2. Closely allied to this process is the one still followed at Foldal in Norway, where an artificial oxidation takes the place of the natural oxidation of similar ores. They are roasted in heaps, and then lixiviated.

3. At Stadtbergen in Westphalia, and at Linz on the Rhine, the vapors evolved in roasting various sulphurets are brought into contact with poor ores containing malachite, and with oxidized ores containing cupric oxide. After these have been acted on for several weeks, they are lixiviated in the usual manner.

4. Dilute muriatic and sulphuric acids, hyposulphite of soda, and even ammonia, have been proposed and occasionally used for dissolving out the copper of oxidized ores.

5. Much resembling the process mentioned under 2, is the method in which the oxidation is performed by calcining in reverberatory furnaces. At various Russian smelting works and in Mansfeldt this process is applied, but in no case does the extraction appear to be at all complete. A large quantity of the copper is removed in the soluble form, but fully as much remains in the residue, which is subject to further metallurgical treatment.

6. The first stage of Bankart's process is the same as the foregoing ones. Rich Cuban sulphurets are first calcined by themselves in reverberatory furnaces, and then lixiviated; the residues are mixed with a fresh portion of raw ore and again calcined. The peroxide of iron contained in the calcined ore causes the conversion into sulphuric acid of a portion of sulphur which would otherwise escape as sulphurous acid. The additional amount of sulphuric acid thus formed contributes of course to rendering the copper soluble. This principle is doubtless correct, but there appear to have been other circumstances which interfered with the practical application of the process.

7. Longmaid calcines pyritous ores with common salt, and then lixiviates. In his process there is doubtless a larger amount of copper rendered soluble than when the sulphurets are calcined alone; but the residues, even when abundance of sulphur is present, are far from being free from copper. The process which I have adopted in the experiments about to be described may be said to be a combination of the two last mentioned methods,—Bankart's and Longmaid's.

8. Henderson's process differs from Longmaid's merely in this particular, that the calcination is performed at such a temperature as to cause the volatilization of the copper in the form of a sub-