REPORT ON THE MOUNT PARIS TIN MINE.

Introduction

On the 27th and 28th February visits of inspection were paid to properties at Mt. Paris charted in the names of McQuay, Chapman and Stevens. These properties have been held under lease by several operators since 1880 and each of the lessees has contributed to the development of the tin ore bodies enclosed within the boundaries. The first lessee sold the mining rights to an English Company whose operators exposed large greisen bodies in three adit crosscuts. It is fair to surmise that the results of those works were unsatisfactory. The properties them came into the hands of Chinese miners. They confined attention to the detrital material from which they obtained by sluicing a large quantity of tin ore. Almost 17 years ago F. Kruska erected a small milling and concentrating plant to treat the greisen ore. He likewise failed to mine and concentrate the ore at a profit.

The present lessees do not regard the greisen ore as of any commercial value unless worked on a very large scale. They intend to concentrate attention on the containing aplitic formation which is very soft and can be sluiced cheaply with water under pressure. It is a remarkable fact that not one of the early operators attempted the development of this the main ore body and the source of the greater part of the tin-rich detritus worked so successfully by the Chinese miners.

Area, Situation etc.

The properties consist of lease 9623/M of 41 acres; lease 9624/M of 20 acres; and lease 2395/W of 5 sluice heads. They are situated three miles north-west of Ringarooma township to which they are accessible by public and private road.

Topography

The area is one of high relief and is minutely dissected. Its outstanding feature is the sharp mountain range of which Mt. Paris is one of the more prominent peaks. The properties enclose Mt. Paris and extend down its southern flank. At its base is Dorset River, one of the major tributaries of Ringarooma River. To the east about seven miles New River empties into the Dorset. The hills dividing New River and the nearer tributaries are not high. This will allow of their being surmounted by a water race which will be used to conduct water from New River to the mine.

Geologic Relations

The area is occupied by two rock formations; one sedimentary, the other igneous. The sedimentary rocks are sandstones and slates of Ordovician age and are like the Zeehan series in every important particular. They are intruded by granite rocks of Devonian age and have suffered greatly from the effects of that intrusion. The granite rocks, (granite porphyry and aplite) represent the acidic phase of the great granite body so prominently exposed throughout the tin belt of the north-eastern district. Granite porphyry consists of large phenocrysts of orthoclase and quartz in a groundmass of the same minerals. Aplite consists essentially of orthoclase, quartz and muscovite mica, the components being equi-dimentional and of fine grain-size. The aplite is in dyke form, about 400 feet wide, and lies between the sedimentary rocks and the granite porphyry. It represents the acid extract of the granite magma and the last stage of the intrusion. This

acid extract contained the mineralisers collected from the cooling magma, and herein is concentrated the larger portion of the tin ore.

The actual end-stage product of the magma however, is represented by greisen veins which intersect the aplite nearly at right angles to its strike. They are the fillings of contraction fissures formed in the solidified aplite whilst it was still in a very hot condition. They provided a way of escape for the last of the mineralisers which in their ascent attacked the walls of the fissures converting the orthoclase component into mica or replacing it with quartz and tin ore. The muscovite mica component suffered also and was transformed likewise. These greisen veins being very hard and resistant to erosion stand out prominently from their soft containing rock aplite. The orthoclase component of the unattacked aplite has since been converted into kaolin and the decomposition of that mineral has led to the disintegration of the rock as a whole. Had it not been well buttressed by the numerous veins of hard greisen the aplites would not have remained such a marked feature of the landscape.

The aplite contains large blocks of occluded sandstone broken from the sedimentary wall rock at the time of intrusion.

The Orebodies and their development

The orebodies may be divided into two groups and subdivided into classes as follows:-

1. Primary
   (a) Aplite dyke
   (b) Greisen veins
   (c) Veins in sandstone

2. Secondary

   (a) Detritus
   (b) Alluvial deposits.

1. Primary Deposits

(a) The aplite dyke body is commercially the most important of them all. It is not only much greater in bulk, but is more easily open to attack and can be reduced cheaply by the use of water under pressure. The tin-rich aplite is confined to a rather narrow belt near the contact with the sedimentary rocks. Tin ore of average pin-head grain-size is disseminated through the aplite and occasional rich concentrations appear as bunches and short veinlets.

(b) Greisen veins, consisting essentially of quartz and lithia mica in varying proportions, are from 4 to 40 feet wide. They course in a direction 75 degrees west of north and dip at high angles to the south or north. They are closely grouped and their arrangement and dip are such as to suggest a branching from one main fissure. Tin ore in coarse crystalline form is abundant in some parts of the veins, especially where secondary mica predominates over quartz. Their average value has not been determined.

(c) Tin ore veins in sandstone appear in open trenches on the 20 acre section. The formation is really of the greisen type, but differs from the normal in that tin ore is relatively abundant and quartz and secondary mica are greatly

reduced in proportion. The veins are very narrow and irregular and are not likely to prove important sources of ore.

Secondary Deposits

(a) Detritus deposits are formed from greisen and aplite by surface weathering, the tin ore becoming concentrated by the removal of a large portion of the disintegrated rock. Very little detritus remains to be worked.

(b) An erosion of the decomposed rock goes on the detrital material is carried into depressions and freshets result in its conveyance to gullies and ultimately to permanent streams. In this way alluvial deposits have been formed & worked for their content of tin ore .

Development of the orebodies

The summit of Mt. Paris is occupied by a very large body of greisen. This orebody was opened by F. Kruska in a cut 30 feet wide and 10 feet deep, and the ore was conveyed from these workings through rises and three adits to the battery at the foot of the mountain. Ore of exceptional richness only could be mined and treated at a profit under these conditions.

No. 1 adit crosscut exposes the large body of aplite and the numerous intersecting greisen bodies at a considerable depth below the open-cut. From this adit crosscut a labyrinth of drives opens the greisen veins along their courses. The end of the crosscut is in aplite which here is soft and clean. Tin ore cannot be detected in the rock. The richest part of the dyke exposed in these workings is the section from the entrance to 80 feet in the adit. The following analysis indicates the value of the material:-

No. of sample	Place from which sample was taken.	Tin %	Tin ore in lbs. per ton	Tin ore in lbs. per cu. yd.
1	70 to 80 feet from entrance.			
2	60 to 70 feet from entrance.			
3	Rich vein at 50 feet from entrance.			
4	From dump.			

Between Nos. 1 and 2 adits a trench has been cut along the course of a tin ore veinlet. Sample No. 6 containing tin in the proportion of per cent represents the quality of the aplite on the dump.

No. 2 adit follows a due north course to the point of intersection of the first greisen vein where its extension is blocked by a fall of earth. Samples of the aplite taken from the entrance to 100 feet show tin ore in profitable proportion. The following indicates the value of the ore.

No. of sample	Place from which sample was taken.	Tin %	Tin ore in lbs. per ton	Tin ore in lbs. per cu. yd.
6	Selected ore near entrance.			
7	From dump No. 2 adit.			
8	" " " " "			
9	" " " " "			

No. 3 adit crosscut is reported to be over 400 feet in length. The aplite dyke with the intersecting greisen veins is exposed here to good advantage and the material is of average quality.

The dyke rock has been prospected at a number of points between these adits with results that indicate a fairly even distribution of tin ore.

The Reserve and the value of the ore.

In order to arrive at a close estimation of the ore reserve and the value of the ore a great deal of work is necessary. The lessees have made many hundred dish tests almost all of which proved satisfactory. On this they base their calculations as to value. It is really an indication of value only. As to quantity of ore available it is certainly large, but not as large as appears at first sight. That section of the aplite exposed in the mine openings and which yields the highest proportion of tin ore is comparatively narrow. The adits cross this section of the body at an oblique angle and the impression is given that the width is greater whereas the major part of the aplite is too poor to allow of profitable treatment. However, there appears to be a large body of material of fair quality available for treatment.

Method of mining

It is proposed to break the aplite by water under high pressure and concentrate the tin ore in sluices. This is the only method of operation that is likley to prove profitable.

By this means a large quantity can be treated at a low cost. Part of the tin ore is of fine grain-size and will require careful attention to prevent great loss. The fine grained aplite would be under ordinary conditions, difficult of treatment in sluices, were it not for the presence of pebbles and boulders of greisen which would serve to arrest the tin ore.

Water Supply

The success of the work depends upon the provision of an adequate water supply. A lease of fine sluice heads has been obtained at New River, seven miles distant, and negotiations are in hand for the purchase of the Nugget conduit and the lease of that Company's Water Rights. These two should be sufficient to provide supplies during eight months of the year.

Summary

From the foregoing account it will be seen that there is here a fairly large body of tin-bearing aplite of undetermined value though evidently of such quality

as to allow of profitable operation by sluicing. The success of the lessees depends first upon the system of operation and second upon the provision of an adequate water supply. If the aplite be of extraordinary richness it is difficult to understand why that deposit was not attacked by the early operators in preference to the hard greisen bodies. Apparently the aplite bodies were not thoroughly tested because very little of the material excavated has been sluiced or crushed.

Mining will not develop a very large reserve of ore. Its extent can be seen now.

The conditions for mining are particularly favourable and the cost should be very low under careful management. That fact conveys the idea that these low grade deposits can be operated profitably.

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