[redacted]

BEACONSFIELD GOLD MINES LIMITED
6th FLOOR, EAST POINT PLAZA,
233 ADELAIDE TERRACE, PERTH, W.A.

COMPENDIUM OF HISTORICAL INFORMATION ON WATER AT THE TASMANIA MINE

BY

S IRELAND

1982

001

FILMED 901003

TASMANIA GOLD MINE - WATER

The following extracts from mining reports to the Launceston "Examiner" during the life of the mine (1877-1914) contain considerable detail of the nature of the water problem and the methods used to deal with it. It will be noted that, in general, mention of water is made when it was troublesome. When the pumps were coping with the inflow there is little comment and hence a scarcity of pumpage data.

A reasonable graph of pumping rates against time can be developed and is attached. The major water bursts and floods are obvious but the graph must be read in conjunction with the text to appreciate the delays to production and, more importantly, development. It is possible to conclude that the very high percentage extraction of this mine was due as much to the water as its high grade. Lower grade stopes were apparently reverted to only in the event of flooding particularly in the first half of the mine's life.

The graph indicated that the total amount of water pumped was 30,675,000 gallons. If a constant recharge of 1.5 M.P.G.D. is assumed then stored water pumped was 15,530,000 gallons; if a recharge of 1.8 M.P.G.D., then stored water was 11,330,000 gallons.

Locations of water bursts were quite well documented and the attached long section shows the major problem areas. Those marked yellow were water bursts which caused major flooding and production delays. Those marked green were less severe, generally being where development was halted to allow the country ahead to drain. Once again reference to the text is necessary to sort out the interconnection of water burst location and scale with the progress of shaft and level development at each particular time.

One of the prime purposes of this section was to attempt to locate the "wet beds" reported in the literature as the source and conduit for water entering the groundwater system to the south of the mine. It seems that the general broken nature of the sediments and the lode do not allow a definite picture and one is forced back to the descriptions of Robertson (1887), Twelvetrees (1903), Cundy & Fawcett (1914) and the mine manager's progress reports.

S.D. IRELAND, 1981

PRÉCIS OF EXTRACT FROM THE LAUNCESTON 'EXAMINER'

DEALING WITH WATER INFLOW CONTROL AT THE TASMANIA GOLD MINE

1877

December 13.

Great scarcity of water for mining purposes (Sluicing).

1881

May 14.

A Drainage Union formed between the following Companies; Tasmania 5-14ths, Golden Gate 1-14th, Florence Nightingale 3-14ths, Lefroy 3-14ths and Dally's United 2-14ths, who contributed a total of ₰7,000 apportioned according to the shares stated above to capitilise "the erection of one powerful plant sufficient to unwater the whole line of reef". At this point in time the Golden Gate Shaft was the deepest on the lease at 175ft. The new plant was to be installed in the Lefroy Shaft after deepening.

November 11.

Tasmania Gold Mine (TGM) directors were installing 12" cornish lift pumps by the Launceston Salisbury foundry in the Golden Gate Shaft, purchased by the TGM.

1882

April 12.

Both Florence and Golden Gate pumps stopped for maintenance and extension of 12" lifts. The lower levels of both mines were flooded temporarily.

1883

April 27.

The plant ordered by the Drainage Union is being assembled at the Lefroy Shaft as described in the following extract.

"The boilers and engines to work the extensive pumping gear for the Drainage Union at Beaconsfield are being placed in a position and the massive machinery required for the 20" pumps is making rapid progress at Salisbury's Tasmanian Foundary, the whole of the pipes having been delivered some time ago. The ironwork of the bob, one of the most important

parts of the machinery, has been completed this week. The bob is a triangular wooden framework connected at its angles by heavy iron castings into which the wooden beams forming the bob are fitted, the whole working on a gudgeon or pivot fixed to the centre of the beam at the base of the bob. The apex of the triangle, technically known as the "bishop's head" is connected by a sweep rod with a crank driven by the engine. As the "bishop's head" is swung to and fro the ponderous beam forming the base of the triangle, and resting on the gudgeon, works with a see-saw motion and gives to the plunger of the pump connected with the end of the beam the up and down motion necessary for forcing the water upwards. Some notion of the magnitude of the work may be gathered from the weight of the metal in this portion of the machinery, each piece of which has been cast in a solid mass. The "bishop's head" weighs 2 tons, and the other 2 angular connections are each slightly heavier. The greatest mass of metal is, however, the gudgeon, which weighs nearly 5 tons, and is without a doubt by far the heaviest casting ever turned out of a Tasmanian Foundary. The crank which was cast about 3 weeks ago, weighs slightly over 4 tons. One of the most interesting features of the work is the marvellous accuracy with which these ponderous masses of iron are fitted and finished after leaving the moulds. Altogether it must be regarded as a satisfactory sight of enterprise and progress that such work can be undertaken and executed in Launceston.

October 23.

TGM ordering another 12½" draw lift to work in conjunction with an existing pump set in order to double capacity.

December 3.

The water level reduced to below the No.4 Tasmania plat (200ft) allowing work on that level. Pumping at 12 strokes per minute.

1884

July 29.

The thirteenth half yearly report of the TGM blaming lower grade on constant flooding of the richer stopes in the lower levels at 200ft depth. The Lefroy Shaft is currently being sunk to 400ft to drain the ground below the current stopes.

October 9.

A significant water burst necessitating a 27% increase in pump speed, i.e. from 11 to 14 strokes per minute, occurred when the reef was intersected at the No.5 Tasmania level (286ft).

December 3-12.

Reported that the lower levels, No.4 and 5, still inaccessible.

1885

January 5.

23 miners and 21 truckers were laid off due to the flooding.

January 10.

Development to the west on No.3 Tasmania level intersected more water.

January 16.

Lefroy Company forced to commence baling water to fulfil their obligation as part of the Drainage Union.

January 19.

Development west on the No.4 Florence level (300ft) hits water. The flow here causes almost total reduction of flow on No.5 Tasmania.

January 23.

The previously cracked spur wheel of the Florence engine disintergrated flooding lower levels again.

January 26.

Spur wheel replaced.

January 29.

The mine manager reports to the 14th half yearly meeting that the average pumping rate had been 40,000 gallons per hour (670 gpm) from a depth of 300ft.

February 14.

Florence No.4 still flooded.

February 20.

Another pump breakdown "Yesterday morning the cutter and gib connecting the main rods of the plunger with the nose of the bob broke. The driver being at the winging engine could not stop it before it had done some damage at the nose of the bob, and breaking the strapping plates".

March 14.

Water down to Tasmania No.5 plat allowing resumption of development after six months delay.

September 11.

An adit opening planned to reduce pumping head by 50ft and save 85 tons/week of wood at 5/6 per ton. "Getting stone at

No.5 level under difficulties, the water being within 4 in. of the top of the trucks, this meaning that the men must be working up to their waists in water".

Lefroy pump reported to be still broken down.

October 23.

Water level is 4ft 10 inches on Tasmania No.5 plat and a strong flow coming from the face of an intermediate 25ft above No.5.

1886

January 22.

Lower levels still flooded.

January 29.

TGM reports that their plant of two 12" pumps can deliver 34,600 gallons per hour from 300ft to adit level.

February 12.

Men still working in deep water.

March 19.

Florence resume pumping but shareholders of the TGM, the largest company on the field, are becoming irritated by having to depend on other companies efforts.

March 26.

Suggested that TGM sinking another deeper shaft in order to drain their workings and reduce their dependence on the others. Recommended haulage on the Tasmania No.5 level with 2ft 10 inches of water on the plat. But Florence pump broke down on the 29th halting production until 2nd April.

Only half of total battery capacity in use.

April 2.

Water inflow easing off.

June 4.

Lower levels dry.

October 22.

Lefroy pump breaks down causing flooding at both Florence and Tasmania workings.

1887

February 18.

Florence pump crank broken, further flooding.

March 4.

TGM operations back to normal as neighbours recommence pumping.

April 22.

A "torrent of water" reported flowing from western face of No.7 intermediate, 360ft below the surface.

June 10-17.

All work suspended while TGM, Florence Nightingale and Lefroy overhaul their pumps.

August 27.

Deepening of Golden Gate Shaft abandoned because of water inflow.

December 3.

"The greatest influx ever experienced" from the western workings of the TGM again drives men from the richer lower workings.

December 31.

The latest flooding revitalises the Drainage Union which contemplates further joint capitalisation of a new shaft and pumps.

1888

January 6.

TGM water level being reduced slowly and men have been back in lower levels but a stoppage at Lefroy reverses the situation.

January 27.

Tas No.6 (375ft below G.G. collar) development to the west suffered two "immense water bursts about 400ft west of the shaft.

The pump shaft at the TGM has broken, causing serious disruption.

Directors of TGM going to shareholders on plans to amalgamate with the other Drainage Union partners.

February 1.

New shaft arrived in Launceston on S.S. Pateena, (presumably from Melbourne) and will be fitted into the crank at the Knights and Phoenix Foundry.

March 1.

Production resumes on bottom levels.

March 30.

Lefroy pump stoppage again.

April 28.

Extrordinary meeting of TGM votes for amalgamation.

May 5.

Water under control and development of Tasmania No.7 level 410' below Florence collar underway.

June 12.

Water under control and pumping rates given as

Tasmania	11 3/4	strokes per minute
Florence	7 ½	strokes per minute
Lefroy	6 ½	strokes per minute

June 30.

Three sets of pumps going.

July 5.

The 14" Lefroy draw lift disconnected as inflow decreases.

July 19.

"Perceptible increase in water as expected" on Tas No.7 24ft west of G.G. Shaft.

August 30.

Lefroy pump crank broken again - bottom levels flooded.

September 27.

"From the date of the breakage of crank shaft at No.3 to the commencing of pumping again was 22 days 14 hours and in fifteen days 7 hours we had the water of the No.6 level plat at No.2" (Florence Shaft).

October 26.

Development westward causes further increase in water and all pumps "fully employed".

November 2.

Under hand stoping resorted to above bottom levels as increased flow floods lower haulage levels bailing as well as pumping at Golden Gate and Florence Shafts but bailing at Lefroy during pump breakdown not very successful as the shaft not skidded.

November 8.

No production from Tas No.7 and Florence No.6 (same R.L.) due to breakdowns and "the increase of water from the fissure at No.7 level".

November 27.

Over the past six days the water inflow has subsided and now only 3ft deep on the Florence No.6 plat.

1889

February

Commenced sinking main shaft to house new pumping equipment.

June 20.

On 8th inst. pinion shaft of Lefroy pumping machinery parted which caused a stoppage of pumps consequently very little work has been done at the deepest levels. Have been driving into the upper levels where a large amount of stoping has been carried on. Hope to have new shaft in position and Lefroy pumps in full work again on 22nd and water out of all the deepest levels on or about 29th instant.

July 6.

Production back to normal.

July 27.

At 23rd half yearly meeting "The chairman stated that the actual cost of raising the stone, independent of pumping was 17s 5½d; including pumping it was £1 16s. This would be very much reduced when they had proper pumping power.

August 15.

Slight increase in flow from Florence No.6 east.

November 7.

Extending 12" draw lift from Florence No.6 to No.7 (No.3 494ft level).

November 18.

The No.7 (494ft) x-cut exposed after having been flooded.

November 22.

Men driven out of No.7. X-cut again.

1890

January 1.

Water reduced in Main Shaft (now at 376ft) and also at west end of Tas. No.7 level but 9ft deep on 494ft x-cut.

January 10.

Shifting 14" lift pump from Lefroy Shaft to Florence to try and combat the water. Main Shaft sink still stopped.

January 18.

"The Directors have requested full designs for engines and pumps to lift by double plungers, 24 inch, 4,000,000 gallons of water per day of 24 hours from a depth of 800ft". The likely suppliers are Harvey and Co., Hull, Cornwall, or Hathorn, Davey and Co. Leed. This pump to be installed in the Main Shaft currently being sunk.

January 27.

14 inch lifts running and water down to 494ft x-cut.

February 1.

Bailing water from Main Shaft in preparation for sinking.

February 4.

After cutting the hanging wall section reef on the 494ft level, the inflow required running the pumps at eight strokes per minute for one hour, "the water then eased off to seven and a quarter strokes".

February 5.

The 494ft level is draining the Tas. No.7 level (410ft) at 7 strokes per minute.

February 17.

Cutting the main (footwall reef) on the 494ft level caused flooding of this level.

February 21.

Pumping at all three shafts and bailing Main Shaft slowly reducing water level.

February 25.

Florence - Plunger pole parted but repaired in 24 hours.

March 7.

494ft level exposed again.

March 13.

Slight increase in flow from Tas. No.7 300ft plus west of the shaft.

March 27.

494ft level flooded again due to breakdown.

April 18.

Pump breakdown floods bottom level temporarily.

April 25.

Broken pump rod causes 6 days delay on 494#.

May 19.

Spur wheel pinion and flywheel of the Florence pumping engine parted and will take two to three weeks to complete repairs. Lower levels flooded.

June 4.

14½" lifts purchased from the Tullochgorum GMC (Fingal) to be installed in the Main Shaft to allow sinking to proceed while awaiting new pumps from England.

June 5.

Florence pumps repaired and water level subsiding.

July 21.

Water level dropping at about 3-4ft per day.

August 8.

Miners laid off while lowest level flooded.

August 16.

MACHINERY FOR THE TASMANIA MINE.

The s.s. Federal is expected in port today from London, having on board two of the boilers which are to be erected on the Tasmania mine at Beaconsfield, in connection with the powerful plant specially made to the order of the Tasmania G.M. and Q.C. Company through their London agents, Messrs John Terry and Co.

The boilers are patent "Galloway" steel, and have been forwarded with all the necessary fittings, made by the celebrated firm of Galloways Limited, at their works at Manchester. The weights of the boilers are as follow:- No.7922, 14 tons 14cwt; and No.7923, 14 tons 13cwt 1qr, and are watertight, so as to be floated from the steamer to Beauty Point Jetty at Beaconsfield. The boilers are described as being each 26ft long by 7ft diameter, and will be "capable of evaporating 55001b of water per hour with average coal and draught, which will drive 275 indicated horse with an engine consuming 201b of water per horse-power per hour." They are suitable for 1001b working pressure, the shell plates being ½in thick, with the other parts in proportion. They are constructed of the best mild steel capable of withstanding a tensile strain of 26 to 30 tons per square inch with not less than 20 per cent. elongation in 10 inches. The specifications forwarded by the engineering firm to the directors of the Company give minute details of the length of the shell, the flue, end plates, man holes, stand pipes, and mountings for the boilers, while the firm will be in a position to supply any connecting pipes that may be required without any delay. Messrs Galloways Limited also forwarded certificates that "the boilers were made by them and tested on the 28th day of May by hydraulic pressure to 1501b per square inch and found tight and satisfactory."

The directors of the Company have made arrangements with the owners of the s.s. Federal to deliver the boilers on to the Beauty Point Jetty, and private tenders have been callled for taking down from the steamer which will come up to Launceston. The steamer brings the plates, etc., for Messrs W.H. Knight and Co., of the Pheonix Foundry, who have the contract for the manufacturing of 24in rising main. The special engineer, who has been sent out from England to superintend the laying of the foundations for the machinery, will arrive at Hobart by the s.s. Doric, which is due in about a fortnight. The other boilers will shortly arrive, and will be forwarded to the mine, while the remainder of the machinery now being fast completed will soon be forwarded to the colony. The erection of this immense machinery marks an era in the commencement of prosperity for the district, and it is hoped for the colony at large.

September 5.

Battery idle for lack of feed.

September 12.

Preliminary operations begun at Blyth's creek to divert water from the mine.

September 19.

14½" lifts at Main Shaft commissioned but Lefroy 20" pumps out of action and repairs impossible as the broken part is under water.

October 10.

Reported that the present combined power of all the engines at the mine including winders and batteries is 270 H.P. The new engine from England is rated at 500 H.P.

The effect of diversion work at Blyth's Creek is noticeable in the mine.

October 24.

Main Shaft sink recommenced at 400ft but production still halted.

November 6.

Installation of a 14" pump in Lefroy Shaft is speeding up dewatering.

November 15.

TASMANIA G.M. COMPANY'S MACHINERY.

The announcement made in Thursday's issue of the shipment of the large pumping plant for the Tasmania G.M. Company per the bark Corinth, which left Gravesend on October 2, has been hailed with much satisfaction in mining circles as an earnest of the renewed energy displayed by the directors. The history of the difficulty experienced by the companies at Beaconsfield prior to the amalgamation it too well known to require reference to it at present, while the efforts made by the directors of the amalgamated Company since the publication of the able report specially made on the subject of the water difficulty by Dr. Robertson, M.E., F.G.S., of Sydney has been fairly commendable. There can be no doubt that the recommendations of that gentleman could have been carried out by the earlier suspension of the payment of dividends, but those well acquainted with the later history of the mine will acknowledge that the circumstances which have from time to time arisen fully warranted the action of the directors.

On the date of Dr. Robertson's visit to the mine he had a consultation with the managers of the various companies and examined the machinery then at work, the result of which he embodied in his report afterwards presented to the directors. That report clearly set forth the extent of the difficulty and the gigantic measures necessary to cope with it. One of these was the largely augmenting the then existing machinery on the claims, which, he stated, was altogether overworked, the diverting of the waters of Blyth's Creek, and the filling in of old quarry holes, which were acting like catch dams for rain and other waters, which percolated from these into the workings of the mine, and thus greatly increased the amount of water to be pumped. In 1888 the companies amalgamated for the purpose of carrying out these recommendations, and since then the directors have exerted themselves to get particulars as to the most suitable machinery, and to come to terms with the proprietors of private property, through which the creek flowed. No unnecessary delay has occurred, and now a plant capable of raising four million gallons of water has been shipped for this port from the seat of the greatest engineering school in the world, and it is probable that by the end of 1891 the immense pumping plant will be erected in position at the new main shaft, the waters of Blyth Creek diverted by fluming and other means out of reach of the surface of the porous ground over the workings, and all the other recommendations of the expert carried out.

It is satisfactory to learn that this large plant has been fully purchased out of the profits of the mine, the amount of purchase money being very large.

The machinery, which has been shipped by the Corinth for this port, compriees some very heavy pieces, the whole amounting to 260 tons 1cwt 81b, together with two boilers of similar dimensions to those which arrived by the s.s. Federal. The boilers and fittings weigh about 35 tons, making the total weight of machinery and boilers about 330 tons. The latter are by the celebrated firm of Galloways Limited, and the machinery by Messrs Harvey and Co. Limited, both of Hayle, Cornwall, the whole being constructed to the order of Messrs John Terry Co., London, the agents of the Tasmania Company. The cylinders and coverings are powerfully constructed, while the complete pistons, guides, connecting rods, air pumps, pipes, plates, etc., appear to be of excellent make. The number of boxes of bolts necessary for the erection and maintenance of the machinery is exceptionally large.

Mr Rollason, the construction engineer, who arrived from England some time ago, has laid out the work for the foundations for the engines in a highly satisfactory manner, and work is now being pushed on under his superintendence with expedition. Messrs Harvey and Co. have selected Mr Prior as the most competent engineer to send out to superintend the erection of the machinery, and he is to leave London at the end of this month. He will be accompanied by Mr Rodda, who is to take charge of the pit work.

December 22.

Men cleaning up lower levels as water recedes.

1891

January 1.

TASMANIA MACHINERY.

Mr E.H. Price, manager of the Tasmania Company, has received additional information in reference to the shipment of the machinery for the mine, and Mr C.S. Trevithick, who arrived from England last week, and who is to assist in the erection, has brought out information as to a similar plant now in use in Wales. Mr Trevithick, when interviewed yesterday, showed illustrations and description of the plant and machinery now in use at the Rhymney Iron Mines, reprinted from the *Engineer* of September 19.

The large pumping machinery shown is of a somewhat novel design, and has been constructed by Messrs Harvey and Co., Hayle, Cornwall, England, the contractors for the machinery for the Tasmania mine. The dimensions of cylinders differ little from those already published, viz., 45in and 72in in diameter, and the stroke of the piston 10ft. The cylinders are fixed tandem on a massive cast-iron bed plate, the piston rod of forged steel, and is about 31ft long. This rod is connected to a wrought-iron crosshead working in strong cast-iron guides, to which is also attached the rod connecting it to the pumping quadrants and the lower cheek of the lever for actuationg the air pumps of the condenser. The valve gear is of the type known as the Cornish, similar to that which has been worked on the single-acting Cornish pumping engines. The number of strokes at which the engine may be worked is automatically controlled by a cataract, and the speed varies from 10 to 12 strokes per minute to as slow - if required - as one stroke per hour. This absolute regulation of the speed of the engine between the limits mentioned is claimed to be of great importance in mine drainage, where the supply of water varies greatly according to the season of the year, and is one of the great advantages on this type of engine over all kinds of rotary engines whose limit of speed cannot be less than from seven to eight strokes per minute. "The opening and closing to steam with these valves is extremely rapid in its action, thus preventing wire drawing. The steam valve on the high-pressure cylinder is arranged to cut off at about a quarter of the stroke, thus allowing for 10 expansions, which, with steam at 100lb boiler pressure, gives very good results. The ratio of cut-off may be varied whilst the engine is working. To prevent accidents to the engine by the possible breakage of pump rods or by any undue increase in the steam pressure, the exhaust valve of the high-pressure cylinder is fitted with a steam jacket, the drainage from which is conducted back direct to the boilers. The stuffing boxes are also all fitted with lanthorn brasses and steamed direct from the boiler. The pistons are of the Bickle type, of which Messrs Harvey and Co. hold the patent rights.

The depth of the pumping shaft is 720ft, and the plunger pumps, illustrated to an enlarged scale, have been designed to force the water the whole height in one lift, and two of these, each 20in in diameter by 10ft stroke, are fixed in the sump, being actuated by two lines of rods depending from the pumping quadrants. Husband's patent four-beat valves, made of gun metal, 20in in diameter, are used both in the suction and delivery boxes, the large waterway of these valves obviating the necessity of a high lift, and consequent shock to the valve-boxes. The pumping quadrants are constructed of steel plates 1¼in thick, each arm being in one plate."

The engine is to be supplied with steam from four of Galloway's patent engines at a working pressure of 100lb to the square inch. The capacity of the plant is 4,000,000 gallons per day of 24 hours. The foundations are now satisfactorily progressing, and already those for the engine are completed. The directors of the Tasmania Company are completing arrangements for the delivery of the plant, at the mine, and it is expected the utmost despatch will be used by the staff of men erecting it. The engines are the largest pumping engines yet made, and the total gross weight of each is about 250 tons.

The contractors for the pumping engine having completed their extensive work, the inspection was made by Mr Provis, who passed it as satisfactory. The Hayle Foundry is one of the largest of its kind in England, and is now giving employment to nearly 2,000 men in various departments of mining and general machinery and shipbuilding. In the latter branch the firm has lately built steamers up to 4100 tons, and are now engaged building a steamer of that capacity. The plant is of such an extent as to allow of the construction of two hulls at the same time up to 4000 tons burthen.

January 28.

RECOVERY OF THE LEFROY PUMP.

A letter was received from the mining manager of the Tasmania mine yesterday, conveying the important intelligence that after months of difficult work the Lefroy pump had been reached and work recommenced in the lower levels.

Mr Davies states in his letter that the Lefroy pump was recovered the previous day and two new clacks were put in. The bottom part of the plunger was quite choked with silt and the clacks were in a very bad condition. He adds "we are now cleaning up the well, also the cistern, and when this is completed to-day we shall at once connect the bottom 20in pole, start it working, and commence hauling stone from the Tasmania bottom, No.7 level west, and no time will be lost in getting into the Florence No.7 level."

Last evening Mr R.H. Price, the manager of the Company, received a telegram to the effect that they had started working with the bottom 20in plunger at the Lefroy claim.

March 13.

"Water low in the mine, but the last few feet seem to defy all effects, raising a little stone and despatching to battery. Work in main shaft progressing slowly but surely, water here well under command. Works in connection with foundations for new machinery being pushed ahead, excavating angle (not larger as erroneously printed in my last) bob pit - This is an extensive piece of work an enormous excavation some 20' or 30' deep, to be piled up with brick and concrete work. Preparing site for new chimney stack, engine being slowly got together. The 2 large cylinders arrived yesterday at the jetty, per the S.S. CORRINA, and were landed this morning, are now on the road to the mine and expected this evening. Pumping and bailing at No's 1 and 2, pumping at No. 3 a nice stream of water now being lifted, Pumping at main shaft continues. Battery not resumed yet.

April 7.

Water off the 494ft level and hoisting of ore commenced after eleven months delay.

April 23.

For unexplained reason No.6 and No.7 levels again flooded.

May 21.

Water level reduced to below No.6 level.

June 20.

The Lefroy pump shaft, plummer block and bed plate fractured halting production for six days.

July 2.

The 494ft level still flooded and a minor breakage of the Main Shaft pump reproted.

July 29.

The twenty-seventh half yearly report blamed low production on the "heavy flow of water" from the western workings.

November 26.

"On Saturday, 14th inst, at the Florence shaft tie pin of the bishop head of the surface bob broke; a new pin had to be made, and pumping was resumed on Sunday night. During the stoppage the water rose 65ft. The water is now out and all hands at work below.

December 5.

Production reported from the lower levels.

1892

January 2.

Development of bottom level (494ft) hampered by an increase in water.

January 2-8.

Still no further development on 494ft level, "the water being strong".

January 5.

28th half yearly report

"There has not been much stone taken out of the western part of the mine during the past six months, fearing to open up ground in that direction on account of the water, which is usually heavy in that part of the claim".

It is evident that work to the west was being postponed until the new pumping machinery being erected at the main shaft was commissioned.

February 25.

TASMANIA GOLD MINE.

STARTING THE NEW MACHINERY

(By Electric Telegraph.)

(From Our Special Reporter.)

BEACONSFIELD, Feb. 24.

The site of the Tasmania Company's works was a scene of eager excitement today, and a large number of persons congregated in the vicinity to catch a glimpse of the new and powerful pumping machinery which has just been placed in position. Mr Price (the legal manager) and several shareholders residing in Launceston were present, but had to return to the city in the afternoon without witnessing the completion of a work the construction of which has proved such a heavy undertaking, and which, despite the zealous efforts which have been made, is not yet finished. The constructing engineer worked hard to get it done, but though it may be moved late tonight it is anticipated that pumping cannot be proceeded with until some other preliminary work is accomplished.

Operation at the mine are being continued satisfactorily.

LATER.

About seven o'clock this evening the engine was moved to connect the sweep rod, and acted well under the control of the engineer, working both ways without a hitch. The sweep-rod was successfully connected, and it is intended to have a trial of the new gear to-morrow morning.

February 26.

TASMANIA GOLD MINE.

STARTING THE NEW MACHINERY.

Considerable interest has been taken in Tasmanian mining circles during the past twelve months in the erection of machinery capable of dealing with the immense body of water which has caused a partial suspension of work in the lower levels of the mine during late years. The first time the appearance of water in the workings gave the manager, Mr J. Davis, cause for uneasiness was when the workings had been carried down to the depth of 150ft, at which the volume was tapped, and since then the company has been struggling with insufficient machinery against an increasing torrent. For years the question of overcoming this great difficulty was one of much discussion, and the best available expert advice appears to have been sought by the directors. That advice was clearly in favour of largely increasing the power of the pumping plants. When, later, the matter became still more serious the directors decided to have enquiries instituted as to the most suitable plant, and aided by the London agents of the company, Messrs John Terry and Co., they were soon in possession of full information of the latest and largest plants in the world. After considerable discussion they finally decided, in face of the most serious difficulty, to have erected on the mine a plant similar in size and power to the two plants which had been constructed by Messrs Harvey and Co., of Hayle, Cornwall, England, and which are stated to have no equal in the world.

In the meantime, during these years when the difficulty was slowly increasing, the workings were carried down to deeper levels, while in other portions of the mine extensive operations were carried out. After the amalgamation of the mines the Florence Nightingale shaft was sunk to 486ft, where the greatest difficulty was encountered, the water making from the lode and the country in connection with the reef. In 1889 the main shaft was commenced 10 x 18, and sunk with four compartments - one for pumping, two for winging, and one for man-way - and is 519ft deep. At the 25ft level the two main 24in plungers have been erected, the shaft having been enlarged to 14 x 18 where they are fixed.

The new machinery plant as it has been erected is well worthy of an inspection. The dimensions of the cylinders are 45in and 74in in diameter, and the stroke of the piston is 10ft. On the occasion of the arrival of one of the engineers in the colony at the close of 1890 we published a full description of the engine, which was constructed for the Rhymney Iron Mines, and is similar in every way to that now erected on the Tasmania. That large engine is stated to have given very great satisfaction, and has been working for some considerable time. The cylinders are fixed tandem on a massive cast-iron bed-plate, the piston rod of forged steel, and is about 31ft long. This rod has been connected to a wrought-iron crosshead, working in strong cast-iron guides, to which is also attached the rod connecting it to the pumping quadrants and the lower cheek of the lever for actuating the air pumps of the condenser. The valve gear is of the type known as the Cornish, similar to that which has been worked on the single-acting Cornish pumping engines. The number of strokes at which the engine may be worked is automatically controlled by a cataract, and the speed varies from 10 to 12 strokes per minute to as low, if required, as one stroke per hour. This absolute regulation of the speed of the engine between the limits mentioned is claimed to be of the greatest importance in mine drainage, where the supply of water varies greatly according to the season of the year, and is one of the great advantages of this type of engine over all kinds of rotary engines, whose limit of speed cannot be less than from seven to eight strokes per minute. The *Engineer*, describing the engine - Rhymney Iron Mines - states "the opening and closing to steam with those valves is extremely rapid in its action, thus preventing wire drawing. The steam valve on the high pressure cylinder is arranged to cut off at about a quarter of the stroke, thus allowing for twn expansions, which, with steam at 100lb boiler pressure, gives very good results. The ratio of cut-off may be varied whilst the engine is working. To prevent accidents to the engine by the possible breakage of pump rods or by any undue increase in the steam pressure the exhaust valve of the high pressure cyclinder is placed under the control of a safety cataract, which, when required automatically closes it, thus cushioning the steam on the back of the piston. The high pressure cylinder is fitted with a steam jacket, the drainage from which is conducted back direct to the boilers. The stuffing boxes are also all fitted with lanthon brasses and steamed direct from the boilers." The pistons are of the Bickle type, and the plunger pumps have been designed to force the water the whole height of the shaft in one lift. "Husband's patent four-beat valves, made of gun metal 20in in diameter, are used both in the suction and delivery boxes, the large water way of these valves obviating the necessity of a high lift and consequent shock to the valve-boxes. The pumping quadrants are constructed of steel plates 1⅛in thick, each arm being in one plate."

The engine is supplied by four of Galloway's patent boilers which ere sent out from England, and on being landed on the

Queen's Wharf created much interest amongst the general public in consequence of their immense size. Much difficulty was experienced in getting these into position, owing principally to their removal from Beauty Point to the mine. This was, however, overcome with as little delay as possible, and the building in has been done with much judgment, while the smokestack is a splendid piece of brickwork. The total weight of the pumps and engine alone is estimated at 380 tons, while the rod and plates weighed 80 tons each. All the pipings were obtained from local foundries, including steam, feed, and drain pipings, 12in lifts, main column rods, etc. A peculiarity of this machinery is that there is no gearing attached to it, but the pumps are worked direct by the sweep rod attached to the piston, and this fact created much interest amongst the visitors who have had the privilege of inspecting it.

The delay which occurred in the erection of the machinery has been a topic of discussion for many months, and at the half-yearly meeting of the company anxiety was expressed at the delay. Men who have had any experience in the construction of large machinery will, however, fully understand this delay. The very many heavy pieces which had to be lifted, and the several alterations found necessary during the construction, have caused the work to proceed rather slowly. It will be remembered that the engineers estimated the time which the construction would take at eight months, whereas it took actually twelve months, the machinery having been landed at the mine in January, 1891, and an earnest start made the following month. Complaint was made by the constructing engineers that everything was not ready for them when the machinery arrived, and they say they had to alter their original plans in consequence. Mr Pryor, an old and experienced engineer, and who has been for a number of years employed by Messrs Harvey and Co., was sent out to especially erect the plant, and, assisted by a few picked men, he has performed his work with credit to his firm. On Wednesday evening, about seven o'clock, Mr Pryor gave the engine a turn, and was well pleased with the first movement, and yesterday a still more satisfactory trial was given, pumping being commenced in the afternoon.

Now that the machinery is fairly completed the future prospects of the mine are being fully considered. There can be no fear as to the working of the lowest levels. For the past three years the combined pumping power used on the mine amounted to sufficient to throw one million gallons per day, but now the new machinery, which is 500 h.p., will throw approximately five million gallons, actually 3860 gallons per minute, 230,400 per hour, 5,529,600 gallons per day, at full speed. The Florence Nightingale deepest level, where the great outbursts of water generally occur, is connected with the main shaft, which is deeper, so that an increase of the water at that part of the mine can be at once dealt with. It is understood that the stone will be raised from this portion of the mine at once. It is a fine body of stone, which will give excellent returns. Had this stone been made available at an earlier date the position

of the company would be much better to-day. The many vexatious floodings out of the lower levels gave the shareholders cause for unrest, but now that the mine is making a new start confidence is restored, and the prospects are bright. With a claim containing an area of 93 acres, giving nearly a mile on the course of the reef, with some of the richest goldbearing stone, there is no need to fear at the present for the future. There are at present 48 miles of roads, levels, man-ways, and air passes on the mine, which, considering the many drawbacks encountered, is very satisfactory. The company has a 20-head battery on the Florence Nightingale, and a 65-head battery on the Tasmania. This latter was erected before the company had any idea of the quantity of water which would be available at the low, levels and is situated at about 1¼ miles from the centre of the mine but connected with the workings by tramways. Having erected such a good battery at this spot the directors have not thought it advisable yet to erect another nearer the mine. In a few years when the new machinery shall have wiped out its cost and reduced the overdraft of the company by the saving of fuel (which is estimated roundly at ₹7000 per annum) and in other ways, the question of increased battery power will have to be faced. Every effort should now be put forward / to get out the stone and carry out the exploration of the mine on a more extensive scale. The people of Beaconsfield have made their homes on that picturesque little spot in close proximity to the workings on the strength of the permanency of the mine, and on the assumption that when possible extra labour would be employed. The chairman at the last half-yearly meeting expressed the hope that when the machinery was completed it would mean the employment of more labour - the time has almost come when the directors will have an opportunity of acquiescing in Mr Douglas's desire.

The manager / (Mr R.H.Price)received a wire from the mining manager yesterday afternoon, informing him that the new machinery and pumps were working splendidly.

March 12.

Working day and night to complete work on new pumping machinery.

The Florence No.7 or 494ft level is being developed east and west on hanging wall and footwall branches of the lode. These two faces are described as having "a large body of water making out of the east face 298ft from the shaft" and "a immense quantity of water flowing" from the face 160ft west of the shaft.

March 15.

"All the old pumps were stopped and a permanent start was made with the new pumping machinery, which has been going

steadily since, and doing its work apparently with the greatest of ease, requiring a speed at the rate of only about 4½ strokes per minute to keep the whole body of water under and it may now be safely said that the greatest drawback the Company has had to contend with (the water difficulty) is got over.

March 24.

New pump working at 5 strokes per minute and lifting 1900 gal/min. Therefore 1 stroke/min is equivalent to 380 gal/min.

April 26.

Development west on the 494ft level is allowing the greatest amount of water yet known into the mine. The new pump being run at 7 strokes/min. (2660 G.P.M.)to hold the water.

May 21.

Flow of water decreasing, pump running at 6¼ strokes (2375 G.P.M.).

June 29.

29th bi-annual report speaks of winter rains overflowing creeks and causing average inflows of 3,000,000 gallons per day. The Main Shaft had been sunk to 600ft without encountering significant water.

August 11.

Increased water flow from Florence No.7 west which is nearing the cross course fault. Pumps having been running at 7 strokes or 2660 G.P.M. for the past six weeks.

September 8.

A recently constructed floodgate on the 494 saved the mine from total disaster due to some clack valve trouble and the other pumps being out of commission.

September 22.

Cutting a chamber in Main Shaft for plungers at 605ft. Pump running at 6¼ strokes.

October 20.

Further increase in flow from 494 west 357ft from the shaft.

November 8.

Diversion works at Blyth's Creek quoted at saving up to ½ stroke/minute.

1893

January 25.

The mine manager reports on the pump failure of the previous August.

"On August 20 the main pumping engine condenser rocking shaft perted. There must have been some imperceptible flaw in the shaft before it left the Foundry in England. The parting of the shaft caused a stoppage of 4 days to the main pumps. The water which was unusually strong at the time rose rapidly throughout the bottom levels, and dissolved the sulphuric acids and other impurities which had become precipitated on the walls of the lode and eat away the metal clack beats causing the whole of the clacks (8 in no.) to fail. Wood beats have been put in the clacks, which are now working and doing better than the metal beats."

This is the only mention in all the literature of acid or corrosive water.

March 20.

The only cruching result for the entire year announced "When at Beaconsfield the directors decided to discontinue raising and crushing quartz from the present stopes and continue all operations to pushing on the sinking at main shaft, constructing cistern and other work in connection with the shaft".

It is apparent the lack of development in the period before the main shaft pump was commissioned resulted in this gap in production.

June.

The 600ft and 718ft levels started similtaneously.

June 1.

Floodgates being constructed on the x-cuts to enable the anticipated inflow to be controlled.

Pumps running at 4½ strokes/min (1710 G.P.M.)

1894

January 11.

Cover drilling ahead of the 600ft x-cut. 718ft floodgate is finished.

January 26.

600ft x-cut about 20ft from the lode. A little water from

the borehole which 8ft ahead of the face.

January 29.

Pumping at 4 strokes/min (1520 G.P.M.)

February 22.

Upon cutting the lode at the 600ft level on the 7th inst. a burst of water broke part of the face down. The faced was boarded up and the floodgate closed until the two 24" plungers were connected at this level. Connection of plungers at the 718ft level with the pump rods commenced.

March 8.

Development on the 600 level recommenced. 30ft of the x-cut immediately before the lode required timbering due to danger caused by "the quantity of water making out of the lode".

March 14.

Pumping at 4 strokes/min (1520 G.P.M.)

April 16.

Cut the lode on the 718 level without water inflow.

June 9.

Winzes 36ft below the 494ft level stopped because of water inflow. Obviously these sections of the lode yet to be drained by the 600 level.

June 14.

Pumping at 4 strokes/minute.

July 12.

Water burst from face of 718 west 77ft from x-cut necessitating closing of the flood-gates and regulating flow to the plungers by two valves.

July 23.

Heavy rain blamed for increase make of the mine. Pumping at 7½ strokes/minute (2850 G.P.M.).

July 26.

Water reported to be draining fast from stopes on the 600 level.

August 9.

The pressure on the 718 floodgate considerably reduced. Water still flowing from the bottom of the face of the 600 west.

August 30.

718 floodgate opened.

September 22.

Pump breakdown but repaired quickly.

October 12.

600 west stopped to allow drainage 190ft from x-cut.

December 13.

600 west still stopped.

1895

June 13.

Pumping at 5½ strokes/minute (2090 G.P.M.)

1896

February 22.

General manager states that the sinking of a new shaft to 1500ft should not have water trouble as water came principlly from the lode.

Discussion concerning the main shaft pump which, although guaranteed for 3800 G.P.M. from 800ft, was only good for 3230 G.P.M. as it could not be safely run more than 8½ strokes/minute.

November 26.

Increase in flow from 718 east but not regarded as significant.

1897

June 25.

Water reported to have reduced significantly on the 718 west allowing increased stoping activity.

June 18.

Placing 18" drawlift in main shaft at the 818ft level.

August 19.

Main shaft sink-on halted by pump breakdown.

December 9.

718 west development stopped for drainage 320ft from x-cut.

December 23.

600 west cut water 440ft from x-cut.

1898

January 12.

Water from the 600 west 15ft below the 500 level had been 3ft above the level.

January 18.

Floodgates enabling access to the plungers and clacks in the shaft.

February 15.

Water 45ft below the 500ft level.

February 25.

Half yearly report in part.

"The chairman, in moving the adoption of the reports and balance-sheet, said considerable delay had been occasioned in getting the new machinery ready by the engineers' strike in England, but as that was now settled, the machinery, he believed, would soon be ready for shipment. The most unfortunate thing they had to report, was the burst of water, which took place at the latter part of the year, and which had continued to be a source of trouble up to the present time. It rose 3ft above the top of the drives of the 500ft level, and all the drives there were flooded. But, now it has been got down between the 500ft and 600ft levels, and the manager thinks it will now subside more quickly. Of course, that was only a surmise. The only stone obtainable since the outbreak was the stone left in the levels at a mush earlier date, and it was sent to the battery, and paid more than the expenses of getting and crushing, and one battery had been kept going. A trial had been made with the surface quartz at the Florence battery. What was crushed there last month did not pay; but another month's trial would be made, and if it was not profitable, the battery would be stopped till they were able to get stone from the lower levels. The new shaft up till yesterday was down 613ft. There had been some delay there too, but permanent poppet legs had been erected by the company, and would be ready for the new machinery when it arrived.

Mr. L. Jolly seconded the motion.

In answer to questions, the chairmain said it was impossible to say how long it would be before they would be able to get into the 600ft level. This was the worst burst of water they had ever had, but they were in hopes it would be

got under at an early date. The water was so highly mineralised that they had to stop every week to clean out the tubes of the condensers.

May 19.

Water 102ft below 500 level.

June 9.

Cleaning up 600 level.

August 25.

Clearing 718 level.

September 9.

Hart Shaft hit water at 717ft. Stopped pending erection of pumping machinery.

October 25.

TASMANIA GOLD MINE.

ATTAINED ITS MAJORITY

REMARKABLE SUCCESS

Just 21 years ago this day, Mr W.D. Grubb and the Hon. William Hart gave £5000 for Messrs. Dallyclaim at Beaconsfield, the vendors retained a one-tenth interest in any company that might be formed. Gold had been discovered in the previous June, and the initial work showed that the property was a very valuable one.

Immediately after the purchase a company was formed with capital of £15000, in 3000 shares of £5 each, the first shareholders being as follows - Messrs. Wm. Dawson Grubb, Newnhan, 1050; Wm. Hart, Launceston, 675; Wm. Hart, jun., Launceston 835; F.W. Grubb, Launceston, 100; C. Grubb, Newnham Hall, 100; Job Dally, West Tamar, 60; Wm Dally, West Tamar, 60; John Dally, West Tamar, 60; James Dally, Launceston , 60; David Dally, Launceston, 60; 3000. Mr. Robert H. Price was appointed legal and Mr. Joseph Davies mining manager.

Since then the company has had splendid record. The product of the mine paid its way, except for a short period. The mine is now well equipped with battery plants and is about to have a second set of powerful pumping machinery on it. It has already given 368,575 tons of stone for 434,857oz. of gold, being an average of 1oz. 3dwt. 15gr. per ton. The gold was valued at £1,578,300 out of which £673,071 15s has been paid in dividends. The capital of the company at present is £300,000, in 60,000 shares of £5 each; and the area of the property is 112 acres, with 4000ft. on the line of reef.

Mr. Davies, F.G.S., the general manager, has everything on the mine in splendid order, and he has shown excellent judgment in the development of the property. He has taken a great personal interest in the mine and has won the confidence of all connected with the mine.

THE MINE.

A well-known correspondent of the "Mining Standard" some time ago wrote an able description of the mine from which the following extract is taken:-

The whole Beaconsfield district appears to be strongly faulted by several large cross-courses, and serious heaves are therefore to be anticipated when working the lodes. These faults may be, in a great measure, the cause of the heavy inflow of water met with in the big mine.

The Tasmania reef is a strong lode averaging six to eight feet in width but varying from perhaps two feet to twenty-five and thirty feet. "Horses" of sandstone are very common in it, often dividing a hanging-wall and a footwall lode for considerable distances. Where the branches unite at each end of the "horse" the lode is usually wider than 15 to 25 feet across. The points the "horses" are very frequently full of auriferous quartz leaders so they are mined and sent to the Stamps. On the Florence Nightingale section, in the upper levels, the reef branches going eastward into apparently two lodes, the "North" and the "South Stone," as they were called. At the 600ft. level, however, these have united, and formed a splendid reef, and it would seem that the branching into north and south lodes was really only the occurence of an unusually large "horse." Lately a parallel reef has also been found near the hanging-wall, some two feet in thickness, opposite the Florence shaft, and in the east end, at the 600ft level, there is another in the footwall. Owing to the occurence of these parallel veins, and the frequent branching of the lode, a good deal of crosscutting is necessary, and probably more than has been done could be effected with advantage.

Above the 400ft. level the quartz was in the whole very free from sulphides, and the gold easily amalgamated, but in the lower levels there is a great deal of pyrites, with some copper pyrites and blende. In parts of the lode there are very curious nodular masses of siclerite and pyrites, extremely hard to break. The pyrites and other sulphidesare very generally auriferous, and much attention is now being given to saving them, as will be seen later when describing the mill.

There are four main shafts from which the mine is worked, not counting the one on the Dally's United section, and one on the Pheonix block, from which the reef has not been reached. The Golden Gate, Florence, Nightingale and Lefroy shafts were originally sunk by the companies of the same names before the amalgamation with the Tasmanian Company. The Golden Gate shaft and Lefroy shaft are not now used but

the Florence is kept for sending down timber, etc. Previous to the amalgamation all three shafts had pumps in them, the Lefroy being the principal drainage shaft, but when down to about 450 feet it was found impossible to get columns into these comparatively small shafts (the Lefroy was 12ft by 6ft, however) sufficient to raise the water. A new main shaft was therefore, put down, 18ft. by 9ft. inside the timbers, with recesses for the plungers 26ft. by 16ft. This shaft is 723ft. deep, and levels are opened from it at 717ft. (No.5 level), 601ft. (No.4 level), 494ft. (No.3 level), and the (No.2 or adit level). No.1 level is a short distance above the adit, sufficient to allow of filling the hoppers from which the quartz is drawn to the tramway trucks, which take it to the Tasmania battery. The ground above the No.3 level has been worked from the old shafts, and the levels are numbered from No.7 (406ft. Florence equal to 414ft. main shaft).

In the main shaft there are two 24in. wrought-iron columns and three sets of plungers, the bottom lift being a plunger, and not a draw-lift. The water is raised 670ft., from the bottom of the shaft to the adit level. To work the lifts there is on the surface a very large pumping engine (by the Harvey Company of Hayle, Cornwall), with two cylinders placed tandem fashion horizontally, the high-pressure cylinder being a 45in. diameter, and the low pressure one 72in. These are supplied with steam from four Galloway boilers, 15ft. (?) long and 7ft. 6in. in diameter. The lifts being balanced one against the other there are no bob-chambers required in the shaft. When first obtained the engine was stated to be able to make 10 strokes a minute on the full stroke of 10ft., and to be capable raising the water a total distance of 800ft or about 130ft. further than at present. Its performance has not, however, come up to the estimate, and is not considered safe to work above ten strokes a minute, on a reduced stroke of 8ft. 11in. When the writer visited the mine the speed was six and a half strokes, and the plant was raising a little over 2000 gallons of water every minute. This enormous quantity of water may be more thoroughly envisaged if we say that it is a little over 13 Tasmanian sluiceheads and would be a supply sufficient for a fairly large hydraulic sluicing claim. The water runs into two large dams, from which supplies are drawn for the Tasmania battery. From the higher reservoir a line of pipes runs to the battery, and feeds impact water-motors, which power the Luhrig vanners and an electric lighting installation. The flow of water is thus utilised to a considerable extent.

Underground, the flow of water in the bottom level is quite a striking spectacle, gushing out from the face in a foaming cataract. When the writer saw it the west end of the 718ft. level had had to be faced up with boards backed with loads of rocks, through which the water issued in a roaring torrent. In the east end, at the 600 level, the water was also spouting from a crevice in the hanging-wall in a jet the size of a man's leg. The enormous flow of water had high cost of the gold won as compared with others which have less serious quantities to contend with. The inflow in the east end probably comes mainly from the "deep lead" overhead, that from west end it is not easy to explain the great flow of water has always been met with

in the west and at each lower level it comes more and more to the east, the line at which it is met with dipping very much the same as the strata of the country. The reef itself is not particularly wet until this line is reached, and then the main flow is from the hanging-wall, so it would seem pretty certain that it is really a channel of very much jointed and shattered country that brings in the water. Possibly the big faults traversing the district act as main water conduits, and thus from them to the reef through broken, jointy country. The probability of cutting the water-bearing stratum some 200ft. below the bottom of the present shaft is one reason for the proposed sinking of a new main shaft further east, instead of deepening the existing one.

The bett of limestone east of the workings has a very probably much to do with the influx of water. It is visible southward for over a mile near the Blyth's Creek, and all along its course a series of subsidences have taken place caused by the collapse of underground caverns as they have been emptied of their contained water by the draining of the mine pumps. At the Blyth's Creek it was noticed that at one time the whole stream disappeared into one of these subsidences, and it was necessary to flume it over the disturbed ground.

The Tasmania reef has been remarkable for the uniformity with which it has been gold-bearing. Above the 500ft. level it has practically all been mined out, only one or two quite small patches having to be left as too poor to take out. In the bottom of the mine good stone is [illegible] proved for a length of some 1400ft., and the average length worked in the upper sections must be quite 1000ft. Though the stone has nearly all been worth taking out there have been several richer shoots in it, which have brought up the average value of the quartz to the unusually high figure of 25dwt. to the ton.

1899

February 23.

42nd half yearly meeting. Some acrimonious discussion about the fact that the Hart Shaft, being only 17' x 5' inside the timber, will be too small to allow installation of the sized pumping equipment required. Some red faces no doubt. Eventually the Hart Shaft was stripped out to 17' x 7¼".

June 29.

Re-erection of the Hart Shaft pumping engine to allow further sinking.

August 31.

718 level cleared of water after previous but unreported flooding.

September 22.

Winzes below 718 west down to water level between 34 and 20ft.

October 6.

Hart Shaft almost dewatered and work to recommence.

November 3.

Excavations being made at the 600 level, Hart Shaft for Reidler pumps (steam driven)

1900

January 26.

718 flooded for about eight days due to stoppage of pumps.

February 27.

Directors' Report

It is hoped that the hydraulic pumping plant will be started within a few weeks. At is was considered probable that this pump might increase the quantity of water to be raised from the 718ft. level to an extent beyond the capacity of the main pumping engine, your directors decided upon assisting the latter with a Riedler pump. The first Riedler pump to arrive will therefore be fixed in the main shaft, another having been ordered to supply its place at the new shaft.

March 2.

The Hart Shaft now at 751ft, the shaft now being sunk at the larger size of 17ft x 7ft 4ins.

March 15.

Hydraulic pit work on the 818 level obstructed by water in the main shaft.

March 22.

718 west work suspended at 410ft for drainage.

March 29.

Increased flow from 718 level and 600 level hindering work on 818 pitwork.

032

April 19.

818 x-cut started.

May 10.

Trial run of hydraulic pumping engine on 818.

May 17.

Hart shaft down 807ft with little water problem.

June 15.

Constructing 818 floodgate.

July 12.

Installing plungers at 800ft, Hart Shaft. At this time Hart Shaft completely independent of other workings.

October 8.

Reidler engine and pumps at 718 level running permanently relieving the main pump.

September 13.

Lode cut on 818 level.

December 13.

Development both east and west on 718 stopped for drainage.

December 25.

TASMANIA GOLD MINE.

A SPECIAL REPORT.

Mr. Joseph Davis, F.R.S., general manager of the Tasmania Gold Mining and Quartz Crushing Co., has furnished to the chairman and directors a special report on the company's mine at Beaconsfield.

It reads as follows:-
Gentlemen,- Having had under careful consideration the future working of the mine, I have much pleasure in submitting to you the following general report:-

Blyth's Creek.-During the coming year it will be necessary to expend about £100 at Blyth's Creek, chiefly in clearing the creek from the gorge to over one mile downwards, and so prevent the water filtering through the fissures into the limestone formation, which is connected by discolated country with the Tasmania mine,

Water Pipes.-Pipes to convey pure water from the new reservoir to the mine should be constructed as soon as possible. The surveyor has been ordered to take levels of distances for this work.

Air Blower.-In order to facilitate the extension of the 600ft. and 718ft. levels westward, also assist in the ventilation of the levels now being opened up, I would suggest that we procure at once a modern air compressor of blower.

Main Shaft.-Water-It is my intention to flume the bottom of the 818ft. level, as the lode is opened up east and west of the crosscut, and so facilitate the sinking of shaft by keeping the water up from the next level beneath. I may say I adopted this plan at the 718ft. level, which proved successful, in allowing me to sink several winzes and take out quartz under one part of the level. I want to sink the

shaft 83ft. deeper; this will give us another 100ft. level and 10ft. of a well.

Pit Work.-The hydraulic pit work should be extended to the 918ft. level, crosscut and flood-gates constructed, and lode intersected. This work should be completed in about 10 months from the date of starting.

Sinking.-New Main Shaft (Hart)-If sinking operations go on as they are doing at present I expect to reach the 1200ft. level before the end of the year 1901. I would suggest that upon reaching this depth the chamber be cut, flood-gates constructed, and lode intersected, after which lock up flood-gate and proceed with sinking soon as possible. This should be done every 100ft. down to a depth of, say, 1500ft.

Work Suggested.-The Reidler pumps now on the works, together with the present machinery, should enable us to sink to this depth. By adopting the above plant the strength of the water would be tested, and the width and quality of the lode ascertained.

Pumping Machinery.-In view of the recent falling off in the volume of water at the 818ft. level, I would suggest that the permanent pumping machinery be not ordered or decided upon until the lode is opened up at the main shaft, 918ft. level, and the strength of the water known. In the 818ft. level, main shaft, I have driven upon the lode for over 200ft. with just sufficient water to keep an 18in. pump working. However, when the machinery is ordered its capacity should be such as would raise more than the anticipated volume of water from the 1500ft. level, so that the mine could be worked and levels economically and conveniently opened up, regardless of any bursts of water.

Water.-My experience in the past (down to the 718ft. level) is the deeper I have got the more water I have had to contend with, but there is a possibility of the water taking off at a depth.

There is unquestionably much less water at the 818ft. level (so far opened up) than there was at the 718ft. level. About 50ft. west of crosscut in this level we had a strong burst of water, also one at a point 280ft. west of crosscut. At the 818ft. level the former burst disappeared, but whether we will get the latter remains to be seen.

At a point 400ft. east of crosscut in the same level we also had an immense burst of water, but I am inclined to think that as the workings are deepened eastward the water will probably take off, as we are getting well under the alluvial gutter or ancient water channel, which extends S.E. towards the Blue Tier Range, and N.W. towards York Town. There is no doubt but what we have drained the country for miles through this channel.

1901

February 1.

818 west suspended 150 from x-cut for drainage commenced x-cut at 1000ft from Hart Shaft.

March 15.

Water flow in 1000 x-cut reported to be slowing.

July 11.

1000 x-cut making more water.

July 25.

818 east stopped to allow drainage.

August 22.

818 east re-started.

August 30.

Half yearly report - Water inflow decreasing. The hydraulic pump had not run for six months and one 18" sinking pump the 818 level was capable of handling water from bottom level development.

December 19.

1000 x-cut water leaking through joints in face at 247ft.

December 31.

818 west at 170ft close to the point of the burst on the 718 above.

1902

January 3.

Reidler pumps being lined up on the 600 level, Harts Shaft. The shaft centres had to be stripped out to allow the pumps to be lowered.

February 13.

Water burst when the hanging wall lode intersected on the 1000ft level. At this time the Main Shaft pump was down so that the pump rods could be shortened to allow for ground settlement over stoped areas.

February 21.

Directors report an 8% reduction in water pumped over the past six months.

March 6.

1000 x-cut continued.

April 17.

Flow from 1000 x-cut easing.

May 22.

Last report of work on the 1000ft level.

June 5.

Reidler pumps in Hart Shaft given a weeks trial.

June 12.

"Getting hydraulic pump into constant running order". (apparently anticipating an increased flow).

August 21.

1000 level development recommenced.

August 28.

Heavy burst on 1000 west filled the shaft to 800ft (however no connection with main workings yet).

September 25.

818 west stopped for drainage.

October 11.

Water at 1085ft in Hart Shaft. Floodgates opened for 15 minutes allowing water to rise to 3ft deep on 1000ft plat. (calculated inflow of 3510 G.P.M.) High pressure steam being supplied to Hart Shaft winder for bailing.

1903

March 5.

Developing new pump chamber on 1000 level.

March 7.

TASMANIA G.M. COMPANY

AN IMPORTANT DECISION.

NEW PUMPING PLANT ORDERED.

TO BE MADE IN ENGLAND.

The following official memorandum was supplied to us yesterday by the legal manager of the obove company:-

Steps have been taken by the directors of the Tasmania Gold Mining and Quartz Crushing Company, Registered, in regard to the supplying of a new pumping plant as follows:-

Complete plans of Hart's shaft, in which the plant is to be placed, have been sent home to be laid before the leading makers in England and the Continent by the company's London agents, Messrs. John Terry and Co., 7 Great Winchester-street, London, E.C., for their proposals to supply a plant to deliver 8,000,000 gallons per day, with a minimum daily continuous flow of 4,000,000 gallons. The plant is to include sinking pumps of 3,000,000 gallons per day capacity, which are to be placed in the 1000ft. level to deliver to the main Cornish engine to assist the other plant until such time as the development work is well ahead of the battery requirements of at least 1200 tons per week.

With the plans, full descriptions prepared by Mr, C.F. Heathcote, the general manager, have been sent, and these have been carefully considered by the directors, the wording being so altered and amplified as to leave no ambiguity that would cause delay.

The large increase in plant has been decided on to prevent as far as possible, any delay in future from bursts of water. It will be in two, three, or more units, and if it is proved that the water eases off as depth is attained these units will be used at lowere levels.

The specification of requirements calls for firm guarantees of steam consumption per unit of water lifted to surface and for punctual delivery. Proposals will be submitted to one of the leading mining engineers in England for his advice, and will then be examined locally, and the order cabled. As soon as the order is sent foundations and buildings will be started, and should be complete before the plant reaches Tasmania. Excavations below ground will also be finished. The time of completion of the plant, therefore, depends entirely on time of delivery by the manufacturers. The plant is to be of such a type that it may be added to indefinitely as depth is attained.

March 15.

THE TASMANIA MINE.

ITS PRESENT POSITION.

REPORT BY THE GOVERNMENT GEOLOGIST

MORE POWERFUL PUMPING PLANT REQUIRED.

The Secretary for Mines (Mr. W.H. Wallace) has forwarded the following report by the Government Geologist (Mr. W.H. Twelvetrees) on the present position of the Tasmania mine:- Agreeably to your instructions, I proceeded to Beaconsfield on April 30 in order to carry out the wish of the directors of the Tasmania Gold Mining and Quartz Crushing Company, Registered, that I should examine the mine and give an opinion upon its present state and requirements so far as these relate to the special reports recently furnished by the general manager.

The handling of the water in the reef has always formed a serious task. For the last nine years, since the cutting of the reef at the 600 and 700 feet levels, three million gallons per 24 hours have had to be raised, the water-level being lowered about 25ft. per annum. In driving on the reef at the 1000ft. level a burst of water took place in August last, which stopped work there, and increased the water raised in that half-year by 240,000 gallons a day. The sinking plant in the new main shaft was unable to cope with the increase of water, which rose in three days to the 818ft. level, and which at the present time appears to be standing at about 64ft. below the 818ft. level. Under these circumstances the company has to decide whether to attempt to overcome the water for a time by readjusting the pumping plant of the different shafts, or to provide for a fuller and more economical development of the mine by the installation of plant adequate to both present and future requirements.

Water.

The water now apparently stands at about 64ft. below the 818ft. level, having been lowered by the vertical distance during eight months' pumping. The history of the mine is that in the course of driving on the reef intermittent bursts of water occur, followed by easing off after draining away the influx. A heavy burst took place about six years ago in the 600ft. level, when it took nine or 10 months' pumping to drain the water, which rose above the 500ft. level. At the 718ft. level west a burst stopped developmental work in that end for nearly three years. In the 1000ft. level, last August, the water broke out of the face, filling the drive, and rising in the reef to the 818ft. within the space of three days.

Much of the country driven through is open and fissured, affording numerous channels for the passage of water, which flows into the levels by tricklings, or even strong gushes, as driving on the reef proceeds. As the reef traverses the strata, it naturally collects the water along its walls, and often receives it into friable or fissured portions of its own substance. The tighter parts of the reef and strata hold back the water till it is suddenly released by driving, and sometimes with inconvenient results. A good deal of the water may have found its way thither from the main cross-course, which in its turn received it from the limestone beds at each end of the mine, though I am inclined to believe that the Blyths creek or eastern belt of limestone is responsible for most of it. Limestone is the most soluble rock in the district - the subsidence of limestone country in the neighbourhood of the mine, presumably -

though the Tasmania drainage is well known. The burst in Dally's United proved the limestone line of country to be heavily charged with accumulated water, and the east end of the Tasmania mine used to be wet, though most of the water has been in the western part. Although the mine is so near the Tamar, the water is not an infiltration from the river, as the strata are dipping towards the latter, and not away from it. The drainage of the Little Wonder mine strata by the Tasmania shows some of the flow to have taken place from that direction. The Tasmania water-logged strata may be regarded as a channel of rather open country, running north-west and south-east, flanked by a highly permeable broken sandstone and limestone belt on the east, and less previous slates on the west. Unfortunately, the store of underground water in the reef-channel shows at present no indication of approaching exhaustion. The signs of drainage of the surrounding country encourage the hope that the continued pumping is having some effect on the great subterranean reservoir. The subsidence of some of the limestone country appears to be due to the work at the Tasmania, but some of the superficial drying up of swamps, etc., may be due to the succession of unusually dry seasons during the better part of the past decade. The constant pumping certainly is lowering the level of the ground water in the mine. The permanent ground water in any district is the residue of the rainfall not discharged at lower level, or by streams or by evaporation, but percolating downwards through the strata until it is arrested by some impermeable rock. It then becomes stationary, or moves gently in the direction of easy flow. In the Tasmania there must come a time when, at an increased depth, the country will become tighter, the fissures which now act as water conduits will close up, and the rock will be found comparatively dry.

How soon this will happen cannot be predicted; it may be at no great depth below the deepest level, or a good deal lower. But, obviously, it would be unsafe to lay out the work of the mine on the assumtion that the water will henceforth begin to be a negligible factor.

There is therefore nothing for it but to proceed steadily with the attempt to obtain command of the water, under conditions that will admit of profitable working. It is possible that, by readjusting the present plant, the normal water store may be handled, and work, after a certain delay, and at an undesirable cost, be carried on for a time as now; but this expedient would be temporary, and sugject to the following drawbacks:-

(1) Although the normal water supply could be controlled, the same liability to heavy increases would continue as at present. (2) The average crushings for the last five years have not exceeded 30,000 tons per annum (the highest, 34,389 tons, last year). The standing charges can only be reduced by increasing the output, and opening the mine by two levels at a time. (3) In a few years the present state of things would recur, and the question of providing permanent plant would have to be faced, with this serious

disadvantage, that there would be no proved reef underfoot, as now, to rely upon as the warranty for future expenditure.

The present pumping machinery is distributed between Hart's shaft and the main shaft. At the main shaft the Cornish plant (two 24in. columns with three sets of 24in. plungers), of 3,500,000 gallons capacity, raises from the 718ft. level the water delivered to it by two 24in. hydraulic pumps at the 818ft. At Hart's shaft the water is raised to the 600ft. level by a Cornish plant (of 1,000,000 gallons capacity), and then transferred to the main shaft, 718ft. level, whence it is pumped as mentioned above. The pair of Riedler pumps (each 500,000 gallons capacity) are used as auxiliaries during stoppages. All these plants, as the general manager points out in his last half-yearly report, are dependent on one another in such a way that if any stoppage happens to one of them the output of ore is immediately affected.

The water at present being raised each 24 hours amounts to something less than 3000,000 gallons. Any new scheme for equipping the mine with a permanent pumping plant for continuous work, regardless of water, and on a scale commensurate with the requirements of the mine as a dividend-paying concern, must provide for a pumping capacity of from 6,000,000 to 8,000,000 gallons per day. Discussion of the particular description of plant, and of its motive-power, is not within the scope of this report.

From my examination of the mine, I arrive at the conclusion that it can only be worked to advantage when it is equipped with appliances for raising the quantity of water indicated in this report. It has been shown to me that for this purpose the directors have invited competitive designs from large manufacturers of pumps and machinery in Europe, America, and Australia; and I understand that tenders for plant, based upon the full requirements of the mine, are now due at the office of the company's London agents. In order that the best engineering advice may be secured, the designs submitted will, I am told, be referred to the most eminent professional authority available in London, and that the final order is only to be given after the guidance of such opinion that this is a highly judicious and effective safeguard.

March 22.

THE TASMANIA MINE.

REPORT BY THE GENERAL MANAGER.

Mr. C.F. Heathcote, general manager of the Tasmania Gold Mine, has prepared a special report on the property.

Mr. Heathcote concludes his exhaustive account on the geology of the mine as follows:-"The combination of hard bands of country, with hard bands in the lode, forms natural 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 ot 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 (limestone, 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" it 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 one-sixth of the rainfall over 10 square 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 this opinion that the above may be taken as a fair average for purposes of calculations."

Water to be Pumped from the Mine.

The whole of the country is saturated with water, and the propositions to be dealt with may be compared to the pumping out of a large cistern filled with broken stones, width about 1 mile, length 8½, or perhaps 10 miles or more, and depth for all practical 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 drained. There is a daily flow into the 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 12 years the water level has been lowered 300ft., or at the rate of 25ft. per year, by pumping about three million gallons per day; while the output has been 25,000 to 30,000 tons of quartz per annum; an output 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 calculating 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 400ft.; these will on arrival be placed at the 1000ft. level to deliver up 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 1000ft. level, in order to place the company on the dividend list as early as possible. It is estimated that a plant of such capacity will cost, erected and running, £85,000, but to cover all contingencies a sum of £100,000 is required.

July 30.

818 west stopped at 740ft for drainage.

August 20.

Rising from 1000 level to 818 level on lode re-started. Still bailing water from Hart Shaft.

October 1.

Stripping Hart Shaft to 17' x 7¼" inside timber commenced to allow installation of new pumps.

October 8.

1000 level floodgate closed for 7½ days.

October 22.

Floodgate still closed.

October 29.

Floodgate opened for 4 days then closed again.

December 21.

First new pump to be delivered in 5 months time.

1904

January 14.

Water level down to 866ft in main workings.

February 5.

The Cornish pump plant - When speaking with regard to the new pumping plant to enable the company to operate at a depth. It will cost £45,000 - the chairman said it was ordered in three separate units, the first of which is to be delivered f.o.b. in this country five months from the date of order in November. At the present time the mine has two working shaft, called respectively Harts shaft and the main shaft. By the enlargement of Harts shaft the first unit of the Cornish pumping plant can be placed there, and this work is now in a forward state and should be completed in good time before the plant reaches the mine. For the reception of the other two units, and for the efficient working of the mine to greater depths, a new shaft will be commenced shortly, and sunk with all possible speed. In addition to the pump and capstan departments in the shaft, provision will be made for large cage roads for the haulage of ore and for taking the miners to and from the underground workings. New winding engines, capstan engines, boilers, pit-head gears, and other necessaties will be supplied, and these have been receiving the close, attention of the board in conference with Mr. Heathcote, the mine manager.

February 11.

Pump breakdown allows water back up to the 815 level. Pumps being coupled to allow sinking of the main shaft to the 915 level.

June 28.

"Hart shaft - A breakage of pump rods has delayed the work of enlarging the shaft for plunger chambers, and the consequent rise of water below the 815' level has practically stopped all developement work during the last fortnight; repairs were effected and the water has now been reduced to the former level. Main shaft - Sinking has not been resumed, the suitable tackle for the 18" drawlift is not obtainable in Australia, it is therefore being made in the company's workshops."

July 12.

Main shaft 14" drawlift replaced with 18" model. Blyth Creek - winter floods reported to be cutting towards the limestone quarries.

September 20.

915 plat excavation stopped by pump breakdown.

December 13.

915 west development stopped at 75ft for drainage.

1905

January 10.

Additional 14" drawlift installed at the 915 level, main shaft.

February 6.

New pumping plant: - Beaconsfield Sunday:-The new pumping plant at Harts shaft, Tasmania mine, was started at 9 o'clock on Saturday evening, and worked smoothly from the first stroke. After about an hour it was found that some grit had got between the pump rods and guides, necessitating a stoppage till 12.30. Then another start was made, and it has been working perfectly ever since. The plant is believed to be the most powerful in the world, developing about 700 horse power, with 1000' lifts, capable of developing 1400 and raising water 2000' by 20" lifts. The new Badcock-Wilcox boilers, which supply the steam, are also working most satisfactorily. Altogether it is one of the most up-to-date plants in any part of the world.

February 21.

Enlargement of Hart shaft completed to surface.

April 18.

Old pitwork and Reidler pumps completely removed from Hart shaft.

May 16.

Main shaft - Hydraulic and Cornish pumps stopped for alterations.

May 23.

TGM - Breakdown of Pumps:- There is a breakdown in the main shaft pump clack piece at the 900' level, which burst on May 19. A breakdown also occured to Harts shaft pump at the 1000' level. The footpiece rising main burst on May 21. Half the main shaft pump is working and the baling tanks are holding the water. Am pushing on repairs with vigour, and expect they will be finished by the end of the month.

FURTHER PARTICULARS:- An accident happened at the Tas mine late on Saturday night. The footpiece of the pump column burst in Harts shaft, at the 1000' level. It would not have been so serious, but owing to the breakage in the clack-piece of the main shaft pump nearly all the water is going into Harts shaft. Most of the underground men were sent home. The hydraulic pump in the main shaft is being brought into requisition and baling is proceeding with tanks in Harts shaft, where there is on of the finest winding engines in Australia; but unfortunately the shaft is boarded over at 1000' and this prevents the tanks going below the breakage. It is hoped the hydraulic pumps will lift the water sufficiently to enable the main pump to raise it to the surface, to allow the clack to be repaired, and ease the water in Harts shaft.

September 5.

915 west reports heavy flow at 235ft.

October 20.

TGM - Some interesting details regarding the TGM writes "Observer" in the "Mercury" brought out by the select committee appointed by the Company. For instance, it was ascertained from Mr. C. Heathcote, (Supt. of Mine) that for every ton of quartz raised the company has to raise from 100 to 150 tons of water. They have to hoist to the surface about 17,000 tons of water per day, or 6,205,000 tons per year. It is estimated that as the shafts are sunk they will have to hoist 26,780 tons of water per day. The cost of pumping is being gradually reduced, and comes to over £22,000 per annum. The old company pumped about 3,000,000 gallons per day and their output was about 23,400 tons per annum. In order to obtain an adequate profit for the capital invested by the new company they will require to raise 90,000 tons of quartz a year, and they calculated upon pumping 6,000,000 gallons of water daily, although the plant is capable of raising 8,000,000 gallons daily. The present pumping plant will take them to a depth of 2000'. At the present rate, if they got to a depth of 3000', the cost of pumping the water would be so great that it might

not pay to continue work. The company calculates that when their plant is in full swing they will make a profit of £90,000 a year. Mr. Harold Evers, the registered agent of the Co. in Tasmania, informed the committee that of the £180,000 placed to working account by the new company, £165,000 had already been spent. Still as the working account is now showing a good profit, the company should be able to take the further expenditure necessary for the plant out of the mine.

November 4.

Water out of 1100 level after installation of 14" bucket lift.

1906

July 2.

"Through the breaking away of Blythes Creek a large volume of water has found its way into the mine. All pumps working at full pressure. Work will be retarded for next few weeks Fluming is now being carried out at Blythes Creek in order to carry the water away and prevent a recurrance of the trouble. Last weeks flood of the creek was the highest on record.

July 3.

Floods - heaviest floods ever known here. Blythes Creek deviation channel broken into limestone depressions. Details contained in Mr. Frechevilles report on the mine: 150 men employed repairing. Water likely to make its way slowly to the mine. May be necessary to use baling tanks at Hart shaft.

July 7.

Blythes Creek - large proportion of the water which had been flowing into the limestone quarries has now been turned into its proper channel. Baling tanks at work at 1000ft. level of Hart shaft.

July 10.

Hopes entertained that the mine will soon be unwatered.

July 13.

Per cable to London: After remaining stationary twelve hours on July 7, water has risen to 826ft. level. Total quantity of water pumped per day now 5.700.000 gallons, inclusive of baling tanks. Placing pitwork 1000ft. level Grubb shaft.

July 17.

THE TASMANIA MINE.

INTERIM PROGRESS REPORT.

The following interim progress report for July from the Tasmania mine has been sent to London:-

Grubb Shaft.- Concreting at 400ft. for balance bobs continued. All work has now been suspended underground. On June 25 the heaviest floods ever known in the district caused the deviation channel of Blyth's Creek to overflow its banks and all protective dams at 3 p.m. By 5 p.m. the average depth of this overflow was 2ft.; 60 men were employed to raise the height of all the dams with sand bags and earth. About 11.45 p.m. all dams had been raised and overflow water stopped. Five minutes later the weakened bank of channel gave way, and one whole of the flood waters rapidly cut a wide channel to the limestone quarries. On June 26 tree butts 65ft. long were placed across the opening, the ends being strengthened by sand bag buttresses, and the logs held in place by wire ropes. On June 28 sheet piling was completed, and the flow of water stopped by some thousands of sand bags at 7.45 p.m. At 8 p.m., before it was finally strengthened, the pressure of water carried away sheet piling and sand bags, and swept a large part of them away into the caves. At 10 p.m. a deviation cahnnel and two dams were started; all carpenters were started on framing and fluming; the saw-mill was started cutting planks and boards night and day. On June 29, at 8 a.m., deviation of flood waters to a quarry further south were completed; at 5 p.m. the first frame set for fluming was placed. On July 3 400ft. of fluming 14ft. wide by 12ft. deep was completed, and partly puddled on sides. On July 5 600ft. were completed, the latter portion being 14ft. wide by 9ft. deep. On July 6, at 10.45 a.m., 940ft. of fluming were completed, and one-half of the water turned into it, and puddling of sides continued. On July 7, at 1.30 a.m., the whole of the water was carried by the fluming. On July 10 everything was secured, and the work of strengthening dams has been continued. The total flow of water into the quarries is estimated at 820 million gallons. The water in the mine has risen to the 821ft. level, suspending all work underground, except that reported above.

The pitwork for the second unit of pumping engine at Grubb shaft is being placed at 1000ft. level. Heavy rains ocurred at intervals during the whole of the above period, accompanied on three days by gales so severe that they prevented the placing of capstan pulleys on Grubb shaft head gear. Baling tanks are at work at Hart shaft, and the total volume of water now being raised to surface is 5,700,000 gallons per day.

July 28.

Pitwork for eastern unit, Grubb shaft has been placed at 1000ft. level. Rods errected complete up to 850ft. level. Water risen to 800ft. level and is now stationary. The pumps and baling tanks are holding the water.

September 1.

Expect the eastern unit pump at Grubb Shaft will be at work around September 7. Lowered water level 812ft. from surface.

September 4.

The new pump in Grubb shaft is working splendidly. Men are in 815ft. level and Superintendent states that very little damage has been done, at that level, not nearly as much as was anticipated.

September 8.

Have lowered water 837ft. from surface.

October 4.

Water lowered. Hoped that within three weeks work will again be in full swing.

October 5.

Water now out of 1000ft. level, no damage was caused. Have started to erect Grubb shaft (western unit) pitwork.

December 13.

Grubb shaft - 900ft. - balance bob chambers continued. The errection of the pitwork for the third unit has been started. The valves at the 1000ft. level and girders for carrying pitwork have been placed in position, and the rods, together with columns and ladders, errected complete up to the 700ft. level. Mine is now drained, although the flow of water at the 900ft. level is still very heavy. The floodgate at the 1100ft. level was first opened on the 10th instant. The levels have been cleaned out and work again in full swing. Battery resumed crushing on October 15 with 40 head of stamps.

1907

January 6.

Grubb shaft - western pump unit started up. Eastern unit stopped to allow repairs to shaft.

July 18.

Water risen to 808ft level.

July 19.

Reprint of James Robertson's report on the Beaconsfield mines, 1887.

BEACONSFIELD MINES,

TASMANIA.

SIR,

In accordance with instructions received from you on behalf of the Companies concerned, and accompanied by the Hon. W. Hart, Messrs. Ritchie, King, and others interested in these mines, I proceeded to Beaconsfield on the 11th, and on hat and the following day made particular inquiries into the geological features and condition of the surface in the neighborhood of the mines, with the view of coming to some determination as to the probable source of the large influx of water into these mines, to enable me to discuss with the Directors on the most effectual remedial measures to adopt, as well as the general question of investigating the several mines to greater depths.

In this investigation, I have had the good fortune of receiving valuable assistance from your Chairman and Mr. Ritchie, whose accurate observations have been of the utmost value to me; while the ready co-operation and assistance of the Managers of the Dally's United, Lefroy, Tasmania, and Florence Nightingale mines, enabled me to grasp the subject at once.

On the 14th October instant I attended a meeting of the representatives of the group of mines referred to, when questions relating to the drainage and the result of my examination formed the subject of a lengthened conversation. During this interview I endeavoured to explain the result of my investigation and my views on the subject of drainage, and if in the following remarks I repeat these views and give details with which the representative Directors are already familiar, the importance of the question is the apology I have to offer for the repetition.

The mines referred to in the following remarks are known as the Tasmania, the Florence Nightingale, the Lefroy, and Dally's United. They are situated about 26 miles

north of Bathurst, continuous to and on the west bank of the Tamar River. In their immediate proximity, and in consequence of the mining operations, the rising town of Beaconsfield has been commenced.

This group of mines have been opened on the line of the Tasmania reef—an auriferous quartz "lode" that, considering its width, the ease with which it can be worked, and its large and regular yields, entitle it to rank as one of the most important sources of gold in Australasia.

The lode (Tasmania) is found intersecting a hill range—a continuation of the Blue Tier—that extends for a few miles in a N.W. and S.E. direction. This hill-range is divided by a gorge, and through this gorge or gully (Blyth's Creek) conveying the drainage from a large area of country to the west passes. The hill-range to the north of this creek is known as Cabbage Tree Range—that to the south the Blue Tier. This range is composed of slates or schist beds, of grey shales or silician bands, having a regularly lithological structure, the slates or beds rising or having a pitch of about 45 degrees to the west. These schists are overlaid by layers of crystallisine and pebbly conglomerate that has been erroneously and unfortunately called "cabbage tree," from the name of the range. I have not been able to verify from personal investigation whether this rests unconformably on the slates or occurs interlaminated with them.

The strike of the beds are approximately N.W. and S.E. Veins of quartz are observable in places interlaminated with the schists and in the line of strike, and in zoned lenticular masses of blue limestone. "Vughs" (open spaces or cavities) occur in the bedding planes of the schists. This may probably be caused by the corosion of the calcareous patches through the percolation of waters carrying free carbonic acid. The bed and planes and joints of the country rock are unusually open and porous.

Parallel with the strike of these beds, and at a point in the slope of Cabbage Tree Range about 300 feet west of the Tasmania shaft, a "slip fault" has displaced the lode and strata 280 feet to the north (in the line of strike of the country). The line of this slip may be considered to form the E. margin of the range. To the west of this fault the lode is considerably disturbed by smaller "heaves." No fewer than 39 of these "heaves" displace the lode to the right and north, and only 1 displaces it to the left. These "heaves" disturb the continuity of the lode, and breaks the country and renders it more liable to absorb and give off water. To the occurrence of these may be due the swerving of the lode to the north, as it is followed to the west.

From the Tasmania the lode has been followed to the east by the Florence Nightingale working contiguous to this boundary. It is twisted to the north, but again resuming its course has been followed to a point within the Lefroy claim, where in the Nos. 4 and 5 levels, at a depth of 270 and 328 feet respectively, it has been cut off by a "sand dyke," or ancient channel filled with alluvium, of which more anon.

From the "slip fault" or so-called "cross course" referred to, veins of quartz radiate or emerge to the S.E. Some of these are auriferous, and this disintergration has given rise to a series of alluvial workings at intervals along its course. The gold was traced over the shallow alluvial, covering the upturned edges of the schists, and was seen to underlie deeper alluvial ground along the base of the Cabbage Tree Range. Several attempts have been made to bottom this supposed rich auriferous wash underlying the thick deposits of drift or alluvium, but I am doubtful whether any of these attemps have proved successful.

The "Ballaarat" shaft to the N.W. of the Lefroy, failed to bottom after a depth of 200 feet had been reached. A short distance north of this the Ophir Company abandoned a shaft they attempted to sink with malleable iron cisterns. At a similar depth the same Company are at present engaged sinking another shaft about 50 yards nearer the base of the range; and at the date of my visit this had reached a depth of 276 feet and was passing through sand-drift, carbonaceous clay, impure lignite, limestone nodules, and conglomerate bearing evidence of being water-worn or rolled. In this shaft a thick auriferous wash was passed through between 100 and 160 feet. Opposite the "Ballaarat" shaft, a small shaft reached solid slate at a dept, of 70 feet, and on driving west discovered the drift beds referred to. To the south and east the Lefroy shaft has been sunk to a depth of 400 feet. In respect to this shaft, I have some difficulty in coming to a satisfactory decision as to the exact nature of the depo-its (or strata) which have actually been passed through.

On being interrogated on the subject, I found that considerable diversity of opinion existed among the managers as to the exact nature of the material passed through in the Lefroy

descriptions of the other managers, I feel that I am bound to accept Mr. Daniels's statements—viz., that at a depth of 60 feet the shaft passed through the last of the drift or debritus, and thereafter the sinking was through soft, grey, broken shale, extremely soft, and liable to run or collapse. This soft shale seems to have possessed little more consistence or coherence than ordinary drift deposits, and necessitated heavy timber to secure the shaft; this may have misled the managers of adjoining claims to some extent. On the supposition that this shaft was sunk in solid, though soft, shale, the course of the gutter or ancient water-course that runs parallel with and along the east base of the Cabbage Tree Range must suddenly have changed at this point and swerved to the south-east, the deepest part of the channel being contiguous to, but east of, the Lefroy shaft. This gutter, deep lead, or ancient water-course appears to be of no great width, to have steep sides, and to deepen towards the north-west. After passing the Ophir it appears to bend towards the north on Tamar River. Insufficient work has been done along its course to justify positive statements as to its course and character. It has not been traced (I was informed) any great distance to the south of the Lefroy, or rather the Tasmania tunnels. Its western limit is clearly delineated at a depth of 270 feet and 328 feet in the Florence Nightingale mine, at which point these two levels percolate into the sand or drift, the lower level 35 feet in advance of the upper. The sides of this ancient channel have therefore a slope at this spot of 1—1—60.

At the Ophir the shaft is being sunk in the deepest part of the head or drift. Between 100 and 160 feet the wash or drift materials were auriferous; below this the shaft has passed through sand, rounded nodules of surrounding rocks, carbonaceous clay, impure lignite, decomposed timber. This gutter or water-course has, when the course of the stream (that once flowed through it and probably grooved it out) was changed, became filled and choked with drift and debris, washed or rolled into it from the range now called Cabbage Tree. These channels of drift material, as a rule, give free passage to water; they are good underground reservoirs, and give off very large quantities when first tapped.

I am of opinion that the pumping operations at the Florence Nightingale and the Tasmania, before the Lefroy shaft was commenced, to some extent drained this drift and enabled that shaft to be sunk; while the more extensive pumping operations at these three shafts, and at Dally's United, have in time enabled the Ophir Company to sink their shaft to its present depth. Had the drift material been sunk through at the date of my visit been accompanied by any considerable growth of water from water-logged drift, the work of sinking could not, with the means employed, have been prosecuted. This ancient channel cuts off, or through, the lodes—in other words, the quartz reef or lodes have been denuded for the width and to the depth of this gutter.

The Lefroy shaft has been sunk contiguous to the margin of this gutter, and for the purpose of working the Tasmania quartz reef; but from the evidence afforded by mines or "drifts" at the 300 level that did not pierce solid rock for a distance of 40 feet from the shaft westwards, and from the steep appearance of the drift at the face of the 330 feet level in the Florence Nightingale shaft, I am of opinion that the gutter may be found at this point to be even deeper than at the Lefroy shaft, in which case the reef would be divided, and any attempt to pierce the drift at the depth yet reached might be frought with danger. At that depth (if drift existed) the debritus would, in all probability, be so charged with water as to render any attempt to pierce it a work involving some danger.

I can see no reason to doubt that the Tasmania reef will be found *intersecting* the *slate under this gutter*. Its continuity may of course be broken by "heaves," evidences of such occurrences (if they exist) is, however, completely obscured by the thick deposits of debritus referred to.

In the Florence Nightingale and the eastern divisions of the Tasmania, the reef, varying between 20 and 30 feet thick, maintains a general and average course of N. 45 degrees E., with a pitch of 35 degrees S.E. The reef is laminated, is remarkably easy to work, and carries a considerable percentage of iron pyrites, which I am informed contains about 7ozs. of gold to the ton. The shoots of gold dip S.E. The reef appears to be richest when its course is W. E., and when it is in contact with silicious beds. The pitch increases with depths, and the country gets more settled. Towards the west of the Tasmania claims the reef has been much tossed about; there it swerves to the north 20 degrees west, and becomes bunchy and comparatively valueless.

Irrespective of the pyrites (which, if properly concentrated and of the value indicated, would add about 2 5 [illegible]

20dwts. and 30zs. per ton, while the pitch of the slates or country rocks is S.E. (the inclination of the beds being about equal to the eastern slope of Cabbage Tree Range), the reef where it follows its normal course (that at which it is richest), is tranverse to the bedding of the country. It then follows that, in opening up or following the course of the reef, every foot of ground driven in exposes new beds and opens up new country, and increases the drainage area. This is somewhat unusual and unfortunate. To this circumstance the open character of the bedding places—the fissures, vughs, cavities—that exist in the strata, the very large amount of water raised by the united mines referred to, may be referred. The upturned edges of the strata running in the line of the top and sides of the range, and overlaid with open, pebbly conglomerate, or porous debris, offers a catchment for water, and permits it to percolate from the surface into the open beds, and thence into the mines.

The lenticular or irregular deposits of limestone occurring in broken and open strata have become coroded and worn away by the evolution of carbonic acid gas, and these, covered by a thin coating of surface, may be regarded as so many reservoirs of unknown capacity or extent, kept full by the freedom and rapidity with which surface water passes or into the open joints and fissures in the shales. When these, or the fissures or open beds that communicates into these, are tapped by your workings, the pent-up waters are suddenly relieved, and a burst of water is the result. In cases where a fissure is tapped that communicates with a distant supply, the rush of water is maintained for a considerable period. The enormous feeder that you have tapped in the lower level (No. 5) of the Tasmania mine at a point 285 feet west of the shaft and east of the "cross-course," or "slip," or "heave," may probably be referred to the last-named cause. The stratification of the country being so open causes the growth of water to follow the progress of the sinking operations, descending to deeper levels as they are opened up.

When mining operations first followed the reef westwards, the strata gave off water from the sides. For some time, however, the growth of water from the north side of your drives had diminished, and has now altogether ceased. Shafts sunk fully a mile to the north and north-west, and formerly abandoned on account of the influx of water, are now dry, proving that the reef and the open strata in that direction have sufficiently acted as conductors—that your pumps have drained, and now drain, the whole of the strata in that direction. The strata to the west of the great "heave," or "cross-course," is much tighter, and passes less water than that to the east of that disturbance.

Along the base of Cabbage Tree Range, and to the south, there is a perceptible surface depression that probably marks the course of the ancient channel referred to. This depression increases to the south. South of the Lefroy shaft the surface waters are collected into a little rivulet (following the course of the ground) that flows in that direction. This stream represents the drainage from the eastern slopes of Cabbage Tree Range, as well as from the area between that range and the low ridge on which the new road to Launceston has been formed. In its course are a few water-holes, which I think have been artificially formed, and appear to be shallow. About one mile south of the Lefroy shaft the surface depression widens into a valley or flat, and across this Blyth's Creek flows, following a somewhat circuitous course. In the centre of this flat or valley is a large water-hole about 35 feet deep and about 50 yards across. About 100 yards or so nearer to Blyth's Creek is a similar hole of smaller area. Across the creek (south) are a number of depressions of limited length, the first two represent the sites where deposits of limestone have been worked for a period of 35 years. These quarries have been disused and up to 2½ years ago they remained continually full of water.

At some remote period a canal has been cut from Blyth's Creek to No. 1, or the largest quarry hole, and in the opposite side an outlet or bye-wash has been cut. The small rivulet that carries the drainage from the valley flows into this canal, and from thence into No. 1 hole. For the period of 35 years the surface drainage kept this hole full, and the surplus passed out by the bye-wash and found its way into the creek at a lower level. No. 2 hole has no connection with the creek, and in former times the soakage into this lime quarry was removed by "force pumps" about 7 inches diameter. It would appear that when pumping operation were commenced in the Lefroy shaft, and the other mines had began to sink to lower levels, that the water suddenly disappeared from these large holes. After heavy rainfalls the creek rises, and a large stream of water passes through the canal, and from thence into the large hole No. 1 hole, and fills it. The streamlet at all times pours its [illegible] into the cavity. Within the past year or so, since attention has been directed to the disappearance of these [illegible]

supply. At the date of my visit a strong stream of water was running into this hole from the rivulet. No water was passing away, and yet the level of the reservoir was being steadily lowered fully 4 inches per day. At the date of my visit No. 2 hole was all but dry, although it was full only a day or so previously.

To the south of the creek are a few depressions where smaller lodes of limestone has been worked, or where the surface has fallen in, revealing cavities of some extent. Into these depressions the surface drainage and storm waters flow, and we are informed that, although a large stream during a recent storm flowed into these, it instantly disappeared.

A lime quarry (No. 3) contiguous to the creek was full of water, but it is probable that as yet no connection has been found here to permit of the water disappearing or finding its way into the strata.

The amount of water raised from the mines bears a direct relation to the rainfall. It is probable that the through drainage of the "gutter" or ancient channel by the Lefroy shaft has tapped the surface water referred to.

By far the heaviest feeder of water issues from the lowest drive of the Tasmania mine from a large crevice in the south wall, where the bedding planes are open. At a point 285 feet west of the shaft, there is a steady rush of water, and evidently represents an extensive drainage area. The water is fresh, and has no smell—it has all the appearance of passing directly from the surface to the point of the mine from whence it issues.

The manager, who naturally is much concerned at the ever-increasing water supply and the serious difficulty connected with future operations for unwatering your mines, is suspicious that this burst of water emanates from, or is derived from, Blyth's Creek, the water finding access along some open bed or joint. This may be so, but there is nothing improbable in its having a more distant origin.

I have very carefully thought over the evidence given, and, as I stated to your Directors on the 13th inst., I am strongly inclined to the belief that the old quarries, Nos. 1 and 2, as well as the smaller depressions south of the creek, have a direct connection with your underground workings. It is also probable that the waters of the creek find access through the beds at a point of the creek further to the west, and probably contiguous to the point where the "cross-course" crosses the stream. The great bulk of this feeder is pumped by the Florence Nightingale and the Lefroy, the small lift at work in the Tasmania being only to pump a small proportion of it. An exactly similar case occurred in my experience at a mine with which I was connected in the East Indies. I am, therefore, disposed to consider that the suspicions of your Managers and of some of your Directors as to the source of a portion of your mine water are well founded. The remedial measures proposed by your Directors and the Manager of the Tasmania, Mr. Davies, viz., to tap and intercept the waters of Blyth's Creek at a part of the gorge where sufficient level would be obtained to convey the whole of this stream on "launders" or fluming over the low ridge or saddle to the south of the depressions or hole, and discharge them into Sassafras Creek to the south. This could be effected as far as Blyth's Creek is concerned, but it has objections:—1st, such a scheme would, by diverting the course, deprive the freeholders further down of the water rights which they are entitled to enjoy; 2nd, such a scheme would not provide or deal with the rainfall from the eastern slopes of Cabbage Tree from the valley to the bush, represented in part by the stream that runs into No. 1 quarry hole.

It is essential that whatever remedial measures are adopted should be complete, and should effectually deal with the whole rainfall. I would, therefore, suggest the following:—(*a*) That you flume the creek from a point considerably to the west of the line of the "slip" or "cross-course," cutting off its sharp angles and sinuosities by gentle curves, preserving as near as possible the same frontage or course, and securing a rapid current by even gradients, and clearing out the channel below the fluming. (*b*) Stopping and puddling up the canal leading from the creek to No. 1 quarry, and conferring the streamlet from the north in small fluming directly into the main fluming referred to. (*c*) Conveying the flood waters from the slopes south of creek by a separate channel into the main fluming. (*d*) Filling up the holes or part of the holes with clay or puddle. These will, I feel convinced, prevent a very material amount of percolation that at present finds its way into the mines, probably a quantity not much short of a quarter. The total water pumped would thus be prevented from gaining access to the mines, and this would be a distinct relief to a group of large pumping engines already overburdened. I believe that the quantity of water might further

surface of Cabbage Range. The innumerable upturned edges of the beds of the strata composing this range, permits water to enter and filter downwards. This may, to some extent, be prevented by constructing channels for carrying the rainfall or soakage rapidly off.

I find that, at the date of my visit, the combined engines were working as follows :—

Lefroy mine was pumping with a 20in. plunger and 8ft. stroke, about	856	gallons per minute
Daily's United, 12in. plunger, 7ft. drawlift ...	250	„ „
Florence Nightingale, 18in. plunger, 7ft. stroke	676	„ „
Tasmania, about	300	„ „
Or a total of	2082	gallons per minute

This is a very large quantity of water to raise from mines of this depth. The situation is the more serious when, from the open character of the strata, it is impossible to prevent any considerable quantity from descending to the lowest level. The mines are, therefore, in this position, that the deepest (whichever that is) will always have the greatest amount, if not the whole, of water to pump.

At the date of my visit the combined engines were taxed to their uttermost ; indeed, they were all overburdened, being driven at a speed in excess of safety. This being so, it would be impossible or safe to sink to a lower level with the present appliances. On the other hand, the Florence Nightingale, with a limited length and thickness of reef, is necessarily obliged to sink at a more rapid rate than the Tasmania claim, so that what could be delayed in the case of the Tasmania, is a necessity in the case of the Florence Nightingale. It would, therefore, be advisable to centre the whole pumping at one shaft.

The size of the Lefroy shaft, 16 feet by 6 feet clear, is admirably adapted for a main pumping shaft, and if the timber that secures it is sufficiently strong (I was unable to examine into this point), it may be wisdom to fix on this site. Its position so far south of the lode or reef necessitates the driving of crosscuts. On the other hand, the length of these will diminish with depth.

To enable these mines to be worked at a depth of, say 1100 feet, pumping machinery is required to lift 2000 gallons of water per minute from that depth. In order to centralise this work, it would be advisable to dispense with the pumps at present in use in Daily's United, the Florence Nightingale, and Tasmania mines, and to continue the Lefroy engine at a safe speed, and lay down a large and powerful engine of an improved type to those in use, capable of raising the balance of the large quantity of water referred to. It is unsafe to drive an engine of the present Lefroy type (geared horizontal) at a speed in excess of 6 stroke on bell cranks per minute. This, I think, may be considered the limit of safe and economical working. A speed of 6 strokes per minute would reduce the work done by this engine to 638 gallons per minute, leaving an estimated quantity of water amounting to 1400 gallons per minute to be dealt with.

It would, I think, be advantageous to arrange the present engine to work two lifts (a double column of pumps). At 5½ strokes in each plunger, it would be capable of lifting from the present depths 1060 gallons per minute. The engine would, by this alteration, be double acting and balanced, and do its duty at a speed well within the margin of safety. This would leave equal to 1000 gallons to be lifted from the bottom of the mine to the top.

I would advise a high and low pressure horizontal direct-acting engine (without gearing, with connecting-rod attached directly to the bell-cranks or pump-rods) actuating two 20-inch plungers, each with 7½ feet stroke. This would be ample. Such an engine would raise the required quantity of water, going 5 strokes per minute. These engines could do, during an emergency, 50 per cent. more work, while, with the surface work proposed, the quantity of water would probably be materially lessened, thus adding to the marginal power of the engines.

When sinking shafts in such open strata, it is always safe to calculate upon an increase in the influx of water by tapping deeper fissures. Should this give off water equal to the amount diverted by surface works, the above calculations will not be interfered with, as they are based on the quantity of water raised during my visit, when admittedly it was at its maximum.

Engines balanced with two plungers each, and one rising main, would enable the pumps at present in use at the Florence Nightingale mine to be utilised. It is indispensable with [illegible] heavy pumping machinery that you should have [illegible] specially adapted to the work with steel [illegible] accessories to lift and handle pumps, rods, or [illegible] or slacks. These are not costly, require [illegible]

12

while heavy lifts, impossible to work with the slow and antiquated capstans you have provided, can be expeditiously taken. On the score of economy, safety, or the rapidity with which heavy work can be executed, steam crabs are to be recommended.

JAMES R. M. ROBERTSON,

M.E., F.G.S., &c.

Sydney, 27th October, 1887.

To the Manager of

THE TASMANIA QUARTZ CRUSHING

AND GOLD MINING COMPANY REGISTERED.

W. G. WILKINSON, PRINTER, PATTERSON-STREET, LAUNCESTON.

March 7.

1000 west stopped for drainage at 380ft.

May 14.

1000ft. level continued but there is a heavy flow of water 1100 west stopped at 215ft before intersecting wet beds.

August 6.

Dismantling main shaft pumps.

October 1.

"Hart shaft has been sunk 16ft, total from surface 1230ft., and stopped for the present, as too much water might be out."

December 2.

1100 level closed for six days while pump rods in Hart shaft shortened.

1908

January 6.

1000 west stopped to drain at 640ft.

January 20.

1100 west development re-started after having been stopped in May 1907.

March 2.

1100 west development stopped again at 320ft.

November 2.

Pumping cost put at 5/6 of total operating cost of 28/-.

1909

January 18.

1100 west development started up again.

June 4.

TGM - Another burst of water in 1250' level. Re: cable to London:- 1250' level west - There has been a burst of water in this end, necessitating closing the flood gate at this level. Expect to overcome within about a week. This has drained the water from the 1100' level west.

Beaconsfield Correspondent writes:

Heavy burst of water at TGM caused expressions of regret on all sides as everything was going so smoothly. Inflow anticipated for some time. 18 months ago similar inflow was met with at 1100' level, but as the backs at the 1250' level are 150'; there is probably double the quantity of water at this level than that in the case of the 1100' level where the backs were only 100'.

Mr. Heathcote (superintendent) hopes to have water well under within a week. 3 pumps going and expected to start baling with the tanks at Harts shaft. The first rush of water was about 4½ million gallons extra a day, but is now easing off. The ordinary flow is 3¼ million, so that about 7 3/4 million gallons a day have to be pumped. The flow at the 1100' level has eased off from 1,660,000 gallons to about 412,000 gallons.

June 12.

Water 108ft above 1250 level.

June 18.

Water 59ft above 1250 level.

July 16.

TGM - Two 14" draw lifts were placed in the Hart shaft enabling pumps to be used in addition to tanks. Water was reduced 26' in 24 hours and is now 8' on the plat at the 1250' level. All going well, work expected to commence in 2 weeks. (Implication that the Hart pumping plant isn't being used - probably not extended to shaft bottom yet.)

July 26.

Production re-commenced. "Water still heavy, but when Harts pumps start again it's anticipated that the water will be kept well under control. Owing to the water being so heavy the sinking of Grubbs shaft will be continued for the present.

Experienced miners say this is the quickest time an influx of water has been reduced.

October 11.

1250 west development re-commenced.

1910

February 18.

An unfortunate interruption was experienced in connection

with the underground operations during the year owing to the cutting, in June last, of a large quantity of water in the 1250ft. level west, causing the lower workings to rapidly fill and, consequently, the suspension, temporarily, of the usual extraction of ore, as also milling operations. The delay and inconvenience thus arising was aggravated by the breaking of a casting forming part of the Grubb's shaft pitwork. This breakage was promptly repaired, and as the company is possessed of a pumping equipment equal to almost any emergency, the unwatering of the deeper workings proceeded satisfactorily, and development and milling operations were resumed in July and August last respectively. The encountering of this abnormal flow of water, which for some little time was at the rate of between eight and nine million gallons a day, was not entirely unexpected, having regard to a similar occurrence in the upper levels. At the 1250ft. level, at at the 1100ft. level, the water, instead of being met with at three successive points as was the case in the higher levels, appears to have accumulated at one point, due to the lode being softer and containing no hard bars. There is not increase in the total water to be pumped per foot of depth, merely a more rapid drainage of the lode channel.

July 21.

1370 east stopped after 11ft to drain.

July 26.

1370 east re-started.

August 15.

Hart shaft at 1338ft., but sinking suspended to allow rise from crosscut (1370) should drain off water.

1911

August 8.

1370 west - water burst less than 300ft. from the x-cut stopped development until January 26, 1912.

1912

January 22.

1500 x-cut cut water 154ft. from the Grubb shaft.

1913

February 20.

Delay occuring on 1500' level. Due to heavy inflow of water, this caused by the strata taking a flatter dip and bringing wet beds close to Grubb shaft much sooner that expected.

TASMANIA GOLD MINE

RECORDED PUMPING RATES

DATE	FLOW (G.P.M.)	STATIC HEAD FT	COMMENTS
Jan 85	666	300	
Jan 85	577	300	
Mar 92	1710	494	
Apr 92	2660	494	Burst on 494 level west.
May 92	2375	494	
Aug 92	2660	494	Heavy flow from 494 level west.
Sept 92	2375	494	
June 93	1710	494	
Jan 94	1520	494	
May 94	1520	494	
June 94	1520	494	
July 94	2850	718	Winter rains.
June 95	2090		
Jan 98	+3000	818,1000	Burst on 1000 level x-cut
Oct 98	2280	818,1000	Heavy flow on 1000 level x-cut.
Feb 02	2100	1,000	
Oct 02	+ 3000 (not recorded)	1,000	Burst on 1000 level west.
Oct 05	2638	1,000	Average rate.
July 06	3958	1,000	Including baling after Blyth Creek flood.
Jun 09	+ 3000 (not recorded)	1,250	Burst on 1250 west.
Aug 11	4687	1,500	Burst on 1370 level.
Nov 11	2257	1,500	
Feb 13	1667	1,500	
June 13	1250	1,500	

5 cm

Scale 1:2000

Work done previous to June 1903 | Work done 1st Oct 1902 to 30 Sept'03

Work done June 1903 to Sept 1904 | Blank Ground

Approximate Surface

AIR SHAFT

MAIN SHAFT

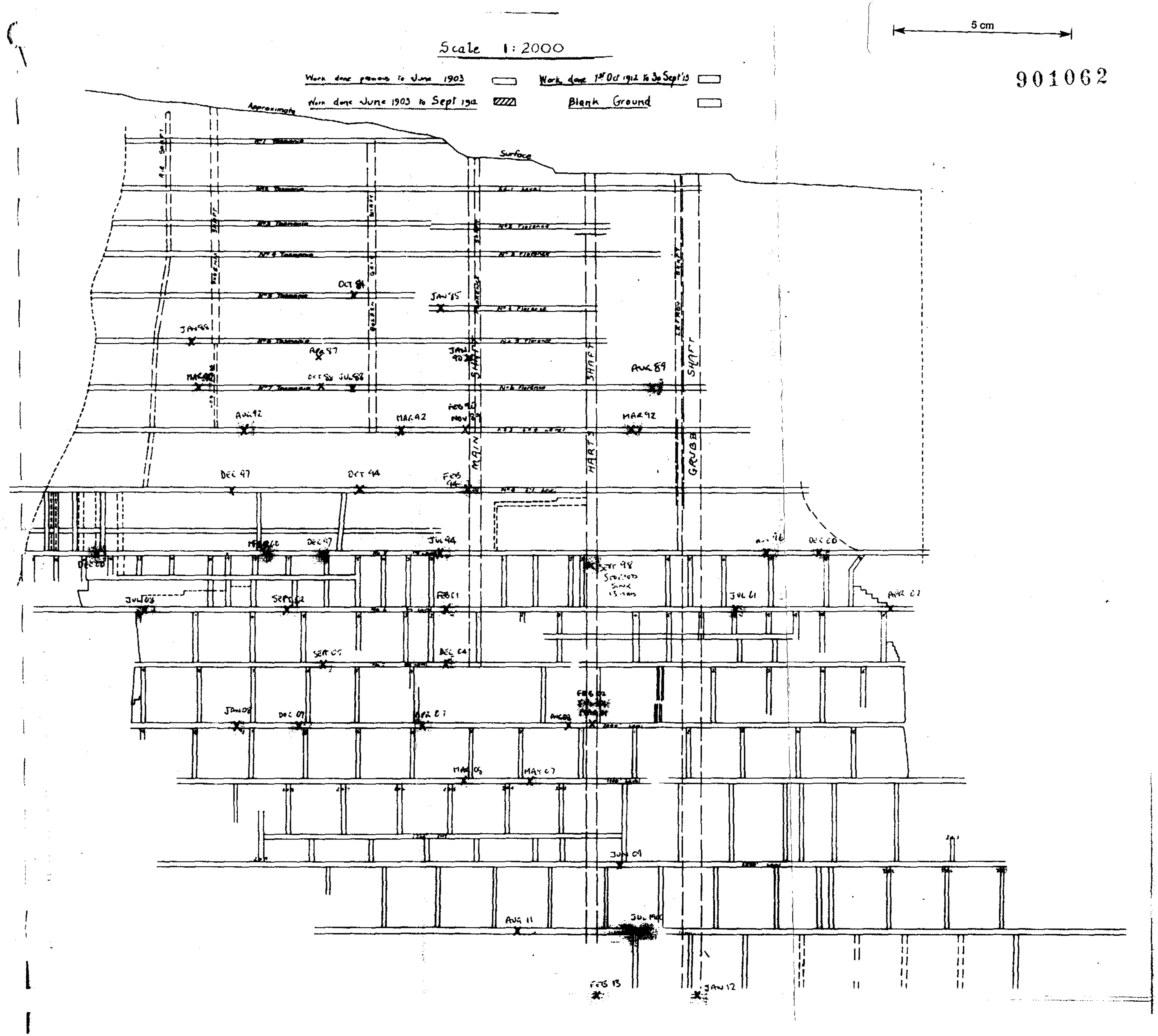
HART'S SHAFT

GRUBB SHAFT

OCT 96 JAN'95 JAN'98 AUG 97 JAN'98 AUG 89 JUL'98 AUG 92 MAR 92 MAR 92 DEC 97 OCT 94 FEB 94 DEC 00 DEC 97 JUL 94 AUG 96 DEC 00 SEPT 98 Stopped Sinks 13 mins JUL 01 APR 02 JUL 02 SEPT 02 FEB 01 SEPT 05 DEC 04 JAN 08 DEC 07 APR 07 AUG 08 MAR 06 MAR 07 JUN 09 AUG 11 JUL 10 FEB 13 JAN 12

059

901062



5 cm
Scale 1:2000
Work done previous to June 1903
Work done June 1903 to Sept 1912
Work done 1st Oct 1912 to 30 Sept '13
Blank Ground
Approximate
Surface
MAIN SHAFT
HART'S SHAFT
GRUBB SHAFT
OCT 84
JAN 85
JAN 86
AUG 87
AUG 89
MAR 92
AUG 92
DEC 97
OCT 94
JUL 94
DEC 00
SEPT 98
JUL 01
APR 02
SEPT 02
SEPT 03
DEC 04
JAN 08
DEC 07
APR 07
MAY 07
AUG 11
JUN 09
FEB 13
JAN 12

060

PUMP OUTPUT - GALLONS/MIN.

4000
3000
2000
1000

BURSTS ON TASMANIA No.4 (238 ft) & FLOREENCE No.4 (300 ft)

DRAINAGE UNION PUMPS UNABLE TO COPE WITH FLOW

MAIN SHAFT PUMP COMMISSIONED

BURSTS ON No.3 (494 ft) LEVEL WEST

WINTER FLOODS 719 ft LEVEL

BURST ON 1000 ft X-CUT

BURST ON 1600 ft LEVEL WEST

BLYTH CK FLOODS WORKINGS

BURST ON 1250 LEVEL WEST

BURST ON 1370 LEVEL

MINE CLOSED

ASSUMED RECHARGE FROM INFILTRATION
1.5 MILLION GALLONS/DAY

HART SHAFT PUMP COMMISSIONED

GRUBB SHAFT PUMPS COMMISSIONED

1877 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914

TASMANIA GOLD MINE - PUMPING RECORD FROM LITERATURE SURVEY 1981