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COMMENTS ON
ADDITIONAL EIP SURVEYS
OVER THE BASIN LAKE GRID, NEAR QUEENSTOWN, TASMANIA
ON BEHALF OF
THE MOUNT LYELL MINING & RAILWAY COMPANY LTD.

U. M.	A. D.	C. G.	E. O.	D. S. M. E.
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COMMENTS ON
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OVER THE BASIN LAKE GRID, NEAR QUEENSTOWN, TASMANIA
ON BEHALF OF
THE MOUNT LYELL MINING & RAILWAY COMPANY LTD.

BY

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GEOPHYSICIST

SYDNEY, N.S.W.

AUGUST, 1978

TAS-054C

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SUMMARY

An extension of the Basin Lake grid westwards did not reveal a major anomaly to account for a mineralised intersection located at about 330 metres in DDH BL#1. However, a minor surface response may be related to the intersection providing the strata dips east at a shallow angle ($\pm 30^\circ$). Should this be the case, extreme variation in the overlying freshrock units could reduce or negate the IP response by masking.

A re-survey of lines 09N to 06S has confirmed an anomalous response in that area, but with no fault or displacement as originally shown. This could be due to a pegging error in the original survey. A pole-dipole line surveyed over line 00 showed similar results to the gradient data.

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INTRODUCTION

On about five days in late January and two days in mid-February 1978, additional gradient surveys were executed on the Basin Lake grid. A pole-dipole survey was also carried out on line 00 between 6800E to 8200E. This work was carried out by Scintrex Operator Mr. R. Sims assisted by Mr. R. Bishop, BSc.

The original surveys were performed between 9th November and 10th December, 1974 and are described in report TAS-025B dated December, 1974.

DATA PRESENTATION

The gradient array is presented on the horizontal scale of 1 inch = 250 feet, while the pole-dipole data is presented at the scale of 1 inch = 200 feet. Vertical scales were 1 inch = 10 milliseconds for chargeability, and for the resistivity was displayed on a five inch log cycle in ohm-metres.

The original chargeability data was displayed on a theoretical grid. The chargeability data from the 1974 survey has been recontoured

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onto the surveyed grid and is presented with this report as a revised plate. The two areas surveyed in 1978 have been separately contoured and are presented as Plate 1 of this report.

DISCUSSION OF RESULTS

A - LINES 9N - 6S

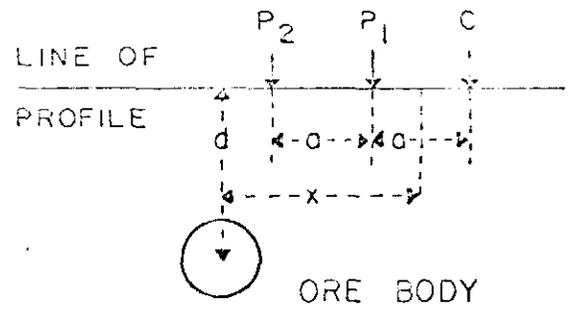
LINE 0 A grid north-south zone was defined with its best response on line 00 at 7250E. The chargeability response is just under 30 milliseconds above the 3 milliseconds (to the west) and 7 milliseconds (to the east) background. The *form* of the profile suggests an east dip and/or a sharp west and gradational east contact between the chargeable material and the enclosing host rocks. The resistivity data on line 00 shows a slight 25% depression to 3500 ohm-metres coincident with the chargeability high. However, the relatively narrow source is contained within a much broader resistive unit extending from 7000E to 7450E. The maximum depth to source for the chargeability response at 7250E is about 50 feet.

The pole-dipole survey shows very similar results. The $n = 1$ spacing shows a "double peak" to indicate the source to lie at 7250E, while the *form* of the "double peak" infers a depth of about 70 feet. The larger n spacings of 2 to 4 inclusive show a distance between maxima of about $(na + 50)$ feet inferring a source width of about 50 feet. Figure 1 shows a similar set of curves for three-array over a sphere. The progressive increase in the observed resistivity

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SPHERE RESPONSE THREE ELECTRODE ARRAY



$$z = x/d$$

$$\alpha = a/d$$

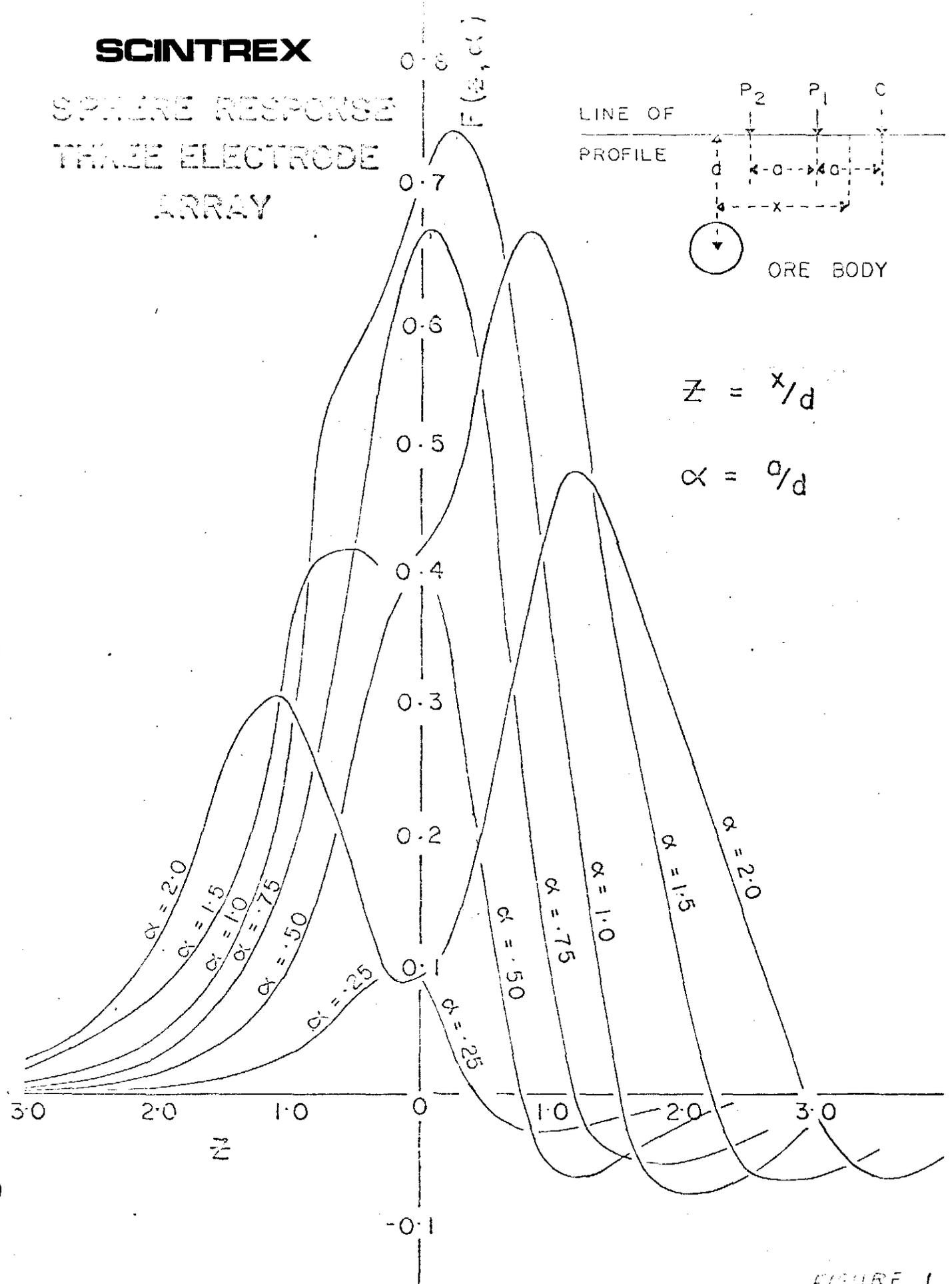


FIGURE 1

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west of 8000E indicates a conductive cover, while east of that point the reverse is the situation.

LINE 03S To the south a 15 milliseconds response was recorded at 7250E superimposed on a 4 milliseconds background to the west, and a 7 to 8 milliseconds background to the east. The induced polarization response is again associated with a minor but distinct depression in resistivity to 3600 ohm-metres from 3900 and 5000 ohm-metres. The *form* of the profile on this line strongly suggests an east dip to the source, which is again contained in a much broader resistive unit which extends from 7000E to 7400E. The maximum depth to the chargeable source at 7250E is 100 feet.

LINE 06S The broad resistive unit referred to above is again recorded on this line, in this case between 6500E and about 7025E. From a background of about 7 milliseconds to both east and west, the chargeability reaches a broad maximum above background of 7 milliseconds at 6900E. Unlike lines 00 and 03S, the chargeability maximum is displaced from the local depression in the resistive unit.

LINE 03N To the north of line 00 a similar general form over the anomalous area was recorded at 7350E on 03N. A chargeability response of about 25 milliseconds was superimposed on 3 milliseconds background to the west and a 5 milliseconds background to the east. A relatively resistive unit of 3500 to 5000 ohm-metres was recorded between 7000E and 7700E. Within this zone a sharp 40% fall in apparent resistivity is coincident with the chargeability peak. The

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source is thus less resistive than the enclosing material. The maximum depth to source on this line is 200 feet.

A "shoulder" in the chargeability data between about 7550E and 7700E infers a disseminated chargeable source to the east of the more conductive one described above.

LINE 06N On this line higher chargeabilities of 15 milliseconds were recorded between 7050E and 7650E, with minor but distinct maxima at 7250E and 7550E respectively. The former is associated with a distinct and substantial fall in resistivity from about 5000 ohm-metres to the immediate east and west to 1500 ohm-metres at 7200E. It is not clear whether this represents a northerly extension of the chargeable zone or not.

LINE 09N A small 5 milliseconds chargeability response at 7350E superimposed on a 12 milliseconds background (which is considerably higher than that observed to the south) was located within a higher zone of resistivity recorded between 7200E and 7600E. The chargeability is not significant on this line.

B - LINES 66S, 69S, 75S, 78S, 80S & 82S

These lines were surveyed to extend the Basin Lake grid to cover a zone over which significant mineralisation was intersected. The diamond drill hole was drilled on a geochemical anomaly within moraine at about 6400E on line 72S.

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The co-ordinates for DDH-BL#1 were 72S/5900E and the surface *vertical* projection of the weakly mineralised zone intersected in that hole between 290 metres and 330 metres is about 6300E on line 75S. The attached down-hole log of BL#1 shows a broad zone of high chargeability of 50 to 80 millivolts/volt between 280 metres and 330 metres from within material of lower than background resistivity (500 to 2500 ohm-metres as against 10,000 ohm-metres).

The explanation of no *apparent* surface expression for this intersection must lie in one of the following.

- a) The relatively minor response at 6750E on 78S, 6950E on 75S and 7000E on 69S may be the up-dip manifestation of this zone.
- b) Masking of the chargeability response by significant variation in resistivity above the chargeable source.
- c) A relatively minor areal extent to the mineralisation
- d) A pitch or plunge to the mineralisation which precludes the mineralisation coming sufficiently close to surface to be detected.

These possibilities are each examined below.

In the case of (a) it would require a shallow dip to the rocks in this area, say 25°- 35°, for this response to be directly related

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to the up-dip projection of the mineralisation. If in fact the dip is "moderate", then masking of the induced polarization response would also occur as within the freshrocks themselves above the mineralised zone because, as the down hole electrical log shows, there is a sequence of resistive units and less resistive units as follows:

A	130 metres - 165 metres	500 ohm-metres
B/C	165 metres - 180 metres	50,000 ohm-metres
D	180 metres - 200 metres	1000 ohm-metres
E(+)	220 metres - 255 metres	50,000 ohm-metres

The chargeability of the zone therefore would be "shorted out" in the less resistive sections and would thus be only detectable in the uppermost sections near surface. As mentioned above, both propositions (a) and (b) require a shallow dip to the source for this to be possible.

Explanations (c) and (d) relate to the possible extent of the mineralisation and thus cannot be assessed from either the surface or down-hole data.

A brief description of the lines surveyed is given below.

A distinct resistivity high was located on all five lines surveyed, and located at about 7000E. On each of the lines the amplitude and width of the response changes, but overall it forms a distinct

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Page - seven

horizon. In detail it is as follows:

<u>Line</u>	<u>Width</u>	<u>Magnitude/Background(Ωm)</u>	<u>Centre</u>
66S	6750E-7350E	10,000/2,800	7050E
69S	6950E-7300E	10,000/3,000	7050E
75S	6900E-7200E	7,000/3,000	6950E
78S	6750E-7100E	6,000/3,000	?
80S	6500E-6800E	4,500/3,000	?

(Phases out to south)

Towards the eastern end of the line resistivities increase rapidly within a highly resistive unit. The boundary is as follows:

75S	east of	7350E
78S	east of	7250E
80S	east of	7100E
82S	east of	7100E

Should the strata have a shallow dip it is possible that the resistive unit at 7000E \pm may be either Zone 'E' (see drill hole electrical log) or less likely, B/C.

The relatively small 5 \pm milliseconds above the 8 \pm milliseconds background noted at 7000E on lines 66S to 75S may be associated with these increased chargeabilities. However, the low chargeabilities within resistive rocks in the drill hole log suggests otherwise. It is possible that these higher chargeabilities are from a rock

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beneath the mineralisation, but this would require a moderate dip

CONCLUSIONS**A - Lines 06S - 09N**

- 1 - The chargeability response is most significant on lines 03N, 00 and 03S at 7350E, 7250E and 7250E respectively. The source, while being less resistive than the enclosing rocks, is still resistive at 3000 to 4000 ohm-metres, and thus the source is disseminated sulphides (or graphite) within a resistive host. The maximum depth to the sources are estimated at 200 feet, 50 to 70 feet and 100 feet respectively on 03N, 00 and 03S.
- 2 - The revised surveyed positions of the grid stations show no fault as suggested by the 1974 survey. It is assumed that this was a gridding error.
- 3 - The pole-dipole survey on line 00 did not improve the resolution or detail obtained from the gradient array data. It did however show conductive surface conditions west of 8000E.

B - LINES 66S - 82S

- 1 - The surface gradient array has revealed a weak 5_{\pm} milliseconds chargeability response above the 8_{\pm} milliseconds background at about 7000E $_{\pm}$ on lines 66S to 75S. This can only be related to the intersection of siliceous sericite pyrite tuffs if the

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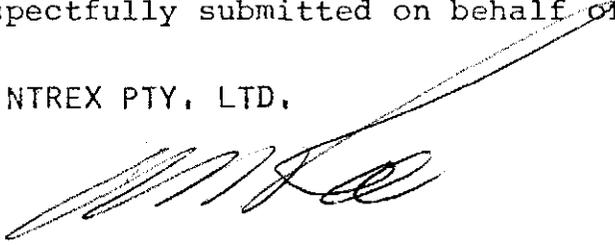
Page - nine

dip of these units is a shallow 25°- 35°.

- 2 - Should the above not be the case, it is considered that the pyrite/mineralised section encountered in drill hole BL#1 from 280 metres to 330 metres must be of limited areal extent and/or not come close to surface.
- 3 - Should the dip be shallow, the extreme variation in resistivities noted, i.e. 500/50,000/1000/5000 ohm-metres, when in a small dip configuration will mask the return to surface of the induced polarization signal.
- 4 - The mineralisation, while not conductive in the true sense, is however, significantly less resistive at 150 ohm-metres at 310 metres and less than 500 ohm-metres between 305 metres and 325 metres than the enclosing rocks of 1500 ohm-metres. Thus this zone *may* be amenable to an applied potential or applied MMR technique providing always that an electrode can be emplaced within the intersection.

Respectfully submitted on behalf of:

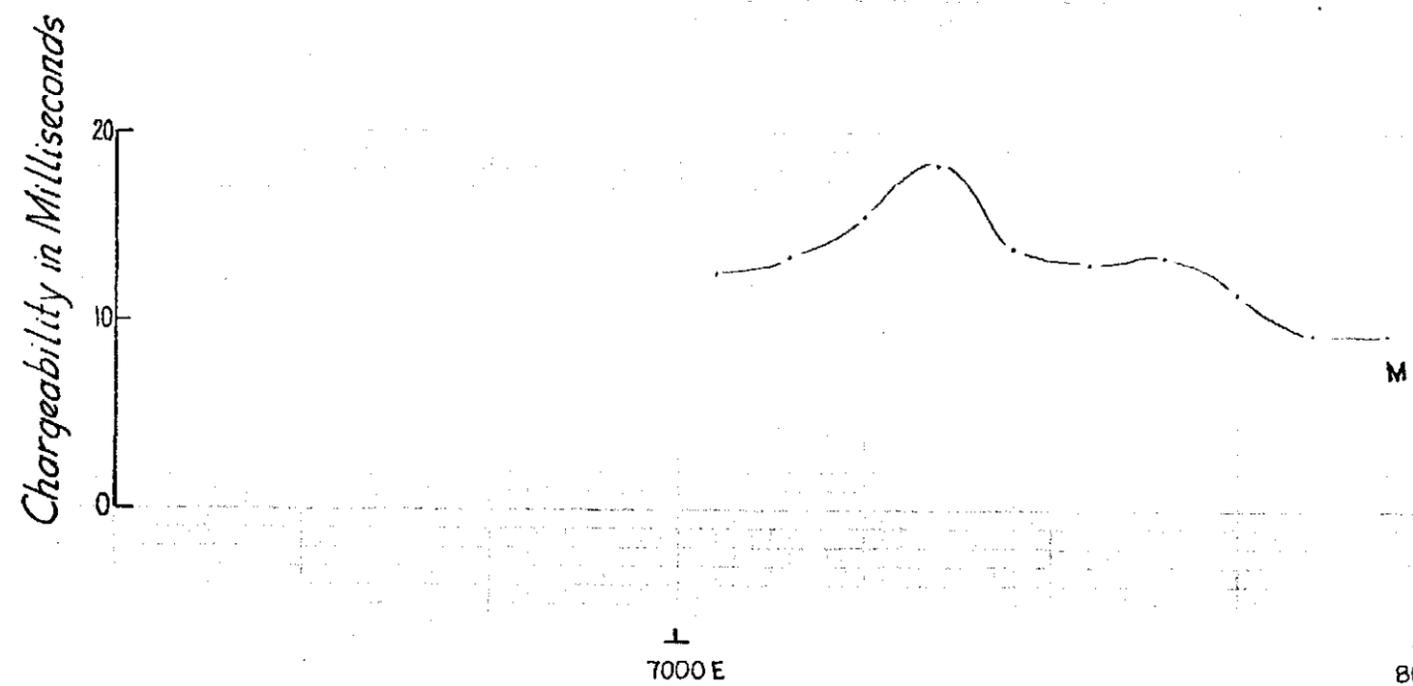
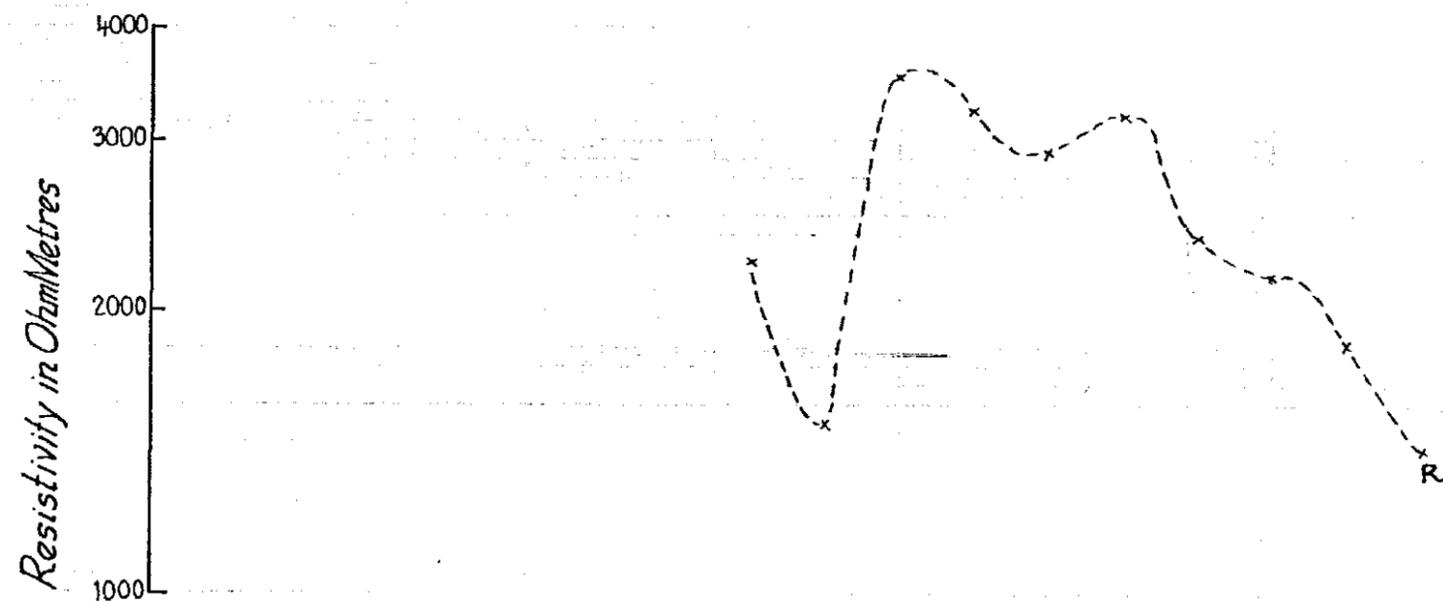
SCINTREX PTY. LTD.



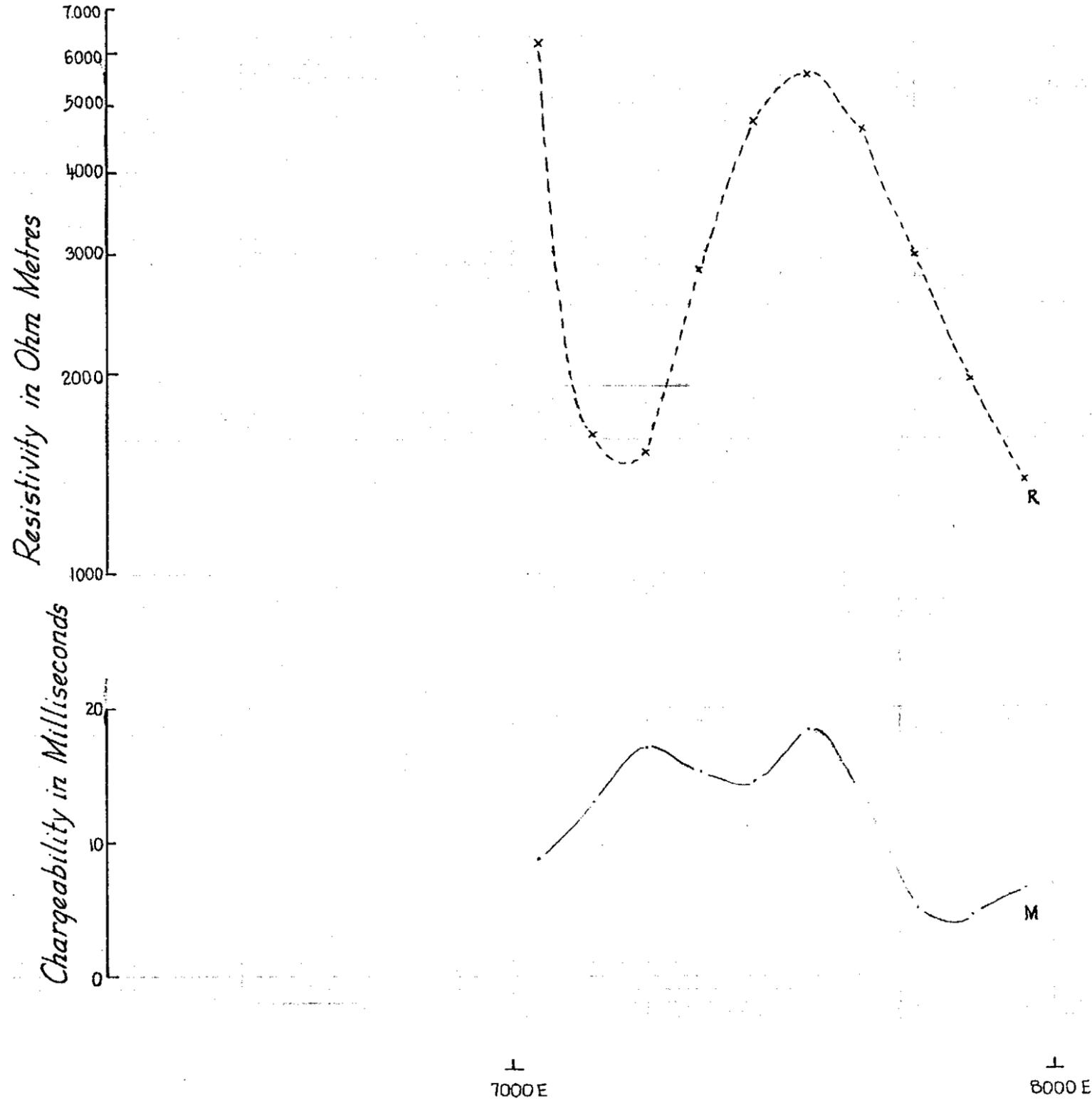
A.W. HOWLAND-ROSE, MSc, DIC, AMAusIMM, FGS.

GEOPHYSICIST

LINE 09 N
BASIN LAKE AREA
GRADIENT ARRAY E.I.P.
TAS-054 C

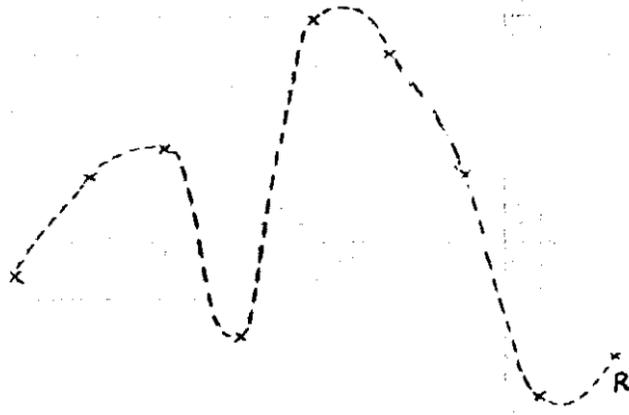
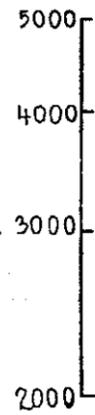


LINE 06 N
BASIN LAKE AREA
GRADIENT ARRAY E.I.P.
TAS-054C

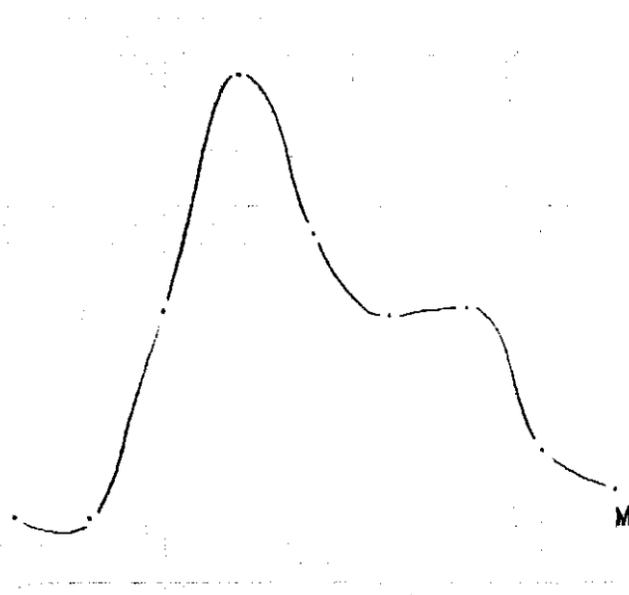


LINE 03 N
BASIN LAKE AREA
GRADIENT ARRAY E.I.P.
TAS-054 C

Resistivity in Ohm Metres



Chargeability in Milliseconds



7000 E

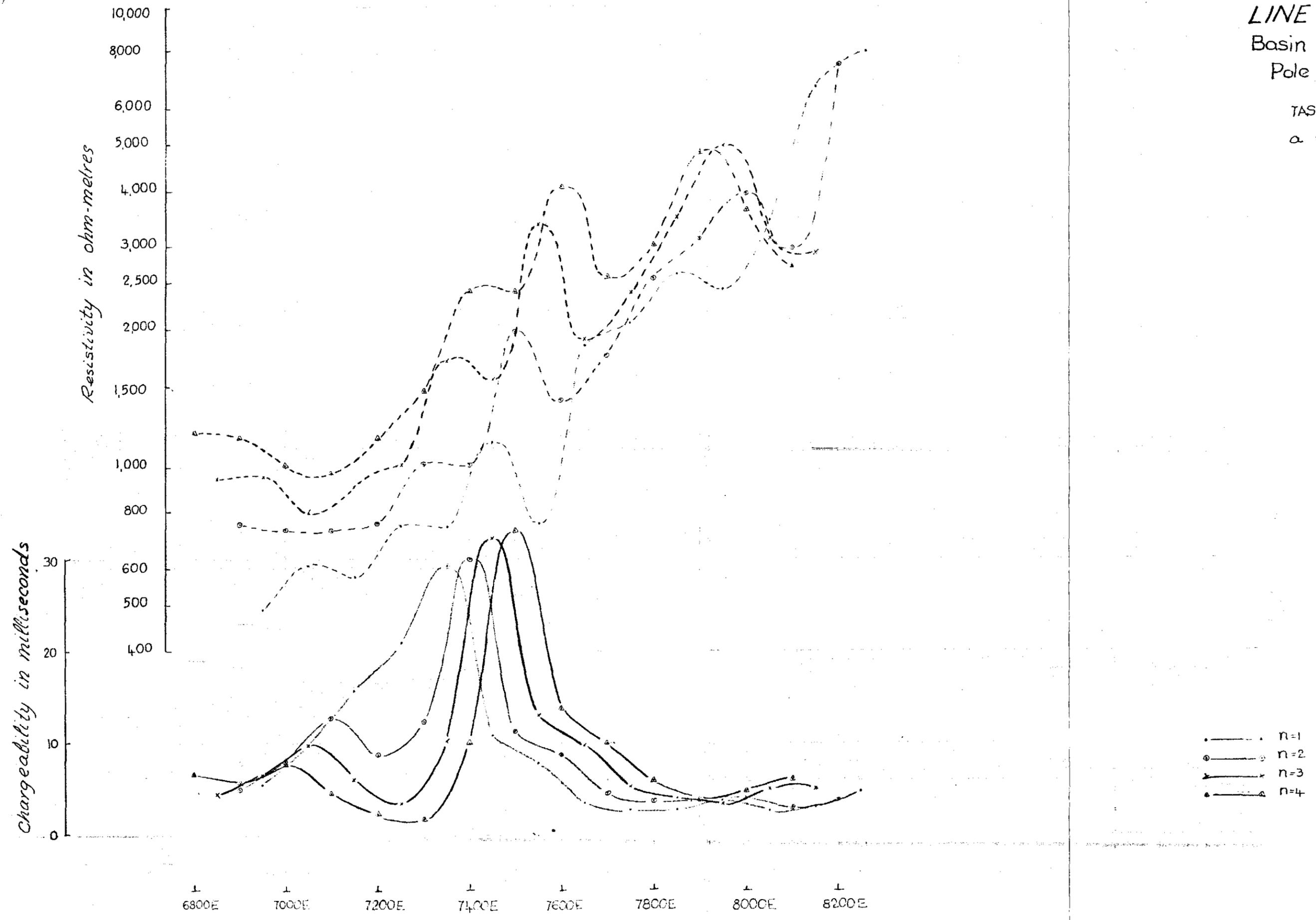
8000 E

016

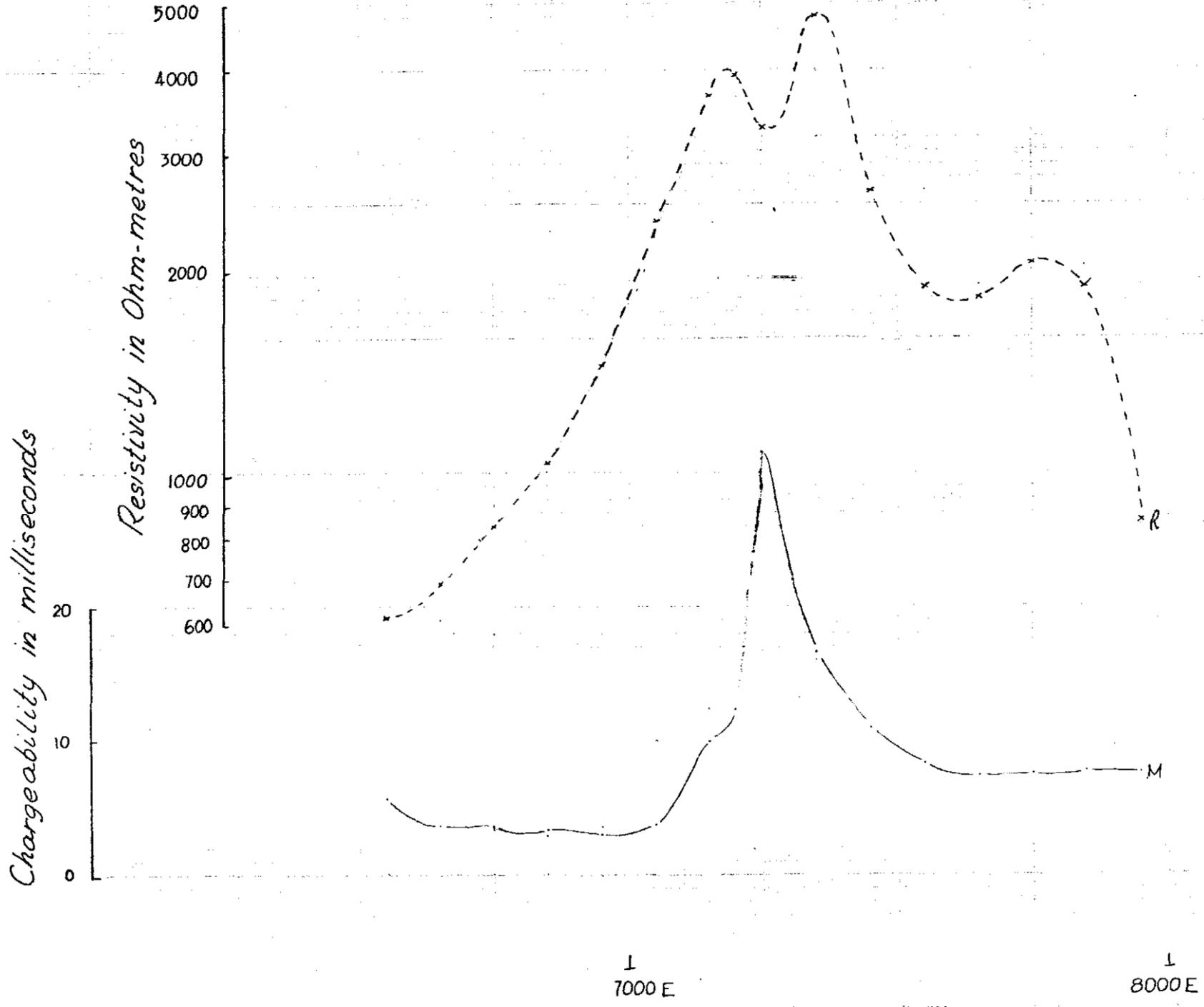
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LINE 00
Basin Lake Area
Pole-dipole

TAS-05₄-C
 $\alpha = 100$ ^{ft}



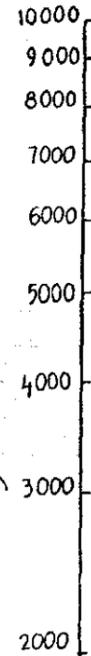
LINE 00
BASIN LAKE AREA
GRADIENT ARRAY EIP
TAS-054-C



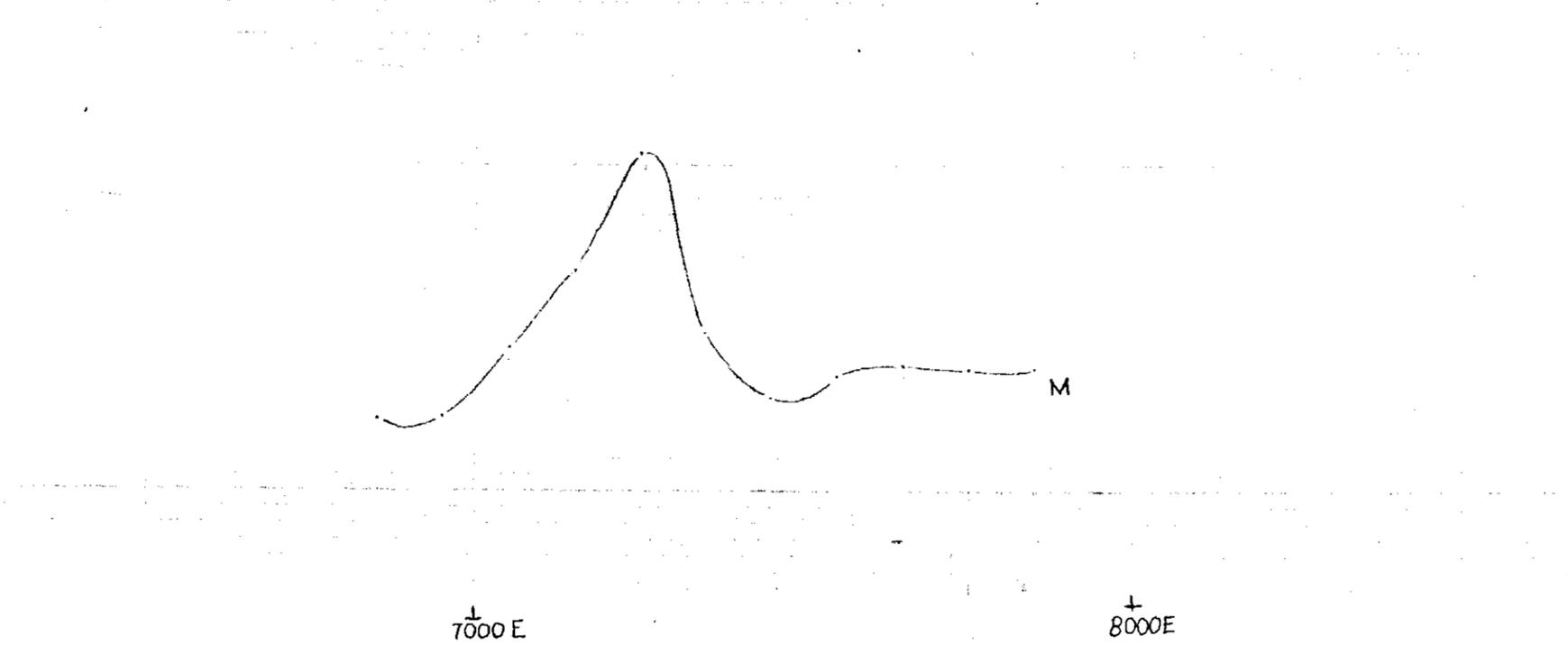
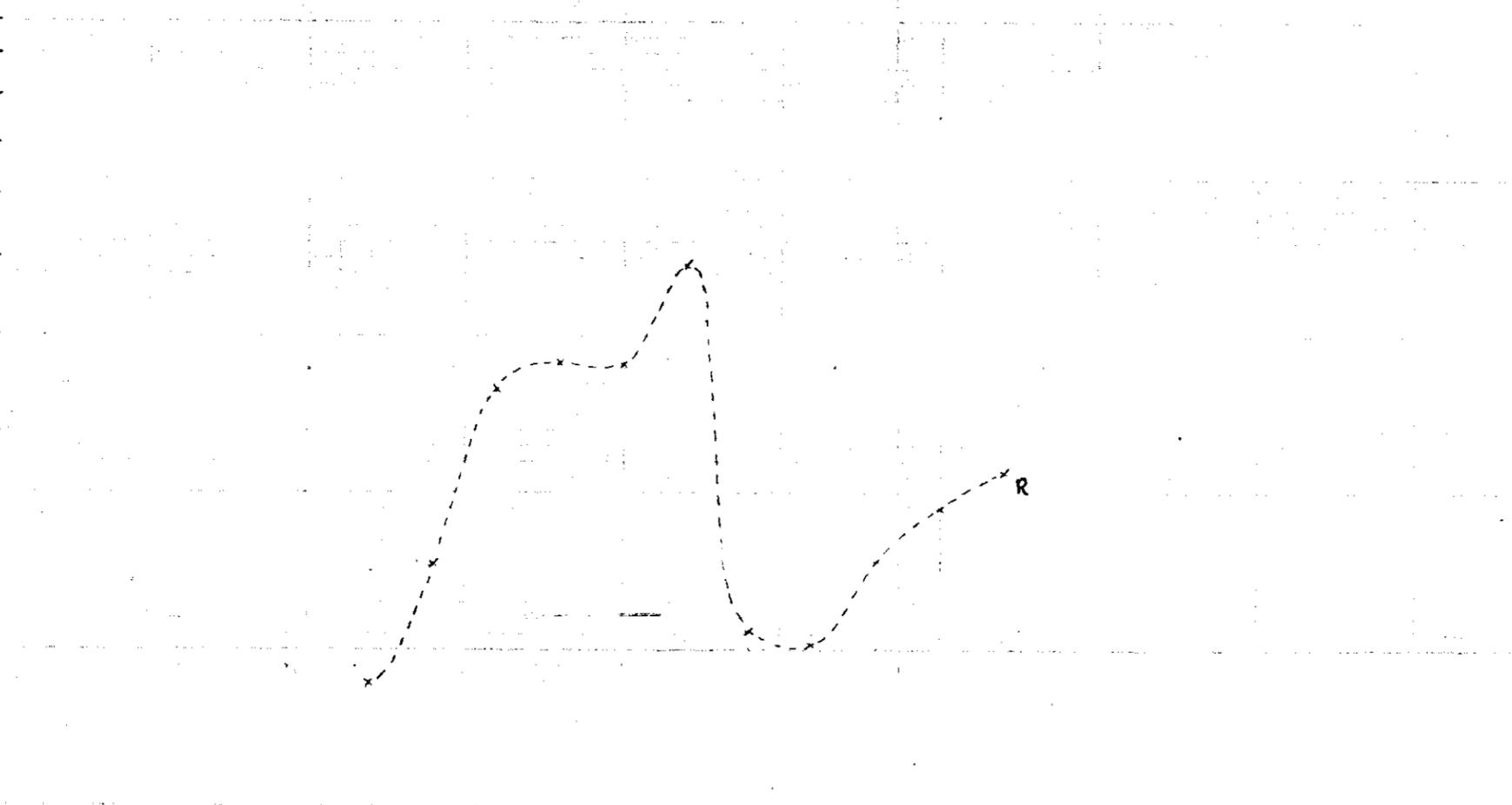
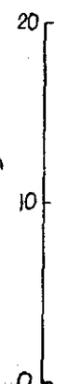
LINE 03S

BASIN LAKE AREA
GRADIENT ARRAY E.I.P.
TAS-054C

Resistivity in Ohm-Metres



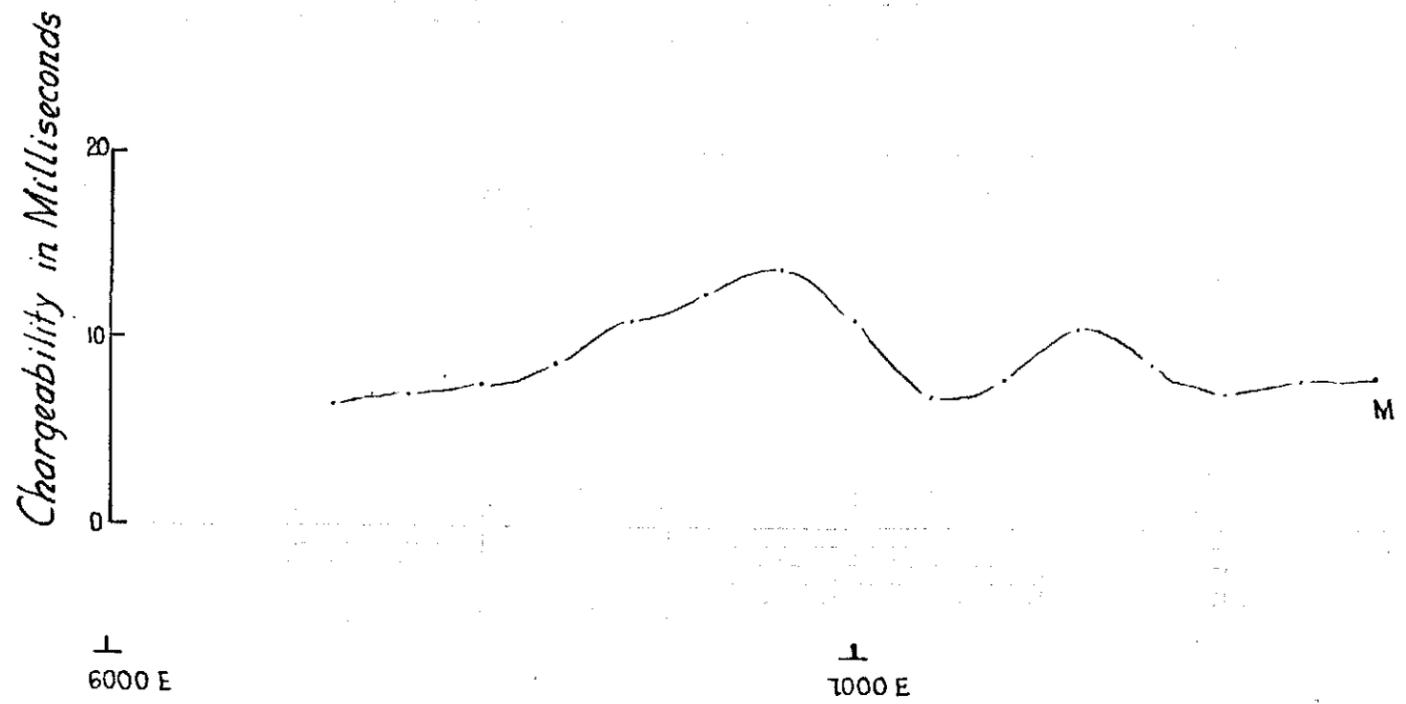
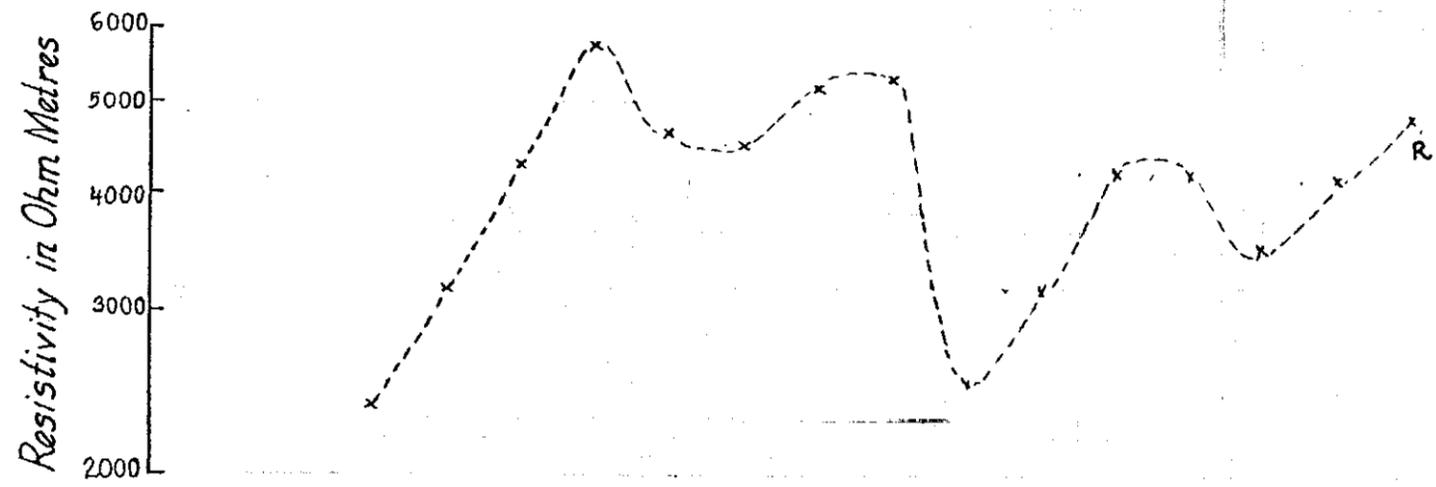
Chargeability in Milliseconds



7000 E

8000 E

LINE 06 S
BASIN LAKE AREA
GRADIENT ARRAY E.I.P.
TAS-054 C



6000 E

1000 E

8000 E

020

KEENE
32 X 38 CM. V.F.B.
10 X 10 TO THE CENTIMETER
NO. 1213



316022

D.H. I.
Basin Lake
Down-hole I.P.
TAS-054-E

-44.7
 -27.9
 -34.3
 -43.3
 -27.5
 -34.7
 -35.6
 -27.9
 -28.6
 -28.2

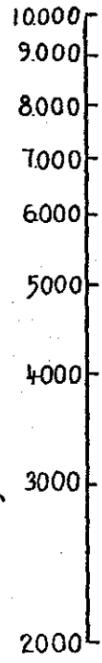
021

316023

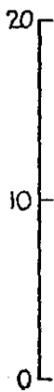
LINE 66 S

BASIN LAKE AREA
GRADIENT ARRAY E.I.P.
TAS-054 C

Resistivity in Ohm Metres



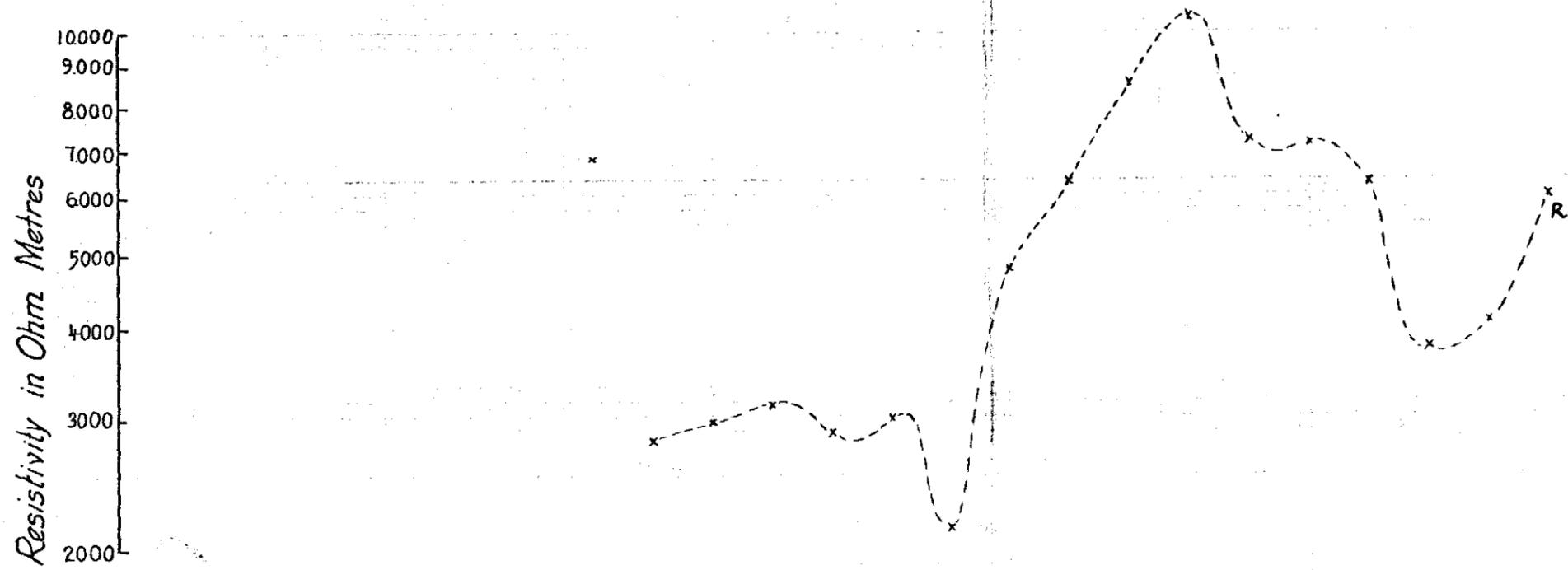
Chargeability in Milliseconds



6000 E

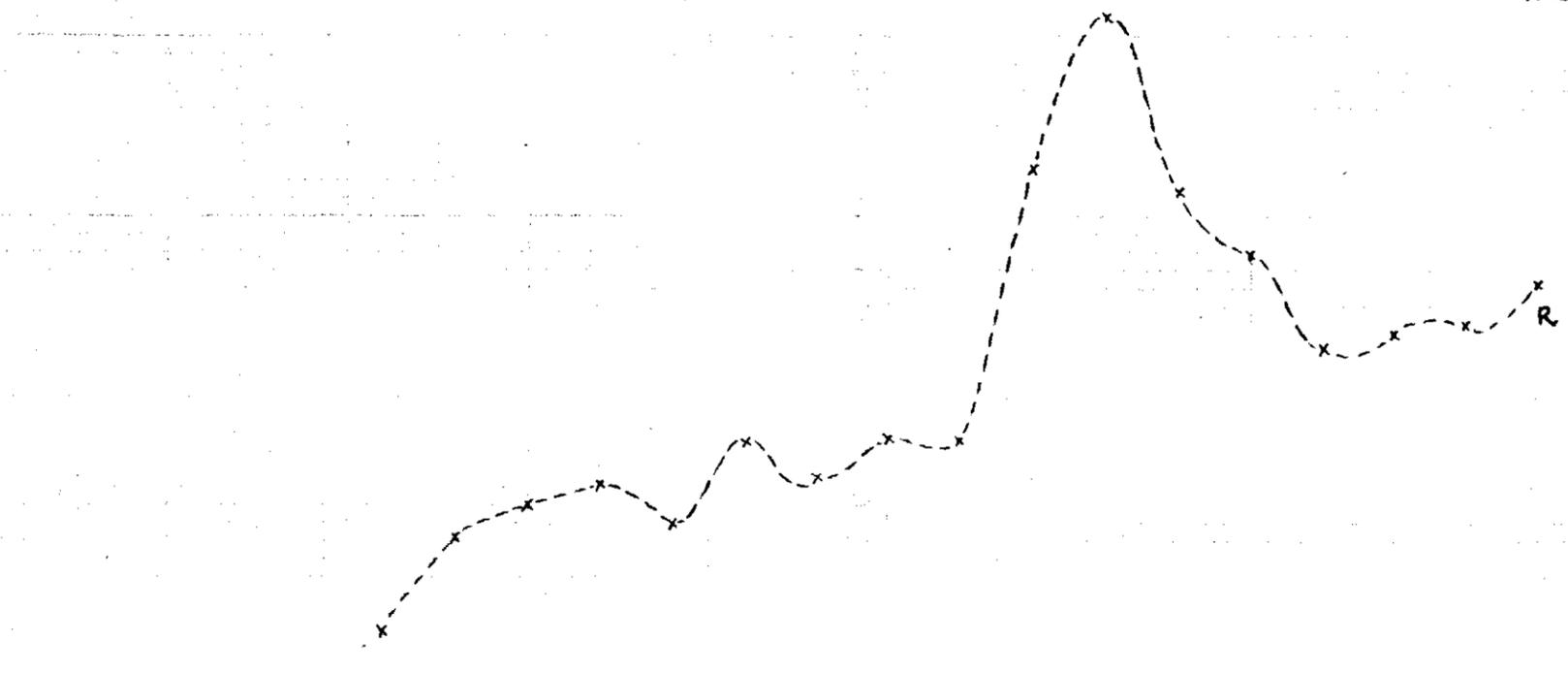
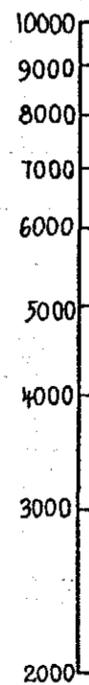
7000 E

8000 E

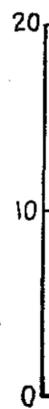


LINE 69 S
BASIN LAKE AREA
GRADIENT ARRAY E.I.P
TAS-054 C

Resistivity in Ohm - Metres



Chargeability in Milliseconds



6000 E

7000 E

8000 E

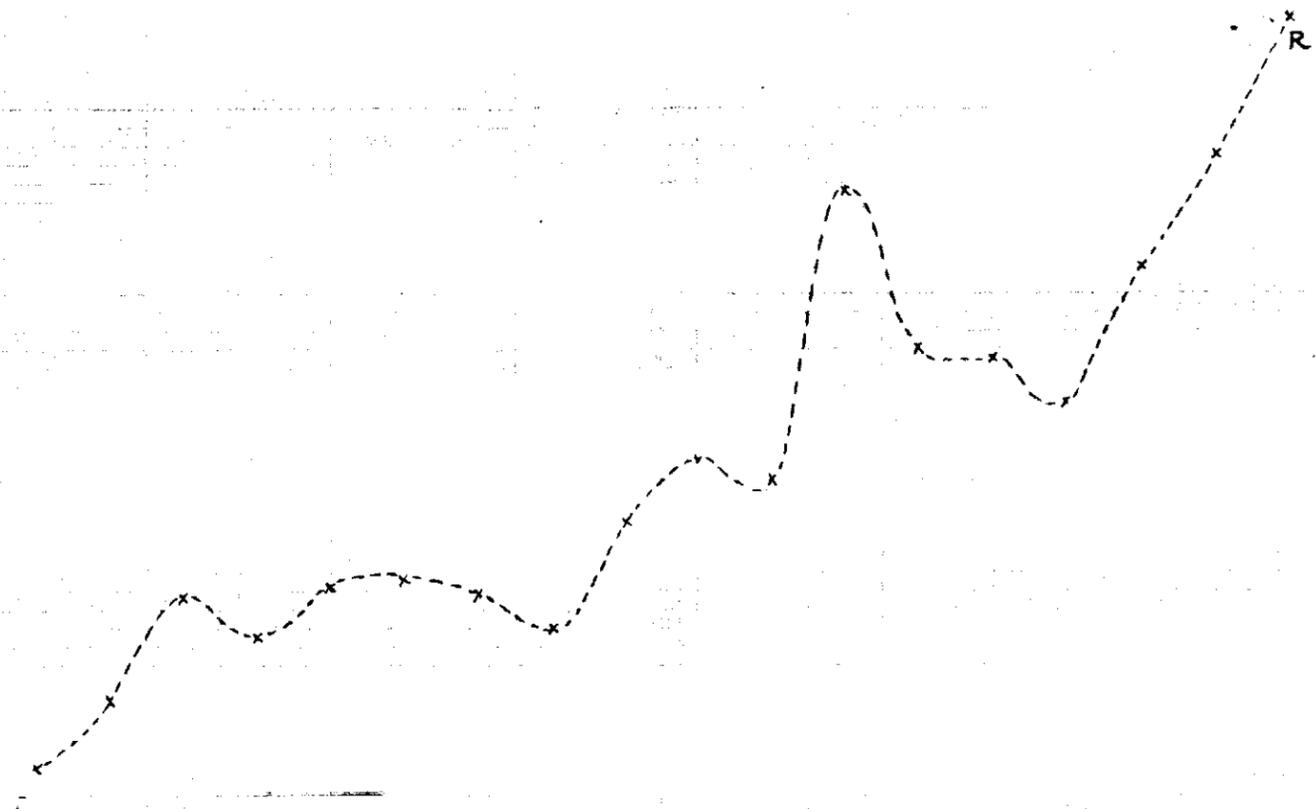
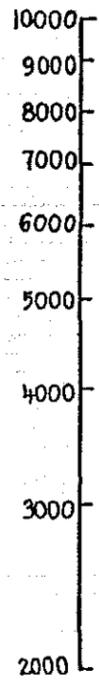


023

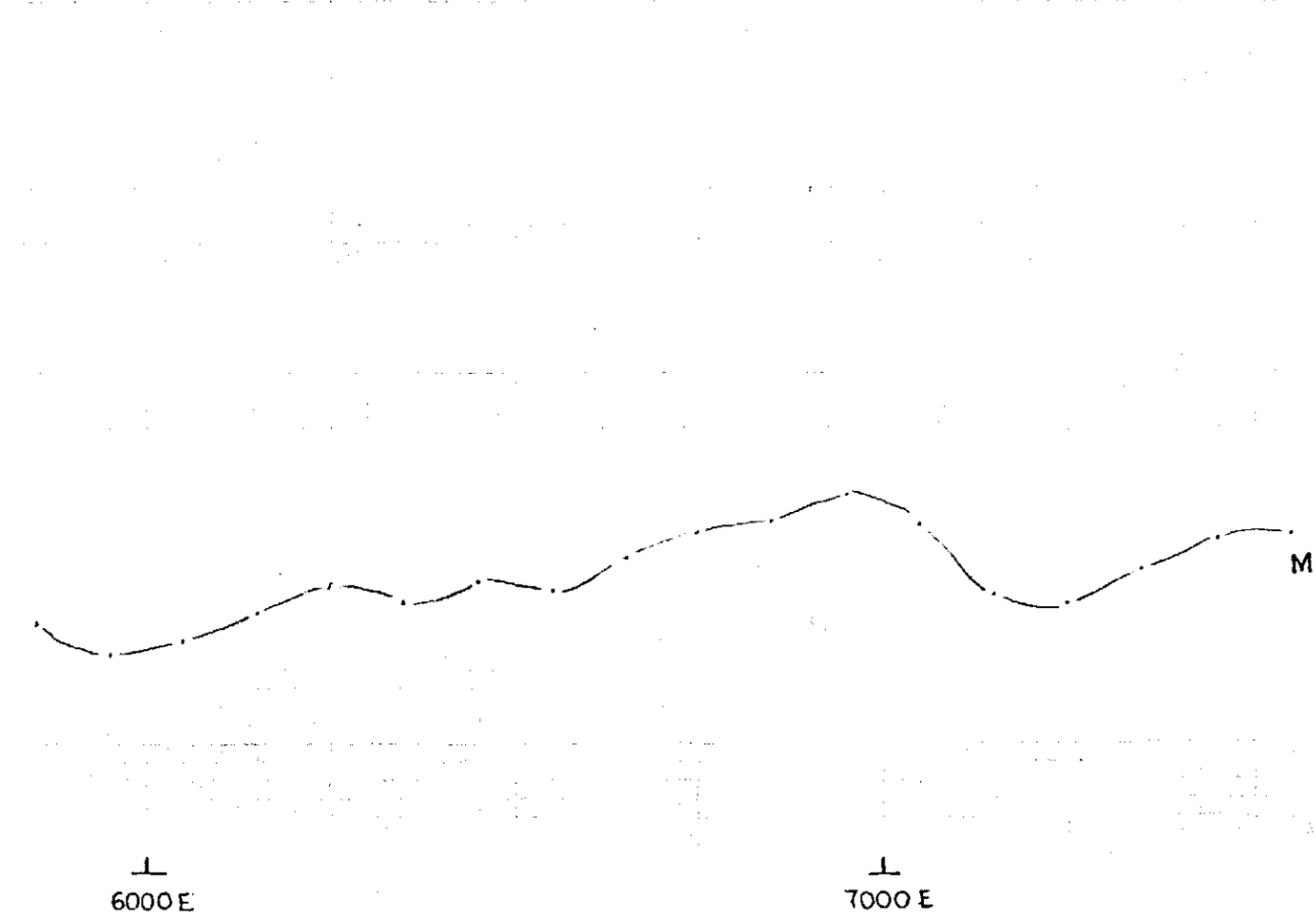
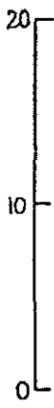
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LINE 75 S
BASIN LAKE AREA
GRADIENT ARRAY E-I.P
TAS-054C

Resistivity in Ohm Metres



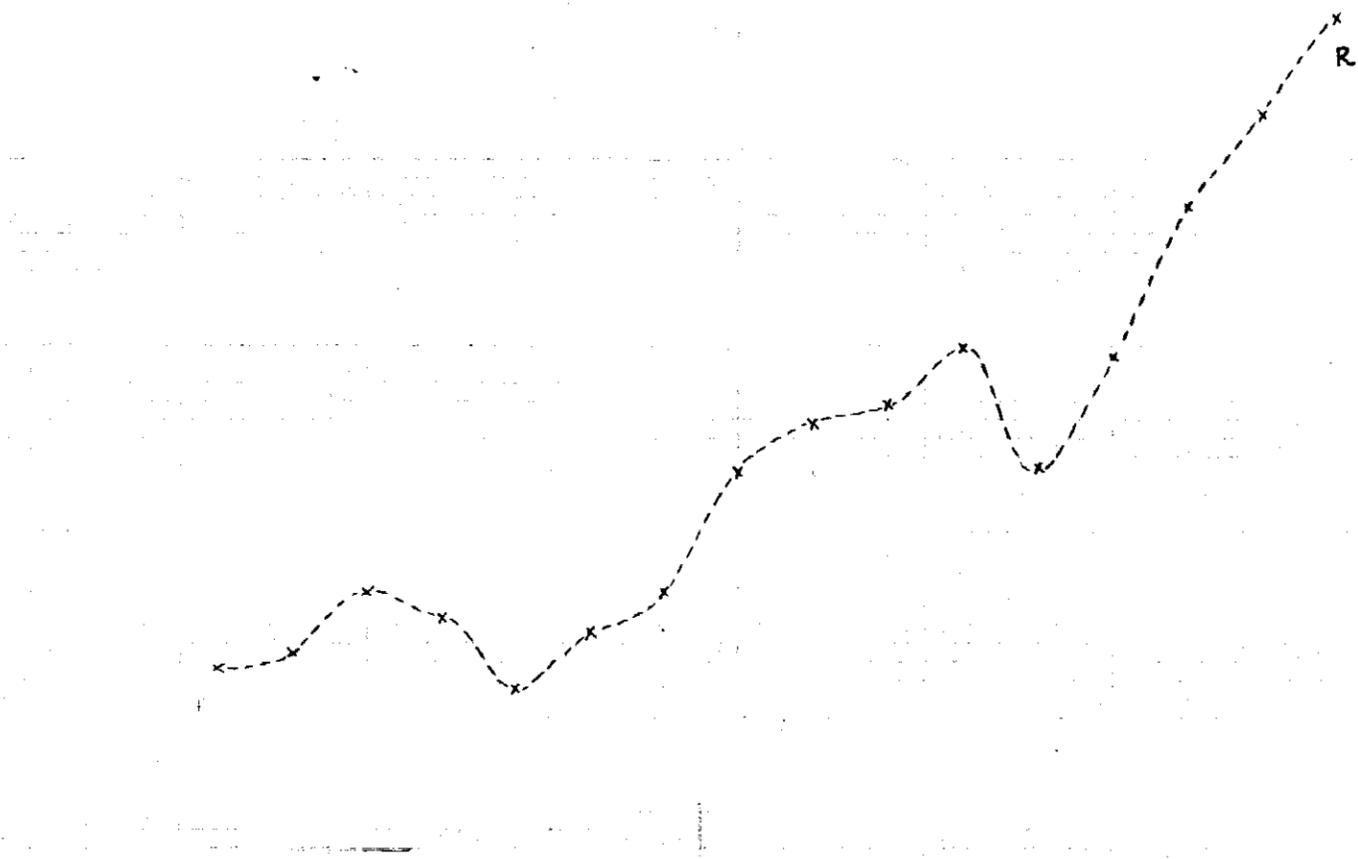
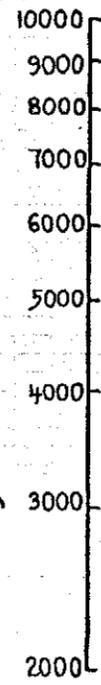
Chargeability in Milliseconds



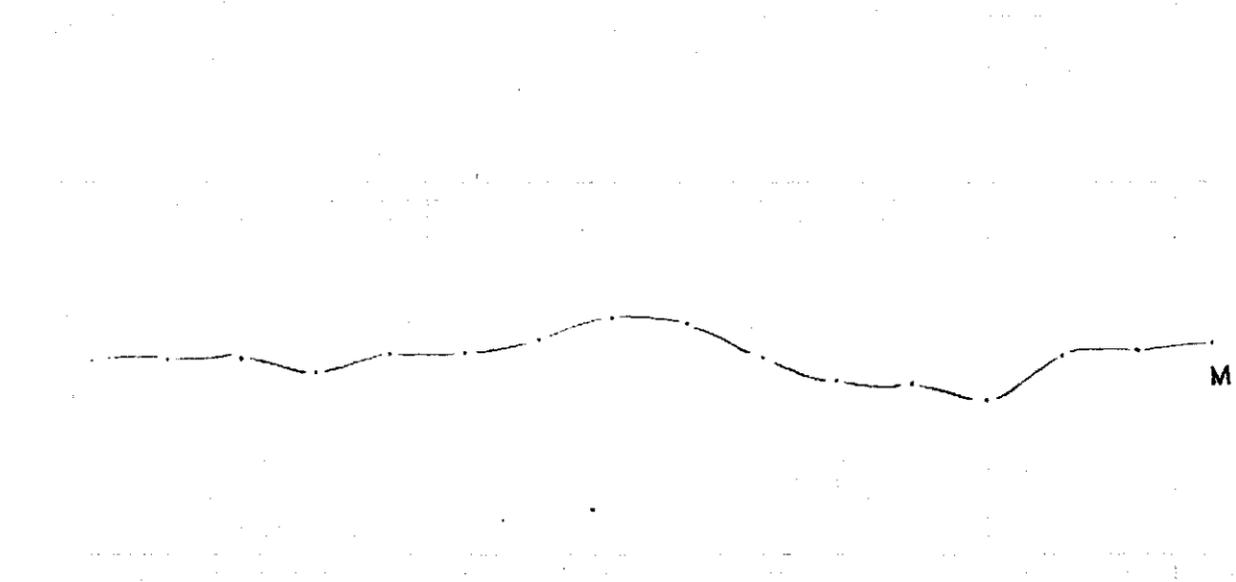
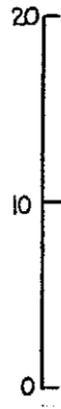
02A

LINE 78 S
BASIN LAKE AREA
GRADIENT ARRAY E.I.P
TAS-054C

Resistivity in Ohm-Metres



Chargeability in Milliseconds



5000 E

6000 E

7000 E

8000 E

025

LINE 80 S
BASIN LAKE AREA
GRADIENT ARRAY E.I.P
TAS-054C

Resistivity in Ohm Metres

10000
9000
8000
7000
6000
5000
4000
3000
2000

Chargeability in Milliseconds

40
30
20
10
0

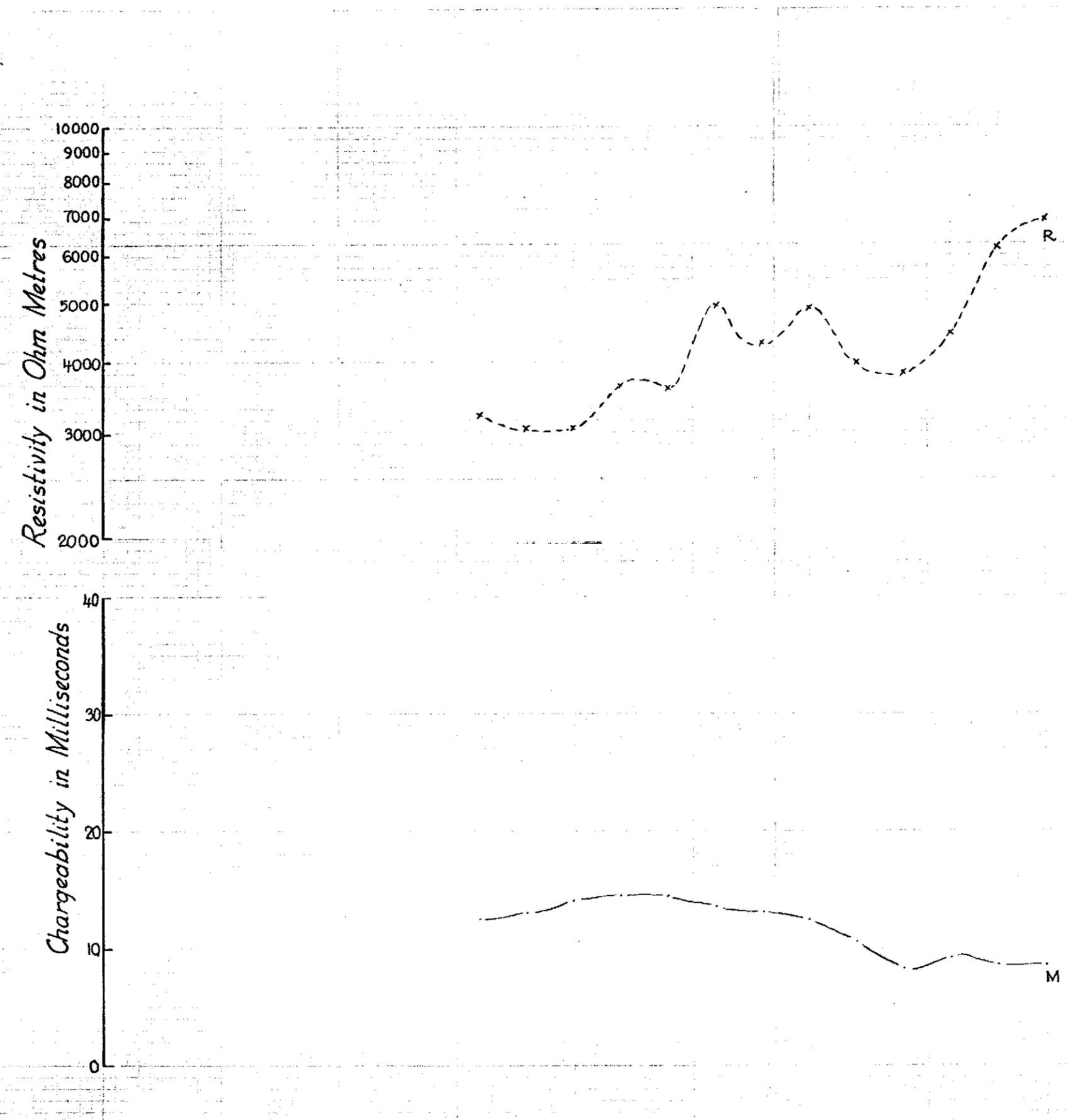
6000 E

10000 E

14000 E

R

M



026

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LINE 82 S
BASIN LAKE AREA
GADIENT ARRAY E.I.P
TAS -054C

Resistivity in Ohm Metres

10000
9000
8000
7000
6000
5000
4000
3000
2000
1000

Chargeability in Milliseconds

20
10
0

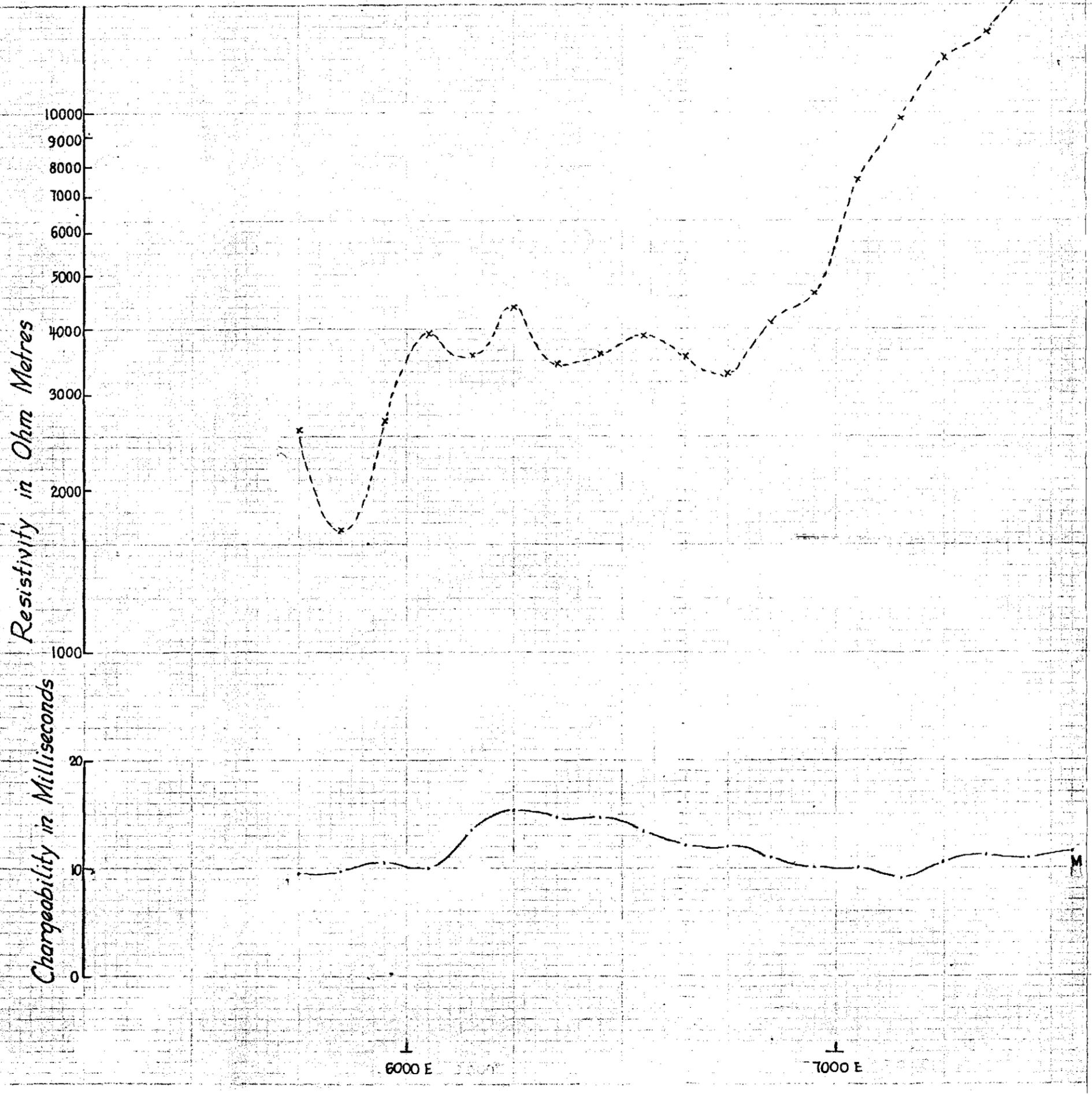
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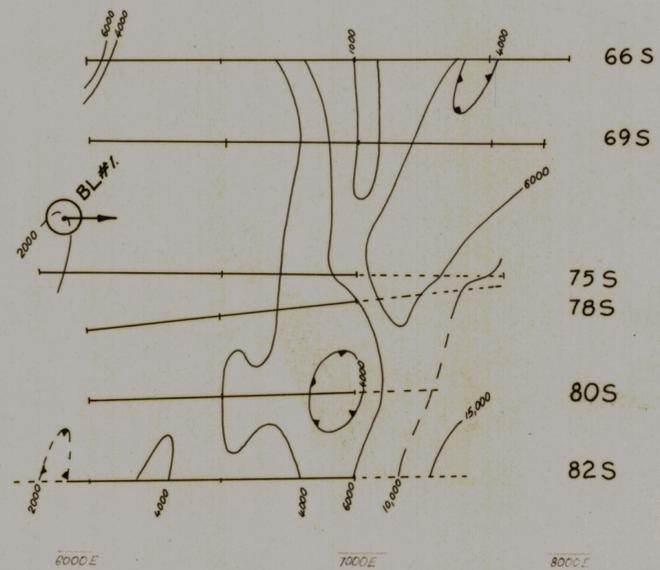
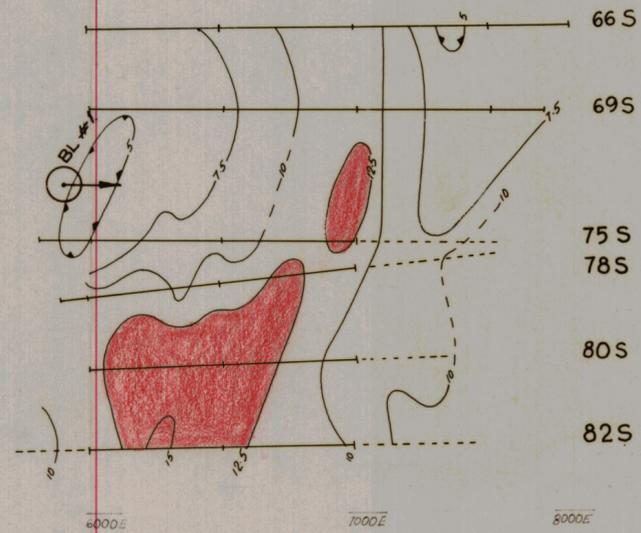
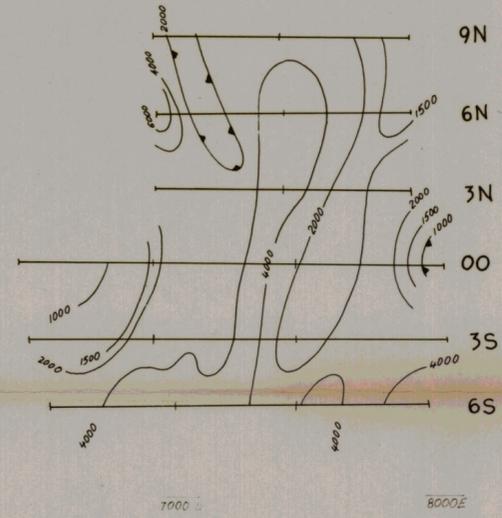
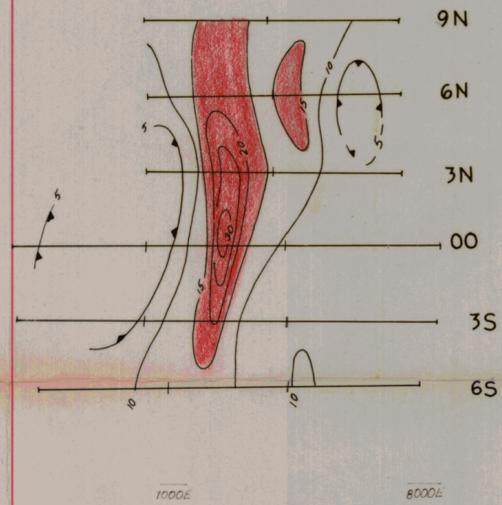
7000 E

8000 E

R

M





**MOUNT LYELL MINING & RAILWAY
COMPANY LTD.**

**BASIN LAKE GRID
WEST COAST - TASMANIA**

**GRADIENT ARRAY
ELECTRICAL INDUCED POLARIZATION
SURVEY**

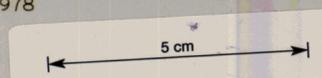
**CHARGEABILITY & RESISTIVITY
CONTOUR PLANS**

SURVEYED & COMPILED BY
SCINTREX

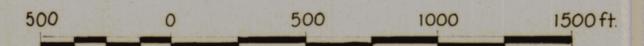


JANUARY - FEBRUARY 1978

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SCALE 1: 6000

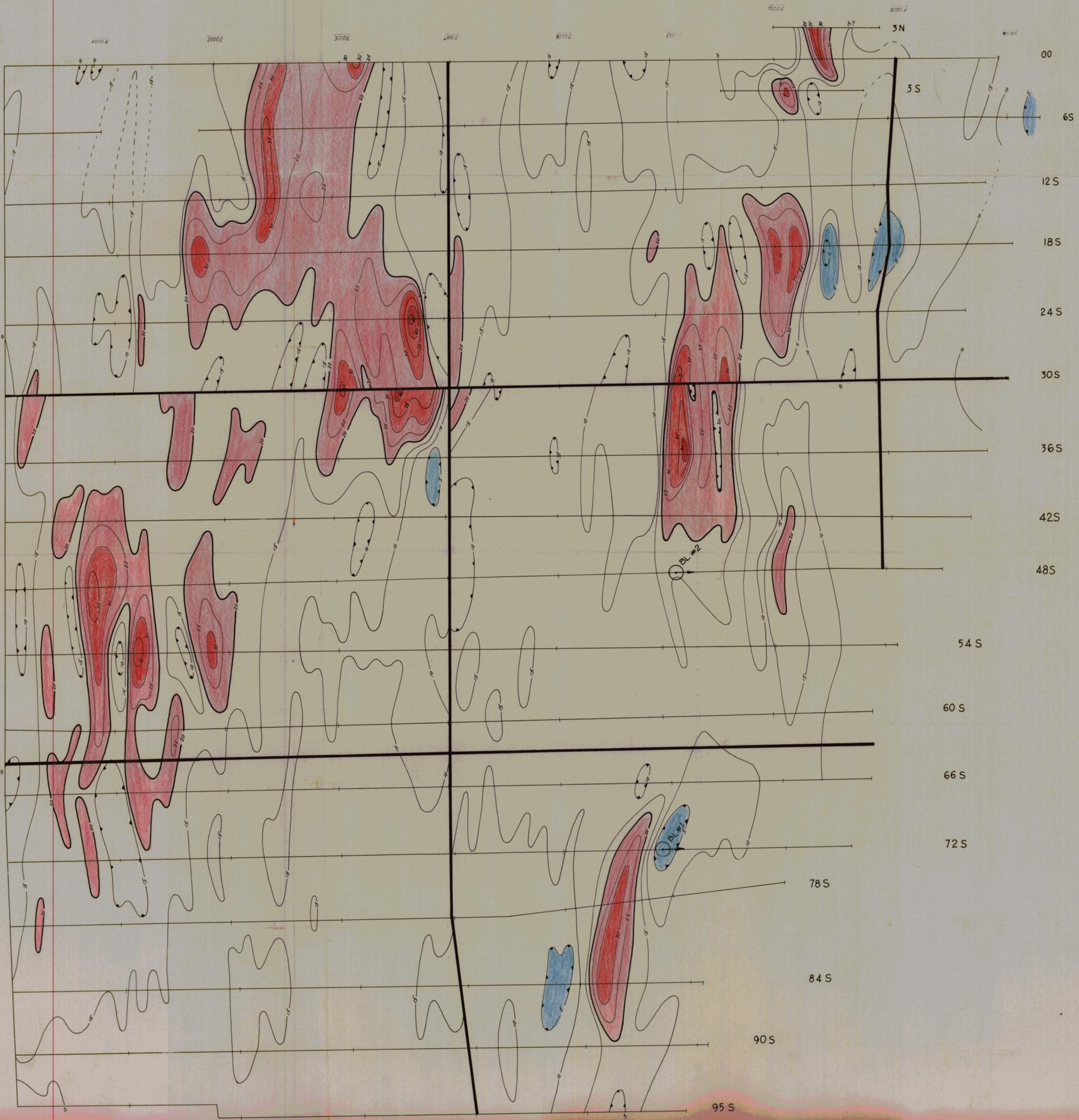


Job. N° TAS-054

Sheet 1 of 1

PLATE 1

84-2244 027



**MOUNT LYELL MINING & RAILWAY
COMPANY LTD.**

**BASIN LAKE GRID
WEST COAST - TASMANIA**

**GRADIENT ARRAY
ELECTRICAL INDUCED POLARIZATION
SURVEY**

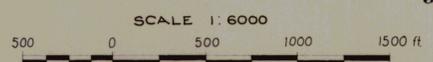
**CHARGEABILITY
CONTOUR PLAN**

SURVEYED & COMPILED BY
SCINTREX

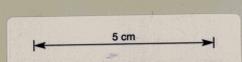


OCTOBER - DECEMBER 1974
Revised with corrected grid June 1978

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Job. N° TAS-025-B Sheet 1 of 1 PLATE 2.



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