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PRELIMINARY REPORT ON THE REGIONAL
GEOLOGY AND MINERALISATION OF THE
RENNISON BELL PROSPECTING AREA, WESTERN TASMANIA

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C O N T E N T S

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FIG. 1 - Geological Section between Rennison Bell & Rosebery

1. INTRODUCTION

This report summarises the findings of a regional reconnaissance of the Renison Bell Special Prospecting area, undertaken during the period 18th to 28th February, 1957.

The primary objective of this survey was to establish ore reserve potentialities of outlying areas in the Renison Bell property, with particular attention to the possibilities of a wider application of geologic mineralisation controls revealed by detailed mapping in the productive area. Field investigations along these lines were chiefly confined to the southern portion of the S.P.L., in the vicinity of Pine Hill and Commonwealth Hill; however, a brief survey was also made of the northern section by Geologist A.B. Clark.

The data presented in the report should be considered as supplementary only to the more comprehensive reports of previous investigators, viz. Ward (1909), Fisher (1943) and Hills (1952)

2. CONCLUSIONS & RECOMMENDATIONS

A preliminary survey of undeveloped areas in the Renison Bell S.P.L. has failed to disclose any tin-bearing sulphide bodies that could be relied upon to provide additional ore reserves.

However, three discarded occurrences of massive sulphide mineralisation, of possibly large dimensions, were observed about Pine Hill, all of which would justify detailed geological and ground geophysical work if a thorough appraisal of the property is required. These are -

(a) An extensive area of gossan proved to cap stanniferous sulphide at the Karlson-Riley workings.

(b) An outcrop of stanniferous sulphide on the northern slope of Pine Hill.

(c) A small sulphide exposure on the eastern slope of Commonwealth Hill, lying near the centres of aeromagnetic and airborne E.M. anomalies.

3. REGIONAL GEOLOGY AND MINERALISATION CONTROLS

A. Stratigraphy

The ore deposits of Renison Bell lie within a Cambrian (Dundas Group) sequence which locally is represented by the four following formations :-

1. The uppermost beds known as the Brewery Junction Slate and Tuff. At Renison Bell, these are represented by upwards of 1,000 feet of poorly-bedded and typically buff-coloured tuffaceous mudstones.

2. The Razorback Conglomerate (or agglomerate) measuring from 100-200 feet in thickness, and represented in the mine area by fine-grained, red agglomeratic sandstone and shaley partings. Locally known as the "red rock."

3. Renison Bell Slates : This formation comprises about 600 feet of bluish-grey, laminated slates and siltstones, which are increasingly dense and siliceous towards the base.

4. Dalcoath Quartzite; represented by several hundred feet of pale grey, laminated quartzite and white, friable sandstone-quartzite.

In the mine area, the largest and most consistent of the Renison Bell ore-bodies (e.g. Battery Workings) are sill-like replacements (or floors) occurring without exception in the uppermost laminated section of the Renison Bell slates. The reality of this stratigraphic control is emphasised by the distinctive colour and lithology of the "red rock" formation which overlies the ore-bodies, and by the repetition of similar stanniferous sulphide mineralisation in the same environment at more distant localities - e.g. the Grand Prize and Razorback Mines, 4 to 5 miles south of Renison Bell (see Plate 3 - J.H. Rattigan's Report)

B. Structure

The mineral-bearing sedimentary sequence described above trends N.N.W. across the Renison Bell property with a shallow easterly dip, comprising on a regional scale the western limb of a broad, north-pitching syncline. The same sequence occurs on the eastern limb of this structure near Rosebery (Text Fig.1) The regional syncline is dislocated by a series of steeply dipping step faults, directed N.N.W. parallel to the fold axis. The faulting is repeated at regular intervals and appears to have developed as a substitute for fracture cleavage.

At Renison Bell, the N.N.W. faulting has provided the feeder channels along which mineralisation has entered the favourable horizons described above (3(a)), while the fault fissures are themselves sporadically mineralised and, in places (e.g. Federal Cut), sizable ore-bodies are developed within the fault zones. This form of mineralisation has occurred irrespective of stratigraphic level.

Tin mineralisation is also evident in similar fault fissures to the east of Renison Bell, at the Exe Prop. Mine and Salmon's Mine (both now abandoned).

C. Intrusives

Beyond the main mining area, the Cambrian sediments are intruded by extensive bosses of basic igneous rock, essentially of gabbroic composition, and, in turn, by smaller bosses and dykes of quartz-tourmaline porphyry, and dolerite.

The influence of these igneous rocks on the distribution of mineralisation requires brief comment.

1. In the southern portion of the S.P.L., there are several instances in which tin-bearing sulphide mineralisation has favoured the margin of gabbro intrusives. This applies particularly at the Karlson-Riley show, and is possibly important in the cases of the Grand Prize and Razorback Mines.

2. The porphyry of Pine Hill would seem to be the logical source of the tin (? and sulphides), particularly as similar rock is also intimately associated with the deposits of Mt. Bischoff. Despite this possible genetic relationship, the distribution of the porphyry outcrops does not appear in any way significant as an indication of lode tin mineralisation.

4. APPRAISAL OF THE PINE HILL AREA.

The Pine Hill area, lying immediately to the south of the Renison Bell mines, has received considerable attention in the past by tin prospectors, and was widely productive of alluvial tin by primitive sluicing methods. The discovery of the Gormanston (one ton) and other large cassiterite nuggets were followed by considerable unsuccessful activity in search of the parent ore-body.

A. Geologic Setting

In the whole of the area examined near Pine Hill, the bedrock consists of easterly-dipping, blue-grey siliceous slates and hornfels of the Renison Bell formation, intruded at the crest of Pine Hill by quartz-tourmaline porphyry, and elsewhere by small bodies of gabbro.

The southern slopes of Pine Hill comprise portion of a large gabbro intrusion following a discordant N.E.-S.W. trend across the whole of the mineralised belt.

It is inferred from the absence of the indicator "red rock" that the sedimentary sequence exposed is below the known favourable horizon for development of sill-type ore-bodies.

B. Evidence of Mineralisation

Observed mineralisation in the Pine Hill area may be classified into three categories which are outlined hereunder in order of importance :-

1. Sulphide Bodies :

(a) Karlson-Riley Prospect. These are old workings located one mile south-east of the Battery Workings, and $\frac{1}{4}$ mile west of the Ring River. Mineralisation is indicated at the surface by heavy ferruginous gossan exposed over 100 yard width in the Boulder water race, and 200 yards north-east of the race at the site of the old workings.

The gossan follows the contact of a large gabbro intrusive into slates and siltstones of the Renison Bell type. The gossan was worked in a small way for its tin values, but massive sulphides encountered in exploratory adits and seen on the dumps were discarded because of treatment difficulties.

The nature and extent of the gossan can be regarded as a likely indication of a large sulphide ore-body.

(b) Northern Slope of Pine Hill - A small exposure of sulphides has been uncovered by alluvial workings in porphyry talus on the northern slope of Pine Hill, about 100 yards north of Auberries Workings (porphyry type). Almost complete replacement by pyrrhotite-marcasite mineralisation occurs over an outcrop area of some 10 square yards, while the wall rock consisting of highly shattered slate is showing on the eastern side of the exposure.

The general attitude of the body appears to be flat, resembling the floor-type deposits of the main workings.

(c) Commonwealth Hill - Massive sulphide was observed in a fissure-type lode about 3 feet wide on the eastern slope of Commonwealth Hill, where the country rock is dark grey siltstone. Aeromagnetic and airborne E.M. anomalies are located in this vicinity.

2. Mineralised Fault Zones :

(a) West Pine Hill (Kapi Fault) A wide zone of brecciated and limonitic slates outcrop on the saddle between Pine Hill and Commonwealth Hill. This outcrop has been prospected by an adit from a northern approach, which is reported to have intersected 60 feet of tin-bearing "decomposed slate and gossan."

(b) Gormanston Creek : A well-defined N.W.-S.E. fault zone follows the power line on the eastern bank of Gormanston Creek.

In the Lower section of the Gormanston valley, the fault is marked by limonitic slates and limonitic gossan exposed over a length of several hundred yards, along the power line track and in the Boulder water race.

In the upper Gormanston Creek, garnet and actinolite are developed along the line of faulting; Kitto's Workings consisting of a deep cut and adit indicated some weak tin mineralisation in this area.

(c) Confidence Saddle : A bold outcrop of gossanous (quartz-limonite) breccia occurs 10 chains to the north of Confidence Saddle, and can be followed for several hundred yards in a north-easterly direction. An adit has tested the fault zone over a length of 96 feet, yielding broken, limonitic and siliceous slate, which look favourable for tin mineralisation. A sample of the gossanous outcrop has been taken for assay.

3. Mineralisation in Porphyry

(a) Penzance (Pine Hill): High up on the southern slope of Pine Hill, the old Penzance Coy. open cuts expose quartz-tourmaline porphyry stringers in shattered slate. These yielded a small production of tin.

On the northern crest of Pine Hill, two adits were driven southerly into indurated slate and porphyry; narrow tin-bearing veins are reported to have been found in these workings, but no indication of any important mineralisation can be seen in the dump material.

A few chains westward of the adits, vein tin was obtained in fractured porphyry at Auberries Cuts.

Another adit (fallen in) has explored the western side of Pine Hill, and similarly revealed sporadic vein mineralisation in slates adjacent to the porphyry.

(b) Abel's Workings : These workings are situated on the steep eastern bank of the Penzance Creek, $\frac{1}{2}$ mile south-east of the Dalcoath Cut. Cassiterite was produced from narrow veins in slate, at the contact with a dyke of quartz porphyry.

(c) O'Dea's Lease : $\frac{1}{2}$ mile south of Dalcoath Cut. Tin-bearing pyritic veins occur in fractured slate and gabbro, which are intruded by small dykes of quartz porphyry. A southerly directed adit disclosed only sporadic narrow stringers of sulphide.

5. RESULTS OF AIRBORNE SURVEYS

The area embraced by the Renison Bell S.P.L. has been completely covered by recent airborne magnetometer survey and helicopter-borne E.M. survey. Both of these techniques yielded

anomalous recordings over some of the exposed sulphide ore-bodies, but only a few of the other anomalies can be related to possible mineralisation.

(a) Aeromagnetic Anomalies :

Seven anomaly peaks were recorded and their positions shown on the accompanying map. (See Plate 1)

1. North of Pieman River.
2. East of Ring River.
3. Near Federal Cut
4. Renison Bell Hill
5. East side of Commonwealth Hill
6. East side of Pine Hill
7. Serpentine Hill.

Nos. 1, 2, 6 and 7 are located in areas of magnetic gabbro.

No. 3 and 4 correspond with known pyrrhotite ore-bodies; No. 4 confirms an earlier B.M.R. ground magnetic result.

No. 5 is an interesting anomaly on the eastern side of Commonwealth Hill, closely corresponding in position with an observed occurrence of sulphide (4.1(c) above) within slate bedrock.

(b) E.M. Anomalies :

The E.M. survey indicated numerous small anomalies in the area of existing mine workings, and in addition the following spot anomalies in outlying areas.

No. 26 - The highest order anomaly recorded in the area, and located near the crest of Commonwealth Hill, within a few hundred yards of sulphide mineralisation near aeromagnetic anomaly No. 5.

Nos. 30, 31, 32 and 33 :- are located in gabbro, south of Pine Hill, and have not been checked on the ground. No. 23, on the eastern side of the Ring River, has been observed to occur in gabbro.

Nos. 27 and 29 :- are located on Pine Hill. No. 29 is directly over the Penzance open cut in weakly mineralised porphyry, while 27 is in poorly exposed slate country on the N.E. flank of Commonwealth Hill.

Nos. 13, 15, 17, 47, 48 and 49 :- are clustered about an area of gabbro two miles N.E. of Renison Bell. Stanniferous sulphide mineralisation occurs as narrow fissure fillings a few hundred yards east of this anomalous area.

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