9N No2.

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Report on Examination of Spero River Area
Magnetic & Electromagnetic 17N/8

58 - 208

Spero R., E.M. Anomaly 17N/8

LSE 26/3/58.

26th March, 8

To: Mr. G.F. Hudspeth.

Report on Examination of Spero River Area

Magnetic and Electromagnetic Anomaly 17N/8

Dates of examination:	March 3rd-13th, 1958.
Party Leader:	P. Rodda.
Personnel Employed:	G. Seymour.
Man days in Field:	22
Location of Camp:	On river gravel beside Spero River, just to east of the Cambrian-Tertiary boundary.
Means of Transport & Supply:	By Djinn helicopter based at Birch & Queenstown.

Physiography of the Area

The anomaly is centered just to the south of the Spero River, on open ground which rises by steps to several hundred feet above river level. To the north the hills slope rather steeply. The river, for at least a mile to the east of the anomaly, is slow-moving, with the bed two or more times as wide as the actual river at the time it was seen. There are river flats on either side. Just to the west of the anomaly, however, there is a long, relatively narrow, strip of high timber, on a ridge running north and south. The river bed is more or less a gorge through this ridge; it is much faster and has no beds or banks of boulders along the sides.

The cause of this physiography may be tentatively said to be due to a north-south fault. The west side was raised slowly and the Spero River was able to erode a gorge through the rising sediments fast enough to retain

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its course. The movement was probably spasmodic and at times the river may have been temporarily dammed, forming a lake, which when drained left mud flats at the sides of the river.

The Tertiary rocks in the area lie on Cambrian rocks (of the Dundas Group). Dundas rocks have been found outcropping in the bed of the Spero River between the peak of the anomaly and the wooded ridge. This Dundas was probably brought up by the fault.

Investigation and Findings

Geophysical and Geological. Four main traverses were made, using the magnetometer - lines A, B, C and D, all being on bearing 250°. Three additional minor ones were also made; line P, starting from A-100' (=Poo') on bearing 160°; line Q from A1700' (=Qoo') on 215°; and line R from C 2300' (=Roo') on 180°.

No soil samples we re taken, because most of the area is covered by Tertiary and Quaternary sediments. Where Dundas rocks outcrop there is no soil cover. These Dundas rocks contain chlorite and serpentine.

The anomaly has a north-west strike; when the magnetometer readings were contoured they showed one main peak to the anomaly, in the form of a ridge, with two lower parallel ones to the north-east. It is only over Cainozoic sediments. Several readings were taken on or very close to Dundas rocks but these were all very low; these readings were at Q 500', Q 1500' and B3250'.

The Dundas found is quite variable, most being fine grained and grey, green or purple in colour (Lee 359). It appears to have been originally igneous. Some has large aggregates of a hard, olive green, ferromagnesian mineral. One particular rock type found has light grey-green groundmass with nodules or aggregates of quartz and a carbonate; these are

up to ¼" in diameter. Throughout the Dundas seen there are veins of quartz with some serpentine, also veins of carbonate. One vein seen was zig-zag along its length; this is probably due to two sets of intersecting planes of weakness at the time the vein was injected - perhaps bedding and shearing planes.

The presence of this Dundas is probably due to the postulated fault. The Tertiaries were eroded off the underlying Dundas in at least one place on the uplifted block; time was not available however to map the extent of outcropping Dundas.

Nothing was seen anywhere in the area to suggest the cause of the anomaly except the serpentine in the Dundas. However, several points lead to the conclusion that the serpentine is not the cause. Firstly, the coincidence of magnetic and electromagnetic anomalies (see sheet P48). The three lines flown, which found anomaly 17N/8, also passed over the serpentine at the mouth of the Spero River. There, a high magnetic anomaly was found; high electromagnetic readings were obtained also, but not coinciding with the magnetic anomaly - they were along the contacts of the serpentine with the country rock. This 17N/8 seems to be quite different. Also, the fact that Dundas rocks gave low readings on the magnetometer bears this idea out. The reading at Q 600' was at an outcrop of Dundas containing serpentine but the reading was exceptionally low compared to all other readings made. The Dundas rocks outcropped in the river bank to a point north of about B1700'; the contours of a higher reading seem to stop south of the river; the tongue of values less than 300 may actually follow the river - the contours are not exact except where they cross traverses.

The thickness of Tertiary sediments above the Dundas was found to be at least 100 feet (Report G42), probably much more. The anomaly is

centered only 50 feet at the most above the river level so probably has a thinner cover than the higher country but there is still a cover of conglomerates, sands and clays.

No conclusions can be reached as regards whether or not this anomaly is worthy of further intense investigation. It was found by three E-W flight lines with both magnetic and electromagnetic methods. Only the magnetic anomaly was investigated on the ground and no soil samples were taken for geochemical testing. Until further airborne geophysical results, to the north and south, are obtained (especially electromagnetic), no final decision can be made.

Summary

This anomaly is in an area where the Dundas rocks are covered by Tertiary sediments, of which at least 100 feet were mapped near the anomaly (Report G42). Dundas rocks outcrop in the bed of the Spero River just to the west of the anomaly; serpentine occurs in these. However, magnetometer readings taken on or near the Dundas were much lower than readings on the Tertiary and Quaternary. This fact, together with striking dissimilarities between this anomaly and the one due to serpentine at the Spero River mouth, lead to the conclusion that serpentine is not the cause of anomaly 17N/8.

Only three flight lines were made, using the geophysical methods, over this anomaly, and only the magnetic anomaly was investigated on the ground. The decision as to whether this anomaly is worth further investigation or not must wait for further airborne and, if necessary, ground geophysical investigation.

A fault has been postulated as being the cause of the physiography of the river near the anomaly - it is fairly level, wide, with extensive flats along its course, until the first outcrop of Dundas. It then becomes

narrower and steeper, in a sort of gorge. It is thought that a N-S fault exists, which was operating at least in Tertiary times. The western side was raised slowly, damming the river on occasions and making it cut a gorge in the rising block. The Dundas under the Tertiaries has been raised and exposed in places by the river's erosion.

Peter Rodda.

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ANOMALY 17N/8.

SPERO R.

Magnetic and Electro-Magnetic Anomaly.

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ANOMALY 17N/8.

SPERO R.

Magnetic and Electro-Magnetic Anomaly.

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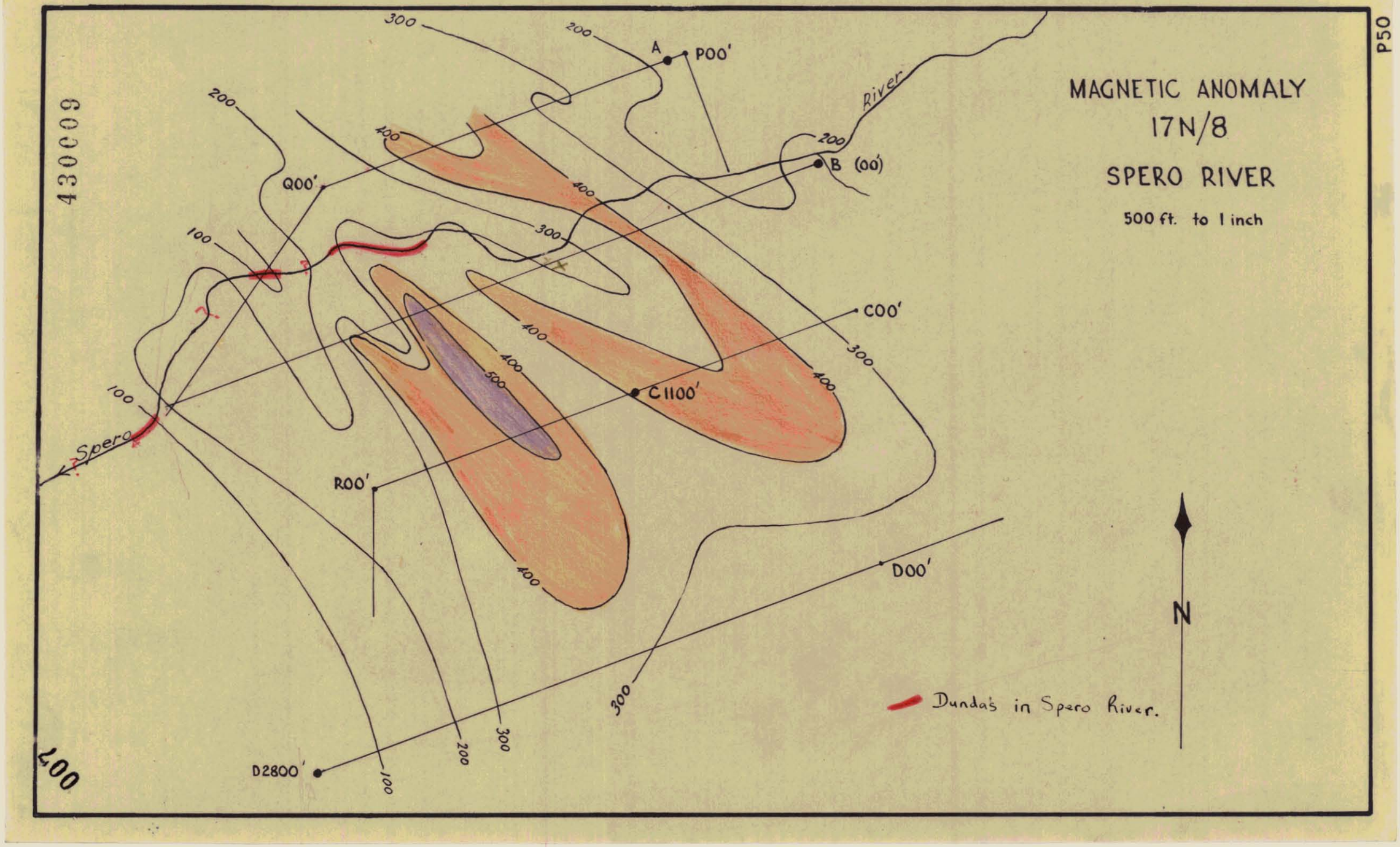
MAGNETIC ANOMALY
17N/8
SPERO RIVER
500 ft. to 1 inch
430009
P50
A
P00'
B (00')
Q00'
C00'
C1100'
R00'
D00'
D2800'
River
Spero
N
Dunda's in Spero River.
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ROSEBERY,

10th April, 1958.

MEMORANDUM TO: DR. B. SCOTT

L.E.E. Anomaly 17N/8
Spero River

I have read P. Rodda's report G.43 on the ground magnetic follow-up on Anomaly 17N/8. Will you please check that this is the correct numbering? The text of the report is headed Anomaly 17N/6.

The ground check of the magnetic anomaly is interesting. Would you please indicate which particular adjusting magnet was installed in the instrument to obtain a maximum value of 500 units?

It appears from the text of the report that Dundas rocks outcrop over a length of 1,000 ft. or more in the Spero River immediately north of the ground anomaly. Apparently the only magnetic ground observation on a Dundas outcrop was at point Q600. I believe that it would be well worthwhile conducting a traverse easterly from point Q600 along the bed of the Spero River.

Possibly on the occasion of this visit, it would be possible to map the position and attitude of the Dundas sediments and to collect a series of representative samples.

Rodda reports the presence of a "carbonate" in the Dundas series. The analysis of this "carbonate" may be significant.

May I suggest that it would be helpful where Rodda describes the bed of the river if he estimated how many feet wide it was.

In the summary he refers to the tertiary sediments as being at least 100 ft. deep. I believe that he means up to 100 ft.

Finally, it would be most helpful if a mark can be placed on Map P.48 which identifies some part of Map P.50. I presume that Map P.48 is a 30 chain to the inch photomap overlay.

GH.

GRAHAM HALL

Mr. Cottle 1.
Mr. Hudspeth 1.

(G.C.43)

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I ~~Numbering is #7N/8. Misprint in heading due solely to slip by geologist.~~

II No adjusting magnet was used to give maximum value of 500 units: field of view in magnetometer is up to 430 units. The center hairline was used in all cases except where it was off-scale; in that case the right hand hair (giving readings 100 units less) was used, and readings adjusted to values for center hairline.

III Only one magnetic ground observation was made actually on Dundas rock but Dundas outcropped approximately where the 100 contour crosses the Spero R at the ends of lines B and Q. Readings here were within about 100 ft from the Dundas.

IV Some samples of the Dundas rock were taken - LEE 359. This one number covers about 16 different samples taken over a distance of about 800 ft. ~~If time had permitted, further samples could have been taken~~ These samples are not representative of the whole outcrop though, which extends for about half a mile along the river.

V The Spero River ~~west of the postulated fault~~ just west of the ends of lines B and Q is about 10-20 ft wide; the banks are steep so even exceptional flooding would not increase the width much. Further upstream, the width is about 20-30 ft where Dundas outcrops in the banks; still further west, e.g. where the river runs close to and parallel to line B for about 300 ft, the water was, at the beginning of March, 15-20 ft wide with ~~boulders~~ pebbles & boulders stretching ~~about~~ ~~not more than~~ 75-100 ft wide in places. The river when in flood is probably ~~much wider than~~ covers much of the pebbles etc.

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QUEENSTOWN.

MEMORANDUM TO

15th April, 8.

Mr. G. Hall,
Rosebery.

Magnetic Anomaly 17N/8: Spero River

In answer to your recent queries (10th April) I have prepared the following information:

Paragraph I of your memo — Correct number is 17N/8

Paragraph II — No adjusting magnetometer was used to give the maximum value of 500 units. The field of view in the magnetometer gives a maximum reading of 450 units on the central hair-line and 550 units on the right hair-line.

Paragraph III — The river bed was traversed from Q600 in a north-easterly direction for approximately 4000 feet: no further outcrops of Dundas were seen beyond 750 feet east of the Q600 position.

Paragraph IV — The position of the Dundas has been accurately noted: their attitude is difficult to determine owing to the relatively poor outcrops and the massive nature of the rock.

Sixteen rock samples have been collected from the outcrops.

Paragraph VI — The Spero River to the west of the junction of lines B and Q is about 10-20 feet wide, flowing in a very steep sided valley. Upstream the width is about 20-30 feet: where the river runs close and parallel to line B the water was 15-20 feet wide in March. However, at the last locality, pebbles and cobbles stretch for a width of about 75 to 100 feet and when at high water the river undoubtedly covers these pebble banks.

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Paragraph VII — The thickness of the Tertiary sediments above the Dundas was found to be at least 100 feet, probably much more (see bottom paragraph, page 3 of this report, G43).

Paragraph VIII — If you would return your copy of maps P48 and P50 to this office, corresponding marks will be placed on them.

B. Scott

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Geologist-in-Charge.

Copies to G.F. Hudspeth
V.M. Cottle