

PRELIMINARY REPORT

5

on

BIRTHDAY MINE, MOUNT AGNEW.General Statement.

The ore-body on this property has been known many years and several parties have contributed to its development. It is generally known as "Sweeney Prospect" because a family of that name performed the most important of the development works. Here, as in so many parts of the western District, an attempt was made to mine and treat the ore before development had been sufficiently advanced to ascertain extent and value of the lodes and the best mode of operating them. Today the ore-bodies remain the same condition of development as they were in Sweeney's time, and our knowledge of them is not much greater.

This report contains not only an account of the ore-bodies and of their geologic relations together with a description of the workings, but suggestions also as to future methods of operation.

Production.

No record of production is available nor is it possible to form an approximate estimate based upon the meagre information at hand. It is known that a fairly large quantity (amounting to many tons) of alluvial tin ore was concentrated in sluices from materials obtained from the bed and banks of Pyke Creek, which runs through the property but it is not known what amount of tin ore was obtained by means of the crushing and concentrating plants. As the plants are of the most primitive it is inconceivable that the amount could have been large.

Area, Situation, Access.

The property consists of one 80 acre lease embracing the original from 20 acre lots. The lease is charted in the names of R.B.Hill and James Dunn.

This property is situated on the southern slope of Mt. Agnew, close to Cumberland Falls, and about $\frac{3}{4}$ mile from the road to Zeehan, which is distant 8 miles. A branch road following the bank of Pyke Creek could be constructed without difficulty on up grades not exceeding 1 in 15. Federation Tin Mine lies $\frac{3}{4}$ miles to the north-east and the Federation Electric Power Station is only half a mile to the west. The mine is, therefore, conveniently situated as regards lines of transport and communication, water supply, and power.

Geologic Relations.

The ore-bodies are contained in the normal coarse-grained pink granite of the district. This rock consists largely of pink felspar and quartz and a little biotite, and it contains nodular aggregates to black tourmaline. The striking topographical features of the area are the Cumberland escarpment over which Pyke Creek falls abruptly 350 to 400 feet and the deep sharply incised gorge of the creek where it flows through the property. It is evident

That there is a casual connection between the rock formations and the development of these features. Examination shows that the cliff-face of Cumberland Falls is composed of hard, erosion resisting granite and is one wall of the wide belt of soft mineralised rock into which the waters of the stream have cut so deeply. The valley then has been carved out of soft mineralised rock, and so rapidly that the wall rock having been undercut has collapsed and now in enormous blocks completely covers the creek bed. At the mine the creek passes below these boulders and does not emerge until the level of the plain is reached, about half a mile away.

Aplite dykes intrude the normal granite and are prominent in the mine area.

The ore-bodies and the Rocks of their Matrices

The ore-bodies, which have no sharp lines of demarcation, vary greatly in composition from point to point. All may be regarded as of complex nature, yet none is so complex as to present serious difficulties in their treatment and separation. The Western lode is very sulphidic in parts, and everywhere contains a fairly high proportion of sulphides. On the top of a hill rising over 100 feet above the creek a part of the lode is exposed in a shallow hole and a trend over a width of 40 feet. Here it contains abundant sphalerite (Zinc Blende) and pyrite, with small quantities of stibnite, chalcopyrite, galena, and cassiterite (tin ore), set in a gangue of quartz, pinite, siderite, fluorite, and tourmaline. These exposures are in the centre of the section. Neither the strike nor the dip is apparent here but it is likely that the trend is in conformity with other parallel bodies which appears to be a little west of north. The full width of the lode is not exposed and no idea can be formed of its length until the thick scrub and soil have been removed from its surface. In the trench the ore consists essentially of sphalerite in a groundmass of quartz and pinite. Crystalline pyrite and fine radiating aggregates of stibnite (sulphide of antimony) are conspicuous accessory minerals. Cassiterite is not visible in hand specimens, but assays show a tin content varying from 0.6 to 0.75 per cent. West of this to 40 feet a grab sample of quartz greisen contained 0.41 per cent tin.

Apparently disconnected by a band of normal granite is another body, not fully exposed, showing 20 feet of lode material of somewhat similar nature. It contains abundant sphalerite and pyrite set in a groundmass of quartz.

A little lower down the hill is a short adit and cut and an open-cut in a large body of ore of similar constitution. This body is traversed by a series of veinlets filled with sphalerite and cassiterite and a little pyrite and galena. The material of these veins is rich in tin. (In taking the samples of the ores here this rich vein material was not included). The felspar of the granite has been either completely kaolinised or converted into pinite.

Below these workings is a large pinitoid body flecked with sphalerite and pyrite, both sulphidic minerals being found in fine-grained aggregates. The whole

formation is extraordinary and particularly because of the absence of quartz phenocrysts in the pinite. It is quite evident that the zinc and iron sulphides are contemporary with the pinite and that the latter is not of secondary origin. The following analysis clearly shows that this mineral is not a member of the chlorite group:-

Silica	49.40	per	cent
Ferrous Oxide	10.80	"	"
Ferric Oxide	3.35	"	"
Alumina	16.26	"	"
Manganous Oxide	3.95	"	"
Titania	0.40	"	"
Magnesia	0.14	"	"
Potassa	4.49	"	"
Soda	0.51	"	"
Pyrite	1.41	"	"
Sphalerite	0.15	"	"
Cassiterite	0.029	"	"
Loss in Moisture	8.90	"	"

At this point the tin ore content is low, but where it is in intimate association with very fine-grained quartz, as in main crosscut, the tin content is much higher.

A few feet above creek level main adit has been driven to cut the several bodies of ore at depth. The adit has been driven 166 feet in a general northerly direction and has exposed a wide section of the containing rock and lode formation. From the entrance to 40 feet the adit passes through normal pink granite, 70 feet through altered granite, 3 feet of pinite rich in tin ore, and 50 feet of tin-bearing quartz-pinite in which nodular bodies of tourmaline-siderite-fluorite are found at intervals. The tin-bearing section of the ore-body exposed in this adit and cut contains cubical and pyritohedral pyrite, sphalerite, a little radiating stibnite. Sometimes these ores are found in a ground-mass of siderite and fluorite. From the rich pinite vein to the end of adit (60 feet) the body appears to be tin-bearing. The tin ore is so fine, however, that it is not visible even with the aid of a magnifying glass.

At the point on the eastern side of valley where the pipe line and $\frac{7}{8}$ water-race join is the centre of a large body of zinc ore in pinite. It is in all essentials similar to that of the western side. The body is 60 feet wide, but its lineal extent is not known. It appears to course parallel to the western body and probably the falls escarpment is its western wall. At the foot of the water-fall prospects of the soil show fine cassiterite in fair proportion thus indicating the continuity of the body in that direction.

The Value of the Ore

In order to get an idea of the value of the ore in the several openings a number of bulk samples were taken. These samples, although not truly representative, show that the ore body is an important one and worthy of the closest investigation. The sub-joined table of analyses conveys the information:

No. of Sample	Location	Width of Sample ft.	Position	Percentage Composition	
				Tin	Zinc
1	Quartz-Pinite	40	West of No.1 Trench	0.41	
2.	Sphalerite-pinite	3	Hole in No.1 Trench	0.62	16.4
3	Quartz-pinite	15	N. end No1 Trench	0.56	
4	Quartz-pinite	10	No.1 adit	0.75	7.85
5	" "	12	No.2 adit	0.46	
6	Sphalerite-pinite	4	No.1 opencut	2.83	7.1
7	Quartz	3	" "	1.7	
8	Quartz-pinite	5	No.2 opencut	1.8	
9	Pinite	20	No.4 "	0.31	
10	Quartz-pinite	50	Main and cut	1.57	
11	Sphalerite-pinite	50	Eastern ore-body	0.1	
12		10	No.1 adit	0.55	
13			10 feet S. of No.1 adit	1.00	
14			20 feet S. of No.1 adit	0.15	
15		8	No.1 Trench	2.00	
16		8	15 ft. lower than 15	1.90	
17		3	50 ft. S. of 14	0.55	28.0

Samples 12 and 17 were taken and analysed by J.H. Levings, late Government Mining Engineer, and are confirmatory of those taken by the writer. Sample 10 is so high that this result requires confirmation and resampling is suggested.

Ore Reserve

An estimate of the actual reserve of ore cannot be calculated from the scanty data available. It would be futile also to attempt an estimate of the probably reserve at this stage of development. The work so far accomplished, however, affords sufficient information to warrant the necessary expenditure for a thorough scheme of exploratory works.

Water - Supply and Power

The only source of supply near the mine is that from Pyke Creek, but the greater part of

this is already taken by the Federation Tin Mining Co. In winter sufficient may be available from the overflow of the Cumberland Dam of this creek and from another but minor tributary for wash water, but in summer that supply from that source would be inadequate. Waterrace and fluming from other creeks on the southern fall of Mt. Agnew would be very costly.

As regards power all requirements can be met by the Federation Tin Mining Company from their hydro-electric power station half a mile away.

Future Development

The first work to be performed is the removal of the very thick vegetable cover. Then trenching should be undertaken to determine the limits of the several bodies and to ascertain their values at the points selected. If the bodies are found to be extensive at surface and of average value, then adit crosscutting at a depth of 100 feet may be undertaken. The continuation of the main adit crosscut to completely intersect the ore channel is justifiable now by the results already obtained. After that work has been accomplished it is desirable to drive north and south and crosscut at intervals from those drives. Dish prospects of the covering soil indicate their northward extension. Moreover, other bodies - these of veins of coarse tin ore - are indicated along the course of Pyke Creek by the presence of granular tinstone, nuggets and sub-angular boulders. Some of the boulders obtained in the sluicing of the creek bed were of almost pure tinstone; others were evidently derived from veins of the quartz-tourmaline type. Specimens of botryoidal ore were not uncommon in the wash. However, most of these specimens have a quartzose groundmass and evidently were obtained from one or more of the bodies described, or one similar to them

Although the ores are complex owing to their association with Zinc sulphide and small quantities of pyrite, galena, chalcopyrite and stibnite the separation and concentration of the tin ore component is by no means a difficult process. If sufficient ore of average quality (0.5 to 1.0 per cent tin) is proved the right process will be found, and capital is always available for the equipment of a profitable mine.

A. McIntosh Reid,
Director of Mines,

24th June, 1927.