In a thin-section of the material whose grain size is of the order of several microns in diameter, a few grain-thicknesses are necessary to build up the thin-section which is close to thirty microns thick.

Between crossed nicols two types of material are evident. Brownish material appears in a network of anastamosing wavy bands whereas blacker material lies as elongated areas within the network. The former is interpreted to be the more intensely broken material which is similar in appearance to the crushed areas bordering the fractures in the coarser grained sphalerite. The latter are thought to be "augens" of sphalerite which escaped the minute fracturing of the neighboring material. If this is a correct interpretation, it might be preferable to speak of these specimens of sphalerite as being mylonitized and possessing flaser structure, to indicate the incomplete crushing.

Pyrite is abundantly distributed through the primary ore. The great majority of the pyrite is present as irregular masses or as euhedral to subhedral crystals which were deposited on sphalerite layers in fissures or as replacements of sphalerite. In some places pyrite has been fractured and the fractures filled with sphalerite similar in every respect to the primary vein sphalerite. These relations indicate the deposition of pyrite both prior to and after the formation of some of the sphalerite. (Fraser, 1935.)

**Description by R. D. Butler**

Microscopic evidences of deformation of the Friedensville deposit are numerous, and formation of the fine-grained cherty sphalerite is thought to have been caused by mylonitization. Evidence of inheritance of texture from the country rock is lacking. There was negligible deformational recrystallization, but aided by solvents, recrystallization of sphalerite has occurred in certain of the deformed facies, and a second generation of pyrite is associated with the recrystallized sphalerite. The paragenesis of the sulphide minerals is: (1) pyrite, (2) sphalerite; and where deformation occurred, (3) pyrite and (4) recrystallized sphalerite may be present. (Butler, 1935.)

Massive pyrite occurs with the sphalerite, and in many places the sulphide ore consists mainly of pyrite. The large quantity of pyrite has been one of the most objectionable features of the sulphide ore. Crystals of pyrite are extremely rare within the ore, but small cubes and pseudomorphs of limonite after pyrite are common in the limestone close to the ore bodies. The ease with which some of the massive iron sulphide decomposes suggests the presence of considerable marcasite, although this has not been definitely determined. Melanterite is common as an efflorescence on the masses of pyrite.

Greenockite (cadmium sulphide), which occurs in many places in association with sphalerite, is found in the Friedensville mines, but only in the amorphous form. It occurs as yellow, greenish-yellow, or orange-colored earthy incrustations on sphalerite, calamine, or limestone. Roepper also found it in clayey material resulting from the decomposition of pyritiferous limestone. A specimen of this material which he analyzed contained 5 percent of cadmium. The greenockite is said to have been separated from the ore at the South Bethlehem furnaces, but this is doubtful.

Goslarite, the hydrous sulphate of zinc, also known as white vitriol, has been obtained in the Friedensville mines in small quantities. It is formed by the oxidation of sphalerite and occurs as incrustations on the sphalerite and as fine acicular white crystals.