

The contrast between the present flow-sheet and that first proposed (see page 581, Oct. 1st, 1909) is marked. At first it was thought necessary to design two sections, one for low grade ore and one for high grade. As it stands at present, the mill is a unit, capable of sampling any class of Cobalt ore. The system of sampling has been modified, and the whole flow-sheet has been adapted to the changing conditions of the camp.

Relatively little of low grade ore is now being shipped from Cobalt. More and more is being concentrated. Thus scrupulous care is needed in handling satisfactorily the high grade ore sent to the sampler.

Every established mining camp that sends its products to outside smelters should possess an independent sampler. Both the shipper and the buyer benefit thereby.

RESEARCH WORK ON CERTAIN NOVA SCOTIAN GOLD ORES.

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During the summer of 1910 I spent several weeks studying a number of the anticlinal gold districts of Nova Scotia, and since returning to my laboratory at Bangor, Maine, I have been engaged in a continuous series of investigations, both physical and chemical, of quartz, associated minerals, ores, slates, and quartzites, all of which were personally secured by me in Nova Scotia or in two instances were furnished me through the kindness of Mr. Holman.

This original work has been supplemented by a study of the geological literature of Nova Scotia, including a set of the maps of the various gold districts furnished me through the kindness of Mr. E. R. Fari-bault, and from a study of these maps alone it is possible to arrive at some very valuable conclusions.

My investigations were conducted on behalf of the Caribou Gold Mines, for which I was retained by Mr. C. Vey Holman, president of the Caribou Gold Mines and state geologist of Maine, and Mr. Holman has generously desired to place such of this privately acquired information as may tend to prove of value in aiding the future mining development of the province, at the disposal of its mining fraternity.

Discovery of Platinum.

Five weeks in all were spent in Nova Scotia, much of this time being passed in the Caribou district, but several other districts on anticlinal folds were studied. The names of these other districts cannot at present be mentioned, although it is permitted me to say that on a mine dump in one of these districts several small crystals of sperrylite, ($PtAs_2$), a native platinum arsenide, were found by me. Though not actually taken from rock in place, there is every reason to believe that the material on the dump actually represented material from an adjoining vein. The gangue mineral containing the sperrylite was quartz, and the chief associated mineral was arsenopyrite, and a magnesia-bearing dike was in proximity. Laboratory tests were applied to this material after returning to Bangor, and the presence of platinum and arsenic in the crystals verified by positive chemical tests. This appears to be the first recorded discovery of platinum in Nova Scotia, but there is no reason why it should not be found elsewhere in the province associated with metallic sulphides such as covellite, tetrahedrite, bournonite, chalcopyrite, arsenopyrite, or other sulphide ores, or as an irregular dissemination in peridotite, pyrox-

enite, gabbro, syenite, or various basic eruptives, or in serpentine associated with chromite, the presence of which latter may be considered quite a promising indication of platinum. Reference to the discovery of selenium and tellurium in Nova Scotian ores will be found on a subsequent page.

Formation of Gold-bearing Rocks and Veins, and Deposition of Ore.

A careful consideration of all the data at hand regarding the origin of the Meguma series of gold-bearing rocks of Nova Scotia, would seem to indicate that it is of pre-Cambrian origin and quite probably Algonkian. (Cf. Van Hise and Leith, Pre-Cambrian Geology of North America, Bulletin No. 360, U. S. Geol. Surv., p. 512). The Meguma series has been divided by Prof. Chapman into a lower or quartzite group, the Goldenville formation, and an upper or slate group, the Halifax formation.

It seems very probable that the quartzites (Goldenville formation) were deposited as sediments in shallow water under the influence of strong waves and currents acting quite constantly for long periods of time, with alternating shorter periods of temporarily deeper waters, and slacker currents. Thus we had deposited coarse sandy material alternating with lesser deposits of very fine clayey sediments. When the metamorphic agencies acted on these later on, thick strata of quartzite with intercalated thin beds of slate were formed.

Following the deposition of these sandy sediments, there occurred a very abrupt change in the conditions, and there was a long time of existing deep waters, very moderate currents, and possibly sedimentary material originating in a more distant land mass was being carried and deposited. This material was deposited as a fine clayey mass quite different in appearance from the coarser sediments beneath. Later this clay sediment became the Halifax series of slates, sharply contrasted in appearance and composition with the Goldenville formation beneath. At far later geologic periods other sediments were formed which we will not consider in this paper.

After deposition of the sediments, a gradual uplifting of them took place. A new land mass was reared above the water, and ultimately crumpled into a series of parallel anticlinal folds by a powerful, uniform, long-continued pressure exerted from the south. More or less coincidentally heat was developed and hot water, bearing silica in solution, permeated the sands of the Goldenville sediments, and by the deposition of

*Abstract of paper read before the Mining Society of Nova Scotia.