RIO TINTO SOUTHERN PTY. LIMITED
MELBOURNE, AUSTRALIA.

PROJECT:— PRP/7/100/C

REPORT No.:— 39/1960

REPORT ON GEOLOGICAL INVESTIGATIONS AT THE HOWARD SOUTHERN ANOMALY, WEST TASMANIA.

by

D. King

06_5279

Report on Geological Investigations at the Howard Southern Anomaly, West Tasmania
Rio Tinto Southern Proprietary Limited*
King, D.

FILE REFERENCE:— 8D/20T

MAP REFERENCE:—

DATE:— 29/11/60.

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C O N T E N T S

P L A N S

		Scale
No. T.711	Geological Locality Plan Howard Southern Anomaly.	1" to 1 mile
" T.712	Detailed Geological Plan and Section Howard Southern Anomaly.	400' to 1"

PREVIOUS REPORTS

J. Boniwell, May 1959. Geophysical Surveys Howard, Tasmania.
E. Muceniekas, May 1960. Geochemical Investigations, Howard Area. (Note Southern Anomaly described as Zone No. 1).

PREVIOUS PLANS

			Scale
	No. T.415	Geology, L. Julia, L. Huntley, Howard Area.	20 chns. to 1"
	" T.476	Lines of Equal Phase Difference, Howard Area.	400' to 1"
	" T.477	Magnetic Contours, Howard Area.	400' to 1"
	" T.479	Equi-Ratio Contours, Howard Area	400' to 1"
	" T.585	Bouguer Gravity Profiles, Howard Area.	400' to 1"
X	" T.586	Residual Gravity Contours, Howard Area.	400' to 1"
X	" T.587	Topographic Contours, Howard Area	400' to 1"

X Refer only to Eastern Anomaly.

INTRODUCTION

Geophysical surveys were undertaken at Howard during the period 26th February to 14th April, 1958, following recommendation based on regional geological mapping completed in January 1958 by D. King. Several parallel conductors were identified by Turam survey. Geochemical follow up work in April 1958 revealed indications of mineralization along the zone described in this report as the Southern Anomaly, and particularly high values for lead and zinc were recorded from an area of gossanous exposures just west of the anomaly at 6000S, 1400W. R.B. Fraser commenced detailed geological mapping at Howard in April 1958, but transferred to Gooseneck before completing the Howard work because of greater importance being assigned to an anomaly found at Gooseneck. Gravity surveys were conducted over Howard anomalies in May 1958 (Southern Anomaly) and January 1959.

A geological inspection of the Southern Anomaly area was carried out with the assistance of F. Finn during 14th-17th November, 1960. The results of the examination are considered sufficiently encouraging to warrant continuance of investigations and all evidences to be considered in planning future work are recorded in this report.

LOCATION AND ACCESS

Howard is the name given to the plateau lying between the Mt. Tyndall conglomerate range and the Henty River gorge, about 9 miles due north of Mt. Lyell and 10 miles south of Rosebery. The most easterly portion of this area, comprising a north south strip up to one mile wide, is open button grass country, while the western section is covered by dense rain forest. The Southern Anomaly is within the rain forest belt, from 500 to 1000 feet west of the clearing.

Overland access involves a five hour hike from either the Hercules Mine via the largely overgrown old pack track to Queenstown, or by following the power line north from Lake Margaret settlement. R.J. Howard's timber workings (Badger Ck.) are only four miles south-west of the area of interest, but the intervening Henty River gorge makes this an impracticable way of access.

Rio Tinto parties have previously relied on helicopter transport in carrying out surveys in the area. The only possible route for pack-horses would be from Lake Margaret and would be extremely difficult.

A tent and basic equipment for two has been left erected at the old camp site No. 3 (Plan No. T.712) in anticipation of additional geological work this season.

GENERAL GEOLOGY

The regional geological setting of the Howard area is illustrated in the accompanying geological locality map (Plan No. T.711). The main area of interest comprises the belt of volcanic rocks which are bordered to the west by an older Cambrian sedimentary sequence and to the east by the Owen Conglomerate of Mt. Tyndall. The volcanic rocks occupy a similar stratigraphic position as the volcanic host rocks of the Mt. Lyell and Rosebery-Hercules Mines. The contact of the volcanics and the Owen Conglomerate marks a line of violent faulting which extends northerly from near Mt. Lyell (see section Plan No. T.712) and is considered to reflect an older line of weakness approximating in position with the northern extension of the Lyell Shear (or Owen Rift Fault).

In the area covered by the geophysical grid (main baseline only, Plan No. T.712), the volcanic rocks are well exposed in portions of the clear plateau between the Owen Conglomerate to within 400 feet west of the baseline. Here the volcanics consist essentially of massive porphyroidal lavas (flows) interlayered with similarly massive agglomerates and coarse tuffs, in places showing bedding trending consistently about 350 degrees (true) and dipping easterly about 80 degrees. One well defined band of agglomerates can be traced following the baseline from 400 south to 5600 south (Plan T.712). There is very little shearing or fracturing in the volcanics in this part of the surveyed area.

Towards the western extremity of the grid lines there are small outcrops of highly schistose volcanics in densely forested terrain. The best exposures of the schists were seen in the southern tributary of Newton Creek (Plan T.712), between co-ords. 3600S, 1400W and 6400S, 1500W, where the course of the gully has evidently followed a zone of major shearing trending about 350 degrees true. Half a mile along strike to the north, similar schists are also exposed in a few places just westerly of the old Tyndall Mine (described below). The Southern Anomaly and the Tyndall Mine Anomaly were recorded in these schist zones.

OLD MINE WORKINGS

The old workings known as the Tyndall Mine are situated at approximately grid co-ordinates 200S, 1550W. W.H. Twelvetrees gave the following description of the mine in a report dated 27/10/1900 (Sec. for Mines, Tas., 1900-1, pp. 103-105).

> "A large quartz lode, carrying clean galena, blende, copper and iron pyrites, crosses a creek in a direction N.15 degrees West, and dipping N.E. Its exposed width is about a chain, including bands of the quartz felsite rock interstratified with it. It has been trenched for about 300 feet along its course.
>
> A north shaft has been sunk on the east side of the creek, at the 60 ft. level a cross-cut is going west through the lode, showing some galena and copper pyrites. Another shaft, 230 feet south of the previous one, has been sunk 38 feet, and a cross-cut west into schist intersected a little galena and copper ore. From my observations of the mineral deposits of this zone, I believe, notwithstanding the handsome galena ore which has come from the Tyndall lode, that the main mineral will be copper pyrites".

These workings are now largely overgrown with scrub and have not been examined in detail by our Company. Dr. Campana and the writer found portion of the workings (probably the north shaft) in 1958 and the presence of large pieces of clean galena on the dump partly influenced us in selecting the area for a geophysical survey.

Other old prospecting pits in mineralized schists carrying chalcopyrite have been mapped about half a mile N.W. of the Tyndall Mine, beyond the limits of the area covered by the detailed mapping (Plan T.712). The workings are shown on previous plan No. T.415.

DETAILED OBSERVATIONS, SOUTHERN ANOMALY

The Southern Anomaly is a conducting body 4,000 feet long which closely follows the course of the Southern Tributary of Newton Creek between grid co-ordinate extremities 2400S, 1050W and 6400S, 1650W. The anomaly is open to the south beyond line 6400S, which is the limit of the area surveyed geophysically. The phase differences recorded were highest on lines 3200-4400S inclusive and on lines 6000 and 6400S (Plan No. T.476).

It has to be understood that the baseline and traverses have not been surveyed and that the plans showing the geophysical stations and results are idealized. The accompanying plan (T.712) was compiled from an enlarged aerial photograph at the scale of 400 ft. to 1 inch. The baseline is shown in its true position as mapped on the photograph. The position of the anomaly and other nearby points of interest are shown in mapped position related to the nearby creek (Southern Tributary), one of the few features that can be identified in the photograph of the anomaly area. Thus Plan T.712 shows the corrected position of the anomaly on the ground, while the co-ordinates given in this report are the same as adopted for the geophysical survey.

Small outcrops and residual rock fragments were found in the vicinity of the anomaly on five lines, namely 3600S, 4400S, 4800S, 5200S and 6000S, and consist of stressed chloritic volcanics and slatey schists (4400S, 1150W) accompanied by quartz veins and masses of red ferruginous chert. Similar schists are also exposed in the creek on line 4000S. Thus the anomaly can be related to a zone of poorly outcropping and highly sheared volcanic rocks and possibly slates along which there are indications of some introduced mineralization. The schistosity strikes about 350 degrees and usually dips 70-80 degrees east, which is consistent with the trend and inferred dip of the anomaly (Boniwell, 1959). Gossan sample No. 4 from location 3600S, 1250W, about 100 ft. downhill from the anomaly revealed 0.12% copper by chemical assay (see assay results below).

The schists as a whole are in marked contrast to the pale coloured and massive volcanics occurring nearer the baseline.

Numerous fragments of brick red ferruginous chert, indicative of mineralization occur in clay at 4400S, 1370W, coinciding with a small peak in the equi-ratio contours (Plan No. T.479).

A deep red ferruginous clay carrying residual boulders of gossan occurs over a width of about 100 feet on line 6000S, centred at 1420W, where high lead (1.5%) and zinc (0.5%) values were reported by our geochemist. Some of the gossan contains disseminations of fine grained hematite (which at first I mistook to be galena), but chemical assays disclosed only traces of copper and no lead or zinc (samples Nos. 1 and 2 below). The width and general appearance of this capping is impressive and deserves more detailed examination. It is located 150 feet east of the Southern Anomaly but is close to a small magnetic high centred at 6000S, 1450W, which is assumed to pin-point the main sub-surface occurrence of the mineralized body (Plan T.477). Another weak magnetic high occurs on the next line south at 6400S, 1475W, but there are no outcrops at this point. A magnetic high at 4800S, 1325W has not as yet been checked geologically.

A total of eight samples from along or near the Southern Anomaly were chemically analysed for base metal contents in the E.Z. Coy. mine assay laboratory. The following are descriptions of the analysed samples and the results:-

Sample Descriptions

1. Hematitic gossan, residual in ferruginous clay, from 6000S, 1400W.

2. Hematitic siliceous lode rock, residual in ferruginous clay, 6000S, 1420W.

3. Yellow-brown ferruginous clay, possibly glacial, 4000S, 1450W.

4. Ferruginous gossan in clay, presumably residual 3600S, 1250W.

5. Brick red ferruginous chert in residual clay, 4400S, 1370W.

6. Hematitic schists, possibly mineralized. In creek at 5160S, 1200W.

7. Brick red ferruginous chert and gossan in schistose rock. Outcrop in creek at 5120S, 1200W.

8. Highly sheared siliceous rock, residual in clay, 4800S, 1100W.

Assay Results

Sample No.	% Cu	% Fe (Total)	% Pb	% Zn	Ozs/ton Ag	dwts/ton Au
1	.01	52.0	nil	nil	nil	nil
2	.01	39.0	"	"	0.08	< 0.1
3	.02	25.6	"	"	0.04	< 0.1
4	.12	10.6	"	"	0.72	< 0.1
5	.01	26.6	"	"	0.14	nil
6	nil	7.8	"	"	0.09	"
7	.07	9.0	"	"	4.22	< 0.1
8	nil	7.2	"	"	0.16	nil

Sample No. 1 also showed 15.8% barium sulphate by chemical assay. This is considered to be highly significant as barytes is an important gangue mineral at Mt. Lyell, Hercules and Rosebery Mines.

OTHER ANOMALIES

There are several other Turam anomalies west and north of the Tyndall Mine which are approximately along the northern strike of the Southern Anomaly. These are also known to lie within the volcanic formations and more detailed studies are required.

The Eastern Anomaly (Plan No. T.712, plan and section) was recorded in clear country trending north-south near the faulted contact of the Owen Conglomerate of Mt. Tyndall and massive volcanics. At the northern end (2800-3200S), the anomalous zone coincides with outcropping and apparently unmineralized volcanic rocks, and is about 200 feet west of the presumed position of the fault. The remaining part of the anomaly is in an area covered by scree and glacial deposits. It has been questioned whether the anomaly may mark mineralization along the major fault, although none of the other post-Ordovician faults in this locality are mineralized. There is nothing to be gained from further/geological work in this area.

surface

CONCLUSIONS AND RECOMMENDATIONS

At the Southern Anomaly there are hematitic and barytic gossan exposures with some evidence of copper mineralization (and lead-zinc determined geochemically) in sheared volcanic rocks of a favourable type, along the northerly strike of which are the old Tyndall Cu-Pb-Zn mine workings. It is therefore recommended that we should plan to carry out more intensive geological investigations in this area, and the following is a summary of work which is considered to be required before considering any other means of testing:

1. Additional geological observations at the Southern Anomaly, including close checking of the densely forested ground between the grid lines.

2. As the Southern Anomaly is open to the south, and the best surface indications are at the south end, it will be desirable to extend geological work beyond the limit of the area surveyed geophysically.

3. Detailed examination of the old Mt. Tyndall Mine workings.

4. Trenching across the hematitic gossan and ferruginous clay at 6000S, 1400W, and possibly in other areas after completion of items 1 and 2. The dense vegetation would make trenching difficult but surface water would not be a problem because of the relief of the ground.

5. Detailed inspections have also to be carried out at anomalous areas (Turam) west and north of the Tyndall Mine.

29th November, 1960.

D. King,
Geologist.

Rosebery Schists

"Rosebery Mine"

"Stirling Valley Mine"

Mt. Murchison

JUPITER FAULT

HENTY FAULT

Hercules Schists

"Hercules Mine"

Mt. Read

Gooseneck Schists

"Gooseneck Prospect"

Old Pack Track

"White Spur Prospect"

L. WESTWOOD

L. JULIA

Mt. Dundas

"Tyndall Mine"

Mt. Tyndall

HOWARD SOUTHERN ANOMALY

Coleman's Old Pack Track

Howard's Timber Tram

Henty River

Track

Pack

LAKE MARGARET

LAKE MARGARET TOWNSHIP

Mt. Sedgwick

WEST SEDGWICK ANOMALY

"Comstock"

MT. LYELL

Lyell Schists

"North Lyell"

LEGEND

ORDOVICIAN

Owen Conglomerate and Jukes Breccia of West Coast Range

CAMBRIAN

Massive volcanics, flows and pyroclastics

Mineralised slatey sediments within volcanics

Basal sedimentary sequence

Geophysical Anomaly

5 cm

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FIG 1

RIO TINTO SOUTHERN PTY. LTD.

Geological locality Plan

HOWARD SOUTHERN ANOMALY

WEST TASMANIA

SCALE : 1 INCH TO 1 MILE	DATE : 21-11-'60
Geologist: D. King	T. 711

Tyndall Mine

TYNDALL ANOMALY

Camp

Newton Creek

Camp

Southern Tributary Creek

BASELINE

MAIN

POWER LINE

EASTERN ANOMALY

SOUTHERN ANOMALY

Camp

400S
800S
1200S
1600S
2000S
2400S
2800S
3200S
3600S
4000S
4400S
4800S
5200S
5600S
6000S
6400S

1400W
1300W
1400W
1100W
1200W
1200W
1500W

T.N

REFERENCE

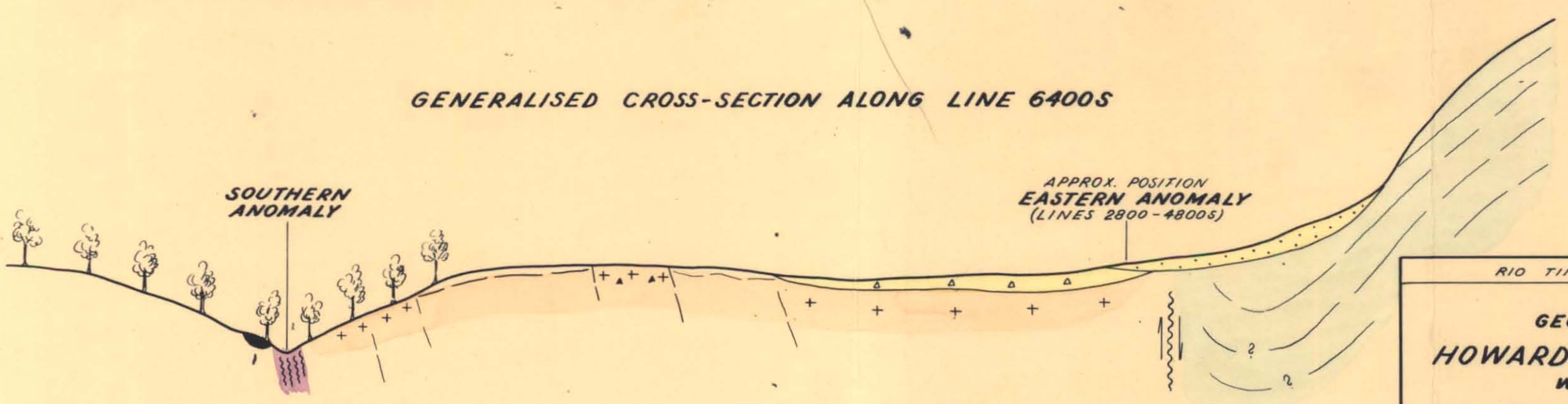
QUATERNARY
- SCREE
- GLACIAL MORAINE

ORDOVICIAN
- OWEN CONGLOMERATE
- JUKES BRECCIA

CAMBRIAN
- MASSIVE PORPHYROIDAL LAVAS
- AGGLOMERATE AND TUFF
- SHEARED VOLCANICS, CHLORITIC

- GOSSAN
- FERRUGINOUS CHERT
- STRIKE AND DIP OF BEDDING
- STRIKE AND DIP OF SCHISTOSITY
- ANOMALY (TURAM, PHASE DIFF.)
- MAGNETIC HIGH (S. ANOMALY)
- ② LOCATION OF SAMPLES
- EASTERN MARGIN OF FOREST
- OBSERVED STATION PEGS IN CORRECT RELATION TO CREEK (STH. TRIBUTARY). HORIZONTAL DISTANCE BETWEEN PEGS APPROXIMATELY 100 feet.

GENERALISED CROSS-SECTION ALONG LINE 6400S



5 cm

06-5279

RIO TINTO SOUTHERN PTY. LTD.

GEOLOGICAL PLAN

HOWARD SOUTHERN ANOMALY

WEST TASMANIA

D. King, 25-11-60	SCALE: 400' — 1"	PRP/7/100/C	PLAN Nº T 712