

O T T A W A

May 8, 1945.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1836.

Summary of Flotation and Cyanidation Tests on a Sample  
of Gold-bearing Rock from the Thompson Bousquet  
Property, Bousquet Township, Quebec.

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(Copy No. 7.)



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ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1835.

Summary of Flotation and Cyanidation Tests on a Sample  
of Gold-bearing Rock from the Thompson Bousquet  
Property, Bousquet Township, Quebec.

Shipment:

Two lots of ore were received from R. G. Walsh,  
General Manager, Siscoe Gold Mines Limited, Siscoe, Quebec,  
the first lot (148 pounds) being received on February 23, 1945,  
and the second (126 pounds) on March 17, 1945.

Instructions:

A letter received from Mr. Walsh on February 15, 1945,  
asked that the following tests be made on the ore:

- (1) Gold recovered by flotation; and if this is satisfactory, gold recovery from the reground concentrate by cyanidation.
- (2) Gold recovery by straight cyanidation.



Location of Property:

The Thompson Bousquet property is located in Bousquet township, Quebec, and is under development by Siscoe Gold Mines Limited.

Sampling and Analysis:

Lot No. 1 was crushed, sampled and assayed by standard methods, the analyses being as follows:

Gold	-	0.07	oz./ton
Silver	-	0.04	"
Iron	-	10.67	per cent
Sulphur	-	4.84	"
Insoluble	-	65.76	"

Under analysis, Lot No. 2 proved to be slightly higher in gold content and assayed 0.085 ounce per ton; on cutting a second head sample, it assayed 0.096 ounce per ton.

CHARACTERISTICS OF THE ORE:

Lot No. 1

Six polished sections of samples from Lot No. 1 were prepared and examined under the reflecting microscope for the purpose of determining the character of the ore.

Gangue -

In the six polished sections gangue material consists of rather soft, fine-grained, dark-grey rock with a minor amount of admixed quartz. The latter constituent is associated with the narrow bands of more or less massive pyrite. In one or two sections the rock exhibits a slight schistose texture.

Metallic Minerals:

Metallization is only moderately strong in the six polished surfaces and is represented chiefly by pyrite. This mineral preponderates as irregular grains and crystals, ranging from about two millimetres down to only a micron or two in size, disseminated unevenly through gangue. In some sections the iron sulphide forms small granular masses arranged in narrow streaks or bands which apparently follow cleavage



(Characteristics of the Ore, cont'd)

or other direction of weakness in the rock. In other sections the pyrite grains are scattered at random throughout gangue.

Tiny grains of a hard, grey, anisotropic mineral regarded as ilmenite are locally common in gangue but the total quantity is small. "Limonite" and chalcopyrite are both present in small amounts; the former as stains and small irregular particles in gangue, usually against pyrite, and the latter as rare tiny grains in gangue and pyrite. No gold is visible in the six polished surfaces.

#### Lot No. 2

Six polished sections, prepared from the more heavily mineralized pieces of the ore sample, were examined under a reflecting microscope.

The character of the ore in this lot is identical with that in Lot No. 1, both as to gangue and metallics, and need not be further described.

The ore minerals visible in the polished sections are: pyrite, "limonite", ilmenite (?) with a little admixed magnetite, and chalcopyrite. The general character of the mineralization is shown in Figure 1. Metallic minerals are much more abundant in the photomicrograph, however, than in the average field of the microscope.

#### Superpanner Concentrates:

Flotation tailings from test work on this sample run 0.015 ounce gold per ton. This is too high for ore of this grade and an effort was made to learn how the gold remains in them. Two 200-gram samples of flotation tailings from Tests Nos. 2 and 3 were superpanned separately and each concentrate carefully examined under a binocular microscope.

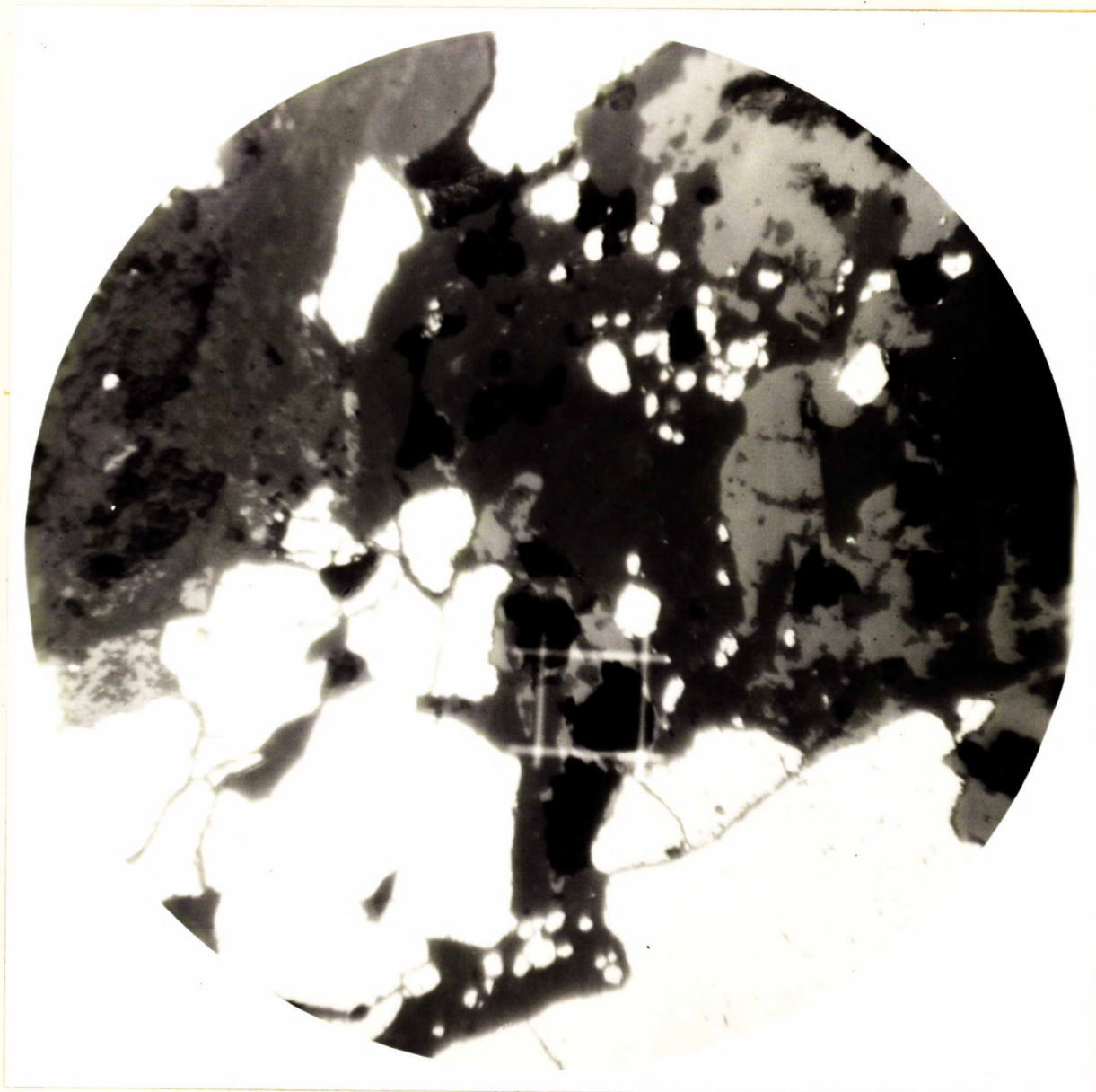
No gold was seen in the concentrate from Test No. 2 but three grains of free gold were found in that from Test No. 3. The largest particle is 75 to 80 microns (just over



(Characteristics of the Ore, cont'd) -

200 mesh) in size, the other two being 64 and 43 microns respectively. Figure 2 shows the general shape and size of the two larger grains; the smallest one was lost in handling. All three are normal in colour.

Figure 1.



X200.

PHOTOMICROGRAPH OF POLISHED SECTION SHOWING THE  
GENERAL CHARACTER OF THE MINERALIZATION IN THE GOLD ORE.

Pyrite - white; "limonite" - light grey;  
gangue - dark grey; pits - black.

A 200-mesh grid is shown near centre.



(Characteristics of the Ore, cont'd) -

Figure 2.



X63.

PHOTOMICROGRAPH OF TWO PARTICLES OF FREE GOLD  
TAKEN FROM SUPERPANNER CONCENTRATE OF FLOTATION TAILINGS  
FROM TEST NO. 3.

The tiny grain shown in the grid and the  
curved particle near the smaller grain of  
gold are specks of dust and fibre.

A 200-mesh Tyler screen opening is superimposed.

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Conclusion from Microscopic Examination:

While gold was not seen in the polished sections  
from either lot, a fact not surprising on ore of this grade,  
medium fine particles of free gold were seen in a superpanned  
concentrate of flotation tailing from Test No. 3, Lot No. 2.  
No reason can be suggested as to why they did not float except,  
perhaps, to point out that the sample is rather extensively  
oxidized (see Figure 1). The grains of gold observed, however,  
should cyanide readily.



General Observations:

The material, as submitted, proved to be somewhat under normal ore grade and appeared to have been taken from the surface, showing signs of considerable weathering and perhaps oxidation.

As such, the results obtained do not indicate the percentage of extraction which might be obtained from freshly mined material of ore grade.

Both lots of ore appeared to present the same problems. Of the number of tests made, representative test results are summarized herein.

Conclusions:

From the test work as carried out in this investigation, the ore as represented by the samples submitted can be more effectively treated by straight cyanidation than by flotation.

Under straight cyanidation a tailing of 0.005 ounce gold per ton is obtained after 30 hours' agitation, which gives an extraction of approximately 93.0 to 94.7 per cent according to the value of the head sample. This extraction must be considered as excellent in view of the low value of the head sample.

Consumption of cyanide and lime is abnormally high, due to the amount of sulphides in the ore.

The ore is very easily ground and gives up its gold values readily at below 90 per cent minus 200 mesh.

Under flotation, the sulphides are easily concentrated but there appears to be sufficient fine gold left in the gangue to prevent a satisfactory low tailing being made, and 0.015 ounce gold per ton was the lowest obtained.

This is more or less substantiated by the results in cyaniding the flotation tailing and by the low percentage of sulphur in the flotation tailings, also the superpanner test on



(Conclusions, cont'd) -

the flotation tailings.

The gold in the flotation concentrate is very easily cyanided.

The best overall recovery from flotation followed by cyanidation of the concentrate was 85.2 per cent of the gold.

SUMMARY OF INVESTIGATIONS:

Lot No. 1, Test No. 2.

1,000 grams of ore ground to 90.2 per cent minus 200 mesh cyanided at 2 to 1 dilution for 30 hours.

Results -

Assay heads	-	0.07	oz. gold per ton.
Assay residue	-	0.005	do.
Extraction	-	92.9	per cent.
NaCN consumed	-	1.6	lb./ton ore.
CaO "	-	8.2	" "
Reducing power per 1,000 c.c. solution	-	100 c.c.	$\frac{N}{10}$ KMnO <sub>4</sub> .

Lot No. 1, Test No. 4.

2,000 grams of ore ground to 96.4 per cent minus 200 mesh.

Reagents (lb./ton) -

<u>Grinding:</u>		<u>Lb./ton</u>
Soda ash	-	2.0
Reagent No. 301	-	0.2
Reagent No. 208	-	0.1
Reagent No. 425	-	0.1
Aerofloat No. 25	-	0.07

Flotation:

Potassium amyl xanthate	0.1
Pine oil	0.05

pH, 8.0.  
Condition, 5 mins.  
Flotation, 15 mins.

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(Summary of Investigations, cont'd) -

Results:

Product	Weight, per cent	A s s a y s			Distribution, per cent		
		Oz./ton:	Per cent				
		Au	S	Fe	Au	S	Fe
Flotation conc.:	19.47	0.30	23.13	25.90	82.9	96.9	43.4
Flotation tailing	80.53	0.015	0.18	8.18	17.1	3.1	56.6
Total -	100.00	0.07	4.64	11.63	100.0	100.0	100.0

Ratio of concentration - 5.14:1.

235 grams flotation concentrate ground to 99.6 per cent minus 200 mesh and cyanided at 4.25 to 1 dilution for 48 hours.

Results -

Assay flotation conc. - 0.30 oz. gold per ton.  
 Assay cyanide residue - 0.01 do.  
 Extraction - 96.7 per cent.  
 Overall recovery - 80.1 per cent.

Lot No. 2, Test No. 1.

1,000 grams of ore ground to 86.0 per cent minus 200 mesh. Cyanided at 2 to 1 dilution for 30 hours.

Results -

Assay heads - 0.096 oz. gold per ton.  
 Assay residue - 0.005 do.  
 Extraction - 94.7 per cent.  
 NaCN consumed - 1.48 lb./ton of ore.  
 CaO - 7.44 do.  
 Reducing power per  
 1,000 c.c. solution - 100 c.c. N KMnO<sub>4</sub>.

Lot No. 2, Test No. 2.

2,000 grams of ore ground to 90.2 per cent minus 200 mesh.

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(Summary of Investigations, cont'd) -

Reagents (lb./ton) -

<u>Grinding:</u>		<u>Lb./ton</u>
Soda ash	-	2.0
Reagent No. 301	-	0.2
Reagent No. 208	-	0.1
Reagent No. 425	-	0.1
Aerofloat No. 25	-	0.07

<u>Flotation:</u>		<u>Lb./ton</u>
Potassium amyl xanthate	-	0.1
Pine oil	-	0.5

pH, 8.4.  
Conditioning, 5 minutes.  
Flotation, 15 minutes.

Results:

Product	Weight, per cent	A s s a y s			Distribution, per cent		
		Oz./ton: Au	Per cent S	Per cent Fe	Au	S	Fe
Flotation conc.	18.9	0.47	28.02	28.42	88.0	98.3	51.4
Flotation tailing	81.1	0.015	0.11	7.00	12.0	1.7	48.6
Total -	100.0	0.1009	5.38	11.04	100.0	100.0	100.0

Ratio of concentration - 5.3:1.

277 grams of flotation concentrate cyanided at 3.6 to 1 dilution without regrinding, for 48 hours.

Results:

Assay concentrate	-	0.47 oz. gold per ton.
Assay residue	-	0.015 do.
Extraction	-	96.8 per cent.
Overall recovery	-	85.2 per cent.

500 grams of flotation tailings cyanided at 2 to 1 dilution for 24 hours.

Results:

Assay tailings	-	0.015 oz. gold per ton.
Assay residue	-	0.005 do.
Extraction	-	66.7 per cent.

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(Summary of Investigations, cont'd) -

Two samples of flotation tailings (200 grams each) assaying 0.015 ounce gold per ton were run over the super-panner and a concentrate and tailing obtained.

Concentrate was examined under the microscope and while in one sample no gold was observed, in the other, three tiny grains of unattached gold, the largest of which would be slightly over 75 microns (200 mesh), were observed.

The tailing from the panner runs was sent for assay and showed no reduction in value from the original flotation tailing.

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WH:GF:GHB.