When the proportion of phosphoric acid exceeds one or two pr. ct., it produces what is called *cold short iron.* It is very readily smelted, and, when mixed in small proportions, promotes the fusibility of other ores, producing a metal suited for smooth and handsome castings.

Bog iron ore abounds in the southern counties of this State, more especially those on the Eastern Shore. It exists in great quantity along the Nasseungo creek, and other affluents of the Pocomoke river. In fact, it is extensively distributed throughout large portions of Worcester and Somerset counties, and also, to some extent, in Caroline and in the eastern part of Dorchester.

It was formerly smelted at Nasseungo furnace, and although pig iron was readily and cheaply produced, yet the brittle character of the metal rendered it unsaleable, and the operation was suspended.

I have not yet had an opportunity to explore that part of the State, but what I saw of these ores a number of years ago, induced the belief that some of them contain very large proportions of phosphoric acid, whilst from others this substance was nearly or altogether absent.

Although so injurious to the iron smelter, phosphoric acid, as we have seen, is an absolute necessity to the former, and I consider it a duty to do all in my power to obtain it at the lowest rates, and, if possible, within our own State. When I made an attempt at a special examination of these ores, with reference to their phosphoric acid, both in the ore and in the subjacent clay, I was informed, by those familiar with the ore deposits, that the water was too high for my purposes. I was promised to have sent me a barrel of the ore from two of the largest deposits, but they did not come to hand. I propose to take an early opportunity to investigate them in all their relations.

Circumstances which have of late come to light, give an increased importance to these deposits. Phosphate of iron, as I have before stated, has been proven to be soluble in alcaline silicates, which must exist in every soil in which grass or grain can grow. It has also been proven that oxides of iron whilst undergoing certain changes in the soil promote the formation of ammonia and carbonic acid. This will probably account for the fact of the growth of fine tobacco in a soil containing 90 pr. ct. of iron as related in chap. XVI.

2. *Brown Hematite.*

This species of iron ore presents several varieties which occur in different parts of the state. Their chemical composition is that of a peroxide of iron united with about 15 pr. ct. of water. When free from earthy impurities it contains nearly 61 pr. ct. of iron, but it always contains more or less of earthy matters, so that as used in the furnaces it usually yields from 35 to 45 pr. ct. of metal. One locality of this ore has come under my notice, in Anne Arundel county, about two miles south of Owingsville.

It exists also in considerable quantities near the edges of the metamorphic limestones in Baltimore county, and is smelted on a large scale at the Ashland and Oregon furnaces near Cockeysville.

In Carroll county it occurs in *immense quantity* in connection with the limestones (11) before mentioned. They range from the Pennsylvania line (north of Westminster) southwesterly for ten or twelve miles. Westminster lies on the eastern edge of the range. There are the ruins of an iron furnace about 2½ miles southwest of Westminster, on the property of Mr. Vanbibber, where these ores were smelted many years ago. The Western Maryland railroad will reach this range of ore at Westminster and pass through it for several miles. This will afford every facility for transporting the ore or the iron that may be made therefrom.

There are also hematitic ores still further southwest on Parr's ridge, which I have not yet examined.

Near the western base of the Catoctin mountain there are very important and extensive deposits of this kind of ore, from which the supplies for the Catoctic furnace have been drawn for about 85 years, and which is now carried on by Col. John M. Kunkle. The ore near the Point of Rocks supplied one of the furnaces of Governor Johnson during the revolutionary war. The same range extends along the Catoctin into Virginia.