

Gold was the first metallic mineral to be discovered in Tasmania, the discovery being at Mangana in 1852, and has played an important part in the exploration and opening up of the State. The prospecting following the discovery led to the exploration of the north-eastern and north-western, and later to the west coast districts. During this period the principal gold fields and also other mineral fields were discovered. For a period of 40 to 50 years the annual production ranged from £100,000 to £300,000 and the total production from 1880 to date has been £7,698,476. During the past twenty years there has been a serious decline in the production and the present annual yield is approximately £20,000.

The greater part of the production has been from quartz reefs, and it is the almost cessation of production from this source (combined of course with the depletion of the alluvial deposits) that has resulted in the decline in production. The only means of revival appears to be in the discovery and exploitation of quartz reefs (and other primary deposits) and so the possibilities of such discoveries will be considered for the various reefing fields of the State.

#### Quartz Reefs in North-Eastern Tasmania.

The fields of this part of the State are mainly restricted to the north-eastern districts. The fields are scattered over this district but they have in general the same geological features. The reefs occur in the slates and quartzites of the Mathinna series (probably of the Cambro-Ordovician system) which are intruded by a granite batholith, the reefs being situated in those portions of the slates &c. occupying the inter-cupola troughs in the upper surface of the granite batholith.

The main zone corresponding to the most defined trough is that extending in a N.N.W. direction from Fingal to Lyndhurst and including the gold fields of Mangana, Mathinna, Alberton (M<sup>th</sup>. Victoria), Warrentinna, Forester, and Lyndhurst. The other fields e.g. Lisle, Golconda, Lefroy and Beaconsfield lie to the west of the outcropping portion of the batholith and apparently occur in a much wider trough with small protrusions of granite. The above conditions are similar to those of the chief goldfields of Victoria.

A geological survey is now being carried out on these goldfields in order to determine the relation if any between the reefs and the structures of the rocks. Any definite relationships that are proved to exist will enable the future prospecting and testing to be carried out to advantage.

(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 of 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 Tasmania Gold Mine Limited 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 1,250 feet 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.

		<u>Length sampled</u>	<u>Average Assay</u>
Above	915 foot level	1,200 feet	76/9 $\frac{1}{2}$
	1,000 " "	1,200 "	54/6 $\frac{1}{2}$
	1,000 " "	1,200 "	33/2
	1,250 " "	1,200 "	22/8 $\frac{1}{2}$
	1,370 " "	1,200 "	23/2 $\frac{1}{2}$
	1,500 " "	900 "	28/7
	1,500 " "	estimated for 1,200 ft.	25/9 $\frac{1}{2}$

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 (1,500 feet) as just under 13 dwt. 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 dwt. (any exceptionally rich ones being rejected) over a width of 4 $\frac{1}{2}$  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.

#### obstacle

The greatest/ to the working of this mine is the great quantity of water that has to be pumped to 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 600 - 1,200 feet, width of 4 $\frac{1}{2}$  to 7 feet, and a value over part of the whole of the length apparently ranging from 6 to 13 dwt. per ton assay value. The Mine is idle for economic reasons.

Apart from the reef in the Tasmania Mine a number of smaller reefs occur in the field some of which are now being opened up.

A geological survey will be undertaken in the near future.

(2) 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 Company 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 1,600 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 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 geological survey has not revealed any definite relationship between the lodes and the structure. However there are several areas in the favourable zone which do not appear to have been sufficiently prospected and testing by shafting sinking or drilling is warranted. In the remainder of the field, the drilling would have to be more of the nature of "blind stabbing" in the hope of finding reefs which do not outcrop.

(3) Alberton (Mt. Victoria). -- This field represents the northerly extension of the Mathinna field. This field contains numerous short and narrow reefs outcropping on a steep ridge. These conditions have enabled exploitation by adits but as no shafts have been sunk below adit levels, the exploitation has taken place to comparatively shallow depths only. The reefs appear to be restricted to a zone occupied by an anticlinal fold and a geological survey is now being started.

The northern part of the field occupies flatter land at the termination of the ridge. Numerous reefs outcrop and alluvial deposits have been and are at present being worked in this part. The reefs have been tested to depths of 40 feet and further testing at depths is warranted. A limited diamond drilling campaign is at present being conducted.

(4) Warrentinna, Forester and Lyndhurst. -- These fields represent the northern extension of the Mathinna-Alberton belt. They resemble the Alberton field, but the reefs are not so numerous. The Lyndhurst field was opened up in the seventies, and difficulty was experienced in connection with the high content of sulphides, and little attention has since been devoted to the field. A geological survey is warranted and further testing may be necessary.

(5) Mangana. -- This is situated at the southern end of the Mathinna belt. Numerous reefs were found, but the mines did not attain any great success. A geological survey is necessary to determine the possibilities.

(6) 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. The possibilities of future development therefore depend upon (a) Discovery of other reefs near the surface with secondarily enriched zones.

(b) Payable shoots in the primary zone. In connection with the latter, there is no evidence as to where they may be sought. A geological survey will be undertaken but in view of the fact that the country is flat and all workings were from shafts and are now inaccessible, the possibilities of obtaining definite results are not great.

The gold in this district has been found to be associated with Devonian porphyries. Quartz reefs are not common except in the Queenstown and Moina districts, and in some cases the gold is probably derived from the porphyries themselves or possibly narrow quartz veins in them. It is possible that the porphyries may in some cases represent low grade gold deposits capable of exploitation, as is evident from the following extract from Mineral Resources Mc.S. by A.M. Reid, in reference to Boulah.

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  $\frac{1}{2}$  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 grain size is fairly abundant, and a considerable amount has been recovered by sluicing the gravels and sands.

This deposit is worthy of very careful investigation.

P.B. Nye (Sgd)

GOVERNMENT GEOLOGIST.

Mines Department,  
Hobart.  
3/2/32.