SUMMARISED REPORT OF THE TASMANIAN GOLD MINE

The Tasmania Gold Mine is situated at Beaconsfield in Tasmania three miles from the deep water jetty at Beauty Point on the West Bank of the river Tamar and eight and a half miles from the east coast. This jetty is connected with the Mine by means of a main road and a private railway.

The area of the mineral leases held by the Company is 142.7 acres
" freehold " is 168 acres
" " land owned " is 136 acres
Easements for dams, water races, machinery sites etc., about 100.

It is equipped with a Stamp Battery of 105 Heads, with a modern Concentrating Plant and with a Chlorination Plant capable of dealing with the out-put of Concentrates from the Battery. The crushing capacity of from 62,400 to 78,000 tons per annum. The Battery is connected with the mine by means of an electric tramway one mile in length.

The main lode is a true fissure lode, cutting the sandstones and conglomerate beds, which form the country rock, at right angles. There is every reason to believe that it will produce over 1,000,000 tons, and probably 1,350,000 tons of quartz from between the 818ft. level and the 2,000ft. level.

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At the 818ft. level, below which no stoping has been done, the length of the lode is 1,551 ft., it has been regularly increasing in length, by over 75 ft. in each 100 ft. of vertical depth. This 818ft. level has now been nearly worked out, and the records show that it will have produced a total of over 90,000 tons of quartz, of a value (after deducting all outside sources of income) of over £3 . 6 . 3 pr. ton

The gross cost of raising and breaking (62,400 tons per annum from the 1,000ft.) level will be -) 1 .17 .10 ,,

Showing a profit of ... 1 . 8 . 5 ,,

or a total of £88,660 per annum when the mine is properly equipped. When the out-put is increased to 90,000 tons per annum the gross cost of mining will be reduced to~~s~~ 1 . ~~15~~ 14 . ~~6~~ 5.3d per tn and the profit per annum should be ~~£138, 000~~ £143137

From the 500ft. level down , there has been nothing to show that the average value of the quartz is in any way diminishing . The lode is so regular in its strike, dip, average width, and value, that calculations on future out-put can be relied upon with much greater certainty than in the case of almost any other quartz mine in Australasia, although none of the ore is in sight as it has not been developed.

A new Main Shaft known as "Hart's Shaft" has been sunk a distance of 1,100 ft. At this level a plat has been cut and a cross-cut has been driven 125 ft. towards the lode.

At the 1,000ft. level the cross-cut has cut the lode which has been driven on a distance of 50ft.; it is exactly similar in appearance and value to the same run of stone in the 500, 600, 718, and 818 ft. levels. The temproary pumping plant erected for sinking this shaft has been quite inadequate to deal with the water, and it is for the purpose of installing a pumping plant that will insure the Company against any trouble from water in the future, that £100,000 is required

The average quantity of water raised has been about 3¼ million gallons daily for some years past. The new plant proposed will have a capacity of Eight Million gallons per day and until shaft sinking is resumed the Sinking Pumps will be able to deliver Three Million gallons per day to the present Main Cornish Pumping Plant, so that development work may be pushed on regardless of water. Twelve months after starting the new plant, sinking can be resumed; in three years from now, another Twenty head of stamps can be added to the Battery, and in about six years from date there should be no difficulty in keeping 200 head of stamps going, which would reduce working expenses, and increase dividends.

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DETAILED REPORT ON THE TASMANIA GOLD MINE.

GEOLOGY OF THE DISTRICT AND MINE - The country rock, in which the main lode occurs is chiefly sandstone, some of these beds are slightly argillaceous (Slatey), the lode cuts these beds nearly at right angles, its strike or direction being N.E. and S.W and its dip or inclination about 1 in 3 to the South, its average width is about 8½ ft., varying from 3 feet to 26 feet abd more, where large "horses" of country rock are enclosed between the walls; occasionally these "horses" are traversed by auriferous veins of quartz and pyrites, and are broken down and sent to the Battery with the quartz which occurs on each wall. The gold contents are not distributed regularly through the whole length of the lode but occur in chutes, which dip at about the same angle as the country rock, towards the East. Even the poor zone however, contain rich patches that cause the whole lode to pay for mining and treatment. The rich and poor chutes occur alternately and hence throughout its length the average value is maintained. The rich chutes predominate in the Eastern half of the lode, the largest chute (measured along the lode) is about the centre of it. The gold contents of the lode do not appear to be influenced by the variations of the enclosing country rock.

The plans prepared by Mr Montgomery, late Government Geologist, and published together with his report, by the Tasmanian Government in 1891, show the dip of the country rock in the upper

levels to be about 45° and its strike North 50° West; later developments have proved the accuracey of Mr Montgomery's statements and deductions, though a few of his surmises have not proved quite correct. At the 718ft. level the strike is the same, while the dip is 52½° , The rocks are therefore straightening up a little towards the vertical, and, (if they have any influence on the contents of the lode) this fact improves the value of the property. The rocks are of Silurian age and their main line of strike is very regular for about 1½ miles North and 4 miles South where it turns towards the South West and is covered by basaltic rocks. There are numerous faults in this distance.

To the North East the Silurian rocks are overlaid by Permo-carboniferous beds with a strike of about 20° South and a very slight dip towards the N. N. E. Any water from the Tamar River we would have to pass through these beds before it could reach the Silurian Strata, but it does not do so. The Carboniferous beds are covered in places by basaltic rocks; as at Beauty Point, between Middle Arm and the Tamar, and along the banks of the Tamar to Launceston, with the exception of a few small gaps.

Figure 1 shows a section across the Silurian beds in the direction of the main lode. It is not drawn to scale, being intended only to show the relative position of different beds of rocks.

Starting from the Tamar River and crossing the Carboniferous, a Bore hole on the East Tasmania property shows beds of sandstone

and slate, followed by dark blue limestone, this latter has been cut in the East end of the Mine and it is followed by a bed of e clay 30 to 40 feet thick, which probably has originally been a bed of slate altered to clay by faulting movement on the bedding planes. The next 60 ft. consists of sandstone beds which have been crushed and broken in places to small pieces, but signs of original bedding still remain . Further West the beds become less broken and gradually harder and darker, in some case very hard. They are followed by a bed of soft white sandstone which is again followed by beds of dark hard sandstone interstratified with a few beds of conglomerate, these gradually increase in number until the main conglomerate beds (locally known as Cabbage Tree) are reached, they contain beds of sandstone and which are of con siderable thickness. The main conglomerates are traversed by numerous faults crossing their line of strike at an acute angle with a result that they are greatly broken and full of cavities and water channels, this is especially noticeable in the 800ft. ± level of the Moonlight Mine. The conglomerate is followed by a bed of limestone which is again followed by conglomerates and sandstones beyond which there must be some impervious beds, as the water is flowing out at the surface from shafts sunk in that direction.

The Western bed of limestone which is 45 ft. thick is very full of calcite seams, and very broken, entirely different to that on the East, or to that at "Winkleigh" some miles South West,

it is likely therefore that this is only a local bed, but of some considerable extent.

In the 800ft. cross-cut in the Moonlight Mine the bottom of a cave has been cut in this limestone; it is filled with a deposit of light weight, containging carbon, which can be pressed between the fingers to powder; it has probably been deposited from water formerly standing or flowing in these cavities. On the Eastern side of the Mine there is an alluvial gutter 400ft. deep, and on the Western side an alluvial deposit 70 to 100 ft. deep.

The Western end of the main lode is cut off by the main cross course or fault, which has a vertical throw of about 300 ft., and its continuation has as yet never been traced beyond this point, no systematic attempt to find it having yet been made. The main fault is accompanied by others with the result that there is a band of greatly disturbed country; a drive has been put through this at the 818 ft. level and is now in more settled country where cross cutting will be started shortly. From the 500ft. level d down the lode increases in length about 75 ft., this end, or 25 ft in each 100 ft. of depth.

In the Eastern end the main lode after entering the ~~sandstone~~ broken sandstone gradually splits up into leaders which apparently die out as they get near the clay bed; it is reported however that at the 360 ft. level the lode continued into the clay turning as it entered, but owing to this level having fallen in this report cannot be ~~rectified~~ verified. Prospecting drives are now following the contact of the clay and limestone. The lode is regu-

larly lengthening by over 50ft. in every 100ft. of depth in this end of the mine.

The combination of hard bands of country with hard bands in the lode forms natural ~~bands~~ dams which are pierced as the lode is driven on with resulting bursts of water. These can be guarded against in the future by boring ahead with a small rotary drill instead of the short hand holes used in the past.

Owing to the broken country due to large and extensive faults, probably as extensive as the lode itself, and to there being limestone beds, both to the East and West of the Mine (lime stone with the exception of chalk is the most pervious to water of all rocks) there is no chance of the daily flow of water being held up as depth is attained, each succeeding level must drain the one above and the daily flow must be pumped from the lowest level. By "Daily Flow" must be understood that part of the rainfall of the district which finds its way into the mine by soaking into and through the country. If 1/8th. of the rainfall over 10 sq. miles does so, the daily flow would amount to about 1,500,000 gallons per day. This amount is of course largely speculative, it may be more or less, but I am of the opinion that it may be taken as a fair average for purposes of calculation.

AMOUNT OF WATER TO BE PUMPED FROM THE MINE IN THE FUTURE.

From a study of the geology it will be seen that the whole of the country saturated with water, and that the proposition to be dealt with may be compared to the pumping out of a large cistern filled with broken stone, width about 1 mile, length 6½ or perhaps 10 miles or more and depth for all practicable purposes unlimited, although as depth is attained the cavities will naturally become smaller. That such cavities of considerable extent have existed near the surface is proved by the settlements that have taken place along the line of limestone as it was drain ed. There is a daily flow into this cistern, but a plant is required on the mine not only to deal with this flow, but also to lower the water level continuously. During the past twelve years the water level has been lowered 300 ft., or at the rate of 25 ft. per year, by pumping about Three Million gallons per day; while the out-put has been 25,000 - 30,000 tons of quartz per annum; an out-put 2½ times as great is required. It will therefore be necessary to pump 2½ times as much water out of the country, or 3,750,000 gallons per day; adding the constant daily flow, it will be necessary to pump 5,250,000 gallons per day. For purposes of calculatieng the cost of pumping this amount will be taken as 6,200,000 gallons per day, while in order to insure safety and to deal with unexpected bursts of water a plant will be erected of a capacity of 8,000,000 gallons per day. , As

development work is behindhand it is proposed that the Sinking Pumps shall have a capacity of Three million gallons per day for a height of 400 feet., these will on arrival be placed at the 1,000 ft. level to deliver to the large Cornish Plant at present in use. There will therefore be pumps of a computed capacity of 11,000,000 gallons per day to insure rapid development of the 1,000 ft. level in order to place the Company on the dividend list as early as possible.

THE FUTURE VALUE OF THE OUT-PUT can only be determined from past records in half yearly reports issued to shareholders; these records show that from between the 500 and 818ft. levels there have been produced 240,134 tons returning 252,734 ozs. of a value of £3-15-3.4 per ounce equal to a value per ton of £3-19-2.8, as however these reported tons are from 15 to 20% below the actual tonnage (no allowance for use of larger trucks having been made and 10% having been constantly deducted for sandstone), The actual value per ton dry weight has been from £3-6-0 to £3-8-11. During the past eighteen months careful records have been kept of the ore raised, and these show that the 818ft. level which is now nearly worked out will have produced a total of over 94,000 tons of a value (after deducting outside sources of income) of over £3-6-3.2 per ton.
As the haulage records can only be traced far enough back to give a true record of this level, it will be obvious that it is impossible to say whether the average value is, or is not in-

creasing. For purposes of calculation this out-put is taken at 90,000 tons.

In the past the computed tonnage of this mine has been peculiar, so also have the ounces of gold, as is the case with most of the gold mines in Australasia, they are neither Fine nor Standard ounces, but some Retorted and some Smelted, hence for the purposes of this report I have reduced all values to £. s. d.

The total tonnage that may be expected from between the 818 ft. level and 1,000ft level is 180,000 tons, from there to the 2,000 ft. level 900,000 tons may be expected or a total of 1,080,000 tons. If the increase in length of lode is calculated on it will give an additional 270,000 tons or the mine may be expected to produce from above the 2,000ft. level 1,350,000 tons of quartz. It must be distinctly understood that none of this ore is in sight , it has been cut at the 1,000 ft. level, and winzes are being sunk from the 818ft. level on a short length of it that is partly drained by pumps in Hart's Shaft. It will be readily seen that if any one level was developed for stoping there would be no need to raise any further capital.

The following calculations are based on the assumption that each level of 100ft. will produce 90,000 tons of quartz.

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THE COST OF DEVELOPING EACH LEVEL will be

		£
Main Shaft	- 100ft. at £40 ...	4,000 ✓
Plat and Ore Bins	...	1,000 ✓
Cross-cut	- 200ft. at £2/10/- ...	500 ✓
Flood-gate	£1,000 ...	1,600
Main Drive	- 1,600ft. at £4 ...	6,400 ✓
Fluming	- 1,000ft at 10/- ...	500 ✓
Air Shafts	200ft. at £4 ...	800 ✓
Rises and Winzes	- 2,500ft. at 30/- ...	3,750 ✓
		£17,950

or less than 4/- per ton. ✓

THE COST OF EXTENDING THE NEW PUMPING PLANT from 1,000ft. level to 2,000ft. level will be at most £70,000, to cover this expenditure a sum of 1s. 6½d. per ton should be set aside as a reserve fund for additional plant and is charged in working costs.

THE COST OF PUMPING PER WEEK with an Electric Plant power being transmitted from the station on the river bank will be as follows, when delivering 6,200,000 gallons per day from the 1,000 ft. level. :-

POWER STATION.	Wages	86 . 16 . 0	
	Stores	9 . 7 . 3	
	Fuel	359 . 9 . 0	
			455 . 12 . 3
MINE PUMPS	Wages	32 . 14 . 6	
	Stores	3 . 3 . 0	
			35 . 17 . 6
	TOTAL		£491 . 9 . 9

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COSTS INCURRED IN MINING as in any other business are of three kinds, viz.:- Standing charges, which do not depend on production; charges which depend w entirely on amount produced; and those which are half and half, of these last winding is the only one of any consequence.

The following costs are taken from the actual expenditure during the past year, with extra allowances where necessary; with an out-put of 62,400 tons per annum they should not exceed the following amounts:-

	Standing Charges.	Cost per ton.	Tonnage Charges.
HEAD OFFICE, viz - Director's fees, salaries, legal, rents, taxes, stamps, stationery & travelling expenses.	5,000	1s. 7.23d.	
GENERAL CHARGES, viz - Mine Office, time-keeper, watchman, sampling, surveys, sanitary, etc.	1,200	4.63	
SURFACE WORK, viz - Repairs to buildings, delivery and handling of stores, uncharged workshops, jobs, etc. Electric Lights, saw-mill, cleaning, etc.	3,700	1 2.23	
GENERAL Underground Maintenance and Supervision.	2,600	10	
VENTILATION	1,000	3.85	
PUMPING	26,000	8 4	
WINDING - viz Platmen and bracemen, engine drivers, stokers' wages.	1,600	6.16	
Carried forward	41,100	13s. 2.1d.	

	Standing Charges.	Cost per ton		Tonnage Charges.
Brought forward	41,100	13s.	2.1 d.	
WINDING, viz. - Stores and fuel			8.2	2,130
WINDING, viz - Repairs, wages and stores			1.28	330
DEVELOPMENT		4	0	12,480
STOPING		5	1.25	15,930
MULLOCKING		1	0	3,120
TRUCKING & TRAM ROADS		1	3	3,900
TIMBERING			10	2,600
TOOLS			6	1,560
CRUSHING and delivery to Battery			9.5	2,470
Total Mining costs	41,100	27s.	5.33d.	44,520
Machinery Reserve Fund	~~4,870~~	1	6.5	4810
Battery & Reduction Works		6	6	20,020
TOTALS	~~45,970~~	35s.	5.83d.	64,540 } 4810 }
FOR EXTRA DEVELOPMENT	6,240	2	0	
PROSPECTING ON OTHER LEASES	1,000		3.85	
	~~4940~~			4810 }
GRAND TOTALS	~~£53,150~~	37s.	9.68d.	64,540 }

Below the 1,000ft. level the cost of pumping will be increased by the fuel required to lift the water the extra height, supposing that the flow of water does not become less as depth is attained, the increase in the fuel bill will be £1,870 per annum for each 100ft. of depth.

The average w cost of pumping between the 1,000 and 2,000ft. levels will be £35,350 per year or £9,350 more than shown in the tabulated costs, this amount however can be reduced by £4,350 a year, by reductions in the price of fuel.

If the out-put is increased to 90,000 tons of quartz per annum, the working costs will become:-

Tonnage Charges £1 - 2 - 3½	...	100,406
Standing Charges	...	53,150
Pumping, 1/3 rd. more fuel.	...	6,240
TOTAL		£159,796

or £1 - 15/14 + 9/5.5 per ton., showing an annual profit of £138,375 down to the 2,000ft. level.

The present Capital value of the mine down to the 2,000ft. level, from the above report may be determined on the following basis:-

In Two years from date dividends should be paid at the rate of £80,000 per year for two years. The balance of £17,320 being spent on increased Reduction Plant. For two years, treating 81,100 tons per year, dividends should be £100,000 per year setting aside £30,000 for an additional Battery.; and for Nine years treating 90,000 tons per year, dividends should be £130,000 per year, allowing £8,000 per year for extras.

Treating these amounts as annuities. To cover the Mining risk, from 15% to 20% must be allowed.

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The Present Value works out as follows:-

At	15%	Compound Interest	...	£459,430
At	20%	Do.	...	£334,050

without considering the Three years additional work which may be expected if the lode continues to increase in length as it has ~~de~~ done in the last 300 ft., and without considering any value below 2,000ft.

Having to wait two years for dividends largely accounts for the values being so low; if ~~^~~ three dividends could be expected at once the Present Value of the Mine would be:-

At	15%	Compound Interest	...	£607,690
at	20%	Do.	...	£481,030

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