

URMISCC/77-88

49 (77)
31, Queen Street,
Melbourne,

9th. October 1900

To Arthur Blackman Esqr.,
Gresham house,
Old Broad Street,
London.

Sir,

I beg to hand you the following report upon the property of the Tasmania Gold Mining and Quartz Crushing Company, Registered., of Launceston, Tasmania.

PROPERTY OF THE COMPANY:- The company holds about 150 acres under lease from the state, giving it a distance of about 4,000 feet along the line of the lode. A list of the different leases and freehold property with full particulars accompanies this report.

GEOGRAPHY:- The Company's property is situated at Beaconsfield, Tasmania, near the mouth of the River Tamar.

Launceston, the nearest important city, is about 23 miles from the mine, and reached either by a good road or by the River Tamar.

A small locality plan is furnished showing the geographical position of the mine.

HISTORY OF THE DISTRICT:- Gold is said to have been discovered on the ground held by the Company in June 1877, by two prospectors named Daley. The claims paid from the start. The quartz was free milling, and returned from two ounces of gold per ton upwards. By 1892 profits amounting to about £500,000 had been distributed among the shareholders of the different claims working on the Tasmania reef.

Up to 1888 a number of Companies, The Tasmanian Golden Gate, Florence Nightingale, Lefroy, and Dally's United, were working the ground which has proved payable.

At this time, the water which had always been heavy, became unmanageable, with the appliances at hand, and the amalgamation of the different claims became a matter of necessity. The present company was accordingly formed, and it was hoped that under one management, there would be no difficulty in coping with the water.

Work went on for about four years, when it was found that all the available ore was exhausted, and that it was ~~useless~~^{hopeless} to attempt to open lower levels with the pumping machinery at hand. In the mean time the Phoenix Company had put down a bore on the south boundary of the Company's property, and cut the reef 12 feet at 705 feet from the surface (the Phoenix Company's lease was purchased in 1895).

This bore having proved the lode 200 feet below the lowest workings the Tasmania Company decided to sink a new main shaft, and equip it with much heavier pumps. The present main working shaft was therefore started, and two 24 inch cornish pumps, having the capacity of about 3,500,000 gallons per 24 hours were placed in it.

These pumps were started on March the 12th. 1892, and by the middle of 1893 a depth of 729 feet had been reached, and cross cuts were started to cut the lode at the 600 feet and 700 feet levels.

This work was completed during the early part of 1894, and the work in the mine from that date to the present time has been from the 700 feet level upwards.

ACCESSIBILITY:- The small locality plan shows position of the mine to be about two miles ^{Estuary of the} from the Tamar River. A jetty with 26 feet of water has been erected, enabling large ocean steamers to discharge.

GENERAL CHARACTERISTICS OF THE REEF AND ORE:- The Tasmania reef cuts the enclosing rock at almost a right angle. The general strike of the reef is N. 48° to 50° E., with an underlay to the S. E. of one in about 2½. The fissure or lode channel in which the ore is found is usually from 8 feet to 25 feet wide. The ore occurs principally on the two walls, that on the foot wall being, as a rule, the better quality. The middle part of the lode, locally called the sandstone horse, is either allowed to remain in position if poor, or broken down and sent to the battery, if a better quality. This horse now and then reaches a thickness of 20' to 30' feet. When this occurs, the hanging footwall portions of the lode are worked independently of each other. Occasional branch lodes of a payable character are met with and worked.

Geology:- The most thorough and recent study of the geology of the district was made by the then Government Geologist Mr. A. Montgomery,

51
79

Mr. A. Montgomery, M.A. in 1889. The reef crops out on the Eastern side of the Cabbage-tree Hill, which is built up of metamorphosed sandstone and grits. These Mr. Montgomery thinks belong to the lower Silurian age. The general strike of the stratified formation is that of the ridge of the hill N.W. and S.E.

A certain amount of folding of the strata can be traced near the crown of the hill, but, the general dip is to the N.E. at angles of from 45 to 75 degrees. The lower or older beds of the series are therefore those seen on the western slope of the hill.

Beginning at the foot of the hill, we have soft blue slates overlaid by bands of hard slates, conglomerates and grits and dark sandstones. These again are capped by bands of lighter colour of the same material. Still higher in the series we have a succession of strata of limestones, slates and sandstones, but as these fall beyond the present extension of the Tasmania lode, they are of less interest in connection with this report.

FAULTS:- The rocks of the "Cabbage-tree" hill are traversed by a number of faults, which have caused considerable displacement of the strata. Two of these faults, the Eastern or main cross course, and the Western cross course, shown on the plan of the mine workings, are of paramount interest, as they fall within the area of the payable known portion of the reef; and as to the west of the western faults, the reef has either not been discovered, or has changed its character entirely. There has always been, and still exists considerable uncertainty as to the relation between these faults and the Tasmania reef. To enter into a full discussion of the subject is probably beyond the scope of this report, and it will no doubt suffice to state the conclusions arrived at. Mr. Montgomery discussed two possible solutions of the question, one that the lode fissure is older than the faults, and the second that the faults are the older. After reviewing the whole subject, he finally concluded that the lode is the older, and that its extension west of the western fault has not been discovered, and would be found by driving south along the western cross course, from the point where it is met by the reef coming from the east.

Since Mr. Montgomery's report was made, 500 and 600 feet levels have been opened, and extended to the crosscourses. What is seen here, does not fit in as well with Mr. Montgomery's arguments as the higher levels seem to do, and I am strongly of the belief that the lode fissures and faults are of about the same age, and that the same force acting, probably through a considerable period of time, and causing a number of distinct movements, is responsible for both. If this is true, the stone worked west of the western crosscourse, and on the mines farther west, viz., Moonlight and Little Wonder, is the western extension of the Tasmania reef. The change of character of the reef east and west of the crosscourse being explained by the different angles at which it cuts the enclosing rocks.

The part of the Tasmania reef east of the crosscourse is characterised by the continuity of the gold bearing stone, while to the west of the Western crosscourse, where the strike of the reef changes from N. 48 E. to about N. 56 W. (agreeing fairly well with the strike of the country rock), the stone is bunchy and similar to that worked in the Moonlight and Little Wonder Mines.

We may therefore conclude that no continuation of the Tasmania reef will be found west of the second crosscourse as Mr. Montgomery surmised, and that the valuable part of the mine will practically be confined within the limits of the ground worked in the upper levels.

The eastern end of the reef is cut off in the upper level by an ancient alluvial gutter, probably between 400 and 500 feet deep. The 600 and 700 feet levels have gone under this gutter, but, the ends are in soft sandstone and the reef is much broken up although the eastern face of the 700 feet level looks better than the level above.

DEVELOPMENTS:- Accompanying this report are copies of the mine plans, No. 1 being a vertical projection of the mine workings, and No. 2 a plan of the different levels. The first of these plans is on a scale of 33 feet to the inch, and the 2nd. 25 feet to the inch. It was not thought worth while to delay the report in order to make fresh plans on a more suitable and an uniform scale.

The ground stoped out during each half year since 1894 is shaded in

in a different colour on the sectional plan .(No.I)

It will be seen from plan No.I that the mine is practically exhausted down to the 700 feet level, with the exception of a portion of the ground between the 700 feet level and the 600 feet level, west of the main shaft.

SHAFTS AND PUMPS:- The mine is at present worked through three shafts. The main working shaft, the Phoenix, and the Florence shaft.

A new main shaft is also being sunk, and is down 900 feet.

MAIN WORKING SHAFT:- This shaft, which is 837 feet deep, is 18 feet by 9 feet in the clear, enlarged to 22 feet by 14 feet at the plunger chambers. This shaft is substantially timbered throughout, and is divided into two winding compartments, pump compartment, and capstan and ladder way. In the shaft are two 24 inch wrought iron columns with three sets of 24 inch plungers, nine foot stroke, which raises the water from the 717 feet level to the No. 2 adit level.

A duplex differential Riedler pump, steam driven, and of about 450, 000 gallons daily capacity, is also placed at this level, and delivers the water to the condenser of the main pumping engine on the surface. The water from below the 717 feet level is to be raised to this level by a pair of 24 inch hydraulic pumps, 10 feet stroke. These pumps are in the shaft down to the 800 feet level, and the machinery on the surface is all completed.

All the ore from the mine comes through this shaft, and is delivered into hoppers in the No.2 adit level, from where it goes to the battery.

FLORENCE SHAFT:- This shaft is used only as a ladder way, and for passing timber into the mine.

PHOENIX SHAFT:- Is used only as a ladder way and mullock pass.

NEW MAIN SHAFT:- This shaft, which is now 900 feet deep, is sunk in the hanging wall country so as to cut the lode at a depth of ^{about} 2000 feet. The shaft is 17 feet six inches by 5 feet down to a depth of 722 feet when it is enlarged to 17 feet 6 inches by 8 feet in the clear. The shaft is substantially timbered throughout. A 14 inch pump easily handles all the water the shaft makes at the present time. Two Riedler pumps, the same as the one in the working shaft, are being placed at the 600 feet level in this shaft, to take the water

water from the sinking pump as work progresses.

FACILITIES FOR WORKING:- The mine being situated within three and a half ^m miles from deep water, all supplies can be delivered at a small advance on what they can be purchased at in the cheapest Australian markets.

Fuel:- Wood is plentiful in the district, and is delivered for 5/6 and 6/ per ton of 80 cubic feet in moderate quantity.

Tasmanian coal of poor quality costs 16/ per ton delivered on the mine. With the advent of Federation and the removal of the income duty, New South Wales coal can be delivered on the mine at 20/ to 22/ per ton.

MINING TIMBER:- Ordinary sawn timber is worth 10/- to 12/- per 100 feet super. and round mining timber in proportion.

BOILER FEED WATER:- The mine water is not good for boiler use, and a fresh water dam to hold about 18,000,000 galls. is at present in course of construction. From the look of the water, which had begun to collect in this dam, I am afraid it contains too much vegetable matter, and it may be necessary to remove the peat which covers the submerged ground before a good boiler water is obtained.

LABOR:- As the district is easily accessible, labor can be drawn from most of all the southern colonies. Surface labor costs from 6/6 to 8/- per day of eight hours. Miners 7/6 to 9/- per 8 hours shifts. Mechanics 8/- to 12/-, and other labor in proportion.

Climate:- The climate is good in every way, although the days in summer may be hot, the nights are most always cool and agreeable.

REDUCTION PLANT AND MACHINERY:- A list of machinery now on the mine and a general description of the batteries and chlorination plant are furnished on a separate sheet.

GENERAL:- The total length of reef worked on the 600 feet level, is over 1,400 feet. As no record has been kept of the ^{quantity of} stone broken from the different levels, I have attempted to calculate the average thickness of the reef worked since 1894 from the superficial area stoped, and the quantity of stone crushed ^{during} each year.

The results arrived at in this way are as follows:-

The results arrived at in this way are as follows:-

Date.	Ground stoped.	Tons crushed.	Average thickness of reef.
2nd half I894	18,400 Sq. ft.	7,167	5ft.
" " I895	43,545 "	18,861	5ft. 6in.
" " I896	81,752 "	42,477	6ft. 7in.
" " I897	60,003 "	37,622	8ft.
" " I898	55,294 "	26,370	6ft. 2in.
" " I899	42,391 "	23,350	7ft. 1in.
Ist. I900	23,893 "	10,620	6ft.

Although these results are probably ^{not} absolutely correct, they should give a fair idea of the average thickness of the reef sent to the battery during this time.

STOPPING:- The ground in the mine, when it is once drained, can be cheaply broken, as it shoots well, and as it is not necessary to keep the timbering so close to the face as to interfere with the work.

PERMANENCY OF THE REEF:- I can discover no reason which would lead me to expect the reef to deteriorate in quality, or to diminish in size, as greater depths are reached. The last 300 feet in depth of the mine worked have been entirely in unaltered country as far as surface influences go, and as far as I can discover from the records of the mine, and from the look of the faces no change has taken place. Within the last few weeks, the crosscut from the main shaft at the 800 feet level has cut the reef showing a splendid body of stone between good walls 23 feet apart. The reef at this point is fully equal in size and quality to its corresponding portion in the level above.

DESCRIPTION OF THE ORE:- The ore consists of a kindly laminated quartz with a considerable percentage of iron pyrites. Near the walls the quartz is usually nearly solid, becoming more mixed with country rock as the centre of the lode channel is reached.

SHOOTS OF GOLD:- Stone considerably richer than the average is found in shoots pitching east at an angle which would about agree with the underlay of the enclosing ^astratified rocks.

RECOVERY OF THE GOLD:- About 75% of the recovered gold is got by amalgamation, and 25% from the recovered concentrates by chlorination. The tailings from the battery assay from I to I $\frac{1}{2}$ dwts. and those from the chlorination vats about 3 dwts. ; 16 to 18% of concentrates are produced.

PROBABILITY of the reef extending beyond the limits worked up to the present: As already stated, I am doubtful whether much more payable stone will be found beyond the western limits of the ^{present} western workings. The eastern face of the 700 feet level looks decidedly better than the corresponding portion of the 600 feet level, and there seems no reason why good stone should not be found in this direction.

WATER:- As will already have been gathered from the previous part of this report, the great difficulty in working this mine has always been the heavy influx of water. An idea of the quantity of water which drains into the lode fissure will be obtained if we consider that the reef was cut at the 600 and 700 feet levels early in 1894. Since that time a quantity of about 3,000,000 gallons has been pumped daily to lower the level of the water in the reef between 200 and 300 feet. There can be no doubt, but, what the pumping operations on the mine have drained a large area of the surrounding country, and the probabilities are that the influx of water will diminish as greater depth is attained. Nevertheless this water question is one which must be seriously considered in estimating the value of the mine, for until it is actually proved that the flow of water diminishes with depth, we can never be certain how deep the mine can be profitably worked. My estimate of profit which may be expected from the mine in the future are based on pumping 7,000,000 gallons per day, 4,000,000 gallons from above the 1,200 feet level, and the balance from below that level.

PAST PRODUCTION OF THE MINE:- As already stated, the mine is practically exhausted above the 700 feet level. Up to the 30 th. June last the mine produced 410, 965 tons of ore, yielding 487,534 ozs. of gold. Dividends amounting to £718,071 had been distributed up to that date.

PAST RESULTS:- The earlier records of the mine are not full enough to make a full analysis of them. We can however begin with the year 1888, when it was first decided to equip the mine with new machinery, and to sink a new main shaft. The useful part of the plant now on the mine has practically all been erected since that time. When the present main working shaft had reached a depth of 700 feet, and the reef was tapped at the 600 and 700 feet levels early in 1894

57
85

early in 1894, the mine was practically worked out down to the 500 feet level, with the exception of some little ground in the western end of the mine above this level (see plan No. I). Since that time the mine has been worked out down to the 700 feet level, leaving about the same quantity of ore in the western end of mine, between the 600 and 700 feet levels as was above the 500 feet level at the beginning of this term. We can therefore say that 200 feet in depth has been worked during this period.

COST OF PLANT SINCE 1892:- Since 1892, when the expenses in connection with the new plant began, the following capital has been raised:-

Calls between July 1892 and 1894, - - -	£63,000
New issue of shares in 1895, - - - -	£11,928
" " " " 1896, - - - -	£72,000
Total, - - - -	£146,928

This amount has been expended as follows:-

Sinking and equipping present main working shaft battery etc.	£61,100
New main shaft,	25,830
Chlorination plant,	9,262
Cost new pumping machinery, mostly in main working shaft cost,	32,007
Erection	12,496
Sundries	4,575
Total - -	£145,270

During this time the mine produced 166,467 tons of ore, yielding 161,594 ozs. of fine gold, or an average of 19.1 dwts. per ton. Dividends were paid during this period to the amount of £141,196. This shows a total cost of £3.4.7. per ton of ore extracted.

This high cost is due principally to the fact that developments in the mine were never far enough in advance of stoping to allow of economical work, and this condition of affairs again was caused by the insufficient capacity of the pumps.

NECESSARY EQUIPMENT:- We will now attempt to determine the cost of the plant ^{yet} necessary to properly equip and open the mine to 1,200 feet level. The following calculations are based on the supposition that 7,000,000 gallons of water will have to be pumped per 24 hours, namely, 4,000,000 from above the 900 feet level, and the balance from

from below this level.

NEW MAIN SHAFT:- This shaft is completed to a depth of 900 feet.

Costs yet to be incurred are:-

Sinking 400 feet at £40 per foot	£16,000
Cost of pair Riedler pumps at 700 feet level	20,000
3,000,000 gallons capacity, cost each	
Hydraulic pump from 700 feet downwards	35,000
5,000,000 gallons capacity, cost	
Boiler Plant cost,	10,000
Installation and housing,	20,000
Incidentals,	5,000
TOTAL COST MACHINERY AND SHAFT	£106,000

Plats crosscut and flood gates at	
900 I,000 I,100 I,200 feet levels	7,500
Ore bins and rail connections on surface	2,500

Total cost shaft equipped and in working order to I,200 feet level, £ 116,000

It will be noticed that no provision is made for winding engine, the one now erected at the shaft being considered good enough for working down to this depth.

OTHER NECESSARY EXPENDITURE:-

Repairs to present 65 stamp mill, and addition	£25,000
50 stamps with concentrating machinery,	
Coal storage bins at wharf and sidings,	6,000
Tram line between mine and wharf,	6,000
Rolling stock,	2,000
Mine sidings,	2,000
Water supply (for boilers)	5,000
Extra tools etc.	5,000
Offices etc., etc. ,	5,000
TOTAL	<u>£56,000</u>

DEEPENING WORKING SHAFT:-

Cost of sinking present ^{Main} working shaft another 100 feet	£ 4,000
sinking and timbering another 100 feet, @£40 per foot	
Plat crosscut and flood gate	2,500
Pumps	7,500
TOTAL	£14,000

New main shaft	116,000
Other necessary expenditure	56,000

GRAND TOTAL £ 186,000

Or we can say in round numbers £200,000 will be required to equip

equip the mine with necessary machinery and plant to treat about 80,000 to 90,000 tons of ore per year. This amount will have to be spent before any increased output can be expected from the mine.

ESTIMATE OF COST: of opening mine between 1,200 and 2,000 feet levels.

NEW MAIN SHAFT.

Sinking 1,200 feet and cutting plats,	£65,000
Pumps from 1,200 to 2,000	70,000
TOTAL	£ <u>135,000</u>

COST OF DEEPENING PRESENT WORKING SHAFT:-

It is not certain that the present working shaft can be sunk below the 900 feet level, as it will cut the lode shortly below this depth, but, in case it could be continued, the cost would be about:-

Sinking and timbering,	£45,000
Plats and connections,	15,000
TOTAL	<u>£60,000</u>

In case it were found necessary to sink a new shaft this could be made somewhat smaller, as no pumping machinery would be put in, and could be done for probably about the same amount as deepening the old shaft. The total expenses would therefore be as follows:-

Sinking new main shaft,	£135,000
Sinking working shaft or an entirely new shaft	60,000
	£ 195,000

This expense would begin in about three years time, and would be spread over about 10 years.

RESULTS WHICH MAY BE EXPECTED WHEN MINE IS FULLY EQUIPPED:-

The following results, you will understand, are based on two suppositions:-

- (1) That the quality and size of the reef remains about the same as it has been for the past 300 feet in depth.
 - (2) That the proposed pumps will be able to cope with the water to enable the mine to be worked at the rate of 100 feet in depth per year.
- I feel fairly confident that the reef will live down, and not fall off in value, but, I cannot speak with the same assurance in regard to the water question. There is no doubt, but, that the pumping has drained a large area of country, and that all the heavy burats of

88
88

of water which have been met with have become exhausted in time, and we can therefore reasonably assume that the water is all derived from local surface sources, and should therefore diminish with depth.

COST OF MINING AND TREATING ORE:-

Opening levels, 1,500 feet main level	£7,500
Fluming	1,000
20 Winzes	<u>4,000</u> 12,500
Breaking 90,000 tons of ore and filling stopes @15/-	67,500
Trucking and hauling	<u>11,250</u> 78,750
Crushing and concentrating	22,500
Chlorinating 18% of ore	<u>2,720</u> 81,470
Prospecting	5,000
Proportionate amount of expenses in developing mine to greater depth	<u>20,000</u>
	TOTAL £148,420
Yearly cost of pumping	<u>65,000</u>
	TOTAL YEARLY EXPENSES, <u>£213,420</u>

YEARLY OUTPUT:-

If the mine continues to yield as during the past 6 years, of which we have complete records, we should recover per year 86,000 ozs. of fine gold worth £368,300

£368,300
Cost of extraction and treatment as above
<u>213,400</u>
TOTAL PROFIT <u>£ 154,900</u>

From this gross profit would have to be subtracted a sinking fund to cover depreciation of the machinery. A fair figure for this would be ten per cent on cost of same. or

£32,000
This would leave for dividends and depreciation of the mine itself
126,900

The water question is however a source of danger which must not be lost sight of in determining whether the mine is a good purchase at the price asked. Personally I feel that the price asked is high. I think 350,000 would be a fair price for the mine, as it now stands, but I do not think it could be bought for that amount at the present time.

(Sd) H.H. Schlapp.

Melbourne
10/10/1900