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BRIEF REPORT ON

GARFIELD MINE

with

Notes on method of operation.

PRELIMINARY STATEMENT

This report is the result of a short visit of inspection to the Garfield Mine on the 9th inst. In the time available an idea of the extent and value of the deposit could not be obtained, but where the deposit is opened in cuts and shafts the tin ore is in profitable proportion. The preceding statement depends upon the processes employed in mining and treatment; the real object of the visit was to determine whether an improvement could be effected in the processes without adding to or altering the arrangement of the plant, not as to whether the original design is the best for the purpose.

General Statement.

This occasion cannot be allowed to pass without making reference to the failure of the Company to perform certain necessary preliminary works, namely:

1. a contour and feature survey of the properties.
2. exploration of the leads by drilling.

To-day neither the Company nor any of their officers has any idea of the value of the properties. Moreover, no member has any idea of the course of the leads, their width, depth, or extent. Yet the Company has provided a large sum of money in equipping and opening the mine, whether at the right place or not remains to be determined.

It is not too late to have these works performed. In fact an expenditure of £500 for this necessary information is warranted. The suggestion is made that the drilling be performed by the Company under the supervision of an officer of the Mines Department, because not one drillman in a hundred is capable of estimating the value of the ground tested.

The Nature of the Deposit.

The deposits are of an average depth of 30 feet and are confined to certain undetermined leads. Where exposed the section is approximately as follows:-

Felspathic sands of fine grain size containing a little fine tin ore, fine to six feet in depth;

pebbly wash in fine quartz and three to four feet thick with a narrow band of sand rich in tin ore at the base;

fine compacted felspathic quartz sands twelve to sixteen feet thick containing a little tin ore;

pebbly wash, rich in tin ore, two to three feet thick;
soft granite bottom.

With the tin ore is associated a little black tourmaline, ilmenite, zircon, monazite, and fine grains of gold.
The several members of the formation are loosely compacted and easily disintegrated under the action of water under pressure.

These leads appear to follow closely the lines of contact between the granite and the intruded Cambro-Ordovician sandstones, and it is certain that a large proportion of the tin ore in the alluvium was derived from these contact formations. In confirmation of this, dish tests of the chloritic and pinitic bodies and griesen lodes revealed a fair proportion of tin ore. Moreover, veinlets of tin ore ramify through the further confirmed by the presence in the basal bed of alluvium of a large proportion of green chloritic and pinitic materials.

The alluvial deposits occupy the bed of a long defunct stream, wide, and with gently sloping sides. In the gutter only is the lower bed of coarse gravel found. This is illustrated at the present workings where the approaches expose the upper beds only, while the lowest bed of rich tin ore drift appears at the bottom of the face in the cut.

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General Description of the lay-out of the Works.

Water is provided by the Government from the Mt. Cameron Water-race. It is conducted across a deep valley through concrete pipes to another race and along that race to a pumping station placed in a position central to all working sites. Each of the Two Keighley Crude Oil Engines raises six sluice heads of water to a head-race about 100 feet above. The water is then conducted along a race to the intake of a pipe line. A seven-inch pipe-line leads to the workings, where the water under a head of 75 feet passes through a 2½ inch nozzle and is projected on to the face of tin ore drifts. The loosely compacted drifts break up easily under the pressure of water, and a large volume of head water is required in addition to carry the broken material away to the sluice boxes along the tail-race to the dump. An ample fall is provided and a large area is available for dumping without other aids.

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The present face of drift was opened many years by Chinese miners who worked the upper bed of tin ore only, whether they thought the compacted quartz sands underlying the upper tin-bearing gravels was the bottom of the formation, or whether they found the work of cutting a deep tail-race or the raising of the materials of the lower beds by the use of machinery a work to costly for them to undertake is not known; but, there is no indication of the exploration of the drifts to bedrock at any point. The determination of the bottom wash was the work of the existing company.

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In order to provide for amply dumping ground for the waste or sluiced materials, and a sufficient

grade for the tail-race and sluice boxes a deep race has been cut to the working face. At first it was no anticipated that such a deep tail-race would be required, but the deepening of the wash as the workings approached the gutter made this necessary. About 120 feet from the face a bar of hard granite intervenes and as this has not been cut through there is not sufficient get-away at the face. This bar should be removed during the first clean-up. During the cutting of the lower part of the tail-race the loosely compacted material slipped from both sides until the angle of rest was reached. The batter or side slope is still at too high an angle for safe-working, consequently the sands will break away under heavy rains. However, that is not a matter of serious difficulty.

As regards the operations in order to ensure success it is necessary.

1. to remove the granite bar to the sluice boxes.
2. to break the coarse bottom wash at the same time as the fine upper sands.

This coarse pebbly wash at the bottom is required to provide natural riffles in the sluice boxes, allow of the concentration of the fine tin ore in the upper drifts, and prevent the packing of the fine sands in the boxes. (At present it is impossible to save all the tin ore by means of the boxes). If the pebbles of the bottom wash are allowed to enter the boxes with the drifts the sands will become more mobile, the tin ore will concentrate there, and a boxman will be able to settle the tin ore by keeping the wash material in motion with the aid of a fork. A boxman should be employed all the time. It is affirmed that a considerable loss will result if the fine sands are treated alone. At present the boxes are filled with fine sand into which the tin ore will not settle unaided.

If the gutter deepen more than five feet another method of operation will be necessary; but a considerable area of ground along the fringe of the gutter can be removed and treated with the present appliances.

As mentioned in an earlier par of this report the company is not in possession of any reliable information as to the course, position, depth, and width of the gutter. A few shafts were sunk in an attempt to determine these points, but not one reached bottom. It was found impossible to sink through the wet drift sands. A boring plant ought to have been used for this purpose. At present the company is operating blindly--guess work is too costly.

As regards the size of nozzle and pipes it would be futile to have bigger with the limited supply of water. In fact it may be stated definitely that the nozzle water is capable of breaking more material than can be carried away by the whole water available.

General Remarks.

If the deposits are of comparatively small extent the present method of operation may prove the most suitable, but the output will be small. The present plant is not capable of treating a large quantity under any conditions. Moreover, the cost of production will be high. However, it may be possible to carry on profitably on a limited scale to a limited extent. It is quite impossible to design a scheme of operation until a thorough survey has been made and drill exploration has been performed. Those works are as necessary to the Company to-day as they were at the beginning.

A. McI. REID
DIRECTOR OF MINES

Mines Department,
Hobart,
10th October, 1927.