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REPORT ON BELL HILL TIN MINE, WELDBOROUGH

Introduction

Tin ore was discovered on this property, and in the neighbourhood many years ago by the well-known prospector and explorer W.R. Bell. In his honour the most prominent peak received its name. The first exploratory work on the known lodes was performed by an English Company in 1876. No further attention was given to the ore bodies until 1902 when the Purdue Company continued the work of development. At that time attention was directed particularly to the lodes, since then operations have been confined to the detrital deposits overlying the ore-bodies now exposed on the hillsides. Recently W.E. Hart of Branxholm arranged for the purchase of the property and is now engaged in the forming of a Company to provide the necessary capital for mining and treating the ore.

Situation and Access

Bell Hill lies midway between the settlements of Ringarooma and Weldborough which are 14 miles apart. Ringarooma is connected by rail with Launceston, the chief port in the northern part of the Island. A road from Ringarooma leads through the property to Weldborough. The mid-section is now in bad repair and is impassable to horse-drawn and motor vehicles. The necessary repairs could be effected at a cost of £500.

Area

The property comprises Mineral Leases 8845/M and 9427/M each of 20 acres charted in the names of G.C. & T.V. O'Brien, mineral lease 9516/M of 20 acres and another lease of 5 acres in the name of A. Hart, and Water-rights 2206/W (26 acres) and 2230/W in the names of G.C. & T.V. O'Brien.

Production

No authentic records of the output of this mine are available. The English Company operating have in the seventies obtained nine tons of concentrated tin ore from 300 tons of stone, and G.C. O'Brien, one of the present lessees, from 100 tons of forkings treated in the Tinpot Company's stamp battery plant obtained 1 ton 16 cwt. of tin ore. During the past eighteen years 12 acres of detritus, two to eight feet thick on the north side and 7 acres on the south side have been sluiced. These operations, it has been estimated, have resulted in the production of 40 ton of tin ore. The output to date, therefore is about 50 tons of concentrated ore.

Ore Deposits

The deposits are of two kinds, namely:-

1. Detrital material;
2. Greisen veins.

1. The soft granite in which the lodes are contained weathering rapidly at surface under the action of heavy rains is removed and the disintegrated tin ore and greisen become concentrated in place. Such are detrital deposits. Almost all the detrital material consists of greisen which is very much harder than the containing rock and is capable of withstanding to an extraordinary degree the disintegrating action of air and water. Detrital deposits are the earliest resources to be tapped because they are more easily accessible and they can be treated at a much lower cost with a minimum outlay. From such, the greater part of the tin ore won, has been obtained. There yet remains on these properties extensive beds of rich tin bearing material.

2. Greisen veins or lodes are the original sources of all the tin ore won in the area. Greisen is the product of the action of mineralising solutions on granite and may be regarded as the last phase of pneumatolytic activity. It consists essentially of quartz and mica, and is often accompanied by tourmaline, topaz and cassiterite. (Tin ore). Quartz is the substitute of feldspar and a white lithia mica is present in place of biotite and also of feldspar. Greisenisation sometimes results in the complete silification of the wall-rock of fissures in granite. As a rule the greisen itself is not particularly rich in tin ore, the greater part of which is often found with quartz and tourmaline in the fissure through which the solutions ascended. This however, is not always the case; rich tin ore extending two to three feet into the walls of the fissure is not uncommon. In some of the lodes here tin ore occurs pseudomorphous after feldspar in large blebs wholly replacing that mineral in certain sections; in others lithia mica and tin ore are equally prominent; in others again silica has been the chief replacing mineral occasionally accompanied by chalcopyrite. Where chalcopyrite (copper pyrites) is prominent tin ore is in very small proportion. It is noticeable that the larger greisen lodes are contained in very soft granite, the cooling solutions apparently having been able to effect the decomposition of original biotite and feldspar components. Greisenisation has extended only a few feet from the fissures, the intensity of the lateration lessening with the distances therefrom. The actual fissures in the granite through which the solutions ascended are generally marked by coarsely crystallised quartz often exhibiting comb structure, and by much mica and occasionally rich veins of tin ore.

Geology

The rock in which all the lodes are contained is a granite of normal type but porphyritic in parts. Yellowish-white to salmon-pink orthoclase feldspar is the most prominent component, with pellucid to dark smoky quartz in large phenocrysts as the next mineral in quantitative importance, and muscovite quite subordinate to both. Biotite is not present. Occasional blebs and bouches of black tourmaline in long radiating columns are seen. Other accessory minerals are not conspicuous. It should be remembered that the magma or molten mass of which the granite is consolidated form cooled under cover of slates and sandstones of the series represented in the neighbourhood. Their removal by long continued erosion exposed the granite at surface. The contracting granite mass in the process of cooling became fissured and these fissures provided the ways of escape or channels of egress for the mineral-laden solutions which attacking the wall-rock converted it into greisen. Thus were formed the greisen lodes. The fissures are very extensive and continue in a remarkably true course. Some of the veins are 3 to 8 feet wide; others are much narrower, and a few

only a few inches in width. The main ones have a general north-easterly trend; connecting ones have an easterly course. All but one dip in a north-westerly direction at angles of 60 to 80 degrees. The intricate nature of the fissuring and vein formation is well illustrated in the accompanying plan.

Development

The many ore-bodies, large and small, have been developed in rather extensive mine openings, adit and shafts. Main adit cuts all the important lodes obliquely and from this crosscut some of them have been explored along their courses. From the entrance to 257 feet six lodes (contained in soft granite) from 3 to 18 inches wide are exposed. None of these have been further explored and the value of the ore in them has not been tested. At 257 feet No. 2 lode, 5 feet wide is intersected. On the hanging wall side is a rich body of ore, but in a short westerly drive the tin ore gives place to copper pyrites. Further exploration along the strike is desirable to ascertain whether copper or tin is the predominant metal constituent. The greisen here is hard and siliceous. On the other side of this lode hard granite comes in and at 362 feet a 3 inch vein of greisen appears. Greisen veins in hard granite are not likely to prove of value. The explanation is that if mineralisation had been heavy the containing granite would have been altered by the acidic solutions. At 452 feet No. 3 lode is intersected. It is here 4 feet wide and according to report, of high value. A rise on the ore body connects with the surface, 200 feet above. An easterly drive is carried to 61 feet; at 35 feet the lode junctions with main lode showing a body nearly 10 feet wide. The westerly drive follows the ore body 121 feet thence turns north westward 90 feet within 20 feet of No. 2 lode. At 37 feet from main crosscut a winze has been sunk 40 feet on a rich body of ore and overhead the lode has been stoped 20 feet above adit level. From a point 75 feet in a south crosscut at 29 feet enters main lode which here is 8 feet wide and contains a fair average proportion of tin ore. In addition to the ordinary greisen components black tourmaline, kaolin, pyrite and vein quartz are in striking evidence. A short drive east and west exposes ore of similar character, much ironstained from oxidised pyrite.

Returning again to main crosscut main lode is entered at 470 feet and passed at 496 feet. It is here of similar nature and character. Hard granite appears and continues almost to the hanging wall of the No. 4 lode at 545 feet. At 530 feet is a west drive in soft granite and an east drive is open to 90 feet. The lode (No. 4) is cut in the east drive at 66 feet. It is here 3 feet wide and rich. The ends of these workings are blocked by fallen stone. In the blocked end of the main cross cut is a rise of unknown extent, and from that point an east drive exposed the lode. Other workings are a shaft 40 feet deep on white lode south of the dam at the summit of the ridge, and a shaft 20 feet deep on main lode near the eastern boundary of the 5 acre lease.

The sluicing operations covering 12 acres on the north side and 8 acres on the south side of the hill have exposed almost all the ore-bodies at surface.

Estimate of Value

In the short time (two days) allotted to the work of investigation no attempt could be made to sample the ore exposed in the various workings and to estimate the quantity of profitable ore. To perform the necessary operations for information from which the reserve and value of the ore could be estimated would require the services of three men for a month.

Development has revealed a very large reserve of ore of unknown value. The first work of the Syndicate should be the sampling and analysis of the ore in bulk. If the result prove satisfactory attention should then be directed to further exploration from adit level along the strikes of the more important lodes. The distribution of tin ore in greisen lodes is rather erratic - rich and poor sections alternate, and the richest material will be found in one side or the other of the lode and not throughout its whole width. Ore selection, therefore, will be an essential to successful operation. It is futile to mine and mill ore of no commercial value with the higher grades in order to effect a low profit average. If it is found after further exploration underground that the ore is not of profitable value the mine may be abondoned at little loss to the investigators. Except under unusual circumstances mine development should always precede surface expenditure.

General Remarks

There are a number of greisen lodes of fair average width and great extent, contained in soft granite. The rather extensive underground works show that a depth of 200 feet the lodes which have shed so much detritus maintain their average value. If long sections of the lodes contain tin in the proportion of half per cent, it should be possible to extract it at a profit to the operating company. This depends upon efficient management and the employment of the latest appliances for tin ore milling and concentration. There is an adequate water supply for treatment purposes. The most efficient power producer is the internal combustion engine using crude oil as fuel. The most efficient appliances are essential to success.

Based on the information attained during this short and hurried examination it may be stated that the conditions generally appear favourable for profitable operation. Everything is dependent upon the quality of the ore.

(Sgd.) A. McIntosh Reid,
Government Geologist.

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