O T T A W A January 6th, 1942.

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ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1146.

Microscopic Examination of Two Samples of Gold Ore from Wampum Gold Mines Limited, Toronto, Ontario.

(Copy No. 27.)

BUREAU OF MINES
DIVISION OF METALLIC MINERALS
—
ORE DRESSING AND
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CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

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Samples:

Two specimens of gold ore from the Wampum Gold Mines Limited were received by the Division of Metallic Minerals, Bureau of Mines, Ottawa, Ontario, on December 10th, 1941. They were submitted by Mr. H. C. McRae who stated that they were high-grade samples which were at the Toronto office of the company. Mr. McRae requested assays

(Samples, cont'd) -

and microscopic examination of the specimens for the purpose of determining the modes of occurrence of the gold. Twelve polished sections were prepared and examined microscopically with this objective in view.

Summary of Results;

Samples Nos. 1 and 2 assayed 43.26 and 79.13 ounces gold per ton respectively, corroborating the expectation that they were high grade. Native gold is abundant in all sections, and is largely distributed in the gangue independently of the sulphides. A small percentage is associated with pyrrhotite and an even lesser percentage is associated with chalcopyrite. There is no evidence that the gold was introduced contemporaneously with the sulphides, although this may have been the case in part. Rather it seems to have been introduced independently of the sulphides (although the same lines of weakness in the rock which provided channelways for the gold-bearing solutions were also followed by the sulphide-bearing solutions) and only by chance have the sulphides and the gold come into contact. It would therefore not be expected that the sulphides would carry any appreciable quantity of gold in sub-microscopic or solid solution forms.

Description of Polished Sections;

Sample No. 1. -

The gangue of Sample No. 1 is reddish brown to yellowish brown, rather fine-textured quartz whose colour is due to the presence of considerable limonite arising from the oxidation of the iron sulphides; it contains some disseminated calcite. The material is sparsely mineralized with scattered

(Sample No. 1, cont'd) -

small grains of pyrrhotite, chalcopyrite and limonite, and small rounded to irregular grains of native gold occur throughout the quartz without apparent relation to the sulphides.

Sample No. 2. -

The gangue of Sample No. 2 is very similar to that of Sample No. 1. This sample shows considerably more mineralization than No. 1, however. Pyrrhotite is the most abundant sulphide; it occurs as small masses and grains along irregular stringers and is often associated with chalcopyrite; the masses particularly exhibit alteration veinlets along which the pyrrhotite has apparently been altered to marcasite and in some places the pyrrhotite has been altered to limonite. In addition to the veinlets mentioned above, marcasite occurs as scattered grains in the quartz. Small masses and grains of chalcopyrite are scattered throughout the quartz, usually associated with some limonite and sometimes associated with pyrrhotite. Only a very minor quantity of pyrite is present as disseminated grains.

The native gold of this sample occurs largely as irregular to somewhat rounded grains in quartz. The size varies from larger than 100 mesh down to grains just visible under the high-power objective (less than a micron) but the quantity smaller than 560 mesh is very small. Most of the gold is not associated with the sulphides. It occurs in general in the areas roughly coincident with the sulphide stringers and adjacent to them, a fact which would indicate that the same channelways provided access for both the gold-bearing and the sulphide-bearing solutions. A small quantity of the gold occurs against or enclosed by pyrrhotite (See Figure 1) but it will be noted that even when enclosed by

(Sample No. 2, cont'd) -

pyrrhotite it is usually associated with gangue inclusions; in the absence of evidence to the contrary, this would suggest that the gold was introduced earlier than the sulphides and possibly independently of them. A very small percentage of the gold occurs in the same relationship with chalcopyrite. If the sulphides and the gold were not introduced contemporaneously (as is indicated by the rather meagre evidence given above) it may be inferred that gold is not likely to be present in appreciable quantity in the sulphides in submicroscopic or solid solution forms.

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MHH:GHB.

Figure 1.

Photomicrograph of polished section from Sample No. 2, showing irregular stringer of pyrrhotite (white) (actually the pyrrhotite is penetrated with alteration veinlets of marcasite not shown at this magnification) and grains of native gold (yellow). Most of the gangue (grey) is quartz but disseminated calcite may be seen as lighter grey grains. Pits in the sections surface are black.

Magnification, X60.

MHH:GHB.