

Report on E. J. CORNISH'S Show, North Dundas.

Access and Location.

From Zeehan the show is easily reached by following the formation of the N.E. Dundas Tram from its turn-off at the Renison Bell road. The show is situated $\frac{1}{2}$ mile from the old Kapi Station, while total distance from Zeehan is about 10 miles.

The lease has been registered as No. 70 M/51 and covers 50 acres. At present wolfram is mined from an alluvial deposit.

Topography and Geology of the Lease and surrounding Area.

The northern part of the lease is situated along the foot of a hill, forming part of the southern flanks of Pine Hill. A small stream runs from a gully rather suddenly into a large flat. The area is drained by the Kapi Creek and its tributaries.

Before studying the conditions at Cornish's workings, a reconnaissance was made on the southern flank of Pine Hill in order to obtain some information on the rock types.

A few chains above the workings we were shown an old adit which has been driven to follow a narrow galena vein. On the dump heap fragments of galena bearing rock occur. The country rock is a greenish igneous rock and partly decomposed. Detritus farther up the hill was found to consist of fragments and blocks of a hard, dense, fine grained, dark green igneous rock in which pyrite blebs frequently occur. This rock is probably a fine grained dolerite. Its texture differs considerably from the rock at the adit. Numerous exposures of the dolerite occur along the steep haulage formation leading to the now abandoned Penzance Mine.

About halfway a marked change in the nature of the detritus occurs; the wash in this area contains abundance of fragments of quartz-tourmaline rock. At closer examination this rock appears to consist of very finely grained sugary quartz in which extremely finely crystalline tourmaline occurs in irregular bands.

At the open cut of the Penzance Mine quartz-tourmaline porphyry occurs; it consists of quartz phenocrysts of average size of 0.1 inch in a greyish green matrix containing very finely grained tourmaline and sugary quartz.

Geological features at the workings in Cornish's lease are as follows:-

The bedrock consists of a soft green igneous rock, in places decomposed into a green clay; in other places it is more solid in appearance, while there are also parts where it shows a schistose cleavage, and greasy feeling, having the characteristics of a talc schist. As quartz is not present in this rock it can be classified as one of the basic types. The rock is probably an altered serpentine.

2.

The alluvial, 2 ft. to 4 ft. thick, consists of coarse gravel and small boulders, derived from bedrock material and the finely grained dolerite on the hill flank. The gravel is in places covered by a 1 ft. to 2 ft. thick overburden of sandy clay. Another characteristic of the gravel is that it contains very little free quartz, but, small fragments of quartz-tourmaline rock occur. The pebbles are in general only slightly-rounded, proving that they have moved over a short distance.

The Workings in Cornish's Lease.

A dam has been constructed in the stream in order to store the water and to deviate it from the lower parts of the workings.

By means of ground sluicing a first rough concentrate is obtained, which is further cleaned in a 6 ft. wooden sluicebox. According to Mr. Cornish wolfram occurs over a length of at least 300 ft. along the stream, with a tendency of decreasing tenors upstream. In addition grounds on either side of the stream have been tested by a number of small pits, irregularly placed.

On my request six samples from the gravel along the stream were washed, at intervals of 30 to 60 ft., over a total distance of 250 ft. This should give some indication with regard to the distribution of the wolfram.

Mineral Contents of the Samples.

The dish concentrates were cleaned, dried, weighed and examined for their mineral contents. The following minerals could be identified by means of magnifying glass, blowpipe - and other simple chemical tests.

1. Wolframite: relatively coarse fragments occur, $\frac{1}{8}$ inch in size. Small grains were difficult to identify on account of the abundance of chromite, which is equally dark in appearance.
2. Cassitérite: its angular brown grains were easily distinguished from the other dark minerals.
3. Chromite : occurs in abundance in small dark octaeders. The fact that they are only feebly magnetic distinguish them from magnetite; also they show a well pronounced chromium bead before the blowpipe.
4. Tourmaline: in small dark rectangular grains.
5. Quartz: fairly abundant, in angular grains.

The assays were done by the Mines Department Laboratory, Launceston. Assay results and metal contents per cubic yard have been compiled in the following table:

No. sample	Weight of dish conc. grams.	WO ₃	Sn	Sn/WO ₃ ratio	Llbs. per cubic yard (based on 90 dishes per cub. yard)		3.
					WO ₃	Sn.	
1	138	2.0	6.7	3.35	0.55	1.83	
2	58	3.0	10.1	3.37	0.34	1.16	
3	168	3.2	16.1	5.02	1.06	5.36	
4	129	1.2	3.6	3.00	0.30	0.92	
5	38	2.7	10.1	3.74	0.20	0.75	
6	72	1.9	1.9	3.37	0.27	0.91	

4.

Conclusions and Recommendations.

Wolfram is in general associated with igneous rocks of the acidic type. That this is the case in the investigated area is proved by the association of wolfram, cassiterite, quartz and tourmaline in the alluvial along the stream and the quartz tourmaline boulders on the hill flank. The presence of chromite in the stream gravel is explained by the serpentine in the bedrock.

With regard to the source of the wolfram, the search should be concentrated on the southern flank of Pine Hill, thereby following the wash of quartz-tourmaline rock encountered along the old haulage formation.

The assay results show the presence of an appreciable amount of tin with the wolfram. No. 3 sample is clearly the richest; it was taken at the part where there is a sudden check in the stream velocity where it emerges from a steep to a fairly flat gradient. It is strongly recommended the gravels below this part be tested.

Remarkable also is the narrow margin of the Sn/WO₃ ratio in the samples. Except in No. 3 sample the ratio lies between 3.00 and 3.74. The higher ratio of No. 3 sample can be explained by the differences in properties of cassiterite and wolframite, as shown in the following table:

	<u>Specific Gravity</u>	<u>Hardness</u>	<u>Cleavage</u>
Cassiterite	6.8 - 7.1	6 - 7	Poor
Wolframite	7.2 - 7.5	5 - 5.5	Perfect

The perfect cleavage and lower hardness of wolframite will cause a much speedier desintegration of crystal fragments than would be the case with cassiterite. It is therefore reasonable to expect higher Sn/WO₃ downstream.

Also it is the writers opinion that careful and systematic testing by pits will provide more detailed information regarding the distribution of the wolfram in the alluvial. It is suggested that the test pits should be placed in a certain pattern, for instance at intervals of 30 ft. along lines, 60 to 80 ft. apart, perpendicular to the stream. Before filling a dish, the gravel should be well mixed. Stress is put on careful washing of the sample. All dish concentrates should be weighed and assayed for wolfram and tin. With the assay results plotted on the map the general distribution of wolfram and tin should become clear.

Further it is suggested to improve the present treatment of the gravel in the following way:

Instead of ground sluicing, the coarse sterile material could be eliminated by passing it over a grizzly of which the bars are spaced at $\frac{1}{2}$ inch. The under size falls into a wooden sluicibox which should have riffles 2 inches high and placed 12 inches apart. A suitable width would be 15 or 18 inches. Slope and quantity of water used, should be tested to suit the conditions.

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The concentrates thus obtained in the suggested sluicibox, could be cleaned, either in a special small clean-up sluicibox, or just by means of the dish.

Zeehan, 19 November, 1951.

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Geologist.

The Director of Mines,
HOBART.