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## NEW METHOD OF CYANIDING FOR RECOVERY OF GOLD AND SILVER.

A feature of interest to gold and silver miners was brought before the meeting of the Canadian Mining Institute in December last at Vancouver during an address on New Methods in Hydrometallurgy of Gold and Silver by Mr. Horace Freeman.

Mr. Freeman's paper dealt with two new developments in this direction, the first describing a process of manufacturing cyanide from atmospheric nitrogen which is now in operation on a large scale at Niagara Falls, Ontario. The product of this plant, which was built under Mr. Freeman's supervision and embracing his patents, has proven much cheaper and more efficient than the article imported hitherto from Germany. Canadian mines are thus independent of any outside source of supply of this important solvent of the precious metals. A considerable export trade has also been built up from the Canadian plant of the American Cyanamid Company, which operates this process and is the only successful one extracting nitrogen from the air on a commercial scale in North America.

The second part of Mr. Freeman's address was devoted to a description of a process recently developed by him for the more efficient recovery of gold and silver from cyanide solutions and for the regeneration of the cyanide in order that it may be used again. A short description of the process now used was given briefly as follows: The rock containing the precious metal is finely ground and is then treated with a solution of cyanide. The metal dissolves in the cyanide and is separated from the rock by settling and filtering. In order now to recover the precious metals from this solution finely powdered metallic zinc is added causing the gold and silver to separate out as a black sludge, which must then pass through a lengthy refining operation before it appears in the form of bars of bullion. During this process the cyanide is lost largely because it enters into combination with the zinc, necessitating an excessive consumption of that metal. In order, therefore, to make the solution available for treating further quantities of ore, more cyanide must be added.

Mr. Freeman's process, on the other hand, consists in treating the pregnant solutions with an alloy of metallic sodium and lead, whereby the sodium enters the solution and throws out the gold and silver. Sodium cyanide is thus reformed and the precious metal is mixed with the lead, which does not dissolve in the solution. In order now to obtain a bullion free from base metals the mixture of gold, silver and lead is simply dried and cupelled, whereby the lead oxidizes and carries away any base metals, leaving clean bullion in the one operation. The barren solution is now ready for use again without the necessity of adding further quantities of cyanide.

It is anticipated that the costs of operating the cyanide process will be greatly reduced by using the cheaper cyanide described above together with the regenerating method and so lead to a greatly extended use of the process.

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