

PRELIMINARY REPORT

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onWILLIAMSFORD TIN MINE, TASMANIAINTRODUCTION :

The earliest record of mineral exploration on this property refers to that performed under the supervision of W. Briggs about 25 years ago on behalf of a Tasmanian Syndicate. An adit crosscut on the north side of the inclined tramway is still open to mark that work, but nothing is known of the aims of the operators. Let it suffice to state that the work was not productive of important result.

The area was abandoned until the year 1910 when M. Connel and others visited the district and continued the work of exploration. A number of tin ore lodes were found including those now under review. The Olympic Tin Mining Syndicate was formed to develop the lodes and ascertain the value of the ore shoots. To this end the lodes were stripped of overburden along their strike and intersected at depth in adit cross cuts. After a long continued but fruitless effort to discover shoots of sufficient size and richness the leases were allowed to lapse and the Syndicate was disbanded.

Subsequently the applications of M. Connell and Philip Burns for leases of the properties were received and granted. As the result of the visit of an Adelaide engineer in 1923, the Williamsford Tin Mine No Liability was organised in 1924 to acquire the mineral rights of the leases and to mine and sell the ore. This report deals in particular with the operations of that Company.

Area, Situation, etc.

The Company holds under lease from the Crown the following areas and water rights : -

9127/M	of	40	acres
9126/M	of	49	acres
9128/M	of	31	acres
8913/M	Of	40	acres
9257/M	of	80	acres
9345/M	of	71	acres
2427/W	of	3	sluice heads
	of		sluice heads.

The mine is connected to Exe siding of the Emu Bay Railway by a two feet guage steel rail tramway two miles in length. Exe Siding is between Rosebery and Renison Bell and is about 74 miles by rail from the Port of Burnie.

Topography in relation to Mining :

The mine is situated high on the western slope of Colebrook Hill which rises over 1000 feet steeply from the valley floor of the Rivulet. The country generally is very broken and is clothed with a thick forest of beech, sassafras, horizontal tree, celery, wine and blackwood. An undergrowth of fern, bauera and cutting grass rings from a thick bed of peat which effectively hides from view the underlying soil and rock. The matted

roots of the dense jungle, the mantle of peat, the heavy rainfall, and the rugged nature of the country make conditions for prospecting, arduous, slow and costly. Because of these difficulties very little effective prospecting has been performed by the Company in search of other ore bodies. The beds of numerous hillside freshets form the only opening in the ground for exploration.

The ore bodies course parallel to the direction of the large axis of the hill and therefore may be cross cut in adits - that is the method of attack employed by the Company. As regards conditions for the carriage of ore from mine to mine the gravity plane or a similar system depending upon the force of gravitation is most suited to the topographic conditions.

#### Geology in relation to Mining :

The greater part of the area is occupied by tuffs, and slates belonging to the Dundas series of the Cambro-Ordovician. These are intruded by serpentinitised pyroxenites and gabbro, and these in turn by an acidic intrusive. Both intrusives are of Devonian age.

The western edge of the serpentines and gabbro body is at the foot of the inclined tramway and the eastern edge is just below No. 3 adit level. Its course in this small area is west of north in conformity with that of the ore-bodies, but the direction of its north and south extensions have not been determined. On the south side of the haulage way and 100 feet west of the entrance to No. 3 adit a small oval shaped body of an acidic intrusive penetrates the serpentine. In this acidic rock are inclusions of serpentine, and veins of it project into the basic rock; but very little has apparently been assimilated, as evinced by the sharpness of the lines of contact. The feldspathic components decompose and disintegrate rapidly leaving a lace work of quartz. Large blocks of this lace like quartz are strewn over the surface. Examples of the weathering of this rock in all stages of progression are obtainable at this spot. (Acidic rocks of this nature and character are responsible for the tin ore bodies) The association here between the serpentine and the acidic intrusive is similar to that of Anderson's Creek near Beaconsfield. The fibrous magnetite, amphibole, asbestos, chrysotile, and talc are common secondary minerals, especially in proximity to the acidic rock. The dark green serpentine is veined with magnetite and limonite. Near the foot of the inclined tramway gabbro amphibolite of pegmatitic texture is strikingly in evidence.

The acidic rock in its natural unweathered condition is milk white to yellowish white in colour. Its components are not easily distinguishable at first sight, the whole appearing felsitic in texture. The feldspathic components have not been determined.

As to the relations of these intrusives to the ore bodies the following facts should be noted : -

1. Not only is the strike of the ore-bodies parallel to that of the intruding serpentine but the dip is in the conformity in direction (easterly) and degree ;
2. The intrusives are responsible for the fissuring of the intruded rocks (tuffs and slates) ;
3. Although the serpentine was anterior to the acidic

degrees E. At 13.5 feet in this drive is a rise on No. 3 lode from N. 2 adit level. Here the vein is marked by a streak not an inch wide. From the 146 foot point the crosscut extends 24 feet on a bearing N. 87 degrees E. Drives 7.5 feet lead from the crosscut north and south from a point 16 feet from the end. In this adit crosscut no ore of value is exposed. No. 2 Adit level crosscut is 60 feet below No. 1 and 490 feet above the level of the Manager's house. It is driven east a distance of 420 feet. At 190 feet from the entrance No. 2 lode is intersected and is exposed in drives north and south of the crosscut. The north drive is on a bearing No. 20 degrees W. and is 69 feet in length. It is not on No. 2 lode the whole way, but follows a branch of it and connects 14 feet from the entrance to No. 1 adit. The lode in this rise is generally poor and narrow (5 to 10 inches), but branches of rich ore occur. At the end of the north drive the lode is only 2 inches wide and is poor. The south drive on No. 2 lode courses S. 30 degrees E. 100 feet, then S. 56 degrees E. a distance of 29.5 feet. At the end of the drive the lode is only one inch in width. At 42 feet a winze has been sunk 15 feet exposing rich ore 3 to 6 inches wide; at 97 feet a rise to surface exposes ore 4 to 10 inches wide of average quality. Between the collar of the winze and the rise a little ore has been stoped. At the 270 feet point of the crosscut a rise on No. 3 lode connects with No. 1 adit level. Thirty feet up the ore peters out. The lode where intersected in the crosscut is much wider than elsewhere, but the shoot is only 30 feet in length and it cannot be traced on the north side of the crosscut. A vein one or two inches wide junctions with it. This vein, which courses S. 58 degrees E. and dips west of south, is exposed in a drive 98 feet in length from its point of junction. In the several north and south drives from this adit crosscut no ore has been exposed.

No. 3 adit crosscut is 65 feet lower than No. 2 adit level. At the mouth of this adit No. 1 lode was exposed but is not now open for examination. This crosscut has been driven east 224 feet, then No. 70 degrees E. a further distance of 159 feet in hard tuff. This opening effectively drains the upper workings.

#### Mining :

The topographic conditions are generally favourable to mining. Although the ore bodies dip into the hill they can be attacked by way of adits to great depth. In other respects the conditions are not conducive to cheap mining. The veins are narrow and irregular and they are contained in very tough rock difficult to drill and shoot. It is not possible to break the wall-rock away from the lode, nor it is possible to break the lode material first. In consequence of this the lode material and wall-rock are broken together and only the bigger pieces or rock are sorted in the mine. The dilution of the lode material with barren wall-rock greatly reduces the value of the crude material sent to the milling and concentrating plants. Very rich ore only could be mined and concentrated under these conditions.

#### Ore Reserve :

From the foregoing account it is seen that the ore-bodies are very small, not extraordinarily rich, nor of any considerable extent. This becomes quite evident on reference to the Company's records of output. The

rock both were derived from the one source.

4. The serpentine was not responsible for the formation of the ore-bodies - the infillings of the fissures emanated from an underlying acidic intrusive of which the small body referred to is a projection ;
5. The fissuring of the tuffs and slates was irregular because of the plastic nature of those rocks - the infillings (ores) are, therefore, narrow and erratic as regard content and length of shoot.

#### The ore bodies -

The ore bodies are narrow infillings of fissures in tuffs. These containing rocks vary greatly from point to point as regards their composition and their physical condition. In some places they are hard, tough, bluish to greyish green rocks showing no distinguishable component; in other places the rock has suffered decomposition to a brownish yellow clay with white saussuritized felspar interlacings. Its high contents of alumina and iron are indicated by the products of its decomposition. The primary ore consists of arsenopyrite pyrite, cassiterite, pyrrhotite and a little chalcopyrite, the whole set in a quartz gangue, In places it consists predominantly of cassiterite, but a great variation is remarkably evident; at short distances a rich shoot may give place to one almost barren of tin ore. Partial replacement of the tuff wall rock has been noted at many points in the lodes. Where massive the tin ore is dense, and fine in grain where distributed. It is contained in or associated with clay in its oxidised portion.

#### Alluvial and Eluvial Deposits :

Alluvial deposits are such as may be found in the beds of torrential streams flowing from the hillside into Exe Rivulet. They are of no economic importance. Deeper and much more extensive alluvial deposits are the quartz and sandstone gravels and clay beds of the high terraces of the Exe. These however are poor in tin ore.

Eluvial deposits consist largely of clay (the decomposition product of the containing tuffs and slates) and are generally poor. At isolated spots small rich concentrations have been found.

The creek bed in front of the Manager's house has been worked for tin ore, which here is associated with a large amount of magnetite evidently derived from the serpentine.

#### The workings :

The ore-bodies have been attacked in three adit crosscuts and an open trench. No. 2 lode is exposed at the mouth of No. 1 adit crosscut and is opened in a short drive, in open trenches and cuts north and south 150 feet in length. Southward it courses S. 13 degrees E and dips easterly at angles of 65 to 55 degrees. Its width varies from 3 to 15 inches and the quality of the ore varies in increased proportion to the width. Northward the vein courses No. 15 degrees W. and it is 5 inches wide and not rich.

No. 1 adit crosscut bears S. 73 degrees E. a distance of 146 feet. At 128 feet the line of No. 3 lode is intersected and is opened 18 feet in a direction W. 18

The quantity of mixed ore and wall rock milled is less than 500 tons. This represents not only the quantity mined by the Company, the accumulation of ore excavated by the Olympic Tin Syndicate during the long period of their operations.

A careful survey of the workings shows that the reserve of ore of one per cent quality above No. 2 adit level is not more than 100 tons.

Quality of the Ore :

No attempt was made on this visit of inspection to sample the veins, because the recovery value is given in the records of milling and concentration. That is the best means of ascertaining the actual value of the ore if the losses in the processes of concentration are not excessive.

According to the records of the Company, copies of which were handed to the writer by the caretaker (Mr. Hetherington), the ore appears to be in certain sections of extraordinary value. A copy of the sample records is given hereunder :

RECORDS OF SAMPLING BY COMPANY'S ENGINEER

No of sample	Place where sample taken	Width	Per cent Tin
18	Sample across drive at No. 2 lode Main Tunnel	7 feet	Trace
19	No. 2 Lode near North drive No. 2 Main Tunnel	10 inc.	2.57
26	Good Tin in narrow vein Main Tunnel	10 ft.	5.31
27	Across back north drive (W drive) No. 3 Main Tunnel	5 ft.	1.14
28	Solid ground between W & E drive No. 3 Main Tunnel	5 ft.	5.01
29	Across back north drive (Winze) No. 3 Main Tunnel	4 ft.	1.04
29A	do.	1.ft.	7.5
51	Sample 18 in. from M. Tunnel on No. 3 lode South (Back)	6 ft.	3.51
52	Sample 5 ft. from 51 on No. 3 lode South (back)	5 ft.	1.008
53	Sample from Cuddy W. Side near No. 51	1½ft.	0.26
54	Sample 5 ft. from 52 on back	5 ft.	0.62
55	Sample 5 ft. from 54 on back	4 ft.	1.06
56.(A)	Sample in Main "X" cut at No. 8	6 ft.	0.72

No. of Sample	Place where sample taken	Width	Per cent Tin.	
57	East side from main "X" cut for 15 ft. 51 to 55	15 ft.	1.49	
58	West side from main "X" cut 13 ft. Cuddy to 55		13 ft.	0.36
59	Across back 5 ft. from 55		4 ft.	3.304
60	Across back 5 ft. from 59 (No. 1 Lode)		4 ft.	0.48
61	Across back 5 ft. from 60		3 1/3 ft.	0.16
62	Across back 5 ft. from 61		3 1/3 ft.	0.18
63	Across back 5 ft. from 62		3 ft.	Trace
64	N side of rise 12 ft. 6 in. from floor of Main Tunnel	4 ft.	0.975	
65	N side of rise 16 ft. from floor of main tunnel	4 ft.	4.59	
66	N side of Rise 21 ft. from floor of M tunnel	4 ft.	3.25	
67	N side of rise 27 ft. from floor of M tunnel	4 ft.	0.72	
68	No. 3 Lode across back 24 in. from M tunnel	4 1/2 ft.	0.84	
69.	No. 3 Lode W side 24 in. from M tunnel	6 ft.	0.74	
70	No. 3 Lode E side 24 in. from M tunnel	6 1/6 ft.	0.13	
71	No. 3 Lode 5ft. from 68. 5ft. sections	5 ft.	Trace	
72	No. 3 Lode 5 ft. from 68. 5ft. sections (E sd)	6 1/6 ft.	Trace	
73	No. 3 Lode 5 ft. from 69. 5ft. sections (W sd)	6 ft.	Nil	
73 (A)	No. 3 Lode 5 ft. from 71. Across back.	3 1/3 ft.	Trace	
74 (A)	No. 3 Lode 5 ft. from 73. Across back.	3 ft.	0.69	
75	No. 3 Lode 5 ft. from 74. Across back	4 ft.	Nil	
76	No. 3 Lode W side 75. No. 3 Lode	4 ft.	Trace	
77	No. 3 Lode W side 72. E. Side No. 3 Lode	74 in.	Nil	
78	" " " " " 77 " " "	74 in.	Nil	
79	No. 3 Lode W side 78. E side No. 3 Lode	74 in.	Trace	

No. of Sample	Place where sample taken	Width	Per cent Tin
80	No. 3 Lode 5 ft. from 79 E. side No. 3 Lode	74 in.	Trace
81	No. 3 Lode 5 ft. from 73 W. side N. Drive	72 in.	Trace
82	No. 3 Lode 5 ft. from 81 W side N. Drive	72 in.	Nil
83.	No. 3 Lode 5 ft. from 82 W. side N. Drive	72 in.	Trace
84	No. 3 Lode 5 ft. from 83 W side N. Drive	72 in	Nil
85	No. 3 Lode 5 ft. from 48 Along back	72 in.	Trace.
86	No. 3 Lode 5 ft. from 85	48 in.	Trace
97	N.E. Drive No. 3 branch 5 ft. from 96	30 in.	Nil
98	N.E. Drive End Country Rock	30 in.	Nil
99	W. Drive on No. 3 Lode 5 ft. from N tunnel	36 in.	0.26
100	W. Drive on No. 3 lode 5 ft. from 99	30 in.	Nil
101	W. Drive on No. 3 Lode 5 ft. from 100	30 in.	Nil
102	W. Drive on No. 3 Lode 5 ft. from 101	30 in.	Nil
103	W. Drive on No. 3 Lode 5 ft. from 102	40 in.	Nil
104	W. Drive on No. 3 Lode 5 ft. from 103	40 in.	Nil
105	No. 2 Lode Nth Drive 5 ft. from M. Tunnel	9 in	2.3
106	No. 2 Lode Nth Drive 5 ft. from M. 105	15 in	3.4
107	No. 2 Lode Nth Drive 5 ft. from M. 106	14 in	6.3
108	No. 2 Lode Nth Drive 5 ft. from M. 107	12 in.	4.3
109	No. 2 Lode Nth Drive 5 ft. from M. 108	10 in.	1.86
110	No. 2 Lode Nth Drive 5 ft. from M. 109	8 in.	2.6
111	No. 2 Lode Nth Drive 5 ft. from M. 110	15 in.	6.4
112	No. 2 Lode Nth. Drive 1ft. from M. Tunnel	10 in.	1.24
113	" " " " " 5ft "	10 in.	2.6
	M. 112		

No. of Sample	Place where sample taken	Width	Per cent Tin
114	No. 2 lode Sth Drive 5ft from M 113	13 in.	0.56
115	No. 2 Lode Sth Drive 10 ft. from M. 114	9 in.	0.51
116	No. 2 Lode Nth Drive 5 ft. from M. 111	10 in.	7.1
117	No. 2 Lode Nth Drive 5 ft. from M.116	10 in.	4.3
118	No. 2 Lode Nth Drive 5 ft. from M. 117	12 in.	3.4
119	Small Tunnel near S.E.C. Peg	2 in.	24.29
120	Small tunnel near S.E.C. Peg	12 in.	0.62
121	Small tunnel near S.E.C. Peg	12 in.	0.14
122	(No entry)		
123.	No. 2 Lode South Drive 5ft. from 115	10 in.	2.14
124	" " " " " " " 123	9 in.	3.7
124.A	No. 2 Lode South drive 10ft. bulk from 124	10 in.	6.31
124.B	No. 2 Lode South Drive 5 ft. from 124.A	10 in.	9.21
125	Re sample at 51 in 36 in samples	36 in.	4.02
126	Re sample at 51 in 36 in samples	36 in.	3.46
127	Re Sample at 52 W side of back	24 in.	0.68
127.A	1 ft. near No. 29 and 30 sample	12 in.	7.5
128	Surface stone near N.E. C. Peg	X	Nil
129	" " " " " " X		Trace
130	No. 2 South Drive N. Wall Iron pyrites	X	0.02
131	Cuddy No. 3 Lode E. side near M. Tunnel	X 12 in.	3.41
132	Cuddy No. 3 Lode W. side near M Tunnel	X 12 in.	3.25
133	Sulphide Branch S. Drive No. 2	X 6 in.	0.20
134	Iron pyrites No. 2 lode centre face south	X 2 in.	Trace
135	(No Entry)		
136	Vein at open cut No. 2 lode in country	X 1 in.	6.1

No. of Sample	Place where sample taken	Width	Per cent Tin
137	Pyrites south end No. 2 Lode X	1 in.	Trace
138	Sample from rise 8 ft from floor W. and N. ends X	96 in.	0.84
139	Sample from rise 13 ft from floor S. and E. sides	96 in.	4.04
140	Sample from rise 18 ft from floor S. side	48 in.	2.65
141	Sample from rise 22ft from floor S.E. side	96 in.	1.23
142	Sample from rise 28 ft from floor part S.W. side	24 in.	1.06
143	(No. Entry)		
144	Sth side M Tunnel near No. 3 Lode S drive	24 in.	Trace
145	do.	60 in.	1.08
146	Started Cuddy at 18 ft from M Tunnel near No. 54 in 30 in.		5.04
147	Started Cuddy at 18 ft. from M tunnel in 6 in.		7.92
148	and 149 no entry		
150	Stone picked up near boundary on track "X"		5.7
151	Soft formation on N. track	6 in.	Trace
152	Open cut cuddy No. 2 10 in. Iron etc.	10 in	1.8
153	No Entry		
154	Sample from 118 to 154 N Drive No. 2 Lode (60 in.)	10 in.	1.4
155	Bulk sample from 13 to 155 S end No. 2 Lode 60 in.	6 in.	6.38
156	Open cut Cuddy No. 2 Lode	36 in.	9.15
157	" " " " " "	10 in	15.45
158	Noentry		
159	Open cut Cuddy No. 2 lode on wall	2 in.	43.0
160	No entry		
161	Re sample between 25 and 26 Vein 2 in. wide	2 in.	13.05
262	Re sample at 59 Vein on Wall	2 in.	13.05
163	" " " 60 " " "	3 in.	4.04
164	" " " 62 " " "	3 in.	2.8

No. of Sample	Place where sample taken	Width	Per cent Tin
164A	Re sample at 61 Ve in on Wall	6 in.	16.9
165	" " " 63 " " " "	2 in.	0.57
166	Re sample between No. 25 and 36 hole in wall	12 in.	0.96
167	Re sample between No. 25 and 36 hole in wall	12 in.	0.25
168	N. Drive No. 2 Lode 10 feet from 154.	12 in.	1.2
169	(No entry)		
170	Piece stone S and No. 2 lode at 64 ft.	3 in.	13.6
171	Piece stone S end No. 2 lode at 64 ft.	3 in.	2.35
172	Bulk Sample No. 2 Lode S from 155 to 172 (10 ft.)	4 in.	6.2
173	Fines going over Mullock dump S end at 66 ft.		1.08
174	Open trench Ironstone		Trace
175	" " " " clay small trench		Trace
176	Lower tunnel quartz		Nil
177	Lower tunnel at water bulk		Nil
178	Lower tunnel at start of drive		Nil
179	Lower tunnel in face of drive L side		Nil
180	" " " " " " R "		.08
181	Open cut small vein start of tunnel		0.75
182	Bulk sample from 53 to 72 ft. S Drive No. 2	4 in.	7.06
183	End of face south No. 2 lode	3 in.	13.5
184	5 ft. from No. 63 S Drive No. 3	3 in.	0.92
185	5 ft. from No. 184 S Drive No. 3	2 in.	0.20
186	15 ft from No. 185 S Drive No. 3.	1½ in.	Trace
187	10 ft. from N. 186 S Drive No. 3.	4 in.	Trace
188			Trace
189	Open cut S end of S side		Trace
190	N end No. 2		0.74

No. of Sample	Place where sample taken	Width	Per cent Tin
191	Sample at No. 8	6 ft.	0.16
192	Quartz etc. flat vein across face	4 in.	0.47
193	No entry		
194	Main open cut face in end	13 in.	5.75
195	Main open cut in back above winze.	12 in.	9.5
196	Main open cut North face	10 in.	0.21
197	No. 2 lode S end 12 inches bulk	12 in.	2.60
198	No. 2 lode S end Sulphide	3 in.	1.07
199	No. 2 lode S and Red Oxide soft.		4.55
200	No. 2 lode S end Bulk from tip		2.00
201	Re sample # 26 to 27 back of drive		1.20

Contrast the foregoing record of sampling with the results actually obtained as given in the sub-joined table. The information contained in that record is of little value because the work was not performed in a systematic manner. The requisite data for an estimate of the value of the ore opened in the mine is not given.

Before presenting the statement of production it is desirable to point out that a large amount of wall rock was included in the material sent to the mill, thereby greatly reducing its value. An examination of the material in the bins at the battery showed at least 60 per cent of mallock. This estimate is confirmed by the results obtained.

P R O D U C T I O N

DATE 1926	CRUDE ORE TREATED	TIN ORE CONCENTRATE	ASSAY VALUE OF CONCEN- TRATE	PRICE PER TON	GROSS VALUE	CHARGES SMELTING ETC.	NET VALUE
	Tns.cwts.qrs.lbs.	Tns.cwts.qrs. lbs.	Per cent	£ s. d.	£ s. d.	£ s. d.	£ s. d.
	70.	15. 1. 1.	69.4	170 15 0	130 5 4	6 17 0	123 8 4
	55. 17.	12. 3. 17.	71.7	171 3 8	110 8 6	5 17 2	104 11 4
June	45.	8. 0. 8.	70.3	175 3 3	70 13 9	3 10 6	67 3 3
10th							
24th	55. 15.	8. 1. 19.	69.1	173 9 4	73 0 6	3 14 4	69 6 2
		7. 2. 8.	69.3	177 8 8	66 3 4	3 6 6	62 16 10
July	51. 6.	5. 2. 9.	68.6	176 18 7	49 7 3	2 1 10	46 15 5
8th		5. 2. 7	68.1	178 9 7	49 12 8	2 11 11	47 0 9
31st	45. 12	4. 2. 22	69.0	183 5 7	43 0 9	2 4 0	40 16 9
Aug.							
10		11. 1. 7	69.0	187 0 4	105 15 8	5 1 8	100 14 0
		<u>3. 19. 1. 14</u>					

From this record it is calculated that the average recovery value of the ore milled is 0.645 per cent tin.

### Transport Lines -

From the mine the ore is transported to storage bins by way of a steeply inclined, double road, two-foot gauge steel rail tramway 15 chains in length. The gravity plane system is used; two full tracks on the down side are required to haul two empty trucks along the up side of the tramway. The endless rope-way system would be much cheaper in operation. From the bins at the foot of the inclined tramway the laden trucks are conducted along a ground tramway 10 chains to the mill bins.

### Milling and concentration -

The milling and concentration plants consist of :-

A Cornish type boiler well set in fire brick;  
 A 14 horse power steam engine;  
 A battery of five stampers each weighing 850 lbs;  
 Two Forward-Down grinding pans of latest design;  
 Six wilfley concentrating tables of No. 6 type;  
 Classifiers and settlers;  
 and a dynamo.

The machinery is new, well set and well housed.

This plant is placed on seven benches instead of three. Modern aim at compactness of plant for the following reasons:-

- (1) To allow of closer attention with fewer employees;
- (2) To reduce the size of the building, the cost of excavation and erection of the plant;
- (3) To reduce the amount of shafting and belting and the amount of power.

As regards the individual parts the powers of the boiler and engine are too low for such a plant. For instance, one grinding pan under full load required six horse power for its operation. In consequence only one grinding pan and four tables have been in use. The stampers of the battery are too light to allow of efficient operation on this class of material. This is clearly shown by the low capacity: 5½ tons of ore crushed to 12 mesh size per day of eight hours. The capacity of the battery could be greatly increased by a preliminary crushing of ore in a rock breaker.

It was reported that the loss in the earlier operations was heavy. The excessive loss was due to the failure of the operators to regrind the middle product of the tables before submitting it to further treatment. This mistake was rectified. Generally the design is not in accordance with modern practice, yet the plant is of the best. One man and two boys only are required to operate the mill.

### Water Supply -

Water races loading from creeks on the north and south sides of the haulage line carry sufficient water for all purposes.

Summary -

It has been shown in the foregoing pages that the failure of the Company has been due to the following causes :-

1. An insufficient ore reserve;
2. The narrowness of the ore veins and their irregularity along their strike and dip;
3. The high cost of mining and milling the ore owing to the impossibility of excluding a large proportion of the tough broken wall rock in the process of excavation;
4. The high cost of transport; and
5. The high cost of milling and concentration owing to the low capacity of the plant and the nature of its design.

Some of these difficulties can be overcome, namely: those relating to transport and treatment of the ore. The apparent insurmountable difficulty is that of developing a large reserve in the known ore-bodies. The total reserve developed was only 600 tons, of which 500 tons has been removed. Unless discoveries of other ore-bodies are made the outlook is hopeless. The failure of this Company to develop the ore-bodies and to provide an adequate reserve of ore are the chief causes of its downfall. The erection of costly machinery on the supposition that the reserve derived from the treatment of ore broken during the stage of development will greatly offset the cost of such work is a too common cause of failure and is unjustifiable from any point of view.

Here is a very small and poor mine with the equipment of a big one.

Prospects -

As to the future of the Company in regard to these leases there are two possible ways of adding to the reserve: -

1. By developing the known deposits at depth; and
2. By the discovery of other deposits.

(1) It has been suggested that No. 3 adit crosscut should be continued to intersect Nos. 2 and 3 lodes in the hope that larger and richer shoots may be found in them at that depth. Although no evidence of a likely improvement is known the suggestion is worthy of consideration.

(2) It is not thought that large ore bodies will be found in the tuffs because of their plasticity and their non-susceptibility to replacement. But along the line of contact between two such dissimilar rocks as serpentine and tuff more favourable conditions may be expected. This line has not been broken at any point by exploration works. As a preliminary operation trenching at intervals across the line of contact is

recommended. Such work could be performed by the caretaker at little cost to the Company. In the meantime it may be of advantage to let the mine on tribute in order that the small quantity of ore remaining above No. 2 level may be removed.

Concluding remarks -

It is hoped that the time will allow of a more thorough examination after the completion of the present programme, in which event a supplementary report will be prepared and sent to the Company.

A. McINTOSH REID

DIRECTOR OF MINES.

14th May, 1927.