Goethite \((\text{Fe}_2\text{O}_3\cdot\text{H}_2\text{O})\)

Goethite has usually not been distinguished from other hydrated iron oxides, but it appears to be present in most of the brown iron ore deposits of the region, particularly in the iron geodes that were abundant in some of the limonite mines.

Limonite \((2\text{Fe}_2\text{O}_3\cdot3\text{H}_2\text{O})\)

Hydrated iron oxides are abundant throughout the county. The term limonite is used to designate those mixtures of ferric iron minerals whose constituents have not been identified. The principal constituents are goethite, lepidocrocite, turgite, hematite, and jarosite. (Galbraith, 1937.) The brown limonite was the principal constituent in the numerous brown iron ore mines once worked but now abandoned. The miners called it brown hematite. Undoubtedly much of what has been loosely called limonite is actually goethite or lepidocrocite. It occurs in many forms. The earthy variety mixed with clay is known as ocher and has been used for paint. The shelly, stalactitic and geode varieties are common. The black varnish-like botryoidal lining of geodes and other cavities reveals a fibrous structure upon fracturing. Although this has been called limonite in the past, it probably is goethite.

Limonite is the chief coloring matter of most of the rocks of the region. The iron was originally derived from pyrite, siderite, and the various ferro-magnesian minerals of the crystalline rocks. Pseudomorphs of limonite after pyrite have been found.

A full description of the limonite ores is given in the chapter on Mineral Resources.

Turgite \((2\text{Fe}_2\text{O}_3\cdot\text{H}_2\text{O})\)

Turgite has been confused with others of the iron oxides. Posnjak and Merwin * make the statement that "the fibrous mineral turgite is variable in composition and considerable evidence is given that it probably represents solid solutions of goethite with hematite together with enclosed and absorbed water."

Reddish iron oxides are not uncommon in the numerous limonite deposits in Lehigh County. Many of these specimens have been called turgite.

Psilomelane \((\text{MnO}_2 + \text{impurities})\)

Most of the limonite ores of the region contain some manganese and in a few places considerable percentages of it. The ocher in some localities contains considerable manganese. Although some of the manganese in the iron ores may be in the form of pyrolusite, it seems that more exists as psilomelane and of the variety known as wad.

Further descriptions are given in the discussion of manganese ore in the chapter on Mineral Resources.

Pyrolusite \((\text{MnO}_2)\)

Dendrites of pyrolusite, resembling ferns and frequently so designated, are common in the rocks of the region. Extending in from the cracks in the rocks the dendrites are very conspicuous, especially in some of the limestones.