REPORT ON THE SOUTH LODE IN THE TASMANIA MINE, BEACONSFIELD.

INTRODUCTION. The Tasmania Mine, Beaconsfield, has been the most important gold mine in Tasmania. The gold-quartz lode in this mine was discovered in 1877, and was worked continuously until 1914. During this period the Tasmania lode yielded 1,039,248 tons of ore from which was obtained 819,000 ozs of gold with a value of £3,008,000 During the early part of the period £772,072 was distributed in dividends, but during later years small working losses occurred. These losses were due to, among other reasons, the decrease in gold content down to the 1100 or 1200 feet levels, and the high pumping costs caused by the enormous quantities of water which had to be pumped. From the 1200 feet to the 1500 feet levels an increase in gold contents occurred.

During the working of the Tasmania lode it was reported that another lode - the South lode - was discovered but not worked. Recently, attention has been directed to the South lode, as it was thought possible that if this lode could be profitably treated it might assist in the re-opening of the mine and the further working of the important Tasmania lode. It has been suggested that the South lode could be tested by boring from the surface, or by cross-cutting from some of the underground workings of the Tasmania Mine which have not been filled with water.

The investigation upon which the present report is based, was, therefore, carred out with the objects of obtaining all possible information about the South lode, and the possibilities of testing it by the methods suggested.

GENERAL STATEMENT.

The South lode is reported to have been cut at only one locality in the Tasmania Mine viz the No. 1 Crosscut south from the 500 foot level. Further, it was not found on the surface, as far as is known, so that direct observation of the lode is impossible. Information had, therefore, to be obtained from old reports (both Government and Company) and from men employed in the mine at the time (1897 & 1898) when the South lode was stated to have been cut. The information from the former source is very small in amount and, therefore, considerable reliance has to be placed on that from the latter source.

The possibility that other portions of the lode may have been cut in adjacent workings had also to be investigated. The plan accompanying this report shows the position etc. of all shafts, underground workings etc. with which this report is concerned.

STATEMENT OF MEN EMPLOYED IN THE MINE.

MR. H. COTTERILL. Mr. Cotterill states that he had a contract to continue the driving of the No. 1 crosscut from the 500 foot level during the years 1896, 1897 or 1898. At a distance of 496 feet from the drive on the Tasmania lode, a lode afterwards known as the South lode was cut. Mr. Cotterill gouged into this, and obtained quartz and pyrite. A rumbling noise was heard, and water entered the cross-cut for an hour. The shift bosses inspected the portion of the lode exposed, and then had the face filled up (to prevent entry of water or gas), and Mr. Cotterill was moved to another portion of the mine. He believed that his working mate at the time was Mr. T. Jackson. Later Mr. Cotterill attempted to see the lode, but found the crosscut filled with old timber.

One or two years later, Mr. Cotterill left the mine, and in 1909 met a Mr. G. Spargo in West Australia. Mr. Spargo had worked in the Tasmania mine, and stated that the lode about 1898 he and a mate had been put in the No. 1 cross-cut to cut through the lode. He stated that the lode was 5 feet wide and consisted of quartz and pyrite.

Mr. Cotterill further stated that he believed that the continuation of the South lode was cut further to the west in the 500 foot level. At a point about 150 feet west of the No. 2 crosscut, a splice of stone 10 feet wide was followed to the south or south-west At 50 feet along this drive an east-west slide was intersected. A trace of quartz occurred along the slide and it is believed by Mr. Cotterill that this represented the western end of the South lode.

MR. T. JACKSON. Mr. Cotterill stated that Mr. Jackson was his mate during the shift when the South lode was first cut. Mr. Jackson remembers the No.1 cross-cut but cannot remember being present when the lode was cut, or whether any lode was cut at all. He was of the opinion that the "New Make" of stone west of the main slide was called the South lode.

MR. W. HUTCHINS. Mr. Hutchins stated that he remembered the No. 1 crosscut being driven and the South lode being cut at a distance of about 300 feet from the drive on the Tasmania lode. He believed the lode to be to be 5 feet wide and to consist of quartz and pyrite. The lode was sealed on account of the gas issuing from it.

Mr. Hutchins reports that Mr. Davies (who was mine manager when the lode was cut) made the following statements when referring to the lode in later years -

1. That the lode assayed 14 dwts. of gold per ton but that it could not be treated in his time on account of its pyritic nature.

2. That with the installation of roasting furnaces at the mine the lode could be profitably treated, in conjunction with the ore from the Tasmania lode.

Mr. Hutchins also stated that Mr. Allen (a shift boss in the Tasmania mine when the South lode was cut, and afterwards manager of the Bonanza mine) believed that he had cut a lode identical with the South lode when opening out a chamber from the Bonanza shaft at 1000 feet. Mr. Allen reported the lode to be 3 feet to 3 feet 6 inches wide and with a gold content of 7 dwts. per ton. Also that the lode would strike from the Bonanza shaft through the No. 1 crosscut in the Tasmania mine, and then near the Primitive Methodist Church

MR. M. O'KEEFE, M.H.A. Mr. O'Keefe stated that he saw the South lode in the No.1 crosscut at the 500 foot level. It had two well-defined walls, and was about 7 feet wide consisting of quartz and pyrite. It had the same strike as the Tasmania lode and with an underlay to the South.

Mr. O'Keefe had also heard that Mr. Allen cut a lode in the Bonanza shaft which he believed to be identical with the South lode.

MR. O'TOOLE. Mr. O'Toole and others mentioned a lode cut in Grubb's shaft at about 700 feet down the shaft, which might be a continuation of the South lode. Mr.O'Toole states that the lode was 3 feet wide, "bearing a little to the west", and an underlay to the south.

THE TASMANIA GOLD MINING AND QUARTZ CRUSHING COMPANY'S HALF-YEARLY REPORTS.

The following extracts from the Company's reports refer to the No. 1, or Southward prospecting crosscut and adjacent portions of the 500 foot level.

38th Report (February, 1897) 500 foot level "Southward prospecting crosscut advanced 315 feet, full distance 467 feet. Further westward another crosscut (now known as the No.2 crosscut) has been driven to the southward. All the debris from the various crosscuts throughout the mine has been utilised to fill up the stoped-out parts of the lode."

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39th Report (August 1897) "500 foot level Southward prospecting drive has been extended 13 feet; full distance, 480 feet from Main Lode. As there were indications of a burst of water making from the crosscut, it was deemed advisable to suspend the work for a time. This crosscut is intended to intersect the lode known as the "Star of South."

40th Report (February 1898) "500 foot level Southward prospecting drive extended 15 feet; full distance from main level, 495 feet."

42nd Report (February 1899) "500 foot level Southward prospecting crosscut advanced 105 feet 6 ins; total from main drive 606 feet 6 ins."

43rd Report (August 1899) "500 foot level No. 2 crosscut has been extended a further distance of 128 feet 6 ins; total southward off main level, 286 feet 6 ins. At this point a rise has been put up for a height of 52 feet the object being to connect with bottom of old Phoenix shaft".

GENERAL CONCLUSIONS FROM THE ABOVE STATEMENTS & REPORTS.

It would appear from the above personal statements that a pyritic quartz lode was intersected in the No. 1 crosscut at the 500 foot level. Unfortunately the company's reports do not mention the incident, although in some respects they support the statements made. The crosscut was commenced as a mullocking and prospecting one after the successful crosscutting further west had revealed the parallel lode (a branch of the Tasmania lode). At 480 feet the reports state that water was coming from the face which was therefore sealed. This agrees with the statements as to what happened when the lode was cut except that Mr. Cotterill is certain that the distance was 496 feet. At the same time the report adds that the crosscut was being driven to intersect the Star of the South lode, and it might have been thought at the time that the quartz in the face represented this lode. The further driving of the crosscut to 495 feet and later to 606 feet agrees with Mr. Cotterill's account of Mr. Spargo's statement.

Assuming that the lode actually exists there are numerous other factors to be inquired into, particularly the possible connections with other lodes that have been suggested above. These have an important bearing on the extension, strike, dip etc. and also the best means of testing the lode. These factors will now be briefly considered.

POSSIBLE IDENTITY OF SOUTH LODE WITH THE STAR OF THE SOUTH LODE.

As the company's report states that the No. 1 crosscut was being driven to intersect the Star of the South lode, and Mr. M. O'Keefe believes the South lode is identical with the former, the possible identity of the two lodes is worth investigating.

The Star of the South section was taken up in 1879 and held under that name until 1883 when it was transferred to the Phoenix G.M.Co. Reg. The latter company must, however, have acquired it in 1881 ot 1882 as G. Thureau reports that considerable work was carried out prior to May, 1883. This report reads as follows ;

"The Phoenix Company's mine, located also upon the Eastern slope of Cabbage Tree Range, and not upon the "Tasmania" line of reef, cannot be so far classed among the remunerative or profitable mines at Beaconsfield, yet, as a representative of a line of reef parallel to the Tasmania, it has been proved to be also subject to dislocations; and a concise description - with sketch plan to refer to - will probably be found interesting, as proving besides the large extent of disturbances this district has been periodically subjected to.

Their main shaft has attained a depth of 178 feet, and at that depth, from an exceedingly roomy and excellently timbered flat, their lode was intersected in a crosscut wide enough for double tramway, at a distance of 184 feet S 5° W.

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The reef lies between the bedding planes of the country rock - consists nearly all of iron pyrites and a little quartz; it is about 10 inches wide on average, and has been proved to carry gold at present in small percentages. One visible fault displaces the whole formation for a distance of about 5 feet, and, as shown on the plan, there are evidently other faults causing further displacements in the lode, not yet traced, occurring between the present workings and those of the old Star Gold Mining Company, which are about 200 feet distant, and which, if as reported, gave moderately remunerative returns."

From the above extract, it appears that some underground workings were carried out by the Star of the South Co. between 1879 and 1881 or 1882. No plan or description of such workings is however obtainable from any source, and the only information as to their location is that they are 200 feet from the Phoenix workings of 1882 (shown on the plan as the Phoenix shaft). It would appear from Thureau's report that he regarded the Star workings and the Phoenix workings as being on the same lode, though it had not been quite traced between the two. Further the lodes could not have been quite on the same line of strike as he suggested displacements due to faulting. As the lode was reportedto lie between the strata it must have strike from north-west to south-east and a dip to the north-east. The No. 1 crosscut in the Tasmania mine would be therefore parallel to the lode and even if the lode continued to a depth of 500 feet it is improbable that the cross-cut at the would intersect it, in fact, the dip of the lode would carry it east of the cross-cut at the 500 foot level. Along the strike the Star of the South lode would, if it continued, junction with the Tasmania lode, but no record of any occurrence is contained in the reports of the company.

The dip of the Star lode would be such that if it continued in depth it should have been cut by the Hart and Grubb shafts.

The lode cut in the Grubb shaft has an east-west strike and a southerly dip and so does not correspond with the Star of the South lode. No record of any lode being cut in the Hart shaft exists.

Even if the Star lode had had an east-west strike it could not have been cut in the No. 1 cross-cut unless it had a northerly dip.

Thus considering the evidence available, it is improbable that the South lode and the Star lode are identical.

POSSIBLE IDENTITY OF THE LODE CUT IN THE BONANZA SHAFT WITH THE SOUTH LODE.

It is stated that Mr. Allen, manager of the Bonanza Prop. Co. cut a lode at about the 1000- foot level which he considered identical with the South Lode, and that further the strike of the lode from the Bonanza through the Tasmania would bring it close to the Primitive Methodist Church

An examination of the Bonanza mine plan and section shown that two lodes were cut near the bottom of the shaft workings. One of these called the South lode was cut at the 1000 - foot level and driven on both at that level, and the 1100 - foot level. The other lode (the North lode) was located 80 feet north of the South lode and was driven on at the 1100 and 1170 - foot levels.

As shown on the plan, the South lode in the Bonanza mine had a strike of 65° or 70° and a southerly dip. Allowing for the difference in level of the surface, the difference in depth where cut and the dip of the lode, a line of strike from the Bonanza through the No. 1 cross-cut would pass some distance north of the Methodist Church, and in fact, north of the Grubb shaft. Thus Mr. Allen's reported statement of the strike of the lode was not quite accurate. A line from the Bonanza mine through the No. 1 cross-cut to the Grubb shaft would have a bearing of 65° which is that of the South lode in the former mine.

Should the North lode in the Bonanza represent the Tasmania lode it is evident that the Tasmania lode and the South lode have approached one another to the west as they were 500 feet apart in the No. 1 cross-cut.

Even though the strike of the lode as reported to have been calculated by Mr. Allen was somewhat inaccurate, it may be inferred from the other part of his statement, that the nature of the South lode was similar to that in the No. 1 cross-cut.

At the 1000 foot level in the Bonanza mine, a drive to the west or the South lode revealed a cross-course, but it is not revealed where the lode passed through the cross-course or wasfaulted. This cross-course may be the main slide of the Tasmania mine in which case the lode would be faulted. The ~~Sheuth~~South lode was driven on to the east at th the 1100 - foot level but was not worked, the reason given being that this drive was close to the Tasmania boundary which is readily seen from the plan.

POSSIBLE CONTINUITY OF THE ~~SHOUTH~~ SOUTH LODE WITH THAT CUT IN GRUBB'S SHAFT.

The following is an extract from the Third Annual Report of the Tasmania Gold Mining Company, Ltd., 1906:

"Grubb Shaft At a depth of 558 feet in this shaft a lode 2 feet wide was cut, the dip and strike being roughly parallel to the main slide lode. This lode (No.2) had a promising appearance, but where cut was valueless; in order not to delay the shaft in any way, prospecting has been put off until the 1000 - feet level is reached. This lode has not been met with in the Mine before, it is possible that it will prove to be of no value."

Although the manager may have had a knowledge of the South lode, it is apparent from the last portion of the above report, that he did not consider the No. 2 and the South lodes to be different portions of the same. However the strike of the No. 2 lode would be such that, if it was continuous to the south-west, it would have been cut in the No. 1 cross-cut at about the same point where the South lode was cut.

POSSIBLE CONTINUITY OF THE SOUTH LODE WITH THE NARROW VIEW OF QUARTZ ON THE SLIDE REPORTED BY MR. COTTERILL.

It is difficult to locate on the mine plans the drive on the south-west splice referred to by Mr. Cotterill. However, the line of strike from any of the drives south of the Main Lode to the ~~point~~ point where the South lode was cut in the No. 1 Cross-cut would pass through the No. 2 cross-cut. No lode was reported in the latter and it is im-~~possible~~ probable that the suggested connection exists.

FURTHER CONCLUSIONS.

From the above discussions it is evident that if the South lode is continuous with others in the vicinity, the probable connections are with the No. 2 lode in Grubb Shaft and the South lode in the Bonanza mine.

Whether these three lodes are continuous or represent three parallel but disconnected lodes along the same general line of strike is a matter that could only be determined by prospecting work.

If these three lodes represent one and the same lode, the length of the latter would be at least 1200 feet. A lode with such a length would be a well-defined one and it is surprising that such a lode, if it exists, does not outcrop at the surface where it would certainly have been located. Such a lode should also have been intersected at the following localities;

1. At a depth of 200 feet approximately in Hart's Shaft
2. At a depth of 300 feet approximately in the Phoenix Shaft
3. In the main adit of the Tasmania mine near the air shaft, south of the Main Shaft.

There is no mention of a lode being cut in either the Hart Shaft or the Main adit, while no record exists as to what was cut in the Phoenix shaft. From these facts it would appear that the lode has no vertical extension towards the surface.

If the lode is continuous through the above three points, the bearing would be about 65° and the lode would approach the Tasmania lode (strike 48°) going westerly. The dip of the No. 2 lode is to the south, as is also that of the South lode in the Bonanza mine. The dip of the South lode is believed to be to the south, which would be in accordance with that of the other two lodes. A slight difference in the amount of dip would assist the difference in strike in bringing the Tasmania and the South lodes closer together towards the west and in depth. Thus it is possible that the North and South lodes in the Bonan za mine represent the Tasmania and South lodes of the Tasmania mine.

VALUES AND WIDTHS OF THE LODES.

As quoted above, the No. 2 lode in the Grubb Shaft "had a promising appearance, but where cut was valueless, in order not to delay the shaft in any way, prospecting has been put off until the 1000 foot level is reached." Thus while valueless where cut it was deemed sufficiently promising to warrant prospecting. The reported width was 2 feet.

The South lode in the No. 1 cross-cut is generally reported to have assayed 14 dwts. of gold per ton. Whether this was from representatives or grab samples is not known, so that no reliance can be placed on this report. The estimated width is given as from 5 to 8 ft.

The South lode in the Bonanza mine is reported to have assayed 7 to 11 dwts. but again no reliance can be placed on the figures as the nature of the samples taken is not known.

REASONS GIVEN WHY THE SOUTH LODE IN THE NO. 1 CROSS-CUT WAS NOT WORKED.

These are several in number, and may all contain a little truth. Bursts of water and gas are stated to account for the sealing-up of the lode where cut. As, however, it was later driven through and beyond for over 100 feet, it was probable that there was no danger from either of these.

Another reason is that the lode was cut at the boundary of the Tasmania mine lease (As a matter of fact it was cut vertically below the north boundary of the purchased Phoenix lease, and the lease (287) to the north was held by Adye Douglas and others. This lease was transferred to the Tasmania G.M.& Q.C. Co. in 1900_ but may have been held by them previous to the transfer. If not then this would have been a reason why the eastern extension of the South lode was not worked, but this would not have prevented the western extension being worked.

A further reason given is that the lode was pyritic and could not be treated on that account. As works for treating pyrite had been established in Beaconsfield in 1881 and were operated for several years at least, it seems improbable that duriferous pyrite could not be treated locally. Further the Tasmania mine had its own concentrating calciningand chlorination plant at that period, so that there is no doubt that the pyritic nature of the lode was no obstacle to its extraction. It may be that the plant could not have handled the concentrates from the South as well as the Tasmania lode, but this could have been remedied by an addition to the plant.

It is probable that the South lode was not worked because of its width, value, and pyritic nature being such that it was more remunerative and easy to work the richer Tasmania lode.

PROCEDURES TO TEST THE LODE.

Two methods have been suggested to test the South lode.

1. Boring from the surface.

In order to site a bore-hole with any prospect of success, it is necessary to know fairly accurately the location, strike and dip of the lode to be intersected. Unfortunately the strike and dip of the South lode in the No. 1 cross-cut is not definitely known although it is stated that the lode is parallel to the Tasmania lode in dip and strike. Under these circumstances the bore would have to be put

down vertically from a point directly above the point of intersection of the lode in the No. 1 cross-cut. This would successfully cut the lode unless it was dipping vertically.

If the South lode is continuous from the Bonanza mine to the Grubb Shaft, it would have, as seen above, a strike of 65° and a dip to the south. Bore-holes could then be successfully sited to cut this lode at a depth of 500 to 600 feet above where its location is known with some accuracy.

The country to be passed through would be the relatively perous and friable sandstones. The only drill suitable for boring these rocks which is controlled by the State is the diamond drilling plant on hire from the Victorian Mines Department. Under the present working conditions and expenses the probable cost of drilling these sandstones would be 25 shillings per foot.

2. Cross-cutting from the Hart shaft

At the 600 – foot level in Hart shaft, a large chamber was excated fro Reidler pumps. A cross-cut was also driven westerly for 170 feet and connected by a winze with the 700 – foot level in the main shaft. AS the water is reported to be up to the 700 – foot level only, it would be possible to enter and drive a cross-cut from the chamber to the South lode. The chamber and cross-cut would provide storage room for the rock obtained from at lease 300 to 400 feet of cross-cutting, providing that the cross-cut is commenced opposite the shaft, so that the full storage capacity of the chamber could be used. This would obviate the necessity of hauling the rock to the surface.

A cross-cut started from opposite the shaft would intersect the lode, if it exists, between the Grubb shaft and the No. 1 cross-cut at a distance of 170 or 180 feet. If the South lode does not connect with the No. 2 lode, more or less crosscutting would be necessary according to the strike and dip of the lode which factors would, in this case be unknown.

To cross-cut to intersect the South lode below the No. 1 cross-cut 450 feet would have to be driven from opposite the shaft, or 390 feet from the top of the winze, at the end of the cross-cut, but in the latter case full advantage could not be taken of the storage room in the chamber and cross-cut.

Prior to any underground work, the ladders would have to be inspected and perhaps repaired and the air in the workings investigated. The working would probably entail the provision of the ventilation plant and also a winding plant.

The country to be passed through by the cross-cuts would be the sandstone zone in which the shoots of gold in the Tasmania lode occurred. These are relatively porens and friable and fairly easy country to drive in. It is probably that cross-cuts coulc be driven in such country at a cost of 30 to 40 shillings per foot.

Cross-cutting would be the most satisfactory and economical way of testing the lode, were it not for the fact that a winding and possibly a ventilating plant would be required. Theppurhcase and installation of these as well as other equipment etc necessary to permit of the cross-cutting being commenced, would unfortunately greatly increase the total expenditure on the cross-cutting, and cause it to be greater than that necessary to sink a bore-hole.

CONCLUSIONS AND RECOMMENDATIONS

From the statements made by men employed in the Tasmanian mine, it appears that an auriferous pyritic quartz lode (the South lode) was intersected in the No. 1 cross-cut south of the Tasmanian lode at the 500 – foot level. Its width is given as from 5 to 8 feet and its value as 14 dwts of gold per ton although the nature of the sampling is not known and no reliance can be placed on the value. No mention is made of this lode in the company's reports nor was it worked by the Tasmanian Co, the reason for the latter being that its smallness, value and pyritic nature did not render the working of it such a profitable enterprise as that of the Tasmania lode.

From a consideration of the adjacent workings and the lodes exposed in them, it appears probable that the South lode, if continous is probably connected with the no. 2 lode in the Grubb shaft, and also the South lode in the Bonanza mine. The No. 2 lode was two feet wide, of promising appearance, but valueless. The South lode in the Bonanza mine was reported to assay 7 to 11 dwts. of gold per ton. It was driven on to the Tasmania boundary. Whether the lode exists continously between these three points, or whether the three lodes are independant ones along the same general line of strike, is a matter that can only be tested by boring or underground workings. The lode has not been found outcropping, neither has it been exposed in any workings above the 500 - foot level such as the Hart shaft, main adit, or Phoenix shaft if continous it has, therefore, no upward extension, and the lateral and downward extensions must, if such exist, be sought for in order to determine the economic importance of the lode. This can be done by either drilling from the surface or cross-cutting underground. The success likely to be met with by these operations is, of course, unknown as they are attended by the usual risk and uncertainty of mining operations. Their carrying-out is, however, perhaps justified as if the lode is proved to be continous and of economic importance, not only might this South lode be worked but it would involve the re-opening of the Tasmania mine and the possible working of the Tasmania lode.

If it were not for the installation of any necessary winding and ventilation plant, the cheaper and more satisfactory method to test the lode between the No. 1 cross-cut and the Grubb shaft, would have been cross-cutting from the Hart shaft as described above. The only alternative is to bore from the surface to cut the lode at depth.

Accepting the presence of the South lode in the No. 1 cross-cut and its reported value and width, it must be understood that the lode would be of no commercial value unless it extends laterally and downwards so that boring would be best devoted to test it in these directions. It is therefore suggested that a bore-hole be sunk to cut the lode, if it exists, at a point midway between the No. 1 cross-cut and the Grubb shaft and at the depth of the 500 - feet level. The depth of such bore would be 475 feet approx. and the estimated cost about £600. Should this bore-hole reveal anything of importance, it would be advisable to sink another between the No. 1 cross-cut and the Bonanza shaft. If these two bores were successful, sufficient information would then be available to justify the commencement of underground operations.

It may happen that the boring will prove that no connection exists between the three lodes discudded above, and that they are merely short "makes" of quartz. In such a case they would be of no economic importance and further work and expenditure would not be justified.

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