TIN MINING IN WARATAH DISTRICT

The purpose of this report is to present a brief account of the condition of mining in the Waratah District and also a summary of the recent investigations of the Geological Survey into the nature and extent of the tin-ore deposits and the factors controlling their deposition. It may be stated at once that the practical results arising out of this examination will prove of immediate benefit to mine owners and incidentally to residents of the district. As a direct consequence of the investigation it is expected that operations will be resumed shortly at the Bischoff Mine, preparations will be made to re-open the Cleveland Mine early next year and a decided impetus will be given to prospecting and exploration in neighbouring areas.

At present none of the mines in the district is in active operation. A little development work is being performed in the underground department of the Bischoff Mine, and one unit of the milling plant is employed in the retreatment of the pyrite concentrate after its calcination. The Bischoff Extd. Company suspended operations two years ago, following the rapid decline in the market rates for tin, and the Cleveland Mine has been idle since 1917. The Waratah Tin Sluicing Co. is engaged upon the erection of a 10-head stamp battery and a small concentrating plant on their property situated ten miles south-west of Waratah. On Pryde's sections in the same area exploratory work has been attended with such encouraging results that the operating Syndicate has decided to proceed with the original plans for the development of the lodes. Besides these established mines several prospects are receiving attention.

Three main types of tin deposits occur in the Waratah District, namely:

(a) Fissure veins

(b) Replacement deposits

(c) Aplite dykes

Of these the fissure veins and replacement deposits have proved so far the most important, and both have been extremely worked in the Bischoff mines. The fissure veins are narrow, rich, and remarkably persistent both in length and depth. Deposits of this kind are operated by ordinary mining methods. Replacement deposits, which constitute the chief sources of tin ore at the Bischoff mine, are large, irregularly-shaped, pyritic masses containing occasional rich bonanzas of tin ore. Probably, as large masses, their maximum depth below the surface nowhere exceeds 300 feet; but from the channels, through which the ore-bearing solutions found their way, rich tabular ore-bodies will be found extending underneath the pyrite bodies.

Eighteen months ago rich ore was intersected in the Brown Face deposit between the open cut and Main tunnel. As it was considered at the time impracticable to remove the overburden of comparatively poor material by open cutting, it was decided to operate on the rich ore through mine openings. Unfortunately, when the enclosing pyrite and marcasite were exposed to the action of the air oxidation was so rapid that spontaneous ignition of the sulphidic ore resulted and it was found necessary to seal the mine openings

to prevent their collapse. The operators had now arrived at an impasse - they could neither quarry nor mine the ore. In order to overcome this difficulty it occurred to the writer that if the pyrite contained no deleterious impurities the overburden of this comparatively poor material could be quarried and milled for its content of sulphur and in the same operations the free tin oxide could be recovered. Not only will this method of operation enable the Company to quarry the ore in the Brown Face, but it will provide also a profitable means of exploring the large pyrite masses in and near the White Face and elsewhere. This plan of operation is likely to be adopted.

The writer has also pointed out where other occurrences of rich tin ore will be found and has proffered advice on the best means of attacking these deposits. It is not considered that ore-bodies approaching the size and richness of those worked during the past 40 years will be discovered, but it is anticipated they will prove of sufficient extent to keep the mine in active operation for several years. Before concluding these remarks it may be mentioned that there are in addition enormous reserves of low-grade material on this property. Such material could be worked profitably only on a very large scale and with the market rate for tin not lower than £250 per ton.

There is no reason why the exploitation of the Cleveland Mine, under expert control, should not prove a profitable undertaking. The writer has some diffidence in critically referring to the methods of mining employed by the successive engineers in charge of these works realising fully the great difficulties contended with and overcome during the early history of the mine. Now, the mine is easily accessible and the errors of the past can be obviated in the future. The design of the works is bad and shows a misconception of the nature of the lodes, on the part of the operators. Under the circumstances it is not surprising that the company failed to operate the mine at a profit. The successful exploitation of these deposits depends largely on the initiative possessed by the operators to apply the most suitable methods of mining according to the requirements of the particular case in hand. Unfortunatel the hard pyrrhotite ore-bodies were attacked while the reserves of high-grade oxidised material were still fairly large. No organised attempt was made to keep development work ahead of mining in order to ensure continuous and economical operation, by providing reserves of ore. This was largely due to the poor financial condition of the company at the time. Before any attempt is made to resume production a large amount of development work should be done, preferably by tunnelling and rising.

The ore-bodies in the South Bischoff area are contained in aplite dykes outside of which very little tin will be found. Exploration, therefore, should be confined to dykes of this rock. The tin ore occurs in these dykes rather irregularly distributed in the form of short lenses and associated invariably with fluorine-bearing micas. This association is so pronounced that the occurrence of these micas may be taken as an indication of the presence of tin. At present the prospects in this area are in the first stage of development only, but the outlook is decidedly promising.

A detailed discussion of all the tin ore-bodies their potention value and the methods best adapted to successfully work them will be given in a bulletin of the Geological Survey now being prepared.

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