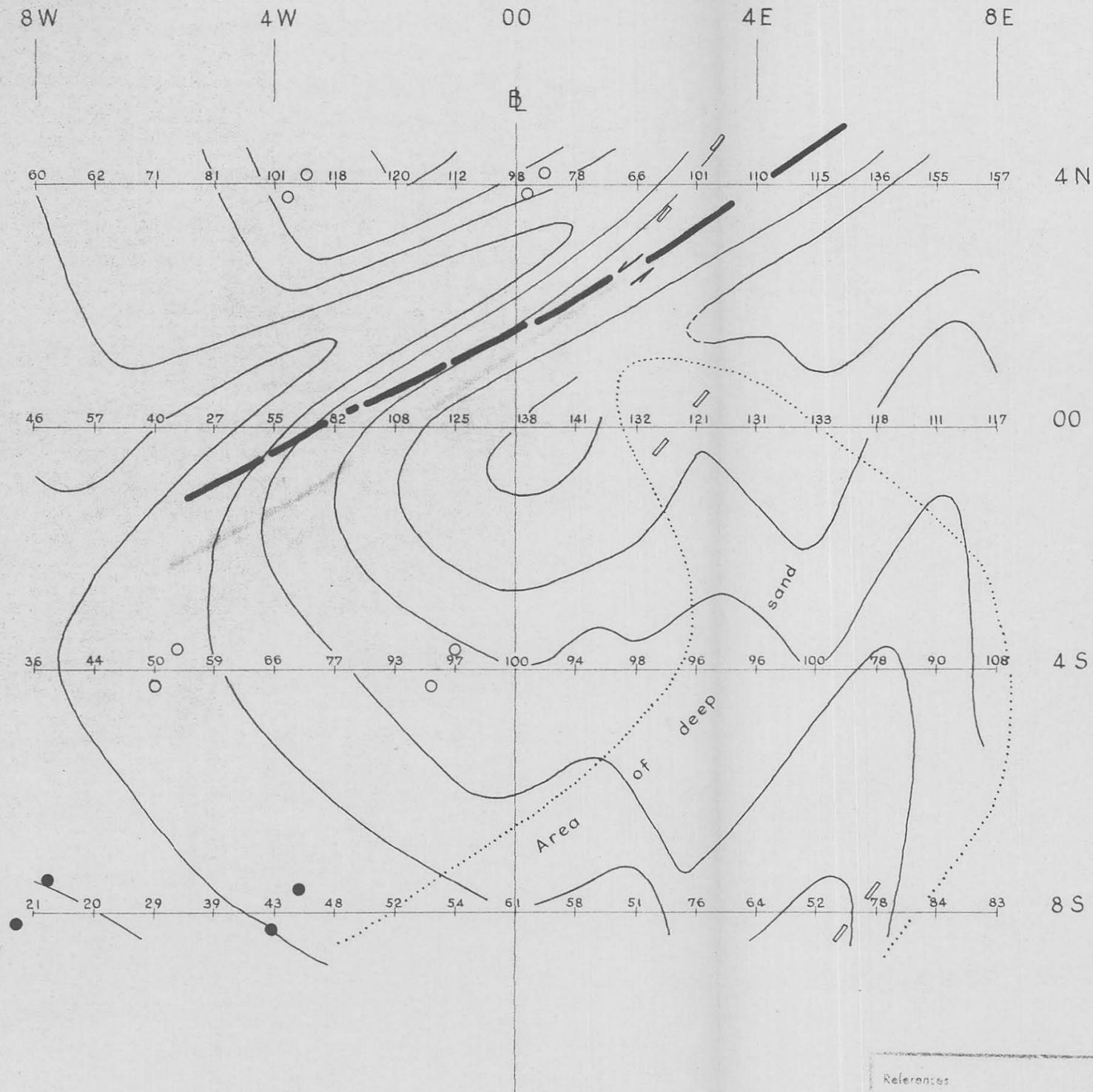


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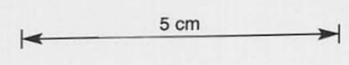
5 cm

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References		LYELL E.Z. EXPLORATIONS QUEENSTOWN			
— Bouguer Gravity		ANOMALY 9/4			
- - - Topography					
E.M. Axes		2307			
Assumed Surface Density 2.65 gms/cc.		Survey	T.N.B.	Apr. '59	Scale
BOUGUER GRAVITY		Geology			Hor.
		Geophysics	I.M.S.	Apr. '59	200' to 1"
		Geochemistry			Vert.
		Drawn	J.B. Boniwell	Apr. '59	20' to 1"
		Traced	D.S.	Apr. '59	Δg
					1" = 1.0 mgal
		Checked by <i>[Signature]</i>			Sheet
		1.7. 59			No. 4



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References
 Topographic contours
 C.I. 20 ft.
 — Faults
 — E.M. Axes

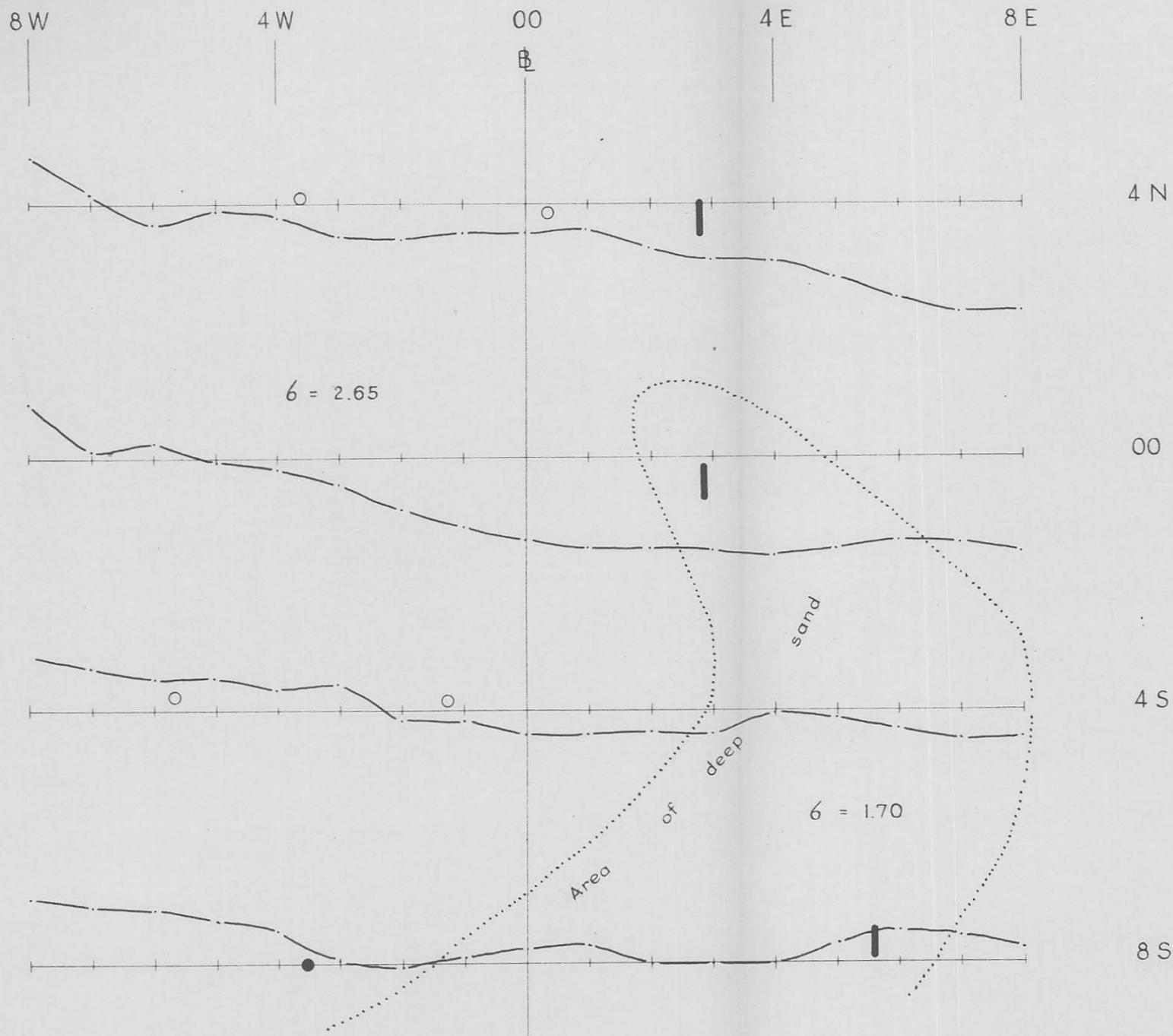
LYELL E.Z. EXPLORATIONS
 QUEENSTOWN

ANOMALY 9/4
 STRUCTURAL INTERPRETATION

GRAVITY

Survey	T.N.B.	Apr.'59	Scale	2303
Geology				
Geophysics	J.B.B.	Apr.'59	200 ft. to 1 inch	Q 27 Sheet No. 4a
Geochemistry				
Drawn	J.B.B.	Apr.'59	Checked By	
Traced	D.S.	Apr.'59	Date	14.7.59

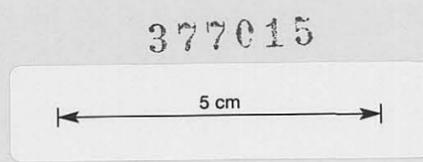
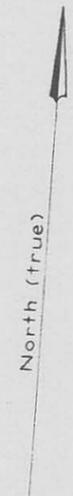
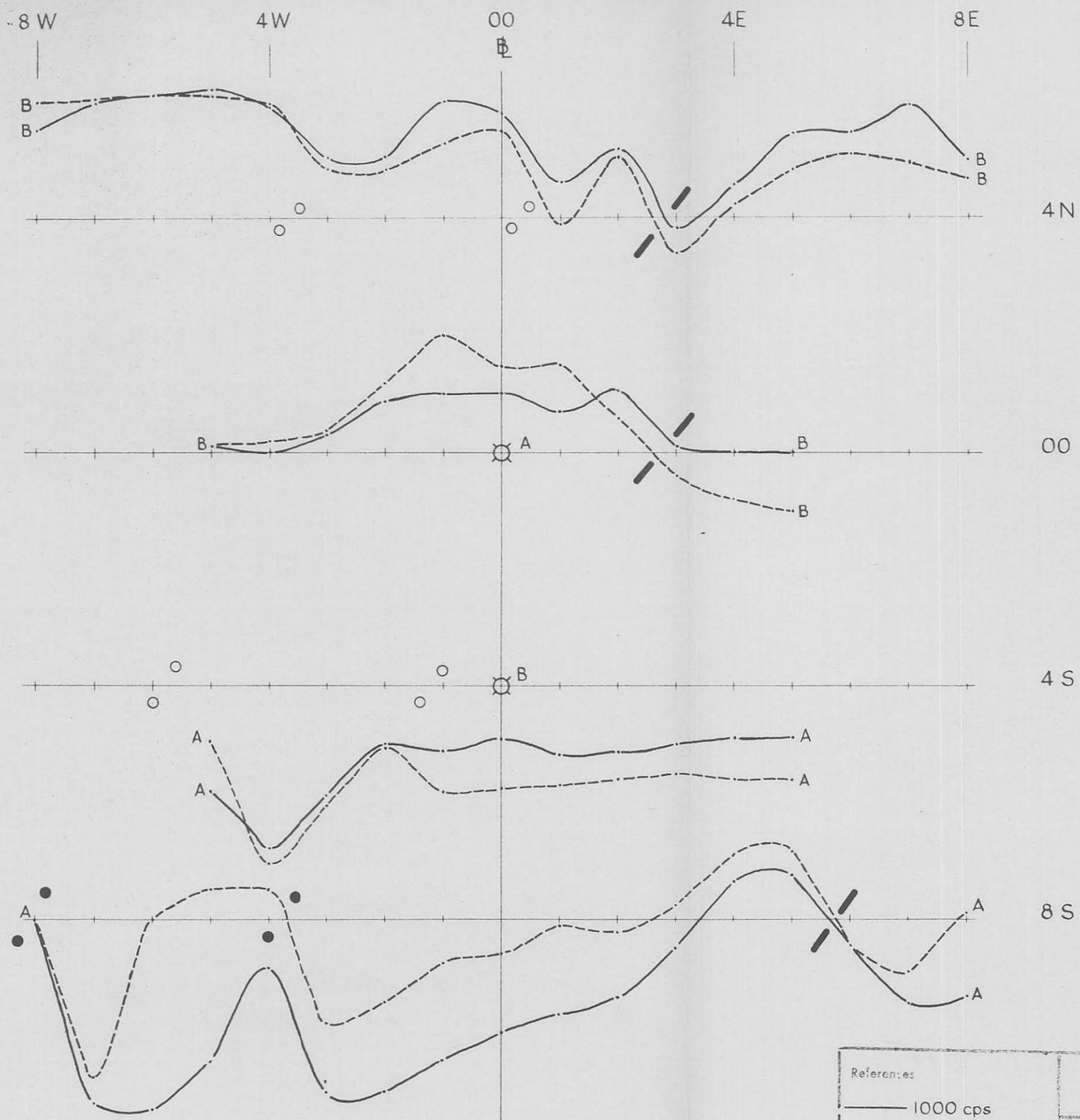
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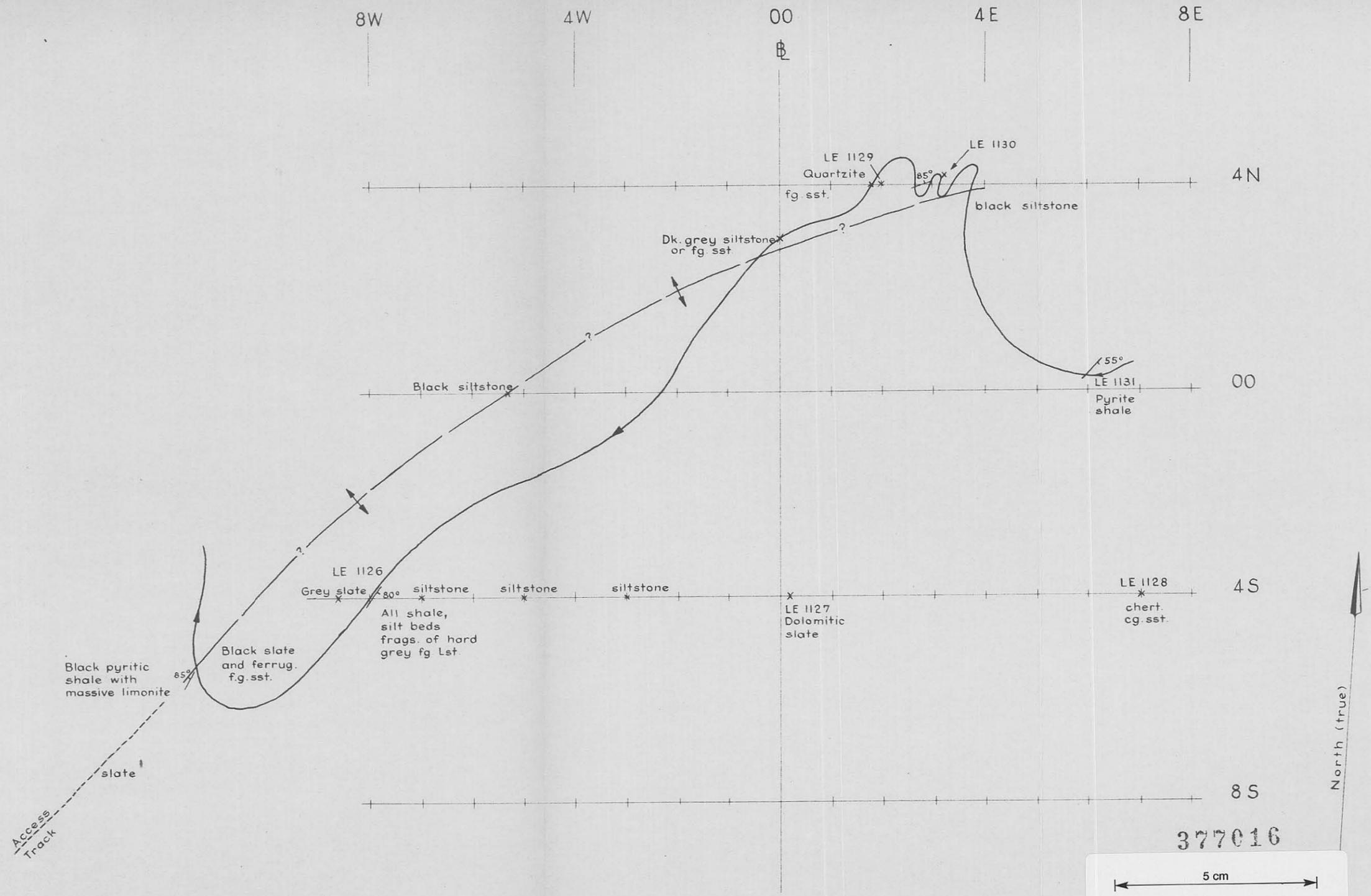
References		LYELL E.Z. EXPLORATIONS		QUEENSTOWN	
Assumed Surface Density:		ANOMALY 914			
2.65 gms./cc.		CONSTRUCTED PROFILES OF BOUGUER GRAVITY			
1.70 gms./cc.		Survey	T.N.B.	Apr.'59	Size
GRAVITY	Hor.			200ft. to 1 inch Vert.	2300
	Geology				
	Geophysics	J.B.B.	Apr.'59	Q 27	Sheet
	Geochemistry				No.
Drawn	J.B. Boniwell	Apr.'59	1.0 mgal. to 1 inch	4b	
Traced	D.S.	Apr.'59	14 7 59		



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References		LYELL E.Z. EXPLORATIONS QUEENSTOWN			
— 1000 cps		ANOMALY 9/4			
- - - 5000 cps					
Survey		Scale	2310		
Geology		Hor. 200 ft. to 1 inch	Q27	Sheet	10
Geophysics	I.M.P., I.M.S.			Apr.'59	
Geochemistry		Vert. 20° to 1 inch	Checked by	Date 14.7.59.	
Drawn	I.M.S.				
Taped	D.S.	Apr.'59			
VERTICAL COIL					



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References	LYELL E.Z. EXPLORATIONS QUEENSTOWN				
	AREA ADDITIONAL TO ANOMALY 9/4				
Survey			Scale	2311	
Geology	R.G.E.	Apr.'59	200 ft. to 1 inch	Q28	
Geophysics					Sheet
Geochemistry				No	
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Traced	- D.S.	Apr.'59	Date 14.7.59		
GEOLOGY					