# AURIFEROUS DEPOSITS IN TASMANIA

## 1. Introduction

Gold was, after coal, the first mineral of importance to be discovered in Tasmania. Gold in alluvial deposits was found at Mangana in 1852, and gold bearing quartz reefs were discovered and worked at this locality a few years later. These discoveries led to intensive prospecting in the State and resulted in the discovery of numerous other fold fields and eventually to the deposits of base metals etc.

The principal sources of the gold production of the State have been the alluvial deposits, quartz reefs, and the copper lodes of Mt. Lyell and North Mt. Lyell, also the zinc lead lodes of Rosebery and Williamsford.

## 11. Alluvial Deposits

These were, as a rule, the earliest deposits to be discovered. The alluvial fields included those at Mangana, Mathinna, Lefroy, Lisle, North-west coast, Corinna, and Mount Lyell.

### 1. Shallow Deposits

The deposits in these fields were generally shallow and were worked by individual miners; the most important fields was that at Lisle from which it is estimated that 250,000 ounces of gold were obtained.

The fields though important producers in the past, have been almost entirely worked out and so have no possibilities as regards future development.

### 2. Deep Deposits

Deep leads occur at Back Creek (Lefroy), and Corinna.

#### (a) Back Creek System

A narrow tract of basalt extends along the Back Creek valley from near Lefroy to the junction of this stream with the Piper River, a distance of 6 to 7 miles. About half way along this tract of basalt or in the vicinity of the Back Creek Goldfield, numerous tributary tracts join the main one. Shallow leads of gold bearing wash were worked right up to these tributary tracts of basalt and passed beneath them. Only a limited number of bore holes (two lines with 7 and 4 holes respectively) have been put down to these leads. With regard to these bores and the possibilities of this system of leads one cannot do better than to quote from A. Montgomery's report (1894).

"Neither of these two series of bores has, to my mind, been well located, the endeavour seemingly having been to drop on the gutters by a random shot instead of by carrying out a systematic search. As seen on the plan, both sets of bores are on branch leads running into the main Back Creek Valley lead; and there can be no doubt that the basalt indicates approximately the position of the old valleys into which it flowed. Had a survey been made of the boundaries of the deep ground, it would have been seen at a glance that there are narrower parts of the old valleys lying a little to the east of both sets of bores, where a complete cross section of the leads could have been made with the same amount of boring, or even less. It should be remembered that the proper use of a diamond

drill in searching for deep leads is to locate the deepest ground, not to find gold, the sample of gravel taken by the drill being so small that the richness or otherwise of the wash cannot be correctly judged by it. For esample, in a recent bore in the East Pinafore mine the drill passed through quartz wash lying on the slate bottom under a basalt flow, but no gold was found in the sample brought up; yet, when the shaft was sunk to this point, it was found that there was a good deal of gold in the wash. In boring for a lead the holes should be put down in regular lines across its supposed course, and the dip of the bottom from bore to bore noticed, so that it can be found between which pair of bores the deepest ground must lie; then other bores should be put down between this pair, at short distances apart, if it is required exactly to locate the gutter. This being found, the further testing of it, to be in any way conclusive or satisfactory, must be done by regular mining, independently of whether the drill has brought up gold in the cores of wash or not.

The bores make it quite clear that there is a very deep old lead under the basalt of the Back Creek Valley. Taking into consideration the number of auriferous branches that have been actually worked successfully, the favourable nature of the whole of the formation through which the valley has been eroded, and the great probability that unknown reefs have been cut through during this erosion, I am of opinion that there is a very great probability that the main lead will prove more or less payable when opened for mining. Mr. Thureau, in his Report of 1882, expressed a similar opinion. Inspection of the plan shows that the lead is narrow almost opposite Mr. W. L. Parry's house, and that this narrow place is only a short distance below the junction of the branch from the White and Red Leads with the main valley, and not far below that from the Old and Cardigan Leads, while on the other side there are two branches of basalt coming in, which may perhaps cover other leads fed from the Major Reef. Not to go too far from the known gold, I should recommend a trial of the lead in Mr. Parry's 16 acre block. A line of bores along an east and west line through the easternmost corner of this section would prove the depth of the ground, and show the position of the butter, and depth and character of wash contained in it; they would also show how near to the gutter it would be possible to sink a shaft in reasonably firm ground which would not move and destroy the shaft when blocking out the wash should commence."

It is evident therefore that there is a system of deep leads beneath the basalt of Back Creek. The whole of the bedrock consists of Cambro-Ordovician rocks which are the repositories of the auriferous quartz reef, and gold may have been shed into the leads from many localities. The leads where they pass under the basalt have all been proved to be gold bearing and have been worked. The deep leads have been tested to only a very slight extent and so appear to represent possibilities for future development.

(b) Corinna

Gravels occupy a considerable area of the surface in the Corinna district the most extensive development occurring at Brown's Plains. The gold content of these gravels is low, but they may possibly be of value in the future.

III. Quartz Reefs

The most important fields have been those of

Beaconsfield, Mathinna, Lefroy, Mangana and Mt. Victoria (Alberton). With the exception of Mathinna, these fields are quite idle.

(1) Beaconsfield

The most important mine in this district was the Tasmania Gold Mine. From the commencement of operations in 1877, this mine produced 1,022,692 tons or ore containing approximately 854,600 ounces of gold with a value of £3,612,680 and paid £772,671 in dividends.

The mine was closed down by the Tasmanian Gold Mine Ltd. in April, 1914, but was worked by a co-operative party until november 1914. The reason for the closure of the mine was that the working was resulting in a loss. For 1912-13 a total of 53,812 tons were mined and treated for a recovery of 21,205 ounces of gold, the loss on the year's working being £3,030. One cause of the losses compared with the profits of earlier years, was the diminution of the values in the lower levels.

This diminution occurred as far as the 1250 foot level, and then an increase in values occurred as shown from the following table of recoverable values as given by development sampling at successive levels.

| | Length sampled | Average Assay |
|---|---|---|
| Above 915 foot level | 1200 feet | 76/9½ |
| 1000 " " | " " | 54/6½ |
| 1000 " " | " " | 33/2 |
| 1250 " " | " " | 22/8½ |
| 1370 " " | " " | 23/2½ |
| 1500 " " | 900 " | 28/7 |
| 1500 " " | estimated for 1200 feet | 25/9½ |

These figures are taken from a report by Mr. A. Llewellyn in 1913.

The Mine Superintendent's report for 1912-13 quotes the bottom level (1500 feet) as just under 13 dwts over an assay width of 7 feet for a length of 940 feet.

Official samples along a length of 600 feet were 268 in number and gave a value of 11 dwts (any exceptionally rich ones being rejected over a width of 4½ to 6 feet.

The total working costs for 1913 were 33/7.86 per ton the principal items being mining and stoping 10/11.88, pumping 5/6.13 (6/11 for 1912) milling and cyaniding 8/8.75, development 2/10.07. The pumping was carried out by steam power, imported coal being used as a fuel, and the pumps of the draw-lift type. With modern pumps and hydro-electric power this item might be considerably reduced. Economies might also be effected in mining by using machine drills, and in using hydro-electric power wherever possible.

The greatest obstacle to the working of this mine is the great quantity of water that has to be pumped from it. In 1912 (the last normal year) 17,277,140 gallons had to be pumped per week. It is also stated that each foot in depth sunk entails the pumping of 21 million gallons of water to drain it.

There is thus in the Tasmania Mine a gold-bearing reef with a length of 1200 feet, width of 4½ to 7 feet, and a value over part or the whole of the length apparently ranging from 11 to 13 dwts per ton assay value. The mine is idle for economic reasons.

(2) Lefroy

The Lefroy field was a productive one during the latter part of last century. Numerous reefs were discovered and many mines opened upon them, many of which proved profitable.

The best values, however, were down to shallow depths of approximately 400 feet. Where work was carried out below this depth, the reefs were unpayable. The circumstances strongly suggest that the payable parts of the reefs were secondarily enriched and that in the primary parts of the reefs were low grade. It does not appear therefore that this field has any large possibilities of future development. The secondarily enriched parts have probably all been discovered. Any future possibilities would depend then upon richer shoots in the primary parts of the reefs, if such occur. There is no available evidence to indicate whether such exist and if so, furnish any idea as to their position.

Drilling appears to be the best means of testing this, but under the circumstances, it would be more or less chance drilling in the early stages.

(3) Alberton & Warrentinna

These fields, particularly the former contain numerous short and narrow quartz reefs. Many mines have been opened on them, but without any great success.

The fields offer little or no prospect of further development unless the reefs change in character in depth. There is the possibility of some of the reefs, owing to their opposite dips intersecting at depth and so larger ones might occur. A system of drilling would be the best means of determining these possibilities.

(4) Mathinna

This has been the second most important field in the State. Numerous reefs have been discovered and many mines commenced on them. The Golden Gate mine was the only successful one and up till the cessation of the operations by the New Golden Gate Co. in 1913 290,000 tons of ore had been treated for 246,000 ounces of gold valued at £950,000 and £365,000 paid in dividends. Several reefs were worked in the mine, the total depth reached being 1600 feet. It is worthy of note that only one of the reefs outcropped at the surface, the remainder being found during the course of underground operations. The mine is at present being worked by a company.

The Mathinna field apparently occurs in a highly favourable zone. Its future, however, depends upon the discovery of any concealed reefs such as those found in the Golden Gate Mine. A campaign of drilling in the favourable zone is certainly worthy of consideration.

(5) Mangana

This was the first field to be discovered in the State. Numerous reefs were found and mines started but not with any great success. It is doubtful if there are any possibilities of further development.

(6) Waterhouse

Numerous reefs were discovered in the sixties and seventies and mines were opened at shallow depths. As soon as the sulphide zone was entered at about 100 feet, mining ceased owing apparently to the inability of the then operators to recover the gold contained in the sulphide ore.

This field certainly appears to warrant further testing and may contain possibilities of further development.

IV. Other Deposits

(1) Beulah

This field has possibilities of future development as may be gathered from the following extract from Mineral Resources No. 8 by A. McIntosh Reid.

"Another important feature is that gold - sometimes in association with pyrite - is invariably found in the quartz porphyry intrusive member. In these narrow porphyry dykes the gold, in a very fine state of division appears to be fairly evenly disseminated. The proportion of gold varies from ½ dwt. to 7 dwt. per ton of rock, and an average of 1 dwt. may be safely anticipated. The Star of the East mine at Beulah, was worked many years ago, but with no good result. It consists of a number of adits and open-cuts driven along the course of a dyke of quartz-porphyry, 12 to 30 feet wide. The material obtained from these excavations was treated on the spot in a small milling and concentrating plant. No gold has been found in Minnow Rivulet beyond the point where it crosses the dyke, but on the downstream side alluvial gold of fine grainsize is fairly abundant, and a considerable amount has been recovered by sluicing the gravels and sands.

This deposit is worthy of very careful investigation."

(2) Mt. Lyell Mines

The Mt. Lyell Co. is the largest producer of gold at the present time. The gold is obtained from the blister copper smelted from the ores of the North Lyell and Mt. Lyell Mines. The production for 1926 was 2306 ounces and the total to date is 387,085 ounces (fine).

Conclusions

It is obvious from the above that there appears to be small possibility of further development of auriferous deposits, but that whatever possibilities may exist depends upon exploration at depth or for concealed (non-outcropping) reefs. This exploration would be best carried out by systematic campaigns of geophysical surveys and drilling in favourable zones.

In the case of the Tasmania mine, however the deposit is not being worked for economic reasons.

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