Report No. 242

The concentration of the copper ore ("F" orebody) of the Noranda Mines Ltd. Rouyn, Quebec

by C. S. Parsons

Shipments: Two shipments of ore were received from Noranda Mines Ltd. Qouyn, Quebec. Lot No. 1, weight 118 lbs. was received September 9, 1925, and Lot No. 2, weight 1500 lbs. January 27, 1926

Characteristics and Analyses: The samples consisted of a heavy sulphide ore containing chalcopyrite, pyrite, pyrrhotite and gold. The chalcopyrite is disseminated, and fine grinding is necessary to free it. Analyses of the two lots were as follows:

Lot No. 1	Copper	1.55%	Arsenic	0.03 %
	Gold	0.25 oz/ton	Iron	50.39 %
	Silver	0.28 "	Sulphur	39.86 %
	Lead	trace	Silica	2.93%
	Zinc	0.28 %		
Lot No. 2	Copper	1.6 %	Gold	0.3 oz/ton

Purpose of Experimental work: The samples were submitted for the purpose of determining whether this type of ore could be concentrated. A concentrate was desired which would contain the gold and copper; the greater portion of the pyrite and pyrrhotite to be eliminated in a tailing product. Also, if possible, to determine what sulphides the gold is associated with.

Flotation Tests Lot No. 1

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Product	Weight %	Assay				Per cent of values		
		Au oz	Ag oz	Cu %	Fe %	Au	Ag	Cu
Magnetic	45.4	0.07	0.13	0.62	57.73	12.0	22.0	19.1
Concentrate	7.2	1.66	0.86	12.04	40.28	44.5	23.1	38.9
Middling	10.2	0.41	0.46	1.83	44.72	15.4	17.2	12.4
Tailing	37.4	0.20	0.27	0.38	46.45	28.1	37.7	9.6
Heads from products		0.27	0.27	1.47	50.95			

Flotation tests Lot No. 2

12	Concentrate	40.6	3.56	0.57	94.5	83.1
	Tailing	59.4	0.14	0.08	5.5	16.9
13	Concentrate	26.8	5.13	0.68	90.0	86.4
	Tailing	73.2	0.21	0.04	10.0	13.6
14	Concentrate	49.4	3.0	0.40	97.5	76.3
	Tailing	50.6	0.07	0.12	2.5	23.7
15	Concentrate	71.8	6.12	0.78	87.8	59.4
	Tailing	78.2	0.24	0.15	12.2	40.6
16	Concentrate	24.6	5.45	0.59	63.1	65.7
	Tailing	75.4	1.04	0.10	36.9	34.3
17	Concentrate	21.3	5.53	0.67	55.4	72.1
	Tailing	78.7	1.21	0.08	44.6	27.9
18	Concentrate	23.9	5.76	0.64	64.7	71.5
	Tailing	76.1	0.99	0.08	35.3	28.5
19	Concentrate	25.3	6.70	0.61	78.23	52.08
	Tailing	76.1	0.63	0.14	21.77	37.92
20	Concentrate	29.2	5.58	0.56	77.35	74.09
	Tailing	70.8	0.67	0.08	22.65	25.91
21	Concentrate	32.3	6.38	0.54	94.0	81.0
	Tailing	67.7	0.19	0.06	6.0	19.0
23	Concentrate	46.5	4.50	0.46	96.5	78.5
	Tailing	53.5	0.14	0.11	3.5	21.5

No. 12	1000 grams ore 45 minutes in mill		
	Soda ash	3.0 grams	
	P.T.&T. #400	6 drops	
	Xanthate	0.1 gram	added to cells
No. 13	1000 grams ore 45 minutes in mill		
	Soda ash	3.0 grams	
	P.T.& T #400	6 drops	
	Xanthate	0.1 gram	added to cells
	Cyanide	0.5 "	added to ball mill
	Copper sulphate	2 c.c.	

No. 14	1000 grams ore 45 minutes in mill	
	Soda ash	3 grams
	DuPonts creosote	6 drops
	Cresylic acid	8 drops
No. 15	1000 grams ore 45 minutes in mill	
	Soda ash	3 grams
	Duponts cresote	8 drops
	Cresylic acid	8 drops
	Cyanide	0.5 grams
	Xanthate	0.1 " added to cells
No. 16	1000 grams ore 60 minutes in mill (-20 mesh)	
	Barretts #4	5 drops
	Cresylic acid	5 drops
	Soda ash	3 grams
No. 17	1000 grams ore 60 minutes in mill (-20 mesh)	
	Soda ash	3 grams
	Duponts creosote	5 drops
	Cresylic acid	5 drops
No. 18	1000 grams ore 60 minutes in mill (-20 mesh)	
	Water gas tar 60)	
	Cresylic acid 20)	10 drops
	Coal tar creo 20)	
No. 19	1000 grams ore -20 mesh 60 minutes in mill	
	Mixture as in 18	10 drops
	Soda ash	2 grams
	Cyanide	.15 "
No. 20	1000 grams ore -20 mesh 60 minutes in mill	
	Mixture as in 18	10 drops
	Soda ash	3 grams
No. 21	1000 grams ore -20 mesh 60 minutes in mill	
	Mixture as in 18	10 drops
	Soda ash	3 grams
	Cyanide	.15 "
	After running few minutes added 1 c.c. copper sulphate - copper coloured froth came up	
No. 23	1000 grams ore -20 mesh 20 minutes in mill	
	Soda ash	3 grams
	Cyanide	.2 "
	Mixture as in 18	10 drops
	Xanthate	.1 gram added to cell
	Copper sulphate	1.5 cc " "

Conclusions: From the results of the magnetic separation test it is evident that the pyrrhotite does not carry the gold. Attention is drawn to test No1 12 on Lot 1, where 78% of the gold was recovered but only 64% of the copper, and to the fact that when x lime is used a high copper concentrate can be obtained with an excellent recovery of the copper, but without a corresponding recovery of gold. These results prove that the gold is not entirely associated with the copper.

One very important point was ascertained, namely that the tests conducted on the ore immediately after it was received gave very good

results - reference to tests Nos. 1-5 Lot 2 - but as the ore became older the results fell off. This characteristic was very noticeable.

Special attention is drawn to the use of cyanide with soda ash. Thests Nos. 4, 5, 13, 15, 19 and 23 were run using cyanide. In the last three of these tests the ore was showing decided signs of oxidation. The results in test nos. 4, 5, and 13, are very encouraging, and warrant the conducting of a tonnage scale test using these reagents.

The experience with this ore shows that the samples used in flotation tests must be sxlected from freshly mined ore and guarded in every possible against oxidigation.