

## ECONOMIC MINERALS AND MINING INDUSTRIES IN CANADA

One of the most useful publications issued by the Mines Branch is the bulletin bearing the above title. It was compiled under the direction of Mr. J. McLeish, Chief of the Division of Mineral Resources and Statistics, who has had the co-operation of several officers of the Mines Branch staff; more particularly Messrs. C. T. Cartwright, L. H. Cole, H. Frechette, H. S. deSchmid, and A. W. G. Wilson; and the objective has been to present in a popular form a brief sketch of the more important economic minerals, and of the mining and metallurgical industries of Canada.

We have found much valuable information in this bulletin and have in recent issues published several short extracts concerning many minerals mined in Canada. We desire to give credit to the staff of the Mines Branch for these concise statements and to recommend our readers to apply to the Director of the Mines Branch for a copy of the bulletin.

## MINERAL PRODUCTION OF CANADA IN THE YEAR 1913

In this issue we publish extracts from the preliminary reports for 1913 of the Department of Mines, Canada and the Bureau of Mines, Ontario. In our January 15 issue we published a report by Mr. E. Jacobs on mining in British Columbia during 1913, and a report by Mr. Theo. Denis on mining in Quebec. These reports all show that mining in Canada is a very important industry and that the industry is growing. The preliminary reports of Mr. J. McLeish for the Department of Mines, Canada, Mr. T. W. Gibson for the Bureau of Mines, Ontario, Mr. Theo. C. Denis for the Department of Mines, Quebec, were read at the recent meeting of the Canadian Mining Institute. The preliminary report of Mr. W. F. Robertson, for the Department of Mines of British Columbia was published several weeks ago. Copies can be obtained on application to the several departments.

## CONCENTRATION AND CYANIDATION OF COBALT SILVER ORES

At the recent meeting of the Canadian Mining Institute two papers presented by Mr. James Johnston, of the Nipissing Mining Company, and Mr. Fraser Reid, of the Coniagas Company, showed that there is considerable room for discussion as to the best method of recovering the silver from low grade Cobalt silver ores. Mr. Johnston showed that excellent results are being obtained by cyanidation at the Nipissing plant. Mr. Reid showed that equally good results are being obtained by straight concentration at the Coniagas plant.

Mr. Johnston's paper has been published in bulletins

of the Canadian Mining Institute and the American Institute of Mining Engineers. The description of the Nipissing cyanide plant was published in our February 1st issue, and part of this paper is published in this issue. The paper is an excellent description of the plant and methods. The basis for comparison of concentration and cyanide methods is, however, not clear. Mr. Johnston presents figures comparing a concentration mill giving an 80 per cent. extraction and costing \$160,000 with a cyanide plant giving a 90 per cent. extraction and costing \$250,000. He concludes that on ore assaying 30.99 oz. per ton the cyanide plant yields 28.88 oz. silver at a profit of \$12.09 and the concentration plant 25.67 oz. at a profit of \$10.50 per ton.

These estimates, so far as the cyanide plant is concerned, have been found well within the mark, the results obtained being a 92 to 93 per cent. extraction on a 26 oz. ore at a cost of less than \$3.00 per ton, a plant costing \$254,839.52, treating 244 tons per day.

On the other hand, however, there has been no similar check on the estimates regarding the concentration plant. Mr. Reid's paper will show that actual results obtained are better than the estimate. The operation of the Coniagas, Northern Customs and other mills using straight concentration methods has been brought to a high degree of perfection.

Early attempts to use cyanide methods were made by the Buffalo, O'Brien and Nova Scotia mining companies. These were regarded as only fairly successful. At the Buffalo only slimes were treated. At the Nova Scotia a combined amalgamation and cyanidation method was used.

It was at the O'Brien plant that aluminum was first used at Cobalt for precipitating silver. In 1906 S. F. Kirkpatrick, Professor of Metallurgy, School of Mining, Kingston, undertook some experiments, with the assistance of the Ontario Bureau of Mines, on the ores of the Cobalt district in order to develop a commercial process of treating them and saving the by-products. It was found that the ores were fairly amenable to cyanidation even when they contained 2,000 to 4,000 oz. silver per ton; but the cyanide consumption was heavy, and zinc was not an ideal precipitant, tending to foul the solution and give a bullion below market requirements. Mr. Kirkpatrick found that aluminum could be used satisfactorily, the difficulties experienced by earlier experimenters being overcome by using the metal in the form of a dust. The process was introduced by the Deloro Mining & Reduction Co., in 1908, and has been in use ever since.

In the Nipissing plant, described by Mr. Johnston, this feature of the O'Brien plant has been adopted. A distinctly new feature is the desulphurizing process devised by Mr. J. S. Denny. These two features, the aluminum dust precipitation and the desulphurizing by aluminum, are important factors in the cyanide process at Cobalt.