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REPORT OF ORE DRESSING AND METALLURGICAL LABORATORIES

Test No. 127.

A shipment of sixty-eight pounds of gold ore was received on October 21st, 1919, from H.R. Blake, Esq., Winnipeg, Man.

The ore consisted of white vein quartz, carrying small amounts of arsenopyrite, chalcopyrite, and galena. No free gold was visible in the original ore, but upon crushing and grinding, a large number of very fine flat flakes appeared.

A few specimens were selected from the shipment and the remaining ore was crushed to 40 mesh and duplicate samples taken, from which the following average assay was obtained :-

Gold.....	6.75	ozs/ ton.
Silver.....	1.04	" "
Copper.....	0.07	%
Lead.....	0.03	%
Arsenic.....	0.66	%

It was desired that a suitable process for the recovery of the gold and silver in this ore be developed, and with this end in view, the following experiments were carried out :-

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AMALGAMATION AND CYANIDATION

Test #1.

1000 grams of the original ore ground to pass 40 mesh were put into a small pebble mill along with 100 grams of mercury and 400 c.c. of water. The jar was then revolved with this charge for 2½ hours, after which the contents of the jar were panned to recover the mercury. During the panning, a lot of sulphides floated away with the tails, but a small amount was saved as a concentrate.

Mercury recovered 100 gms.

Concentrates 8.2433 gms., Au 29.05 oss/ ton.

Tails 994 gms., Au 3.96 oss / ton.

The tails from this amalgamation were ground to 100 mesh, and cyanided for 8 hours in a .33% solution. After this treatment, the tails were sampled and cyanided again, as before.

Tails after 1st cyanidation, Au 0.16 oss/ton

Tails " 2nd " , Au 0.06 " "

Recovery 1. in concentrates 2.3 %

2. By amalgamation 39.0 %

3. " cyanidation 57.8 %

Loss.....0.9 %

Test # 2.

This test is the same as test No. 1 with the following changes :-

1. Charge revolved in the pebble mill 3½ hours.
2. No concentrate saved in panning.

This test gave the following .-

Mercury recovered 99.5 gms.

Tails from amalgamation 993 gms, Au 0.65 oss/ton

Tails after 1st cyanidation, Au 0.04 ozs /ton.
 Tails " 2nd " Au trace.

Recovery.- 1. By amalgamation 91.7%
 2. " cyanidation 8.3%

Test 3.

26½ pounds of the original ore crushed to 40 mesh were put through an amalgamator, and then over amalgamation plates, the flow from the plates being led to a series of settling boxes, so that the amalgamated ore would settle out from the water. After the run, all the amalgam was collected from the amalgamator and the plates, and treated to recover the bullion in it. The ore in the settling boxes was also collected, dried, weighed and sampled. In panning the mercury from the ore remaining in the amalgamator, a small amount of concentrate was recovered.

Weight of tails	26.25 pounds.
Analysis, Au	1.80 ozs/ton.
Content	.02362 ozs.
Gold recovered in concentrate	.00189 "
Gold recovered as bullion	.06574 "
Gold in heads used	.08859 "

2365 gms of tailings from the above were crushed to pass 100 mesh. In doing this, a small amount of metallics was recovered on the screen. The material - 100 mesh was cut in two on a Jones Riffler, and the two halves were cyanided separately for 8 hours in a .23% solution, then decanted, washed and cyanided again for 8 hours with fresh solution.

First Half,-

Tails after 2nd cyanidation, Au 0.18 ozs/ton.

Second Half,-

Tails after 2nd cyanidation, Au, 0.15 ozs/ton.

Gold recovered in metallics 39 mgs Au 0.395 ozs/ton

Recovery,- 1. By cyanidation	2.1%
2. " amalgamation	72.0%
3. In metallics	5.7 %
4. By cyanidation	17.8 %
Loss.....	2.4 %

AMALGAMATION, TABBING AND CYANIDATION.

Test #4.

20.5 lbs of amalgamation tails from test No. 3 were tabled upon a small Wilfley table, making a concentrate, a middling and a tailing. The middlings were rerun making a concentrate and a tailing which were put respectively with the first concentrate and tailing. In tabling a small amount of the concentrate floated off as a scum into the tailing box; this scum was removed and put with the concentrate.

Wt. of concentrate	.586 lbs.
Analysis, Au	82.12 ozs/ton.
Content, Au	.01585 ozs/ton
Wt. of tailings	19 lbs.
Analysis, Au	0.28 oz/ton
Content, Au	.00286 ozs.
Gold in feed used	.01845 ozs.

Two 1000 gram lots of the above tailing, crushed to pass 100 mesh, were cyanided for 8 hours in a .23% solution and then decanted, washed and cyanided for another

8 hours with fresh solution.

First Lot .-

Tails after 2nd cyanidation, Au .10 ozs./ton.

Second Lot.-

Tails after 2nd cyanidation, Au .08 ozs/ton.

Recovery.-

1. by concentration	2.1 %
2. " amalgamation	72.0 %
3. (" tabling	22.2 %
4. " cyanidation	2.5 %
Loss.....	1.2 %

TABLING AND CYANIDATION.

Test # 5. 11.75 lbs of original ore crushed to pass 40 mesh were tabled on a small Wilfley table, making a concentrate, a middling and a tailing. The middling was rerun making a concentrate and a tailing which were put with the first concentrate and tailing. Some seam found floating in the tailing box was put with the concentrate.

Wt. of concentrate	.236 lbs.
Analysis, Au	263.60 ozs./ton
Content, Au	.03110 ozs.
Wt. of tailings	10.75 lbs.
Analysis, Au	1.16 ozs./ton
Content	.00623 ozs.
Gold in feed used	.03966 ozs.

Two 1000 gram lots of the above tailing, crushed to pass 100 mesh, were cyanided for 8 hours in a .23% solution and then decanted, washed and cyanided for another 8 hours with fresh solution.

First Lot,-

Tails after 2nd cyanidation, Au .10 ozs./ton

Second Lot,-

Tails after 2nd cyanidation, Au .10 ozs./ton

Recovery,-

1. By tabling	83.3 %
2. " cyanidation	15.3 %
Loss.....	1.4 %

Test # 6.

10.10 lbs of original ore were crushed to pass 40 mesh, some metallics being obtained on the screen. The -40 mesh material was sampled and the remainder, 9.47 lbs. was tabled on a small Wilfley table, the procedure being the same as in the tabling in test No. 5.

Gold in metallics from 10.10 lbs. 68.55 mgs.

.. " " " " 9.47 "	64.07 mgs.
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= .00206 ozs.

Wt. of concentrate 0.196 lbs.

Analysis, Au 228.41 ozs /ton.

Content, Au .02238 ozs.

Wt. of tails 8.77 lbs.

Analysis, Au 1.19 ozs./ton

Content .00522 ozs.

Analysis of -40 material, Au. 5.85 ozs/ton

Metallics -40 mesh, correspond to .43 ozs/ton

.. Analysis feed used 6.28 ozs/ton.

Gold in feed used = .02974 ozs.

Two 1000 gram lots of the above tailing crushed to pass 100 mesh were cyanided for 8 hours in a .23%

solution and then decanted, washed and cyanided for another 8 hours with fresh solution.

First Lot,-

Tails after 2nd cyanidation, Au .08 ozs/ton.

Second Lot,-

Tails after 2nd cyanidation, Au .16 ozs/ton

Recovery,-

1. in Metallics	6.9 %
2. By tabling	75.5 %
3. " cyanidation	15.8 %
Loss.....	1.8 %

TABLING AND FLOTATION

Test # 7.

A small flotation test was made upon 500 grams of table tails from Test No. 6 ground to pass 100 mesh.

Wt of concentrate	5.35 gms.
Analysis, Au	71.00 ozs/ton
Content, Au	.000419 ozs.
Wt. of middling	36.0 gms.
Analysis, Au	4.12 ozs/ton
Content, Au	.000164 ozs.
Wt. of tailing	456.0 gms.
Analysis, Au	.10 ozs/ton
Content, Au	.000050 ozs.
Gold in feed used	.000656 ozs.

Recovery ,-

1. In metallics	6.9 %
2. By tabling	75.5 %
3. In flotation concentrates	11.6 %
4. In " middlings	4.6 %
Loss.....	1.4 %

FLotation AND TABLING.Test # 8.

1560 grms of original ore were crushed to pass 40 mesh, and some metallics were obtained on the screen. Flotation tail was then made upon the -40 material.

Gold in metallics 10.50 grs	=	.000627 ozs
Wt. of concentrates		56 grms.
Analysis, Au		45.22 ozs/ton
Content, Au		.002791 ozs.
Wt. of middlings		89 grms.
Analysis, Au		10.02 ozs/ton
Content, Au		.000983 ozs.
Wt. of tailings		1403 grms.
Analysis, Au		4.20 ozs /ton
Content, Au		.006495 ozs.
Gold in feed used		.011607 ozs.

1304 grams of flotation tailings were tabled upon the small Wilfley table, the procedure being the same as in the tabling in test No. 5. In this tabling no scum was found in the tailing box.

Wt. of concentrates		15 grms.
Analysis, Au		399.21 ozs/ton.
Content, Au		.00660 ozs.
Wt. of tailings		1262 grms.
Analysis, Au		.22 ozs/ton.
Content, Au		.00031 ozs.
Gold in feed used		.00604 ozs.

Recovery .-

1. in metallics		5.8 %
2. " Flotation concentrate		25.6 %
3. " " middling		9.0 %

4. In table concentrate	56.9 %
Loss.....	2.7 %

CONCLUSIONS.-

The above tests show that the ore as represented by the small lot submitted can be treated in a number of ways with success, and the selection will depend to a large extent on the situation of the property and other local conditions.

The ore contains values in gold to the extent of \$135.00 per ton and as 80% of this can be recovered by amalgamation, it is obvious that amalgamation would be adopted as the first stage in the treatment.

The ore contains mineral in the form of arsenopyrite, chalcopyrite, galena and sphalerite to the extent of 1.5% by weight, and this mineral constituent can be concentrated on tables and a high grade concentrate obtained carrying practically all that remains of the gold values after amalgamation. This seems feasible as the second stage of the treatment.

It has been proven that the tailings after amalgamation and concentration, reground to 100 mesh, can be readily cyanided with a recovery of any values remaining.

It has also been proven that from the tailings after amalgamation and concentration, reground to 100 mesh, the remaining values can be concentrated by flotation.

Which of these latter methods is adopted, will depend on local conditions.