

copper from ores containing purple copper or copper pyrites, without any admixture of iron pyrites. Although in some respects very successful, these experiments still left much to be wished for. Ores deficient in sulphur could not at all be efficiently treated. Even the pyritous ores required to be mixed with a large quantity of iron oxide in order to the complete removal of the copper. This, although favorable to the extraction, largely increased the bulk of material to be treated, and consequently the cost of calcining.

While visiting the Bruce and Wellington mines, on Lake Huron, last summer, I was forcibly reminded of the vital importance to them of an easy and economical process for extracting the copper of their ores, which consist, almost exclusively, of copper pyrites in a matrix of quartz. It may be safely assumed that one-fourth to one-third of the copper in these ores is lost in the present system of ore dressing. Of equal importance would such an economical humid process be to the Harvey Hill mines, in Megantic county, Quebec, where the ores are also too poor in sulphur to be advantageously treated by any known extraction process. It occurred to me that the difficulty, caused by the scarcity or absence of sulphur, might be overcome by furnishing the ore with sulphuric acid in the shape of calcined sulphate of iron, giving it at the same time the proper proportion of common salt, from the decomposition of which by the sulphate of iron chlorine might be developed for the formation of proto-chloride of copper. It next occurred to me that on precipitating the copper from the solution of the latter salt by metallic iron, a solution of proto-chloride of iron would result, which, on evaporation to dryness, would furnish an effective re-agent for treating fresh portions of ore. And, lastly, it appeared to me, that an easy method of procuring this proto-chloride of iron in the first instance would be to dissolve together equivalent quantities of green vitriol and common salt, crystallise out the sulphate of soda, and evaporate the mother liquor to dryness. The proto-chloride during evaporation might become partially oxidized, but this would not lessen its effectiveness in the proposed application.

At the first opportunity I proceeded to ascertain by experiment, in the laboratory, whether these ideas were capable of being applied successfully, and the following is an account of some of the trials made. Through the kindness of James Bennetts, Esq., Manager of the West Canada Company's works on Lake Huron, I