

UR1951/176-184

LEASE No. 11708/M - W.F.THOMAS - ZEEHAN.Location.

This 50 acres lease is situated in West Zeehan and covers portion of the Argent Flat between Manganese Hill and Queen Hill. In the period before the First World War the area contained portions of leases held by the Mount Zeehan (Tasmania) Silver Lead Mines.

Previous Investigations.

The lease has been examined in 1943 by H.G.W.Keid, Government Geologist. A further brief examination was made in 1950 by B.L.Taylor.

Topography.

The Argent Creek flowing NE and following more or less the diagonal of the lease, forms the western limit of the Argent Flat. West of this creek the country rises to form the Queen Hill and adjacent hills and gullies. A strip of marshy land 1 to 3 chains wide is situated immediately E of the creek. East of this strip flattish higher ground is encountered.

Description of Workings.

The following workings have been surveyed and examined.

Warren's Adit No. 1. The workings in this adit include: Adit crosscut 220 ft long, No.1 Drive South 27 ft long, No.1 Drive North 42 ft long, No.2 Drive North 35 ft, No.2 Drive South 18 ft, No. 3 Drive North and South not surveyed. Cross cut 28 ft from No.1 Drive S to No.2 Drive S, extension No. 2 Drive S 72 ft. Winzes have been put down in No. 1 Drive N and in the extension of No.2 Drive S.

Warren's Adit No. 2. The workings in this tunnel consist of the adit cross cut driven in a general westerly direction and about 180 ft long. At 80 ft from the portal drives were put in following a faultplane for 25 ft in a northerly and southerly direction. At the end of the adit cross cut some overhand stoping and driving along a mineralized fault have been carried out.

Inglis Adit. The main feature is the adit drive of 90 ft running NNW, gradually bending westward and continuing for at least 320 ft. From the adit drive a crosscut of 57 ft has been driven in SW direction. In addition a number of short drives, not exceeding 12 ft, have been driven along structures encountered in the adit.

Main Workings. An adit has been driven in WNW direction with a length of 92 ft. From a point at 20 ft from the portal a crosscut of 66 ft has been driven in a southerly direction. In addition a winze has been sunk and a small excavation made, used as store.

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**Northern Adit.** The workings consist of an adit crosscut 144 ft long and running WSW, at the end of which a drive has been put in along a well pronounced fault plane, 60 ft northward and 20 ft southward.

**Pyrite Quarry.** This is an open cut 110 ft long and with an average width of 20 ft. The general direction is WNW.

**Trench.** This is a smaller open cut, 80 ft long, situated W of the Pyrite Quarry.

**Thomas's Shaft.** Only the top could be examined as the groundwater level occurs at 6 ft from the collar.

**Old Shaft.** This shaft has been sunk in slightly higher ground but groundwater is only 10 ft below the collar.

**New Trench.** This trench has been dug only recently to investigate a mineralized outcrop.

#### General Geology.

The rocks of the lease form part of the upper portion of the Pieman Group. The Argent Flat is composed of portion of the Read - Rosebery Volcanic Series which apparently overlies conformably the Nubeena Quartzites. These quartzites form the Queen Hill, portion of which forms the western side of the lease. Two northwest trending regional faults occur roughly a mile apart, respectively north and south of the lease. Two minor northwest trending faults occur within the boundaries of the lease. These faults occur respectively north and south of a conical hill (marked by trig station) located in the NW section of the lease. Their positions are marked by two small streams flowing into the Argent Creek. Numerous minor fractures trending NE occur. These are only visible in the workings and are described in the section on underground geology.

No evidence as to the age of the host rocks has been adduced during the present investigation. General work in the Zeehan area indicates, however, that the rocks are of Cambrian age.

#### Underground Geology.

**Warren's Adit No. 1.** From the portal grey and brown partly decomposed slates are encountered for a distance of 70 ft from the entrance. The slates are followed by quartzites; their contact is a fault striking NE and dipping vertically. The quartzite strikes NNE and dips at 35° to the E. At 120 ft from the portal a fault occurs beyond which a section of slates commences, continuing for 38 ft to be cut by another fault. West of this second fault the country is again quartzite.

The faultplanes cutting the adit crosscut have been followed north and south. Both faults are sinuous in form, their general strike is NE and dips varying from 64° NE to vertical.

The only exposures of metal occur in No. 2 drive S. and N. of the adit crosscut. Galena occurs as a small lens 3 inches wide on the floor of No. 2 South

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drive and as blebs irregularly distributed over the southern face of the drive. In No. 2 drive N galena occurs in a crossvein 1 inch wide striking N and dipping at  $72^{\circ}$  to E.

The quartzite encountered in the adit is grey to darkgrey medium to fine grained.

Warren's Adit No. 2. The first 55 ft of the adit crosscut has been driven through dark slate, striking N and dipping at  $63^{\circ}$  to E. This section of slate is crossed by two parallel faults striking NW and dipping at  $67^{\circ}$  to  $74^{\circ}$  to NE. The second fault forms the contact with quartzite which extends through the western parts of the workings. The main structural features are two well pronounced faultplanes. The first one is intersected at 85 ft from the portal, strikes NS and dips at  $62^{\circ}$  to E. Although the faultpug and crushed material are ironstained, no metal was visible. The second fault strikes NW dips at  $70^{\circ}$  to NE. This fault carries a galena vein of 1 inch wide which apparently peters out in the SE prospect drive.

Strikes of the quartzite vary from W to SW and from  $41^{\circ}$  to  $78^{\circ}$  to S. A small anticline pitching eastward occurs E of the second fault.

The two principal faults exposed in this adit are evidently the northern extensions of the first two main faults in Warren's Adit No. 1. - Inglis Adit. The first part of the adit has been driven along a zone of faulting for about 85 ft. The country has been much shattered on either side of the adit. The faultplane in this zone can be followed from the west wall of the adit at the portal gradually crossing to the east wall. The country rock consists of slates E of the fault and of quartzite on the W. The fault strikes NNW with varying dips from  $68^{\circ}$  to  $80^{\circ}$  to E.

In the bend a small fault occurs striking NNW and dipping steeply to E. A few feet W of it a narrow mineralized vein occurs in the N wall carrying some galena only  $\frac{1}{4}$  inch wide. At 150 ft from the portal a fault occurs striking NW and dipping at  $60^{\circ}$  to NE. Between this fault and the first fault at the entrance of the adit, the country rock consists of quartzite with strikes varying between WNW and NW and dips of  $50^{\circ}$  to NE.

The quartzite is followed by slates, with strike in general parallel to the adit and with very steep dips. The slate has been penetrated over a distance of 110 ft and has its western limit marked by a faultcontact with shale. This fault strikes NNW and dips at  $64^{\circ}$  to W. The shale has a general EW strike and steep dips; it extends for at least 158 ft. The shale is very light grey and rather soft.

The end of the adit could not be reached owing to water accumulation.

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**Mainworkings.** These workings are situated entirely in dark slate striking NW and dipping at  $73^{\circ}$  to NE. Three faults occur in the adit. The first one strikes nearly N and dips vertically. The second fault strikes NW and dips at  $66^{\circ}$  to NE. An irregular and broken quartzlens, 2 ft wide and containing some pyrite is associated with this fault.

Towards the end of the adit a fault occurs striking WNW and dipping at  $30^{\circ}$  to N. At a distance of 78 ft from the portal a winze has been put down for 50 ft and a drift put off to the E. This winze was full of water and could not be examined.

**Northern Adit.** Slates have been penetrated over a distance of 95 ft in this adit. The section has exposed four faults, 3 small ones while the fourth is one of considerable magnitude. The first fault strikes NE and dips at  $45^{\circ}$  to E, the second and third are running parallel; they strike NNW and dip at  $67^{\circ}$  and  $52^{\circ}$  respectively to E. The fourth fault has a zone containing pug 2 ft wide and shows evidence of crushing. This fault strikes NNW, dips at  $72^{\circ}$  to E. It forms the western limit of the slate which strikes nearly N and dips steeply to E.

The balance of the adit has been driven through quartzite with ENE to NE strikes and dips varying from  $66^{\circ}$  to  $72^{\circ}$  to E. At the end of the adit a well pronounced vertical fault-plane occurs striking NNW.

**Pyrite Quarry.** This quarry is situated in the NE corner of the lease and has been worked in previous years for its pyrite contents. The cut has a length of about 110 ft and runs in a westerly direction. Its average width is 20 ft. The floor of the quarry is slightly higher than the general level of the Argent Flat, while the western extremity is 10 to 15 ft higher.

The N wall consists of intensely fractured dark slate, impregnated with pyrite veins. Although this wall is irregular in places it has a well pronounced WNW strike with steep southerly dips. In addition slickensides occur.

The S wall consists of quartzites, in places fractured and containing pyrite. In parts the beds are still visible striking NW and dipping steeply to NE.

From the above it is evident that this pyrite mineralization is associated with a zone of fractured material caused by an important fault, striking WNW and dipping steeply to S.

The western face of the quarry consists of a hard siliceous rock containing fine grained sphalerite with little blebs of pyrite; galena occurs in occasional large blebs.

On the hill flank above the W. face of the quarry a small outcrop of ironstone occurs. This ironstone is evidently the oxidised cap of the underlying mineral zone.

#### Trench.

The ground SW of the Pyrite Quarry has been tested by a deep trench 85 ft long and driven through slates. An irregular body of ironstone has been cut. The ironstone is highly siliceous, containing limonite, siderite and small amounts of sphalerite, galena and pyrite. As this body is not situated in the strike of the Pyrite Quarry, it is considered to be an enormous boulder rolled down the hill. It probably originated from the ironstone outcrop W of the quarry.

#### Thomas's Shaft.

The country rock is grey slate in which a  $\frac{1}{4}$  inch wide galena vein occurs, striking NW and dipping at 51 to NE.

#### Old Shaft.

This shaft has been sunk in black slate which contains traces of galena. About 30 ft SW of this shaft mineralised rock has been exposed in a small hole, containing antimonial lead ore in a gangue of quartz and siderite. This exposure is too small to determine strike and dip.

#### New Trench.

In this trench, 8 ft long, a lode formation has been exposed consisting of shattered limonitic slate. The lode is about  $1\frac{1}{2}$  ft wide and carries on the hanging wall 1 inch of galena. It strikes slightly E of N and dips at 65° to E.

#### Sampling.

A series of twelve samples were taken and assayed for silver lead and zine by the Mines Department Laboratory in Launceston. The results of these samples are shown in the table below.

No. :	Location	: Ag : Ozs/ton	: Pb : %	: Zn : %
Z 8 :	Pyrite Quarry, from ore parcel	: 2.3	: 0.4	: 32.1
Z 9 :	Pyrite Quarry, West face, horizontal width 8 ft	: 2.1	: 0.5	: 21.9
Z10 :	Pyrite Quarry, from oxidized cap above West Face, horizontal width 9 ft	: 0.1	: Trace	: 1.8
Z11 :	Trench, from ironstone body, hor. width 11 ft	: 1.1	: 1.4	: 1.7
Z12 :	Warren's Adit No.1, No.2 Drive South, 3 inch wide galena vein on floor, 8 ft S of entrance of drive	: 77.3	: 70.0	: 2.5
Z13 :	Warren's Adit No.1, No.2 Drive North, 1 inch wide galena vein, on floor, at 12 ft N. from entrance of drive.	89.2	: 74.4	: 3.3
Z 7 :	Warren's Adit No.1, No. 2 Drive South at southern face, 2 ft horizontal width	: 13.0	: 13.0	: 1.1

No. :	Location	: Ag : Ozs/ton	: Pb %	: Zn %
Z14 :	Warren's Adit No.1, No.1 Drive South, 15 ft S of entrance of drive, hor. width 3 ft.	: 0.9	: 2.6	: 0.2
Z15 :	Warren's Adit No.1, Extension No.2 Drive South, 14 ft S of winze, faultpug 4 inches wide	: 0.1	: 0.3	: Nil
Z16 :	Warren's Adit No1, No.2 Drive North, at North face, 2 ft horizontal width	: 0.3	: 0.5	: Nil
Z17 :	Warren's Adit No.1, No.1 Drive North, at Northern face, 2 inches of faultpug	: 0.3	: 1.6	: 0.2
Z31 :	Small cut on fault 250 ft NW of portal of Warren's Adit No. 2 Pyritic slate	Nil	Nil	Nil

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The assays have revealed the following points :-

(1) The material in the Pyrite Quarry is high in zinc content. Sample Z9 taken in the quarry shows 21.9% zinc, while sample Z8 from an ore parcel shows 32.1% zinc. It is considered that the quarry as a whole will bulk approximately 20% zinc. The lead content of the material in the quarry is negligible. The silver content, while low, is high with respect to the amount of lead.

(2) The gossan portion of the Pyrite Quarry is generally of low and variable value. The ratios between the metals present are also variable.

(3) Samples taken from Warren's Adit No.1 show generally the presence of silver, lead and zinc. The zinc content is always low, while the silver-lead ratio is of the order of 1 to 1. Although some of the assays are high, they are mostly taken in comparatively narrow veins. The total quantity of material available is extremely small.

(4) Sample Z31 was taken from a small cut located on the north bank of a small stream flowing past Warren's Adit No.2. This cut shows much contorted and crushed slate carrying a fair amount of pyrite. No silver, lead and zinc occurs with the pyrite.

#### CONCLUSIONS.

1. The eastern portion of the lease consists of rocks of the Read-Rosebery Volcanic Series, while the western portion consists of slates and quartzites of the Nubeena Series. Both these series are upper members of the Pieman Group of rocks of assumed Cambrian age.
2. Two WNW trending faults occur in the lease both of which show some horizontal displacement.
3. A further series of parallel NNW trending minor faults occur.
4. All faults appear to belong to the one period and were formed before the period of mineralization.
5. Both series of faults are mineralized, the minor NNW series carrying galena with high silver content, the WNW series carrying pyrite sometimes associated with sphalerite. At least one of the lodes occurring on the Argent Flat carries a percentage of antimony.
6. The galena-silver veins are very narrow and do not offer much encouragement for further work. The most promising is No.2 Drive of Warren's Adit No. 1. The lode recently discovered in the New Trench on the Argent Flat has not been sufficiently opened up as yet and no opinion can be formed as to its merits.
7. The most promising lode on the lease is that which has been opened up in the Pyrite Quarry and which has been shown to carry high zinc values over a width of 8 feet.

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8. In view of the already extensive underground exploration carried out by previous workers which has not proved the existence of payable silver-lead lodes, continuation of this type of exploration is not warranted.

RECOMMENDATIONS.

1. Of all the silver-lead lodes exposed in the adits, the one in No. 2 Drive of Warren's Adit No. 1. is the only one which offers any promise. This is a narrow vein but, because of its high silver content it may be profitable to win a few tons of ore from it. This can best be done by shallow winzing or underhand stoping.

2. The Pyrite Quarry is rich in zinc and entirely suited for open cutting. As opened up at present, it is estimated that 10 to 20 tons of ore could be broken from the present west wall.

3. Testing of the probable extension of this lode should be carried out by means of costeans westward from the present quarry. These costeans should penetrate through the gossan into the underlying sulphide zone.

4. Possible extensions of the lode recently exposed in the New Trench should be tested by costeans north and south of the exposure. Two notes of warning should be sounded with regard to this exposure.  
 (a) Being located in the flat, almost at creek level, much difficulty will be encountered with water inflow. The problem will probably be one with which a small syndicate would not be able to cope.  
 (b) Much driving has been done beneath the Argent Flat. It is possible that this lode has been worked at depth. The possibility of striking underground workings in this lode must be kept in mind while exploration proceeds.

5. Some ore remains in the old dumps. Recently the lessee has collected about 4 tons of ore in this way and several more tons could be recovered.

(Sgd)

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The Director of Mines,  
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Zeehan,  
 21st December 1951.