

There is a good deal of hornblend intimately mixed with these ores. Microscopic examinations shewed a little more free silica in the Paxton than the other ores.

The minerals occurring with the ores in this district are calcite, hornblend, actinolite, augite, felspar, mica, iron pyrites, quartz, and I found specimens of olevine, scapolite and serpentine.

To obtain a true estimate of the value of the above ores, we will consider those of Sweden which most closely resemble them, and which are at the same time recognized as equal to any in the world.

In a very interesting pamphlet on the actual state of the iron industry in Sweden, written in 1878, by Richard Akerman, Professor at the School of Mines of Stockholm, and one of the best known metallurgists of the day, a very great number of analyses of Swedish iron ores are given, nearly 800. The average ore as shewn by these contains from 45 to 50 % metallic iron, and the majority requires calcining to remove the sulphur. Mr. Akerman states that some calcareous ores, especially useful for mixing with the silicious ores, are mined as low as 20 % iron. This pamphlet also tells us that in Sweden, with a smaller population than ourselves, 484 mines were worked in 1876, from which 787,950 tons of ore were raised. From the above facts it is evident that our magnetic iron ores are equal in composition to the celebrated Swedish ore, and they are similar in occurrence. Therefore, notwithstanding the fact that it does not pay to ship under 50 % metallic iron to the United States, the majority of Swedish ore would be excluded- by which fact we can rest assured that our magnetic iron ores must soon be much more extensively worked; which, with the aid of the diamond borer for exploration and steam mills, will, without doubt, be most successfully accomplished.

The Cleveland and Pittsburg smelters are looking about most anxiously for new supplies of ores, as those from Lake Superior are becoming very expensive. They are even meditating opening up part of West Virginia with a Railroad 300 miles long, to get at a low grade ore. We have the advantages to offer them of better ore and cheap return freight in coal vessels to Cleveland.

A few words on the question of iron smelting with charcoal I thought would not be amiss in connection with this paper.