some calamine was found at a depth of 975 feet. On the other hand, some sulphide ore was found only a few feet from the surface in the Old Hartman and Correll mines. This difference was undoubtedly due to meteoric waters bearing oxygen moving downward, along certain strata with greater freedom, and changing the sphalerite to calamine or smithsonite. The vertical limestone strata of the Ueberroth mine readily permitted the surface waters to pass between the bedding planes to greater depths than in the Correll and Old Hartman mines, where the beds of limestone are less steeply inclined.

The Friedensville sphalerite, or zincblende, is of a peculiar character, essentially unlike any other found in the country. In the main, it occurs as compact gray to bluish-black masses having a prominent conchoidal fracture and rarely showing any traces of crystallization. In one educational institution specimens of the compact ore from this locality were preserved in a quiz set of minerals. Few students ever identified it by eye examination. It is translucent in thin pieces and rings when struck. Much of it resembles dark blue limestone, from which it is readily distinguished, however, by its greater specific gravity. Sphalerite of a light resinous color, and well crystallized, occurred in small veins in the limestone and, less commonly, small honey-yellowish crystals were found on the sides of cavities in the limestone. As sent to the works, the sulphide ore contained from 35 to 40 percent zinc. The noncrystalline structure of much of the ore and the presence of pyrite render its concentration difficult.

In 1935 D. M. Fraser and R. D. Butler presented independent results of their microscopic examination of the Friedensville sphalerite. The following paragraphs are quoted from their articles:

**Description by D. M. Fraser**

Sphalerite appears in two distinct types. One, the more common blackjack variety, is coarse-grained and massive with the broken surfaces showing cleavage faces with random orientation. The other type is chert- or flint-like in appearance, ranging from gray-brown to black in color, is dense, massive, and breaks with a conchoidal fracture.

In thin-section the coarser-grained variety is dark brown in color and shows a complete network of fractures traversing the mineral. Between crossed nicols it is noted that the mineral has a clouded appearance, not only adjacent to the fracture planes, but also for a distance inward equal to several times the width of the apparent fracture zone. Also when the clearer, less prominently fractured parts of the sphalerite are examined, it is found that their diaphanely is conditioned by countless smaller breaks which appear to be mainly cleavage planes and by numerous granule or rod-like inclusions having diameters of only a few microns. Some of these may be cadmium, probably in the form of the sulphide, but they have not been proven to be such. X-ray studies in progress at the present time may give more definite information on this point.

Inasmuch as the clearer, more yellowish sphalerite found in the oxidized ore shows numerous cleavage cracks but is lacking in inclusions and in the network of fractures with crushed borders, it is suggested that the black-jack variety found in the primary ore may be less diaphanous and of a darker color due to these features as well as its probable higher iron content.

In plane polarized light this yellow-brown to dark brown sphalerite is seen to be a granular mass wherein the individual grains are more or less indefinable. This is due to the presence of fractures even in what are apparently the more distinct grains, and also to the overlapping of grains.