Cerium was not detected, but was probably present inasmuch as it is usually noted in analyses of this mineral.

The ores of the Friedensville region are remarkably free from objectionable minerals such as those containing lead, arsenic, and antimony, and for that reason the spelter and oxide made from them always commanded the highest prices. The following editorial in the Engineering and Mining Journal of June 12, 1886, is interesting in this connection:

"Lehigh zinc, or spelter, made from the ores of the Friedensville mines, near Bethlehem, Pa., has a world-wide reputation as the purest zinc in the world, and as specially adapted for use in cartridge making; in fact, it is the only zinc yet known that will make a cartridge that will never expand and stick in the gun in firing. The Russian and Turkish governments long ago recognized this fact, and during their last war had expert commissions in this country testing the metal made into cartridges for them, and they even brought over ores from other countries to treat here, in order to determine whether the high quality was due to any special treatment here. It was fully demonstrated that Lehigh zinc is better than any other because the ore is purer, containing neither arsenic nor lead, and that, with Lake copper, it formed the best cartridge metal yet made. Other European nations have recognized the same fact by buying here; but the English government, with its accustomed 'deliberateness,' could not accept this fact without expensive experience of its own. Fortunately this experience came in a little, instead of a great, war. In the Sudan campaign, it is said to appear beyond doubt from evidence collected by Lord Charles Beresford, that in one action with the Arabs twenty-five per cent of the rifles were at one time useless by the jamming of the Boxer cartridge, and as this, no doubt, greatly increased the losses of the British, and lacked but little of annihilating the band of heroes who fought their way forward in their vain effort to rescue General Gordon, it has at last attracted the attention of the government, and a contract has been made for a large amount of Bergen Point Company's Lehigh spelter, with which new cartridges are now being made. The price paid is said to be the equivalent of 83½ cents a pound.

"All the famous mines producing this exceptional ore are now owned by the Bergen Point Zinc Co., which has now made contracts to send 2,000 tons of this ore to Belgium for treatment."

Ore Occurrence

The Friedensville zinc deposits are almost in the middle of the Saucon Valley, which is of irregular shape and about 8 miles long and 2½ miles wide. It is floored by Cambrian and Ordovician limestones and surrounded by hills of pre-Cambrian gneisses that rise from 400 to 600 feet above the comparatively flat valley floor. The valley represents a down-faulted block (called a graben) of limestone that normally should be about 4,000 feet above the gneiss. This profound faulting is evidenced on both sides of the valley by patches of Jacksonburg limestone brought into contact with the gneiss. One of these patches is near Lanark and the other at the northern base of Saucon Hill. In both places the entire Cambrian series of strata and the Beekmantown limestones of Ordovician age have been faulted out. During the deformation that resulted in this great displacement, and in part by both earlier and later disturbances, the strata of the Saucon Valley have been folded and faulted in a complicated manner. In most places there are insufficient outcrops for the determination of the actual structures or the exact boundaries of the different geologic formations. Core drilling by the New Jersey Zinc Co. has furnished