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21st April, 1933.

MEMORANDUM:

Senator the Hon. A.J. McLachlan,
Minister in charge of Development,
CANBERRA.

The Hon. C.E. James,
Minister for Mines,
TASMANIA.

GOLD RESOURCES OF TASMANIA

As instructed we have studied the possibilities of increasing the output of gold in Tasmania and beg to submit the following report and recommendations:

We have had conferences with the staff of the Geological Branch of the Department of Mines of Tasmania and have discussed the reports of the Department in the light of the latest information available since the date of these reports.

The areas in the State in which gold has been won profitably are:

1. The Queenstown district of the West Coast.
2. The Corinna district of the West Coast.
3. The Moina and Beulah district of the North Coast.
4. The Beaconsfield district north of Launceston.
5. The district stretching from Lefroy to Lisle on the North East Coast.
6. The district from Lyndhurst on the North Coast to Mangana near the East Coast.
7. The Gladstone district near the North East corner of the Island.
8. The Cygnet district, South of Hobart.

Geology

The West Coast deposits are associated with porphyries of Devonian age intrusive into Lower Paleozoic sedimentary rocks.

The same remarks apply generally to the area around Moina.

The deposits at Beaconsfield, Lefroy, Lyndhurst-Mangana and Gladstone are in the Cambro-Ordovician series, slight differences existing between the more westerly outcrops in the Beaconsfield and Lefroy areas and the easterly outcrops of Lyndhurst-Mangana and Gladstone.

Dealing seriatim with the various areas:

(a) Queenstown and Corinna districts of the West Coast.

In the Lynchford area about ½ mile east of Lynchford station on the railway line between Regatta Point and Queenstown considerable alluvial gold was won in the early days.

A company was formed to work a quartz reef between Specimen Creek and Lynchford Creek known as the King River mine. Approximately £20,000 was spent underground and on the surface, including the provision of a battery, and gold to the value of £3,345 was recovered; the results being unprofitable.

This mine has been inspected by Departmental officers from time to time since 1890 and reports have been submitted by Messrs. Montgomery, Twelvetrees and Finucane.

From 1890 to 1894 tributors devoted attention to a decomposed porphyry dyke on the foot-wall of the quartz reef with results which for the time were recorded by Mr. Montgomery as encouraging. According to later reports the underground operations of the tributors were discontinued owing to heavy ground and it is suggested that this was due to proximity of the workings in the quartz reef.

The lease of this ground has been held continuously probably owing to the fact that exceedingly rich pockets of ore were discovered from time to time.

We have been intereviewed by the representatives of the present lease-holders, and have discussed the possibilities of this lease. We are of opinion that nothing further can be done by the Department of Mines pending exploration work by the interests holding the area, following upon which further geological survey could be undertaken if necessary.

It would appear that gold to an unknown value has been proven in the decomposed dyke on the footwall of the quartz reef probably in veins of quartz and limonite but nothing is known regarding the width and depth of the gold bearing zone.

On the opposite side of the Queen River quartz reefs in the slates and sandstones were worked in mines, owned by the Princess River, the Princess River Extended and Madam Howard Companies.

Some success attended the work in the early days and it is stated that one dividend was paid by the Princess River Company. Work ceased on the Princess River mine about 1890. In 1894 a report prepared by Mr. Montgomery, then Geological Surveyor, drew attention to the possibilities of this mine; he stated that there is a great inducement to put down the shaft and try the reef again at a depth. The reports by Mr. Montgomery are available in the Departmental records at Hobart for inspection.

Small quantities of gold are associated with the Mt. Lyell Copper Ores and, owing to the large tonnages treated, a considerable amount of gold is recovered from

the blister copper in the electrolytic refinery. Small quantities of gold are also associated with the zinc lead ores of Rosebery and Mt. Read and, when base metal prices recover and these mines commence operations, the gold production of Tasmania will benefit correspondingly.

We are unable to make recommendations in regard to other areas on the West Coast, except that the work now in progress on the alluvial at the Whyte and Savage Rivers in the Corinna district should be continued.

(b) Moina and Beulah districts of the North Coast.

A small amount of work is proceeding in the Moina area and a detailed geological survey of this district should be undertaken when opportunity offers.

In 1924 Mr. A. McIntosh Reid, Government Geologist, reported that, "Gold sometimes in association with pyrite is invariably found in the quartz porphyry of the Beulah district, and that the gold varies from .5 dwts. to 7 dwts. per ton." Mr. Reid concludes this portion of his report by saying, "This deposit is worthy of very careful investigation."

This area should be reviewed by the Geological Staff of the Department.

(c) Beaconsfield district.

In 1923, Dr. Loftus Hills, then Director of the Geological Survey made a detailed survey of the Beaconsfield district and came to the definite conclusion that from the geological evidence available it would seem that the Tasmania lode is the only really important zone of gold deposition in the Beaconsfield district.

We are satisfied that Dr. Hills' conclusion is sound, upon the evidence then available; later prospecting work may however, have supplied further information of value and we recommend therefore a review of the district by the Department.

We have had submitted to us for consideration proposals for the reopening of the Tasmania Mine at Beaconsfield which worked from 1877 to 1914 producing gold to the value of over £3,612,680 and paying dividends to the amount of £772,671 from the treatment of 1,022,692 tons of ore.

We have studied the reports of the Company from its inception with the hope that we would be able to make a recommendation for further work on this mine because there exists without doubt below the bottom (1,500 ft.) level nearly 1000 ft. of auriferous lode averaging 7 feet in width with an average value of approximately 13 dwts. per ton.

A study of the special reports made by the Superintendent of the mine, Mr. C.F. Heathcote A.M.I.E., F.G.S., and by Mr. Arthur Llewellyn, M.I.M.M., copies of which are available in the files of the Department of Mines are conclusive.

Regretfully we have been forced to the conclusion that we cannot recommend any further action taking into consideration:-

1. The capital cost of over £40,000 to erect a power line from Launceston to the Mine.

2. The increased wages and other costs at present

date compared with the periods during which the mine was operated profitably.

3. And all the various factors stated so clearly and concisely in the reports by Messrs. Heathcote and Llewellyn.

(d) Lefroy-Lisle district.

(i) Lefroy. The Lefroy field was a productive one during the latter part of last century. Numerous reefs were discovered many of which proved profitable down to approximately 400 feet. At greater depths so far as tested the reefs were unpayable.

The possibilities of future development depend upon the discovery of other reefs and of payable shoots at depth in the reefs already known.

A geological survey will be made by the Department as soon as practicable, but the possibilities of obtaining definite results are not great because the country is flat and all mine workings are inaccessible.

(ii) Lisle. Alluvial gold only has been found at Lisle and work has been discontinued except for the activities of small parties of individuals.

North of Lisle a number of reefs have been discovered from time to time but have been unprofitable.

Pending a geological survey no comments of value can be made.

(e) Lyndhurst-Mangana district.

For a distance of nearly 50 miles stretching mainly between granite massifs in a direction from Lyndhurst slightly east of south lies the most promising gold bearing area of Tasmania so far as discovered to date. We are of opinion that more attention by investors to the possibilities of this district is justified and that the geological survey by the Department should be completed as quickly as possible. In this connection we are recommending later in this report that the Geological Staff of the Department should be increased.

(i) Lyndhurst. The Lyndhurst field was opened up about 1870 and a number of reefs were discovered. Difficulty was experienced with the recovery of the gold owing to the high percentage of sulphides in the ore. Probably for this reason little attention has been devoted to this field for many years.

The prospects of the field justify a geological survey as a first step towards consideration of the economics of the field.

It may be pointed out that metallurgical practice has improved greatly of recent years so that a high recovery of gold from sulphides at much lower cost can be obtained in many cases. Further details regarding this matter are given later in this report.

(ii) Forester and Warrentinna. From time to time short and somewhat narrow reefs have been discovered in this area and attempts have been made to develop them, but with unsatisfactory results.

The projected geological survey of the whole of the district from Lyndhurst to Mangana will include this area. Until the survey is completed no further comments can be made in regard to the possibilities of Forester and Warrentinna as gold producers. It may be expected that if favourable results are obtained north and south of this area further attention will be given to the Forester-Warrentinna area at a later date.

(iii) Alberton. This area known earlier as the Mt. Victoria Gold Field has been the subject of several geological reports by the Department. Following earlier reports by Messrs. Thureau, Montgomery and Twelvetrees, a detailed report was submitted in 1923 by Dr. Loftus Hills. We have studied this report and are in full agreement with the recommendation, namely, that the future of this field depends upon exploration at depth to determine whether the reefs continue and carry payable values.

The field contains numerous short and comparatively narrow (from 2 to 6 feet in width) reefs outcropping on a steep ridge. The topographical conditions have enabled exploitation by adits, resulting in the discovery of gold-bearing quartz of reasonably profitable grade in many cases so far as the comparatively shallow depths are concerned.

Dr. Loftus Hills recommended the grouping of the field as an economic necessity so that reefs adjacent to each other could be mined under one management. In the known length of the more concentrated area of the field, approximately six miles, it would appear that there is room for the formation of at least six groups of mines.

Recent press notices have indicated that a Melbourne Company has taken an option over one of the central areas called the Mercury Lode Group, and that attention is to be given to the unwatering of a winze below the bottom available adit level in which rich stone is reported to have been found. From the evidence available we are of opinion that justification exists for sinking in this area and that exploration should continue if encouraging results are obtained from this preliminary work.

Shoots of payable width have been discovered in several portions of this field averaging approximately 1 oz. of gold per ton and there is no geological evidence which would indicate that the values should not continue at further depths.

The metallurgy of the gold recovery will vary somewhat according to the nature of the ore. In many cases it would appear from the evidence available that the ore will be free-milling, most of the gold being recoverable

by ordinary battery treatment; however it can be anticipated that some of the gold will be recovered in the form of a pyritic concentrate which will need further treatment for recovery.

The Department of Mines is engaged at present in carrying out a geological survey of this promising field and in drilling at the north end of the area.

(iv) South Mount Victoria Area. About 3 miles to the South of the Mt. Victoria area there are occurrences of reefs of a highly pyritic nature carrying gold. So far as known at present two reefs have been exposed known as the Una and the Hinemoa. A syndicate is engaged at present in carrying out exploratory work on the Hinemoa lode regarding which a report has been submitted recently by Mr. K.J. Finucane, Field Geologist.

Trenching across the lode has proved a length of 700 feet to 800 feet with values varying from a few dwts. to several ozs. per ton. The lode has been tested by an adit at the bottom of the gorge being driven on the lode for a distance of approximately 210 feet with widths averaging from a few inches to 3 ft. 6 inches. The syndicate is engaged at present in driving an intermediate adit 100 ft. vertically above the lower adit.

The lode appears to consist of a series of lenses of variable value with indications that a considerable tonnage of sulphide ore could be proven.

The metallurgical treatment of the ore requires consideration at an early date in order to determine firstly how much of the gold can be obtained from battery treatment and what recoveries are possible by other processes such as a differential flotation and cyaniding either before or after roasting.

It is possible that more lodes of this description in addition to those mentioned above will be found in this area, and we are of opinion that there is sufficient promise to justify energetic investigations both on the mining and metallurgical sides.

(v) Mathinna District. Second only to the Beaconsfield district, the Mathinna district has been the most important in Tasmania. Numerous reefs have been discovered and many mines operated. However the Golden Gate mine has been the only successful one. Until the cessation of 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 divideneds.

Several reefs were worked in the Golden Gate Mine and underground operations were extended to a depth of 1600 feet, only one of the reefs outcropping, the remainder being found during the progress of mining.

The Mathinna field occurs apparently in a highly favourable zone. However its future depends upon the discovery of any concealed reefs, as the surface possibilities have been explored thoroughly.

Unfortunately a geological survey just completed has failed to reveal any definite relationship between the lodes and the rock structures. However several areas in the favourable zone have been only partially prospected and shaft sinking or drilling may discover new reefs of

payable quality.

In view of the absence of any geological data of value which would be of assistance in indicating the directions of exploration, shaft sinking, or drilling must be in the nature of blind stabbing and therefore we are unable to make any firm recommendation.

With a limited amount of money available for such purposes it would seem wiser to devote expenditure to areas of more promise where definite objectives can be indicated.

(vi) Mangana area. This area 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.

(f) Gladstone District.

The Gladstone district is situated close to the north-eastern corner of the Island. A small amount of work is being carried out at present by a No Liability Company.

The field was opened up originally in 1880 to 1881 with little success; it is reported that the presence of considerable sulphides in the ore made treatment difficult. The field consists of a number of apparently narrow reefs 2 to 3 feet wide ranging up to 200 feet in length which could be developed to a small extent by adit levels. The value as indicated by a recent survey by the Government Geologist gives promise and further work on sound lines should be undertaken on a more extended scale than at present.

The metallurgy applicable to the treatment of the ore should have attention whilst the underground exploration is proceeding.

(g) Cygnet District.

Approximately 1000 ozs. of alluvial gold have been recovered during past years. A small amount of underground work has been carried out in search of reefs but the evidence tends to show that the gold occurs at the contact of the porphyries and the mudstones in an irregular and indeterminate manner.

Insufficient evidence is available to justify any recommendation for further work in this district.

Metallurgy of gold ores.

During recent years considerable advance has been made in the treatment of auriferous sulphide ores which, subject to examination and investigation in each particular case can probably make valuable contributions to the economics of treatment of such ores.

Co-operation between the Department of Mines through its Laboratory at Launceston, and investors interested in the gold mining industry of Tasmania should make the application of these improved methods of importance and value to Tasmania.

Recommendations.

We recommend as follows:-

1. That the geological surveys of the areas dealt with in this report should be accelerated and that if possible arrangements be made whereby the services of two more field geologists should be available to the Department for this work.

2. That the Government of Tasmania give consideration to the means whereby a sufficient sum of money should be provided for assistance in the pioneering work of investigating and demonstrating the economies of various gold mining districts in Tasmania.

The possibilities of gold mining in Tasmania are considerable and every effort should be made to overcome the present state of doubt and apathy and to encourage sound investigation and development by investors. Loans and grants in aid for work under the direct supervision and, in some cases, direction of the officials of the Department of Mines would be of great value because one or two discoveries leading to profitable results would attract attention and increase greatly the scope of activities in the neighboring areas.

The argument put forward at present that gold mining should need no assistance even in pioneering work because of the high present prices of gold is reduced considerably in its effect by the doubt in the minds of investors regarding the future of the price of gold. Again, the Government assistance is often warranted to demonstrate possibilities which having proved attractive can then be left to private enterprise to develop.

In our judgment the areas surveyed in this report and particularly those in the North-east of the Island are worthy of sound assistance by the Government with the hope that considerable profitable and reproductive employment can be provided.

The sum of £10,000 drawn from the unemployment funds or other sources as might be determined should be sufficient for the purposes as generally outlined above. We are of opinion after discussion with representatives of various companies and syndicates interested in the gold mining industry in Tasmania today that great difficulty exists in commanding the money necessary for pioneering development. We are submitting a confidential report to the Minister for Mines indicating the areas which, in our opinion, are worthy of immediate attention and to which assistance is justified after all necessary proof is submitted that every effort has been made to raise money from ordinary sources. The assistance should be granted by way of loans except in very special circumstances and the programmes of work should be prepared in full detail before expenditure is authorised.

3. That a sum of £100 be appropriated to the Department of Mines for Laboratory plant and apparatus to enable the Department to carry out investigations into the metallurgical treatment (flotation, cyaniding, &c.) of gold-bearing ores and so provide advice for further

investigations on the right lines.

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