DEPARTMENT
OF
MINES

DIVISION OF
ORE DRESSING AND
METALLURGY

CANADA

MINES BRANCH



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# REPORT
of the
# ORE DRESSING AND METALLURGICAL LABORATORIES.

## Test No.174

## The recovery of the values from the ore of the E. H. Gladwin Mine, Beaver Dam Mining District, Nova Scotia

by R. K. Carnochan.

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A shipment of 5 bags of gold ore, weighing 575 pounds, was received at the Ore Dressing and Metallurgical Laboratories November 13, 1922. This ore was sent in by Mr. W. R. Hitchcock, Cornwall, Ont., and came from the E. H. Gladwin Mine, near Upper Musquodoboit, Beaver Dam mining district, Halifax county, N.S.

The shipment consisted of vein quartz carrying a fair amount of sulphides and some free gold in large flakes. Tests were desired on the ore to determine the best method of extracting the gold.

Head Sample: The ore is very difficult to sample due to the presence of metallics. Four samples of about 30 pounds each were taken and crushed through 40 mesh, some metallics being obtained on the screen. The results from these four samples were not satisfactory, so the remainder of the shipment was cut into halves, making two more samples, and these were crushed through 40 mesh, metallics being obtained on the screen. The following table shows the results obtained from the six head samples:

| Sample | Weight lbs. | Metallics | | | | -40 mesh | | Total | |
|---|---|---|---|---|---|---|---|---|---|
| | | Au. mgms | Ag. mgms | Au oz/ton | Ag oz/ton | Au oz/ton | Ag oz/ton | Au oz/ton | Ag oz/ton |
| 1. | 33.25 | 11.04 | 0.40 | 0.02 | 0.00 | 0.27 | 0.04 | 0.29 | 0.04 |
| 2. | 35.00 | 25.00 | 1.50 | 0.05 | 0.00 | 0.08 | 0.00 | 0.13 | 0.00 |
| 3. | 30.25 | 338.47 | 23.33 | 0.72 | 0.05 | 0.08 | 0.02 | 0.80 | 0.07 |
| 4. | 30.75 | 36.46 | 2.48 | 0.08 | 0.01 | 0.11 | 0.03 | 0.19 | 0.04 |
| 5. | 208.00 | 304.22 | 20.96 | 0.10 | 0.01 | 0.08 | 0.04 | 0.19 | 0.05 |
| 6. | 210.00 | 298.50 | 20.50 | 0.09 | 0.01 | 0.01 | 0.06 | 0.19 | 0.07 |
| TOTAL | 547.25 | 1013.69 | 69.17 | 0.12 | 0.01 | 0.12 | 0.03 | 0.24 | 0.04 |

As the table shows, the shipment of ore assays 0.24 oz per ton gold and 0.04 oz per ton silver, this being equal to $4.96 in gold and 3¢ in silver, making a total of $4.99

Amalgamation & Cyanidation — A 684 gram portion of the -40 mesh material of no. 1 head sample was amalgamated:

| Product | Au oz/ton | % Au value |
|---|---|---|
| Metallics | 0.02 | 6.9 |
| Amalgamated | 0.05 | 17.2 |
| Tailing | 0.22 | 75.9 |
| Heads | 0.29 | 100.0 |

The amalgamation tailing was ground to pass 200 mesh, and cyanided:

| Product | Au oz/ton | % Au value |
|---|---|---|
| Cyanided | 0.22 | 75.9 |
| Tailing | 0.00 | |
| Feed | 0.22 | 75.9 |

Amalgamation, Tabling, and Flotation: — A 1090 gram portion of the -40 mesh material of no. 2 sample was amalgamated, the amalgamation tailing being tabled, and then the table tailing was floated. The flotation concentrate was re-run to clean it.

| Product | Weight grams | Au oz./ton | Assay x Wt. gms | % of Au value |
|---|---|---|---|---|
| Metallics | | 0.05 | 54.50 | 38.5 |
| Amalgamated | | | 34.06 | 24.1 |
| Table concentrate | 34 | 0.46 | 15.64 | 11.0 |
| Flotation " | 120 | 0.26 | 31.20 | 22.0 |
| " middling | 126 | 0.05 | 6.30 | 4.4 |
| " tailing | 681 | 0.00 | 0.00 | |
| Loss | 129 | 0.00 | 0.00 | |
| Heads | 1090 | 0.13 | 141.70 | 100.0 |

Tabling and Flotation: — A 1018 gram portion of the -40 mesh material of head sample no. 5 was run over a small Wilfley table, making a concentrate and tailing. The table tailing was then floated in a small Ruth machine, the flotation concentrate being re-run to clean it.

| Product | Weight grams | Au. oz./ton | Assay x Wt.gms. | % of Au value |
|---|---|---|---|---|
| Metallics | | 0.09 | 91.6 | 57.8 |
| Table concentrate | 26.6 | 2.52 | 67.0 | 42.2 |
| Flot. concentrate | 78.0 | trace | | |
| " middling | 121.0 | 0.00 | | |
| " tailing | 677.4 | 0.00 | | |
| Loss | 115.0 | 0.00 | | |
| | | | 158.6 | |
| Heads | 1018.0 | 0.19 | 193.4 | 100.0 |

In this test the table recovers practically all the gold and leaves only a trace in the table tailing. In the amalgamation, tabling, and flotation test, the table did not remove all the gold. These different results are due to the spotty nature of the ore, and the difficulty of getting a representative sample

Amalgamation and Flotation: Three tests were made on the ore using amalgamation followed by flotation, about 1000 grams of ore being used in each test. In every one of them more gold was obtained in the products than the amount which assays showed to be in the feed. This is due to the very spotty nature of the ore. These tests show the flotation concentrate to run about 1.25 oz/ton gold, and the flotation tailing about 0.08 oz/ton gold.

Conclusions: The tests show that the ore does not amalgamate very readily, and to make a good recovery of the gold, amalgamation would have to be followed by some other process.

Amalgamation followed by cyanidation gives a very high recovery of the gold and this seems the best method of treatment.

The ore is low grade, and a considerable tonnage of it would need to be available before a mill to treat it is built.