COMMONWEALTH OF AUSTRALIA
MINISTRY OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS.

RECORD 1950. NO. 25

# GEOPHYSICAL SURVEYS AT HERMIDALE AND GIRILAMBONE NEW SOUTH WALES

*by A. J. Barlow*

ISSUED UNDER THE AUTHORITY OF THE RT. HON. R.G. CASEY, M.H.R.,
MINISTER FOR NATIONAL DEVELOPMENT.
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# C O N T E N T S.

## LIST OF PLATES.

| | |
|---|---|
| Plate G.72-1 | Location Plan. |
| Plate G.72-2 | Budgery Mine Area : Geomagnetic Vertical Force Contours and Geological Information. |
| Plate G.72-3 | Budgery Mine Area : Spontaneous Polarisation Potential Contours and Geological Information. |
| Plate G.72-4 | Budgery Mine Area : Geomagnetic Vertical Force Profiles. |
| Plate G.72-5 | Budgery Mine Area : Geomagnetic Vertical Force Profiles. |
| Plate G.72-6 | Budgery Mine Area : Spontaneous Polarisation Potential Profiles. |
| Plate G.72-7 | Budgerygar Mines Area : Spontaneous Polarisation Potential Contours and Geological Information. |
| Plate G.72-8 | Budgerygar Mines Area : Geomagnetic Vertical Force Profiles. |
| Plate G.72-9 | Budgerygar Mines Area : Spontaneous Polarisation Potential Profiles. |
| Plate G.72-10 | Girilambone Copper Mine Area : Geomagnetic Vertical Force Contours and Geological Information. |
| Plate G.72-11 | Girilambone Copper Mine Area : Geomagnetic Vertical Force Profiles. |
| Plate G.72-12 | Girilambone Copper Mine Area : Spontaneous Polarisation Potential Profiles. |

# GEOPHYSICAL SURVEYS AT HERMIDALE AND GIRILAMBONE, N.S.W.

## 1. INTRODUCTION.

Hermidale and Girilambone are situated in central New South Wales about 400 miles from Sydney. Hermidale is on the railway line between Nyngan and Cobar, and Girilambone on the line between Nyngan and Bourke. Plate G.72-1 shows the location of these towns and also the location of the areas surveyed. The Budgery Mine is situated about two miles north-west of Hermidale and the Budgerygar group of mines about fourteen miles north on the road to Girilambone. This road is in bad condition and becomes impassable after rain.

Much of the information on the geology and history of the Budgery and Budgerygar copper mines has been taken from Andrews (1913), and for the Girilambone Copper Mine from Carne (1907). This information has been supplemented by annual reports of the New South Wales Mines Department. The help of Mr. N.G. Chamberlain, geophysicist, in compiling this report must also be acknowledged.

The geology, history and results of each area will be dealt with separately.

## 11. OUTLINE OF OPERATIONS.

Geophysical work commenced at the beginning of September 1949, and was completed in December. Of this period, ten weeks were spent at Hermidale and five weeks at Girilambone. Initially, Mr. W.D. Keating and the writer, with Mr. D. Harris, an employee of North Broken Hill Ltd., as field assistant, formed the party. After one week Mr. Keating returned to Melbourne, but returned for a few days in November to conclude the Hermidale surveys.

The operations comprised both geomagnetic and self-potential surveys. For the magnetic surveys, Watts Vertical Force Variometers, nos. 57139 and 57140, the property of North Broken Hill Ltd., were employed.

The traverses covering the area were surveyed and pegged earlier in the year by Messrs. L. Rosenbrock and P. Andrews of North Broken Hill Ltd. The surface geology and positions of shafts, costeans and residue dumps were also plotted by this party.

## 111. BRIEF DESCRIPTIONS OF METHODS USED.

### (a) Magnetic Method.

The magnetic method may be used for the direct detection of ore-bodies which contain magnetic minerals such as magnetite and pyrrhotite. The presence of such magnetic bodies may be successfully detected if they are of sufficient size and magnetisation appropriate to their depth below the surface; for under these conditions, measurable local anomalies in the earth's magnetic field are produced at the ground surface in the vicinity of the ore-bodies. The presence of

-/local

local anomalies may be detected by a vertical force variometer which measures, from point to point, variations in the vertical component of the earth's magnetic field.

Although magnetite or pyrrhotite are not specifically known to occur in the ore-bodies in this particular area, they do occur associated with the copper ore-bodies at Nymagee and Cobar hence it is probable that they will occur at deeper levels at Hermidale and Girilambone. Since in general, the country rock is magnetically inert, any local anomalies of the appropriate type are possible indicators of the presence of ore-bodies.

### (b) Self-Potential Method.

The Self-Potential or Spontaneous Polarisation Potential method may be used for the detection of sulphide ore-bodies which are oxidising. If the upper limits of a sulphide body extend within the zone of oxidation, the electro-chemical effects associated with the oxidation are such that a difference of electrical potential is produced between the upper and lower limits of the sulphide body. As a result of this spontaneous polarisation, current flow takes place in the body and through the surrounding rocks. The current flow may be investigated by making potential measurements on the ground surface, and under suitable conditions, a "negative centre" will be found above the top of the ore-body. If the ore-body is dipping flatly, there will also be a positive centre above its lower end. Best results are obtained when sulphide bodies contain abundant pyrite, and are in a state of active oxidation.

## IV. THE BUDGERY MINE AREA.

### (a) Geology and History of Mine.

The area over which the survey was carried out is fairly flat and is largely covered with a thin layer of alluvium. There are a few isolated outcrops of slate and quartzite of the Girilambone Series with some limonite gossan. About half a mile south-east of the area, a quartzite ridge stands out. Where exposed in numerous costeans, the country appears to be mainly slates and schists, generally striking just west of north. There are some quartzite outcrops in the south-west corner of the area.

It has been stated (Andrews, 1913) that the lode is in the form of a pipe and appears to be a replacement of country rock at the intersection of faults or large joints. The pipe has a dip of about 45° and pitches to the south east. The main shaft has a depth of 410 feet with levels at 122, 218, 266, 311, 353 and 400 feet. Of these only the 218 and 266 feet levels are at present accessible, the depth of water being 270 feet. It was considered in 1913 that ore exposed in all drives was a secondary enrichment and that prospects of payable ore below 400 feet were remote.

The main lode outcropped as a limonite gossan forming a slight rise on which the main shaft is situated. Following the discovery of the Budgery copper lode in 1906, several prospecting shafts were sunk and much costeaning done but no further payable lodes were discovered. Of

-/these

these shafts, one situated about 500 feet west of the main shaft, (the coordinates being 135.60/51.80) and about 180 feet deep is of some interest in relation to a magnetic anomaly obtained. This shaft was sunk to prospect a gossan outcrop approximately 600 feet west of the main shaft. It passed through an ironstone-quartz formation five feet thick with an underlay to the east, and showing traces of copper. However, an easterly cross-cut put in at the 177 feet level failed to intersect this formation. The possible relation between this lode and the magnetic anomaly will be discussed in the following section.

About 20,000 tons of crude ore had been taken from the mine to 1920 since which date mining has been only desultory. Some copper has been obtained by precipitation from the mine water.

## (b) Results and Interpretation.

### (i) Geomagnetic Survey.

As shown in Plate G.72-2, traverses 2,500 feet long were pegged 200 feet apart over the known occurrence of ore, and the area extended north and south with traverses pegged 400 feet apart. Measurements of the vertical component of the earth's magnetic field were in general taken at intervals of 50 feet along the traverses, but at intervals of 25 feet over the anomaly. Traverses 122 to 134 were extended 500 feet easterly in order to completely investigate the anomaly. Measurements at 40 foot intervals were also made along traverses approximately at right angles to the axis of the anomaly.

The magnetic profiles along these sets of traverses are shown in Plates G.72-4 and G.72-5 respectively. It will be noted that the profiles show numerous small irregularities attributable to small and valueless magnetic bodies in the soil cover close to the surface. The gaps shown in some profiles occur where readings could not be taken owing to the presence of iron bodies such as rails and galvanized iron sheds. The main feature of the results is the large anomaly shown on traverses 122 to 140.

Plate G.72-2 shows the contours drawn from these profiles together with the surface geology and positions of shafts, costeans, and residue dumps. The contours show two distinct centres, and since the lodes are in the nature of replacements and the line joining their centres does not lie along the strike, the centres may be attributed to separate ore-bodies. On this assumption, theoretical profiles have been calculated for uniformly magnetised spherical bodies at various depths, and by comparison of these profiles with the observed profiles, an estimation of the depth to the centres of the magnetic bodies has been made. In this way it has been estimated that the depth to the centre of the body causing the eastern portion of the anomaly is approximately 550 feet. The plan position of this centre is to the south east of the main lode and from known pitch of this lode, it is almost certain that the magnetic body is a continuation of the main lode to this depth. There has been no prospecting done below a depth of 400 feet so that anomaly represents a promising indication.

-/From the

From the form of the profile across the western portion of the anomaly, it has been estimated that the depth to centre of the second magnetic body is approximately 500 feet. The formation outcropping as gossan to the west of the main shaft and cut in the prospecting shaft may possibly open out at this depth, and it is suggested that the magnetic body causing the anomaly is an extension of this ironstone-quartz lode to this depth. A break due to faulting could account for the lode not being cut in the 177 feet level.

In calculating the theoretical profiles, bodies of spherical shape have been assumed as this appears to be suggested by the general form of the observed anomaly and also considerably simplifies the theoretical treatment. The elongated shape of the eastern anomaly possibly suggests that the body may be of cylindrical shape, but it should be pointed out that such an assumption would not appreciably affect the estimated depth or position of the centre. It is not possible to make a quantitative determination of the size of the magnetic bodies, as there is no information available in regard to the magnetic properties of the material of the probable ore-bodies.

(ii) The Self-Potential Survey.

This method was applied over the same area as the magnetic method and measurements were taken at intervals of 50 feet along the traverses. The potential measurements are not affected by scrap iron and no noticeable effect is produced by the residue dumps, so that the survey was able to cover the whole area.

The profiles obtained along the traverses are shown in Plate G.72-6, and the results have been contoured at 10 millivolt intervals as shown in Plate G.72-3. It is seen that there is a weak but definite anomaly with both negative and positive centres. Calculations from the form of the anomaly show that it is caused by a sulphide body dipping to the east, and centred at a depth of about 300 feet. The position of the anomaly shows that the ore-body is almost certainly the main lode at present mapped from the mine workings. Since there is little or no oxidation of sulphide bodies much below water level, the results of the self-potential method do not necessarily confirm the magnetic indications since the estimated depths of the magnetic bodies are much greater than that of the water level, now 270 feet.

The form of the Self-Potential anomaly suggests that the main lode is dipping somewhat more flatly than is actually the case. However, estimations of dip would be unreliable because of the disturbance of the water level by pumping of water for copper precipitation, and secondly, because the anomaly is possibly due to the combined effect of this lode and another lode to the west as indicated by the magnetic method.

-/(c)

## (c) Drilling Recommendations.

The strong magnetic anomaly is taken as a basis for the drilling recommendations but due regard has also been paid to the probable attitude of the ore-bodies expected from geological considerations. In general, the lodes of these areas have a definite underlay to the east although the main Budgery lode is known to pitch to the south east, so that the drill-holes should approach the target from an easterly direction in order to cross-cut the lode.

As stated earlier in the report, the eastern centre of the anomaly appears to be caused by a continuation of the main lode, and the centre of the magnetic section at a depth of 550 feet is well below that already prospected and should be a worthwhile target. Although the estimation of depth has been based on a spherical magnetic body, it is not expected that the ore-body will conform to this shape but will probably be elongated in the direction of the known lode, retaining its pitch to the south-east. Actual recommendations are -

| | |
|---|---|
| Coordinates of Target | 130.60/58.60 |
| Depth of Target | 550 feet |
| Coordinates of Drill-Site | 128.90/62.80 |
| Bearing of Drill-hole | 270° (magnetic) |
| Depression of Drill-hole | 51° |

Probable length of Drill-hole required 900 feet.

It is probable that the magnetic body causing the western portion of the anomaly also pitches to the south-east, particularly if it is an extension of ironstone-quartz formation cut in the prospecting shaft near the surface. The recommendations for this drill-hole are -

| | |
|---|---|
| Coordinates of Target | 133.80/51.66 |
| Depth of Target | 500 feet |
| Coordinates of Drill-Site | 128.60/52.30 |
| Bearing of Drill-hole | 331° (magnetic) |
| Depression of Drill-hole | 50° |

Probable length of Drill-hole required 900 feet.

Both of these drill-holes should be well clear of any existing mine workings. No allowance has been made for possible flattening of the drill-hole.

## V. THE BUDGERYGAR MINES AREA.

### (a) Geology and History of the Mines.

The topography of this area is very similar to that at Budgery in that it is fairly flat and has a thin cover of alluvium although outcrops of slates and quartzite of the Girilambone Series are more frequent. A quartzite formation striking just west of north outcrops in the south-eastern part of the area. A strong gossan outcrop traverses the mining leases formerly held by the Budgerygar and Budgerygar North mining companies. Between their main shafts there are two

-/parallel

parallel outcrops which appear to join just south of the Budgerygar shafts. The lodes dip east and the main shafts have been sunk so as to intersect them, but the western lode does not appear to have been cut either by shafts or drives.

Two shafts were sunk on the Budgerygar lease in 1907 and 1908 their depths being 203 and 350 feet, and are connected by means of drives and a winze. Cross-cuts to the lode from these shafts show that it is of tabular form striking approximately north-south and dipping to the east at an angle of 55° and has a thickness of about 60 feet.

The Budgerygar North mine was first officially reported in 1910 when the shaft was down to 225 feet with cross-cuts at the 100, 160 and 225 feet levels. The general form of the lode is reported as being that of a pipe, although it may be a continuation of the tabular Budgerygar lode.

The main shaft of the Bonnie Dundee mine was commenced in 1909 to intersect a lode outcropping as gossan to the north west of the Budgerygar leases. Its depth is 539 feet with cross-cuts at the 100, 250, 300, 400 and 500 foot levels. Good grade copper ore has been proved below 250 feet but the width of the lode is only a few feet. It has a steep dip (about 70°) to the east.

The positions of the mines and the gossan outcrops together with the other surface geological features as surveyed by P. Andrews, geologist of the North Broken Hill Ltd., are shown in Plate G.72-7. The prospects of all these mines at the time of ceasing production were reported as being good.

## (b) Results and Interpretation.

### (i) Geomagnetic Survey.

Measurements were taken with the variometer at intervals of 50 feet along the pegged traverses. The resulting profiles are shown in Plate G.72-8. Small local variations occur but there are no marked anomalies attributable to sulphide bodies at depth. It is apparent that the known sulphide lodes contain little or no magnetite or pyrrhotite.

### (ii) The Self-Potential Survey.

The potential measurements were made at the same stations as the geomagnetic readings and in addition four intermediate traverses 129, 131, 133 and 135 were surveyed from 45.00 to 55.00 in order to obtain greater detail over the centre of the anomaly.

This survey revealed a well-defined anomaly in the vicinity of the Budgerygar and Budgerygar North shafts, but no indication was obtained over the Bonnie Dundee. The profiles are shown in Plate G.72-9 and the resulting contours at 10 millivolt intervals shown in Plate G.72-7. The contour plan shows two distinct negative centres close to the Budgerygar and Budgerygar North shafts. It is considered that the two centres are caused by separate bodies although the country between may be mineralised.

-/In the

In the case of the Budgerygar centre of the anomaly, the estimated dip of the lode is about 60° which is very close to that of the known lode. The position of the anomaly in plan confirms that it is caused by that lode or an extension of it to a slightly greater depth. From the form of the anomaly, the estimated depth to the centre of the lode is approximately 400 feet.

The estimated position of a sulphide body which could cause the northern centre of the anomaly does not agree with that of the Budgerygar North main lode and appears to be about 300 feet to the south west of the known lode. As the observed anomaly is probably the combined effect of the known lode and a second one to the south west, little reliance can be placed on estimates of depth and position of this second lode. However, the western outcrop of gossan may be the extension of this lode to the surface and be indicative of its position (Andrews, 1913, p.116).

(c) Drilling Recommendations.

The centre of the anomaly in the vicinity of the Budgerygar North shaft represents the more promising drilling target since its cause may be a lode not previously tested. The 209 and 225 feet levels of the main shaft have been extended approximately 20 feet to the west to prospect a possible lode associated with the western gossan outcrop, but until 1913, at least, such a lode had not been intersected. The target depth is given as 350 feet since in order to produce a self-potential anomaly, the sulphide lode must extend to water level which is approximately at this depth. Since the lode probably dips to the east in common with others in the area, the drill-hole should approach the target from an easterly direction. With due regard to these considerations the following recommendations are made -

| | |
|---|---|
| Coordinates of Target | 136.60/53.50 |
| Depth of Target | 350 feet |
| Coordinates of Drill-site | 135.28/55.12 |
| Bearing of Drill-hole | 285° (magnetic) |
| Depression of Drill-hole | 60° |

Probable length of Drill-hole required 500 feet.

This drill hole should be clear of any mine-workings and may also serve to test, at a comparatively shallow depth, any possible southerly extension of the Budgerygar North main lode.

On the basis of the self potential method alone, a strong recommendation for drilling the Budgerygar centre of the anomaly cannot be made, since the ore-body causing it has already been well prospected to a depth of 350 feet and the copper content appeared to be decreasing with depth. However, should the other drill-holes (at Budgery and Budgerygar North) show good copper values at depth, it would be advisable to investigate the extension at depth of the Budgerygar lode. Details of the drill-hole necessary for this purpose are as follows -

-/Coordinates

| | |
|---|---|
| Coordinates of Target | 131.30/52.35 |
| Depth of Target | 430 feet |
| Coordinates of Drill-site | 129.90/54.40 |
| Bearing of Drill-hole | 282° (magnetic) |
| Depression of Drill-hole | 60° |

Probable length of Drill-hole required 600 feet.

Again, in making these recommendations, no allowance has been made for the possible flattening of the drill-hole.

## VI. THE GIRILAMBONE COPPER MINE AREA.

### (a) Geology and History of the Mine.

The Girilambone copper lode outcrops on the crest of a low hill known locally as Girilambone Hill or Copper Hill. The rocks outcropping on the hill are chiefly quartzitic and are highly contorted. The country rocks are schists, sandy slates, and quartzites of the Girilambone Series, but they are largely covered by alluvium except where exposed near the top of Copper Hill and occasionally in watercourses.

The lode has a N.N.W. strike at the surface and dips to the east but Carne (1907) states that, at depth, there are two lodes striking north-west and west respectively. The width of the lode varies from 2 feet to 25 feet.

Mining was commenced in 1880, but little work was done until 1896 when the Girilambone Copper Mining Company was formed. The main shaft was deepened to 544 feet and passed out of the lode at 420 feet. Drives have been put in at the 140, 200, 300, 360, and 520 feet levels. By 1907, over 58,000 tons of ore had been taken out, but in that year the price of copper dropped, and since then little mining has been done. Some copper has been obtained by precipitation from mine water and by leaching of the residue dumps.

### (b) Results and Interpretation.

(i) Geomagnetic Survey.

The main feature of this survey is the magnetic anomaly of moderate intensity centred approximately 1,100 feet north-east of the main shaft. To completely define this anomaly, traverses 156 to 168 were extended to 7,000 and a further traverse, 170, was surveyed and pegged from 4500 to 7000. The magnetic vertical force profiles are shown in Plate G.72-11, and the resulting contours are shown in Plate G.72-10. As over the other areas, measurements were taken at intervals of 50 feet except where readings were very irregular, when 25 foot intervals were used. Many of these irregular values were caused by ironstone pebbles near the surface and also by a considerable amount of scrap iron remaining from old houses and workings. No measurements could be taken over the slag dumps since the slag produces strong local magnetic effects obscuring those due to natural causes.

-/The form

The form of the anomaly suggests an almost vertical tabular ore-body with a strike having a magnetic bearing of 116° and a dip to the north of not less than 80°. The ore-body appears to be very close to a contact between slates and a massive quartzite formation. These geological conditions are favourable for the location of sulphide ores being similar to those of the Cobar copper field. Theoretical profiles have been calculated for a vertical tabular body at varying depths and compared with the observed profile at right angles to the axis of the anomaly. In this way, it has been estimated that the centre of the magnetic body has a depth of approximately 600 feet and the top of the magnetic body probably not less than 400 feet from the surface. No estimation of thickness can be made.

The small but intense magnetic anomaly shown on the profile of traverse 164 is difficult to explain but may be due to a body of magnetite at a fairly shallow depth. This anomaly appears to be too wide to be attributable to a mass of buried scrap iron. The absence of any magnetic anomaly over the known lode may be explained by the fact that the ore is highly siliceous and magnetic minerals are apparently absent.

(ii) The Self-Potential Survey.

The Self-Potential survey was carried out over the same area and the resulting profiles are shown in Plate G.72-12. No marked anomaly is shown on these profiles. The irregularities of the profiles of traverses 146 to 152 may be due to small stringers of ore, but are more probably due to the unfavourable electrical contact conditions afforded by the bare rock outcrops near the top of the hill.

Carne (1907) states that the ore is oxidized to the 200 feet level. At present the water level is at 160 feet so that there can be little or no oxidation of sulphides to give self-potential anomaly over the known lode.

## (c) Drilling Recommendations.

The geomagnetic anomaly represents a promising drilling target in that it is some distance from any existing mine workings and is probably not an extension of the main-lode. Although the estimated depth to the centre of the magnetic body is given as 600 feet, it will be a more economical proposition to select the target at a depth of 450 feet as the lode should extend at least to this level. Details of the recommendations are -

| | |
|---|---|
| Coordinates of Target | 162.80/58.20 |
| Depth of Target | 450 feet |
| Coordinates of Drill-Site | 166.40/59.35 |
| Bearing of Drill-hole | 205° (magnetic) |
| Depression of Drill-hole | 50° |

Probable length of Drill-hole required 700 feet.

-/V11.

## VII. SUMMARY AND CONCLUSIONS.

In the geophysical survey of the Hermidale and Girilambone area, the magnetic and self-potential methods have been applied to the problem of locating further copper ore-bodies in the vicinity of the Budgery, Budgerygar and Girilambone mines.

At the Budgery mine, the proven lode has been shown to give a well-defined self-potential anomaly. The magnetic method has indicated the presence of a mineralised body which extends to a depth of at least 600 feet and appears to be an extension of the main lode already worked to a depth of 400 feet. The magnetic results also show a second magnetic body situated about 800 feet west of the main lode and at a depth of approximately 500 feet. The existence of this body is supported by a small patch of gossan outcropping to the west of the main shaft.

At the Budgerygar mine the self-potential anomaly observed corresponds to the known ore-body, but also indicates a possible new lode near the Budgerygar North shaft.

In the Girilambone area the magnetic method has been successful in locating a probable ore-body of tabular shape and depth approximately 600 feet, and situated some distance from the present mine-workings.

Drilling targets have been recommended where the geophysical methods indicate possible new lodes or extensions of those already worked. It is impossible to assess the value of the geophysical survey until the results of the drilling operations are known, but the positive results obtained over the existing lodes give encouraging confirmation of the usefulness of the geophysical methods in these areas.

It is noteworthy that the line joining these areas is approximately parallel to the regional strike of the beds of the Girilambone series and in all cases the known ore-bodies are near a contact of slates and a quartzite formation. There is some justification for a reconnaissance survey along this line with perhaps a more detailed survey over the quartzite-slate contacts where these can be ascertained from the infrequent outcrops in the area.

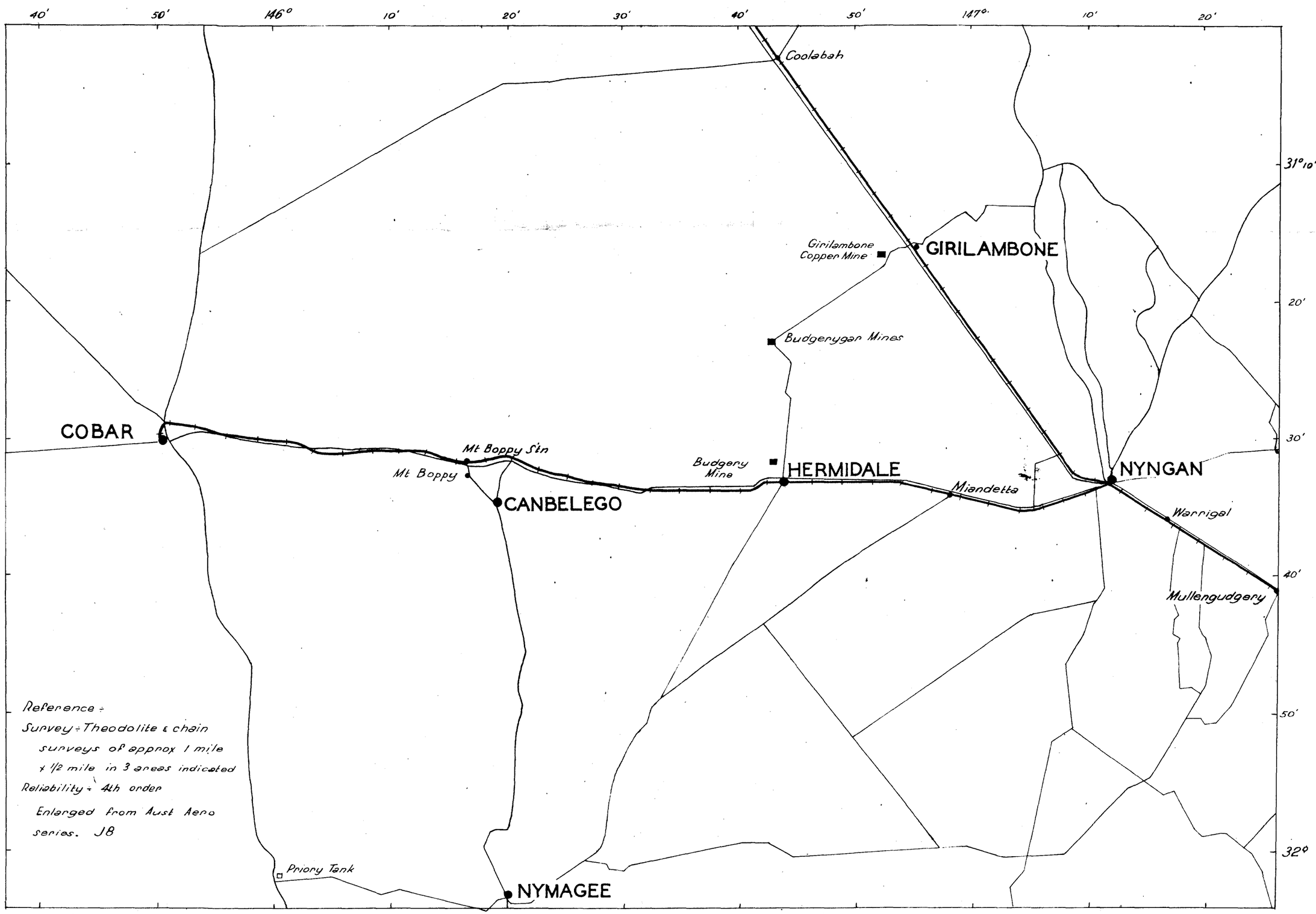
## VIII. REFERENCES.

Andrews, E.C., 1913 - The Canbelego, Budgery, and Budgerygar Mines. (Cobar Copper and Gold-field, Part II), Dep.Min.N.S.W.Min.Res.No.18.

Carne, J.E., 1907 - The Copper Mining Industry, Dep.Min. N.S.W.Min.Res.No.6, 2nd Ed.

(A. J. BARLOW)

*August 21, 1950*




Reference :-
Survey :- Theodolite & chain surveys of approx 1 mile x 1/2 mile in 3 areas indicated
Reliability :- 4th order
Enlarged from Aust Aero series. J8

*LEGEND*

Location of Geophysical Survey Areas
Railway Line
Roads

*SCALE*

8 0 8 16 24 32

TN

A. J. Barlow.
Geophysicist
21-2-50

# GEOPHYSICAL SURVEY AT HERMIDALE AND GIRILAMBONE N.S.W.

## LOCATION PLAN.

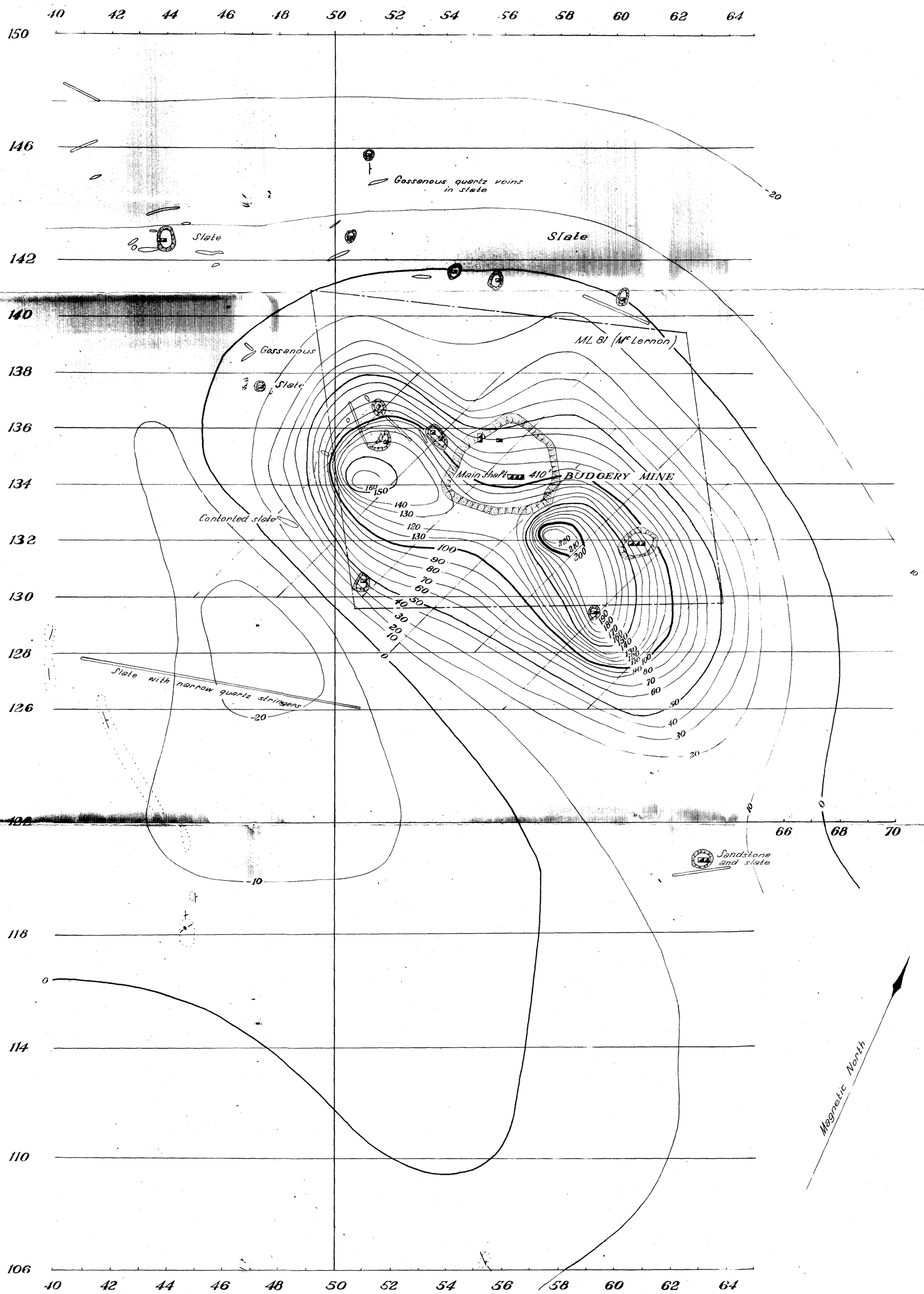
SHOWING AREAS SURVEYED

AT

## BUDGERY, BUDGERYGAR & GIRILAMBONE COPPER MINES.

G.72–1

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics




**LEGEND**

- Strike and Dip
- Outcrops
- Residue Dumps
- Costeens
- -10- Geomagnetic contours.
- Joints

SCALE

200 0 200 400 600 Feet

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GEOPHYSICAL SURVEY AT HERMIDALE N.S.W.

# BUDGERY MINE AREA.

SHOWING

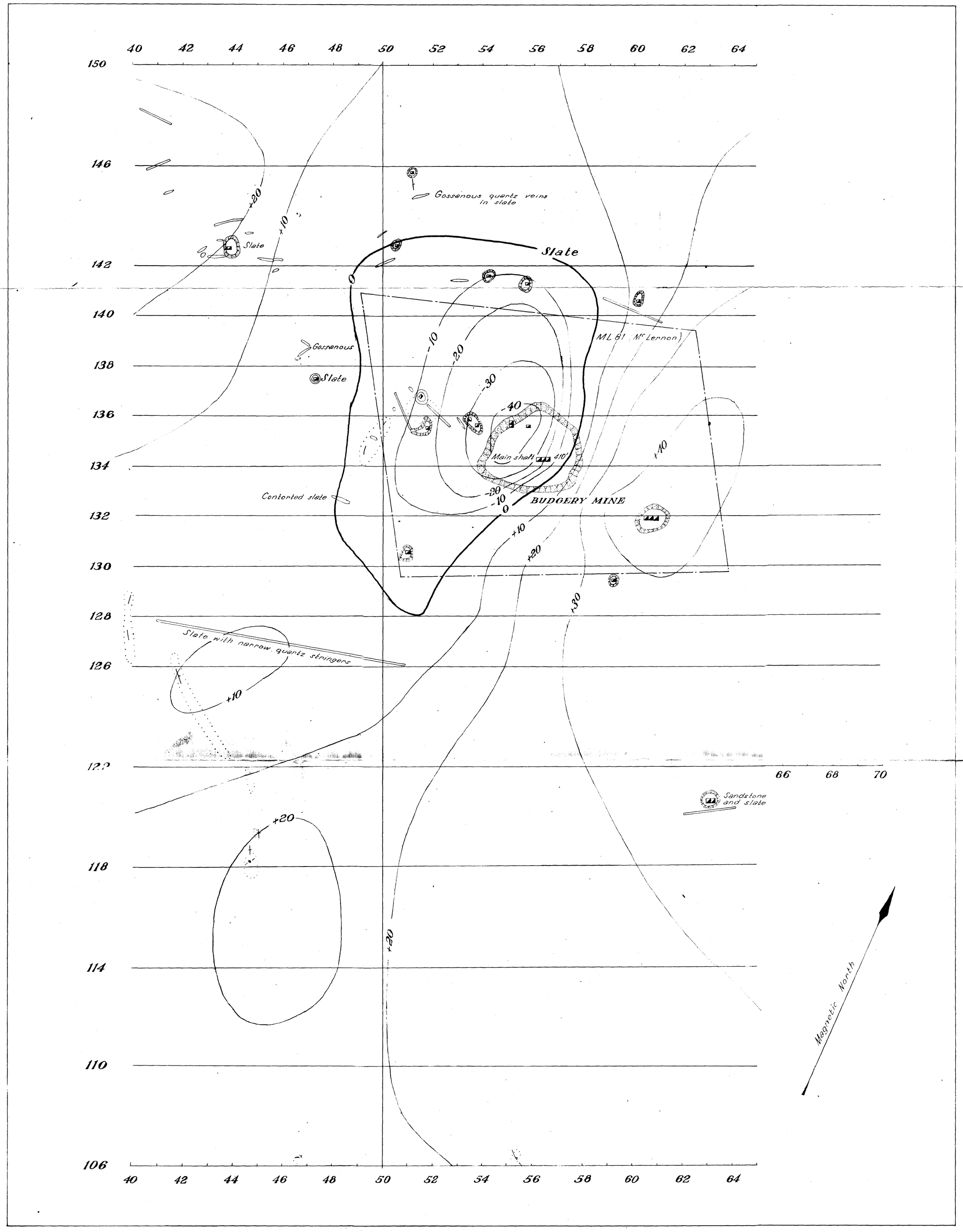
# GEOMAGNETIC VERTICAL FORCE CONTOURS

WITH

# GEOLOGICAL INFORMATION.

G.72-2

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics.




**LEGEND**

- Strike and dip
- Outcrops
- Residue Dumps
- Costeens
- +70 S.P. Contours
- Joints

SCALE

200 0 200 400 600 FEET

Contour Interval - 10 Millivolts

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21-2-50

GEOPHYSICAL SURVEY AT HERMIDALE N.S.W.

BUDGERY MINE AREA

SHOWING

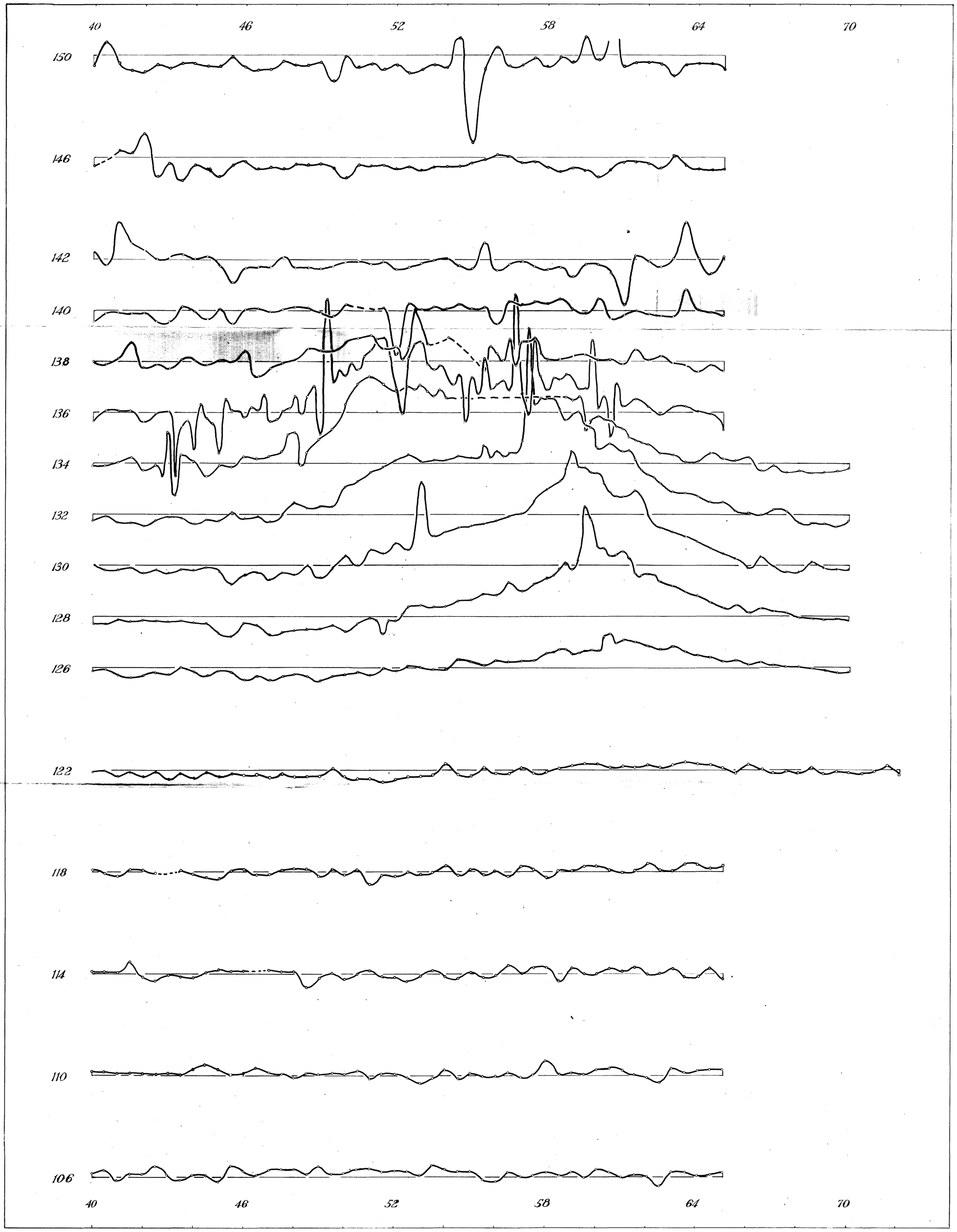
# SPONTANEOUS POLARISATION POTENTIAL CONTOURS

WITH

# GEOLOGICAL INFORMATION.

G.72-3

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics.




SCALES

Horizontal 200 0 200 400 600 Feet

Vertical 100 0 100 200 300 Gammas

A. J. Barlow

Geophysicist

21-2-50

# GEOPHYSICAL SURVEY AT HERMIDALE N.S.W.

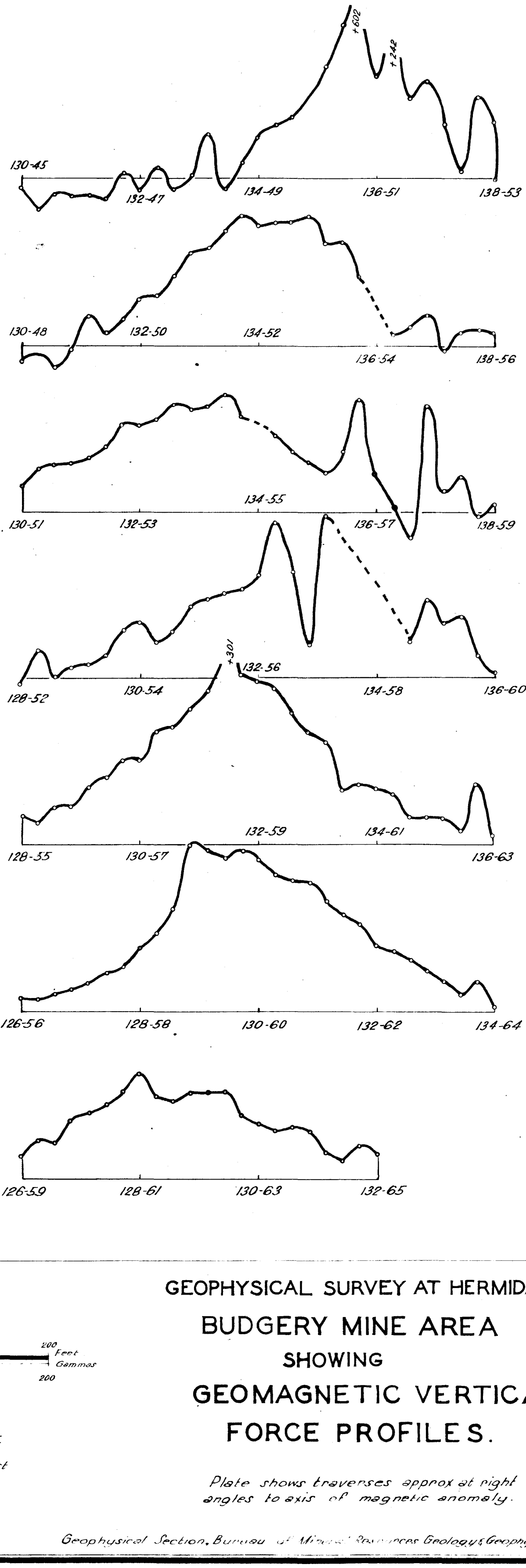
## BUDGERY MINE AREA

SHOWING

## GEOMAGNETIC VERTICAL FORCE PROFILES.

G.72-4

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics




SCALES

200 0 200 Feet Horizontal

200 0 200 Gammas Vertical

A. J. Barlow.
Geophysicist
21-2-50

# GEOPHYSICAL SURVEY AT HERMIDALE N.S.W.

# BUDGERY MINE AREA

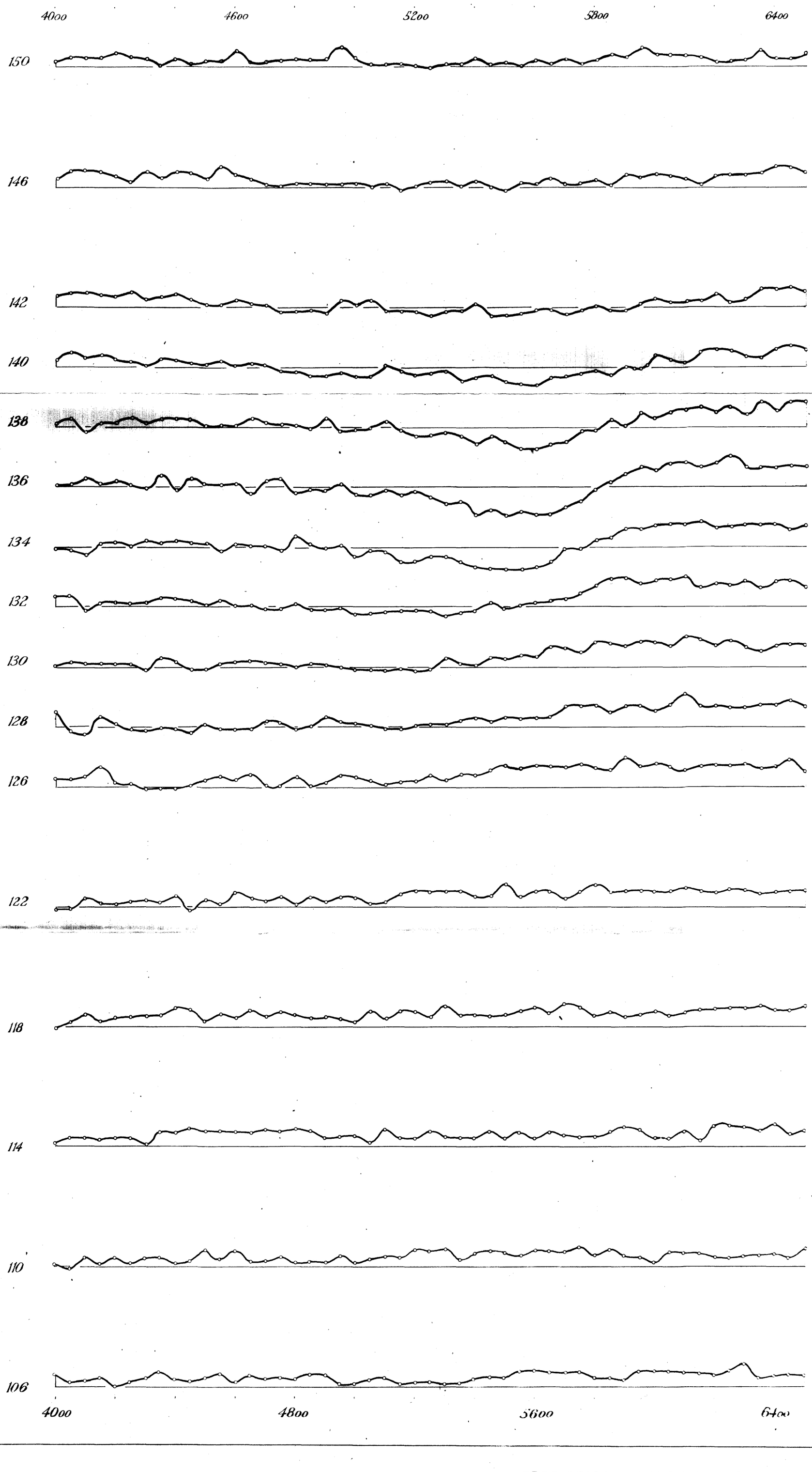
## SHOWING

# GEOMAGNETIC VERTICAL FORCE PROFILES.

Plate shows traverses approx at right angles to axis of magnetic anomaly.

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics

G72-5.




SCALES

Horizontal 200 0 200 400 600 Feet

Vertical 100 0 100 200 300 Gammas

A. J. Barlow

Geophysicist

21-2-50

GEOPHYSICAL SURVEY AT HERMIDALE N.S.W

BUDGERY MINE AREA

SHOWING

# SPONTANEOUS POLARISATION POTENTIAL PROFILES.

G.72-6

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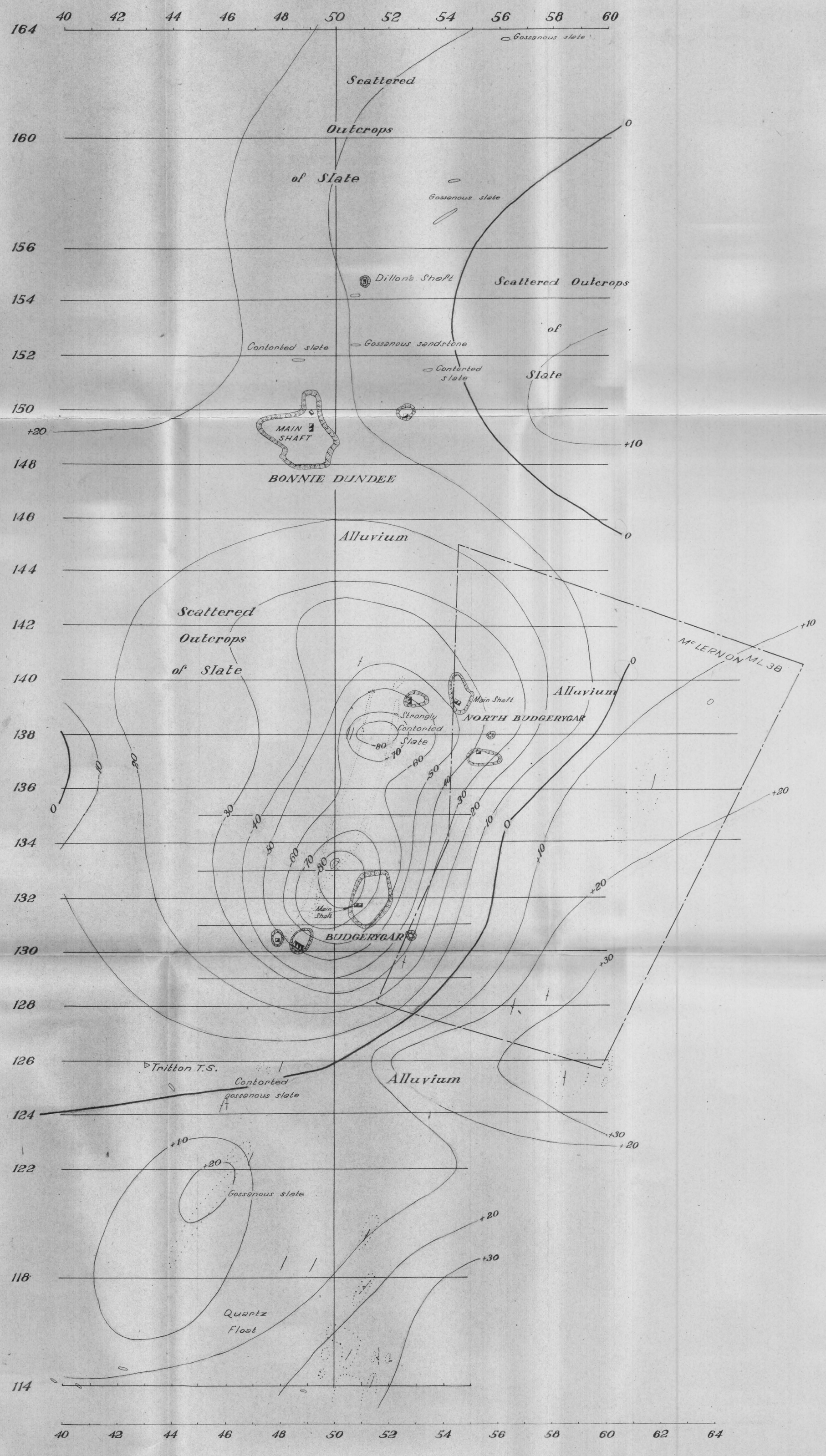


LEGEND

- Strike & Dip
- Joints
- Outcrops
- Residue Dumps
- Costeens
- —70— SP Contours

SCALE

200 0 200 400 FEET

A. J. Barlow.
Geophysicist
21-2-50

GEOPHYSICAL SURVEY AT HERMIDALE N.S.W.

# BUDGERYGAR MINE AREA

SHOWING

# SPONTANEOUS POLARISATION POTENTIAL CONTOURS

WITH

# GEOLOGICAL INFORMATION.

G.72–7

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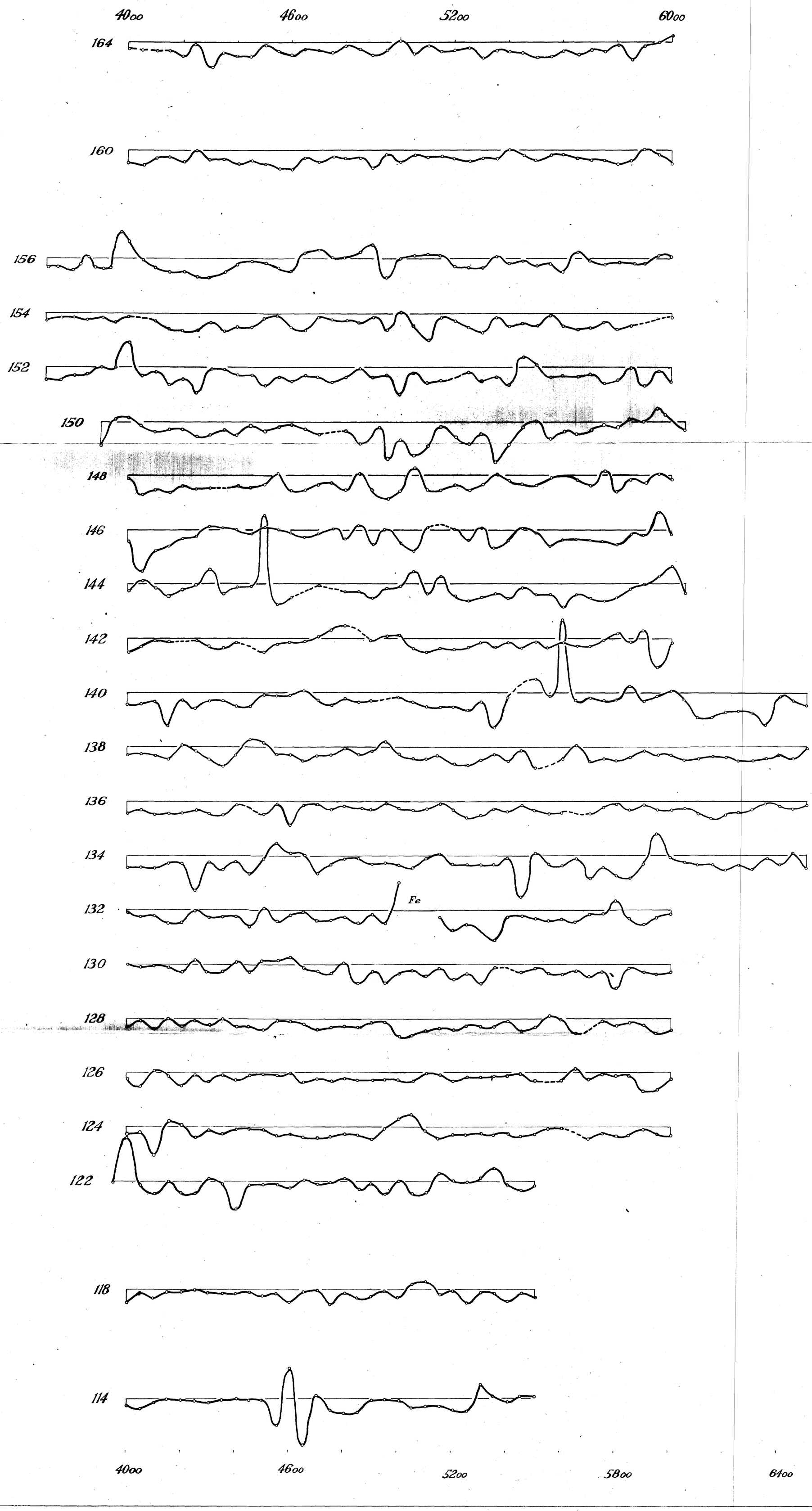


SCALES

Horizontal 200 0 200 400 600 Feet

Vertical 100 0 100 200 300 Gammas

A. J. Barlow.
Geophysicist
21-2-50

GEOPHYSICAL SURVEY AT HERMIDALE N.S.W.

# BUDGERYGAR MINE AREA

SHOWING

# GEOMAGNETIC VERTICAL FORCE PROFILES.

G.72-8

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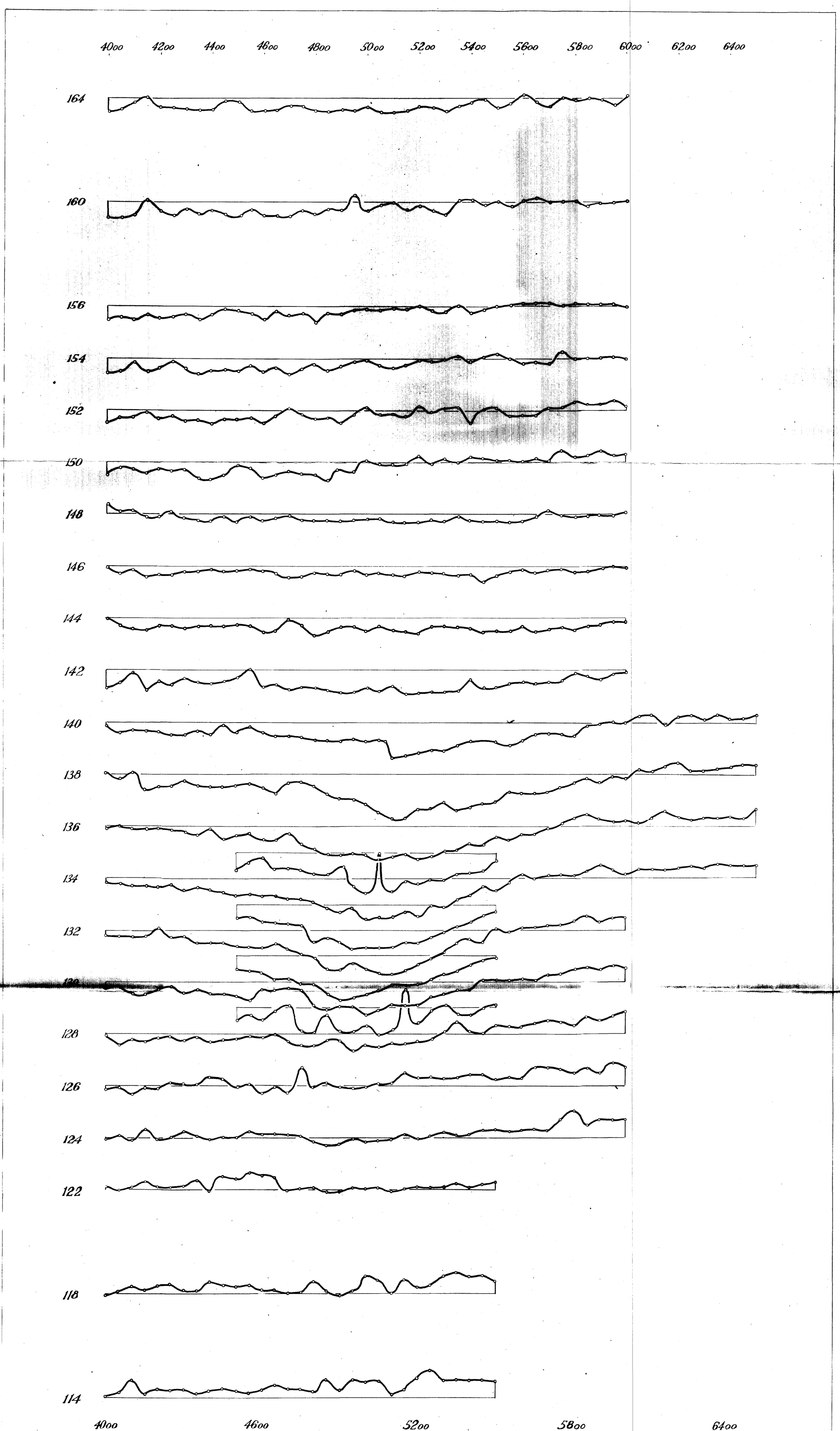


Horizontal 200 0 200 400 600 Feet
Vertical 100 0 100 200 300 Millivolts

A. J. Barlow
Geophysicist
21-2-50

# GEOPHYSICAL SURVEY AT HERMIDALE N.S.W.

## BUDGERYGAR MINE AREA

SHOWING

## SPONTANEOUS POLARISATION POTENTIAL PROFILES.

G.72-9

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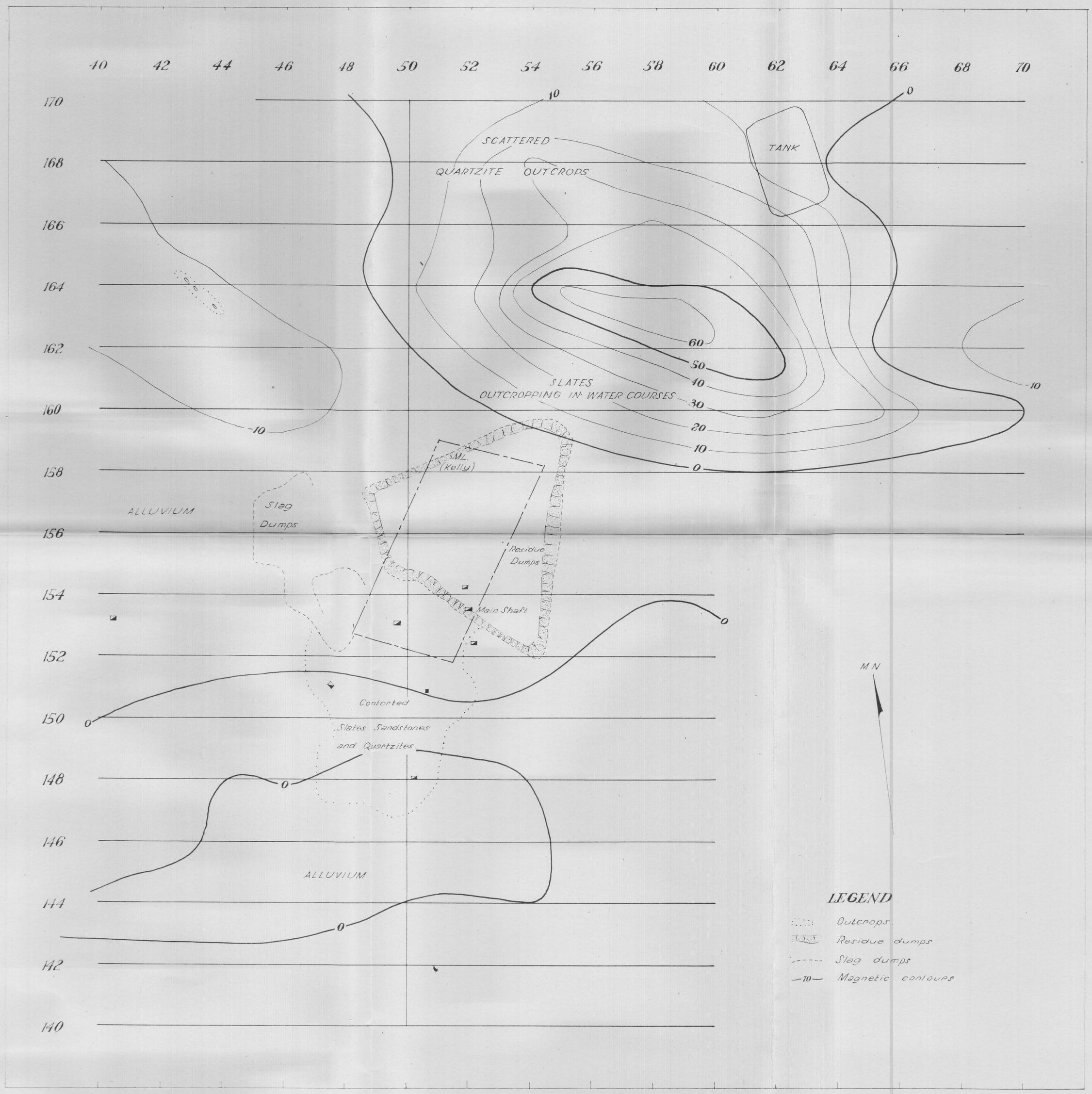



LEGEND

- Outcrops
- Residue dumps
- Slag dumps
- —10— Magnetic contours

SCALE

200 0 200 400 600

Contour Interval = 10 Gammas.

A. J. Barlow
Geophysicist
21-2-50

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics.

GEOPHYSICAL SURVEY AT GIRILAMBONE N.S.W.

GIRILAMBONE COPPER MINE AREA

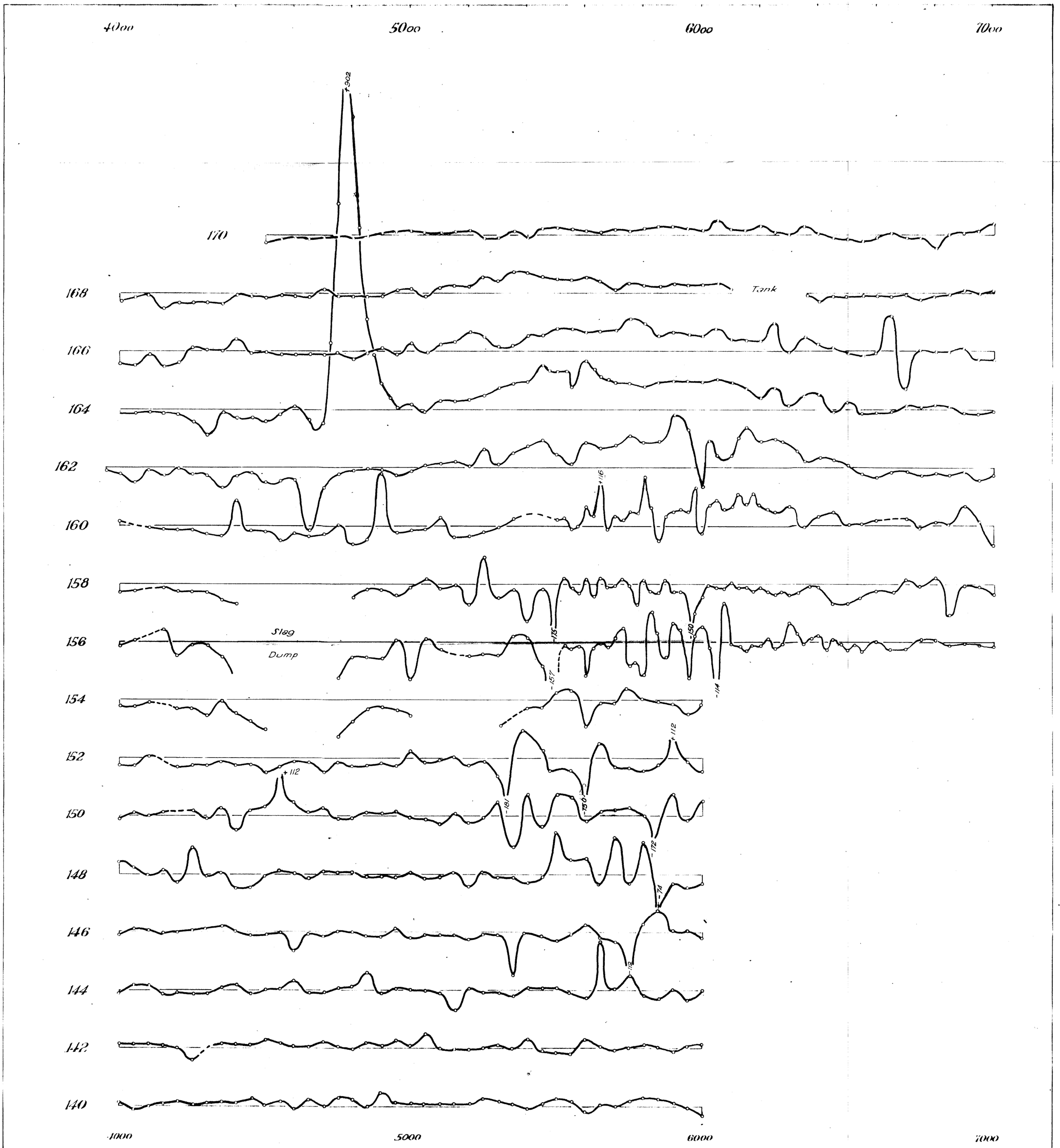
SHOWING

# GEOMAGNETIC VERTICAL FORCE CONTOURS

WITH

GEOLOGICAL INFORMATION

G.72—10

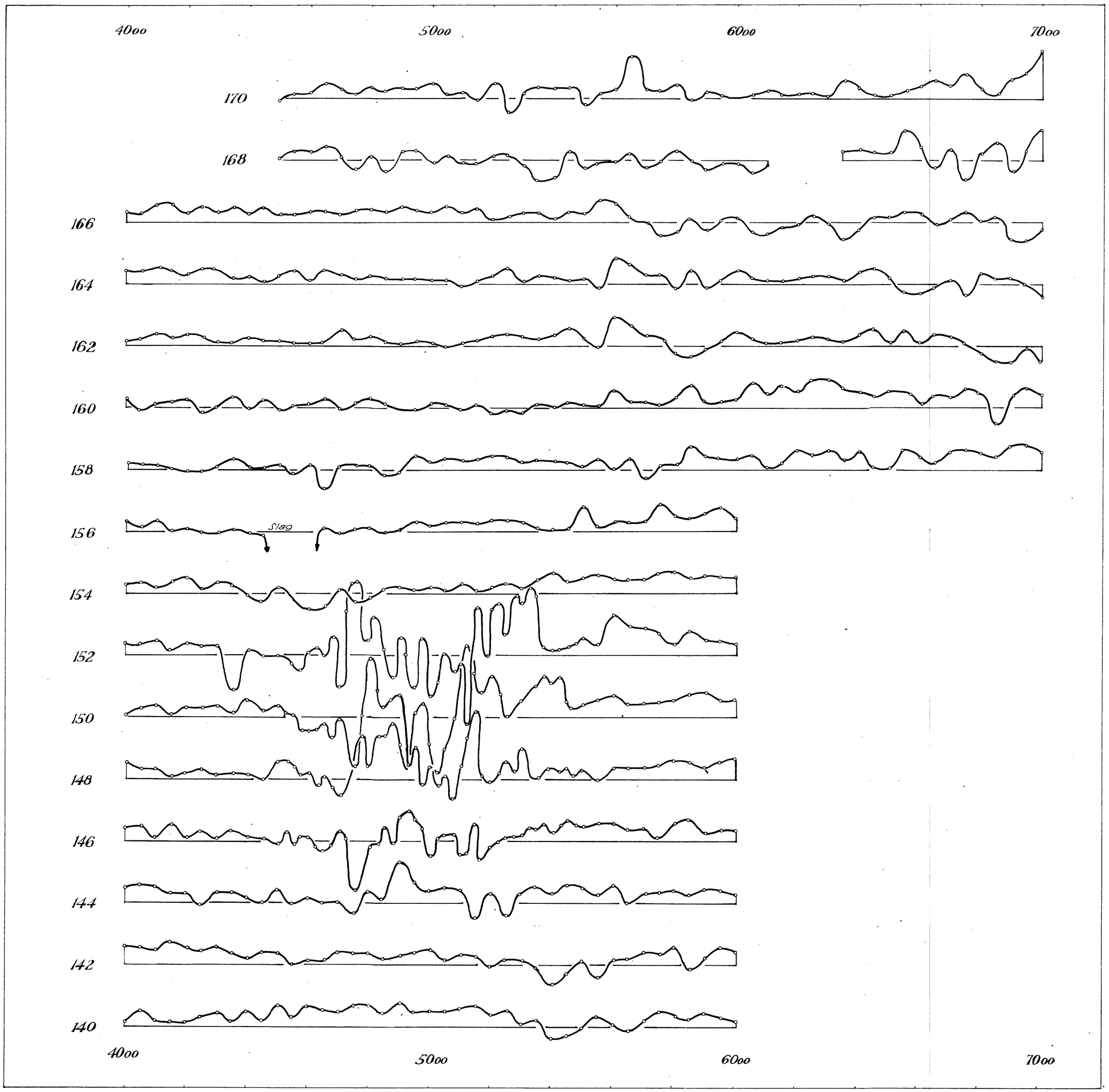



Horizontal 200 0 200 400 600 Feet
Vertical 100 0 100 200 300 Gammas

A. J. Coulson
Geophysicist
1972

# GEOPHYSICAL SURVEY AT GIRILAMBONE
# GIRILAMBONE COPPER MINE AREA
## SHOWING
# GEOMAGNETIC VERTICAL FORCE PROFILES.

G.72–11




SCALES

Horizontal 200 0 200 400 600 Feet

Vertical 100 0 100 200 300 Millivolts

A. J. Barlow
Geophysicist
21-2-50

GEOPHYSICAL SURVEY AT GIRILAMBONE N.S.W.

# GIRILAMBONE COPPER MINE AREA

SHOWING

# SPONTANEOUS POLARISATION POTENTIAL PROFILES.

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics G.72–12