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REPORT

on

THE ARGYLE MINE, MANGANA

Location and Access:

This mine is located on section 1766G held by the Argyle Gold Development Company Limited. The section is situated on Sailors Gully and lies about sixty chains to the south-east of Mangana Township. A track which follows Sailors Gully goes from the Fingal-Mangana Road to the mine workings, the distance being about fifty chains.

Previous Reports:

The following list includes all official publications and typewritten reports relating to the mine.

Mineral Industry of Tasmania	W.H. Twelvetrees	1900-2
"The Mangana Gold fields" Bulletin No.1	" "	1907
Secretary for Mines Report		1907
"Notes on the Golden Entrance Mine.	F.H. Barrett	1927
"Advisory Report on the Golden Entrance Mine Mangana"	A.M. Reid	1929

History:

The Argyle reef which lies on the southern side of Sailors Gully is probably the southern continuation of the old Golden Entrance Reef which was worked principally between Sailors Gully and Sharkeys Gully.

The Golden Entrance reef was discovered J.S. Goodall Jnr. and three sections were taken up early in 1896. During January and April 1900, these sections were acquired by B. and J.E. Smith and were transferred to the Golden Entrance Company in September, 1900, the company having been formed in July of that year. The operations of the company extended chiefly over the years 1900-02 during which a total of 224 tons 6 cwt of ore was treated for a return of 1427 ozs. 2 dwts of gold. During the years 1903-05 the mine was worked on tribute. A total of 441 tons of ore was broken for a return of 988 ozs. 3 dwts of gold. The mine was again worked by tributors in 1907 but the results of their work are not known. The Golden Entrance Company finally abandoned their leases in December, 1909.

Some of the sections were taken up by various persons between the years 1910 and 1924 but very little gold appears to have been won.

Prospecting work carried out by C.E. Chesshire during the latter part of 1927 and early in 1928, resulted in the location of the southern continuation of the Golden Entrance reef, and in June 1929 the Argyle Gold Development Company was formed with the object of testing it.

Topography:

Sailors Gully crosses the central portion of the lease and flows in a general south-westerly direction.

It crosses the reef almost at right angles. The country on either side of the gully rises sharply and hence conditions have been favourable for development by means of adits.

Geology:

The rocks in the vicinity are Cambro-Ordovician slates, sandstones and quartzites of the Mathinna series. The structural features are somewhat obscure but it is probable that their general direction of strike is north-westerly and that they have been more or less folded.

The Reefs:

For the purposes of this report the southern continuation of the Golden Entrance reef will be referred to as the main reef while a smaller vein lying to the west will be called the Western Reef.

The Main Reef:

This consists of a quartz vein containing gold, pyrite, arsenopyrite, galena and some carbonates. The strike varies from N40°W to N55°W and the dip is to the north east at 55° to 70°. There is considerable variation in width from place to place throughout the workings. In some places the quartz is five feet wide while in others it diminishes to a mere thread. The average width would be about two or three feet.

The principal workings are shown on the accompanying plan of the mine. They consist of two adits driven into the hill on the south side of Sailors Gully and a short adit on the north side. In addition a small amount of surface trenching has been carried out.

No. 1 S Adit - This is 119 feet above No.2 adit and approximately 140 feet above the bottom of the gully. It has been driven on the reef for a total distance of 242 feet (measured from the toe). For the first 170 feet the drive has a bearing of 128½° but over the remaining distance it is 141°. Over the first portion of the drive the reef varies in width from 1 to 4 feet, the average width being about 2 feet 6 inches. From the toe to 70 feet the vein is poor and consists of white vitreous quartz with pyrite and arsenopyrite. At 120 feet a winze (No.2) has been sunk 23 feet on about 2 feet 6 inches of quartz; down to 12 feet this is said to have contained 12 to 15 dwts of gold per ton. Near the bend in the drive another winze (No.3) has been sunk, the depth being 49 feet. Here the width of the vein is about 2 feet 6 inches and like No.2 it carried 12 to 15 dwts of gold down to 12 feet. From No.2 winze, at a depth of 12 feet below the floor of the adit, an intermediate drive has been put in to connect with No.3 winze. In the back of this drive the vein varies in width from 2 to 3 feet and is said to contain about 10 to 12 dwts of gold per ton. In this section the vein dips to the north east at 65°. Between No.3 and No.1 winzes the average width of the vein is about 1 foot. In the face of the drive it is somewhat broken and irregular and consists of pug seam containing small veins and irregular patches of quartz. The width of this formation in the face is 18 inches. No.1 winze has been sunk to a depth of 27 feet. Down to 7 feet the vein carried about 10 dwts of gold per ton, the width being 9 inches.

About 6 tons of ore has been broken from the back of the level at a point immediately north of No.2 winze and another 4 tons from a point above No.1 winze. When treated at the Old Boys battery at Mathinna the 10 tons yielded 7½ to 8 ozs of gold. Unfortunately a small amount of free gold, obtained from dollying, was included in this crushing and hence detracted somewhat from the value of the test. Nevertheless it seams probable that the average gold content of the ore, at the two positions indicated, is about 15 dwts per ton. Two check samples were taken, one from the back of the drive at a point 8 feet south of the centre of No.2 winze, and the other from the back of the drive at a point immediately above No.1 winze. The results of these samples are as follows:-

Table No.1

Assay Results of Samples No.1 Adit

Sample No.	Regd. No.	Location	Width	Assay Value per ton Gold	Silver
1	1038	Back of drive 8'8 of No.2 winze.	2' 0	0ozs.15 dwts 4 grs.	0ozs.2dwt. 8grs.
2	1039	Back of drive above No.1 Winze	1'3" 0	" 14 " 9 grs.	0ozs.1dwt. 20grs.

These results agree generally with the returns from the crushing and shows that fair grade ore, exists at the positions indicated.

With the object of ascertaining the average value of the ore won from the development work the quartz paddocks at the entrance of No.1 Adit was sampled fairly systematically. One sample No.3 was taken over No.1 paddock and six (Nos,4-9) from No.2 paddock. The latter were taken right across the dump at intervals of approximately four feet. Thus No.4 sample consisted of a number of shovels-full of ore taken across the top of the dump and then quartered down, while No.5 was taken across the dump 4 feet lower down and so on to the bottom of the dump. The results of these samples are shown in the following table.

Table II

Assay Results of Samples from Quartz Paddocks No.1 Adit

Sample No	Registered No.	Assay value per ton. Gold Ozs.	dwts.	grs.	Silver Ozs.	dwts.	grs.
3	1040	0	2	15	0	0	13
4	1041	0	2	15	0	1	13
5	1042	0	1	20	0	0	19
6	1043	0	0	13	0	0	13
7	1044	0	1	7	0	0	13
8	1045	0	8	9	0	1	7
9	1046	0	1	1	0	0	13

With one exception these results are consistently low.

The average value indicated is approximately 2 dwts 15 grs per ton.

No.2S Adit - This has been driven on the course of the lode for a total distance of 414 feet (measured from the toe.) From the entrance to 66 feet the lode consists of 3 to 5 feet of quartz containing a good deal of pyrite and arsenopyrite but with very minor quantities of gold. From 66 to 110 feet there is about 2 feet of solid quartz on the hanging wall with a formation containing veins and irregular patches of quartz on the footwall. The total width of the lode in this section is 5 feet and the dip is 70° to the north east. At 110 feet the lode diminished in width and as far as the first bend consists of small veins and irregular patches of quartz. Over this section the drive has a bearing of 124°. At 197 feet the drive turns slightly to the east on a bearing of 114° and the lode maintains this course for a distance of 53 feet. Over the first 30 feet only occasional patches of quartz were seen but over the remaining distance the reef widens to 1 foot. The drive then turns on a bearing of 133¾° for a distance of 57 feet. Over this section the reef maintains an average width of 1 to 2 feet but widens to 4 feet at a distance of 50 feet from the second bend in the drive. At 307 feet from the toe the drive again turns to the east, the bearing being 119°. Over this last section the drive has followed an almost vertical puggy wall and only occasional small patches of quartz may be seen.

Near the last bend in the drive, i.e. at 307 feet from the toe, a well defined pug seam goes into the west wall. This seam contains a fair amount of quartz and may represent the continuation of the lode. Moreover the projected position of the lode from No.1 adit, taken from a point mid-way between Nos. 1 & 3 winzes, lies to the west of the last section of No.2 adit. Hence it is possible that the latter portion of No.2 adit has not been driven on the reef.

No samples were taken from this adit. The ore is stated to be generally poor.

No. 2N Adit - This is located on the northern bank of Sailors Gully directly opposite No.2S Adit. A drive has been extended 53 feet into the hill on a bearing on 296½°. This follows the footwall of the reef which is dipping to the southwest at 75°. Sample holes have been put into the west wall at regular intervals. These indicate an average width of 3 to 5 feet of quartz but there is very little gold. Where it outcrops at the entrance of the adit the reef is fairly well mineralised with pyrite and arsenopyrite.

Surface Workings - At a distance of 180 feet south west of the entrance of No.1S adit a deep trench has been put in on the reef. This is 94 feet above the adit. The vein strikes 134½° and dips to the north east at 75°. It is about 1 foot wide but contains no gold. This is the most southerly trench on the reef.

There are also a few trenches between the No.1S and No.2S adits, but these were all partially filled in.

General Remarks - A characteristic feature of this reef is a smooth slickensided plane which persists throughout its length. This is probably a plane on either side of which there has been a little differential movement. Most of the gold is said to occur on the western or footwall side of this plane and may be present as coarse specks or tiny veinlets in the quartz or in association with small veins of limonite occurring in the quartz. The latter occurrence indicates that some of the gold is probably present in the pyrite and arsenopyrite of the unoxidised portions of the vein and also points to secondary enrichment in the upper portions of the reef.

The Old (Golden Entrance Workings) - These are situated on the northern side of Sailors Gully and extend in a north westerly direction as far as Sharkey's Gully. No.2. adit has collapsed at the entrance and is now inaccessible. The 150' level adit (i.e 150 feet below No.2 shaft) appears to have been driven on a smooth slickensided wall which dips to the east at 85°. No.1 adit was accessible for a distance of 90 feet (measured from No.3 shaft). It presents the same general features as the 150' level adit but about 4 or 5 inches of laminated quartz occurs towards the end, at a distance of 78' from the shaft. Around No.2 shaft some old stopes come right to the surface. Other workings extending north of No.2 shaft, and an adit from Sharkey's Gully were not examined.

The following returns, taken from the "Mineral Industry of Tasmania" show the tonnage and gold content of the ore extracted from the Golden Entrance workings.

Table III

Golden Entrance Mine Returns 1900-1905

Period	Tonnage Tons.	cwts.	qrs.	Gold Ozs.	dwts.	grs.
3 mths ended 30th Sept. 1900	21	6	3	322	2	3
12 " " " " 1901	101			933		
3 " " 31st March 1902	81			140		
3 " " 30th Sept. 1902	21			32		
3 " " 31st Dec. 1903	41			38	13	
3 " " 31st March 1904	125			94		
3 " " 30th June 1904	108			160		
3 " " 30th Sept. 1904	76			270		
3 " " 31st Dec. 1904	43			116	10	
3 " " 30th Sept. 1905	48			309		
Total	665	6	3	2415	5	3

The average value of the ore treated was therefore 3 ozs 12 dwts of gold per ton.

In connection with the above statistics it is uncertain whether the return for the twelve months ended 30th September 1901 has been meant to include that for the 3 months ended 30th Spptember, 1900. In this

event the tonnage and gold content of the ore would be 644 tons 12 cwts for 2093 ozs 3 dwts, the average gold content being 3 ozs 5 dwts per ton.

Most of the earlier workings are described in detail in Twelvetrees Bulletin. For purposes of comparison these workings have been swung on to the present compass survey. (Their positions as shown on the plan are probably only approximately correct). The longitudinal section shown that most of the ore came from within 100 feet of the surface. Moreover the line of the bottom of the various stopes is roughly parallel to the surface contour of the hill. This, combined with the fact that Twelvetrees reports that the gold occurred in association with oxides of iron, points to secondary enrichment.

No free gold was seen in the Argyle Mine during my examination but A.M. Reid in his advisory report (1929) mentions the occurrence of gold in association with oxides of iron. This supports the above idea, viz. that secondary enrichment has taken place throughout the reef.

The Western Reef. - About 150 feet south west of No.1 S Adit a little work has been carried out on a reef striking N 70° W. An adit has been driven 25 feet on about 2 feet of quartz. At the mouth of the adit a shaft has been sunk to a depth of 20 to 25 feet. Here the vein dips to the north east at 60°. Farther up the hill some shallow trenches have uncovered what is probably the same lode. In these the quartz varies in width from 2 inches to 2 feet. Very little information could be obtained as to the gold content of this vein but generally the quartz appears to be fairly low grade.

SUMMARY AND CONCLUSIONS

The returns from the Old Golden Entrance Workings show that some rich patched of gold have been won from this reef and the work carried out by the Argyle Company represents the opening up of a large block of new ground. So far these operations have been attended with only a small measure of success but the possibility of the existence of some payable stoping ground is indicated by

1. the results of the trial crushing

and 2. the fact that fair grade ore appears to exist above the sections from which this crushing was broken (as shown by samples 1 and 2, table I).

In view of the above and bearing in mind the nature of the occurrences in the Golden Entrance Workings the following work is recommended in the order given.

(1) Careful sampling of all workings in No.1 S Adit:- Time and the materials at my disposal did not permit of the execution of this very necessary work. Very little information could be obtained as to the actual gold content of the ore throughout these workings and the figures quoted in this report, apart from the actual samples taken, are statements made and are probably only approximations. The sampling of the quartz paddocks (table II) shows that a good deal of the ore must be very low grade but, on the other hand, there is no information to show the extent or

value of any possible stoping ground that may exist. It is fairly certain that the first 70 feet of No.1 S adit is in a low grade portion of the vein so that this could be excluded from the sampling operations. Sampling over the remainder of the drive should be carried out at intervals of 10 feet (or closer if necessary) over the full width of the vein. The three winzes and the intermediate drive between Nos. 2 and 3 winzes should be sampled in a similar manner. This work would give definite limits to such portions of the reef as may be worth extracting.

(2) Rising from a point 8 feet south of the centre of No.2 Winze:- Sample No.1 shows that fair grade ore exists in this portion of the reef and there is approximately 65 feet of untested ground between the back of the drive and the surface. The Golden Entrance occurrences and the possibilities as to secondary enrichment indicate that the uppermost sections of the reef are more likely to yield payable ore. The height of the rise would depend on the results obtained.

(3) Rising above No.1 Winze:- Conditions here are similar to those outlined in the previous paragraph. The extent of untested ground between the back of the drive above No.1 Winze and the surface is approximately 105 feet.

(4) Crosscutting from No.2 S adit:- As stated earlier in this report, it is possible that the latter portion of No.2 S adit has not been driven on the reef. In order to determine this point a crosscut could be extended 15 or 20 feet into the west wall from a point 347 feet south of the toe of the adit. In the event of the reef having been missed by the drive, this work would enable it to be tested at a point below the intermediate level in the No.1 S adit workings.

FIELD GEOLOGIST

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