

ollowed at Fol-
o place of the
in heaps, and

the Rhine, the
ught into con-
oxidized ores
ed on for sev-

ite of soda,
ually used for

er 2, is the
ing in rever-
orks and in
the extrac-
f the copper
ains in the
ment.

as the fore-
d by them-
he residues
n calcined.
ses the con-
hich would
amount of
dering the
but there
ed with the

, and then
amount of
e calcined
is present,
h I have
y be said
s,—Bank-

ly in this
emperature
of a sub-

chloride. The latter is condensed and treated further. This process labors under the same disadvantage as Longmaid's with regard to copper in the residues.

Among the various processes just enumerated, those which are most advantageous in economical respects, and which are best suited to the local circumstances of Canada, are evidently those in which few or no extraneous substances are required to render the copper soluble, and in which the acid necessary to form the soluble salt of copper is derived from the oxidation of elements present in the ore itself. At first sight the simplest and possibly most efficient means of rendering the copper soluble would appear to be that of merely calcining the sulphuret ores and lixiviating the product. Almost all such ores, whether containing copper glance, purple copper, or copper pyrites, certainly yield by such treatment more or less of their copper in a soluble state; but the amount of the metal so yielded in proportion to the quantity contained in the ore, is invariably very small indeed. Even with ores which contain a very considerable excess of sulphur, the calcination must be very carefully conducted if the extraction is at all to approach completeness. In the first stage of calcination sulphurous acid is given off; in the second sulphate of iron is formed; during the third stage it is necessary to heat the charge rather strongly in order to decompose the sulphate of iron, and transfer its sulphuric acid to the oxide of copper. In so doing there is a danger of too much heat being applied, and even of the sulphate of copper being decomposed. It is therefore extremely difficult to regulate this process, and the disadvantages of its being performed at too low a temperature consist not only in the extraction being imperfect, but also in the deposition of basic salts of iron while the copper is being precipitated. In this way the latter becomes so contaminated that many specimens of copper produced by cementation do not yield by assay over 60 per cent of the pure metal.

These disadvantages are to a very great extent removed by the use of common salt. By its action the sulphate of iron first formed is decomposed at a low temperature, and sulphate of soda and chloride of iron produced. The latter seems to be easily decomposed, and its chlorine transferred, in part at least, to the copper. On treating the calcined product with water, a solution is obtained which is very pure, often containing merely a trace of iron, in which case the deposition of basic iron salts becomes impossible. But although common salt may remedy the defects here indicated,