on each side, the one furnishing direct connection with New York and the other with Philadelphia. The furnaces, with a capacity of 2,000 tons per annum, were completed October 12, 1853, and on the following day zinc oxide was produced from the Friedensville ore by Wetherill’s “furnaces” and “tower” processes, combined with Richard Jones’ “bag” process of collecting. This process was described by M. S. Henry in 1860, as follows:

The entire process of manufacture practised here consists, in effect, of the following operations, viz.:

The ore, pulverized and mixed with coal, is strongly heated in furnaces which are fully supplied with air; the metallic zinc which is thereby extracted in the form of vapor, is instantly oxidized, and the oxide of zinc thus formed, being an exceedingly light powder, is carried immediately from the furnaces by a strong artificial draft, together with large quantities of gases, and such ashes, etc., as are light enough to float in a current of air. These ashes are taken first and separated and deposited with the coarser particles of zinc oxide in rooms provided for the purpose; a part of the pure zinc oxide is afterward caught in chambers, and finally the gases are all strained out by an immense apparatus of flannel and muslin bags, to the inner surface of which the last and finest of the zinc oxide adheres, whence it is removed at proper intervals.

The zinc oxide which is thus collected in the chambers and bags, is in the form of a very white, fine, and flocculent powder, which is compressed by proper apparatus into much smaller bulk, and is then carefully packed into strong, tight, paper-lined casks.

The manufacture of zinc oxide from the Friedensville ore was the second successful attempt of the kind in the United States. In 1852 the New Jersey Zinc Co. in their works at Newark, N. J., had begun the manufacture of zinc oxide on a commercial scale. Their output for 1852 was 1,083 tons, and for 1853 it was 1,805 tons,—altogether only about 2,500 tons had been produced in the country before the beginning of operations at Friedensville.

On May 2, 1855, by an act of the Legislature, the Pennsylvania & Lehigh Zinc Co., with a capitalization of $1,000,000, and composed of the same men who had already begun operations, was incorporated “for the purpose of mining zinc ore in the counties of Lehigh and Northampton, of manufacturing zinc paint, metallic zinc, and other articles from said ore, and of vending the same.”

Attempts to produce spelter were early made, and between 1854 and 1859 Wetherill carried on a series of experiments for that purpose. He succeeded in producing spelter but the process he developed was not economical and the experiments were discontinued. His method was to heat the ore in the open furnace and then draw the vaporized oxide through incandescent anthracite to reduce the oxide. He made a few tons in this way.

In 1857 Matthiessen and Hegeler, two young men fresh from the School of Mines of Freiberg, Saxony, obtained permission to experiment in the plant which the company had erected at Friedensville. They were successful in making spelter but were not able to make satisfactory terms with the company for the erection of a plant of practicable size. The low price of zinc oxide about this time and the reduced market may have influenced the decision.

In 1859 Joseph Wharton leased the furnaces and began the erection of spelter works of the Belgian type, with retorts made of materials