blast-furnace is supposed to have been first used in Belgium, and to have been introduced into England in 1558. Next came the use of bituminous coal, urged with a blast of cold air. But it was not until 1829 that Neilson, an Englishman, conceived the idea of heating the air of the blast, and carried it out at the Muirkirk furnaces. In that year he obtained a patent for this process, and found that he could from the same quantity of fuel make three times as much iron. His patent made him very rich: in one single case of infringement he received a cheque for damages for one hundred and fifty thousand pounds. In his method, however, he used an extra fire for heating the air of his blast. In 1837 the idea of heating the air for the blast by the gases generated in the process was first practically introduced by M. Faber Dufour at Wasseralfingen in the kingdom of Württemburg.

In this country, charcoal was at first used universally for smelting iron, anthracite coal being considered unfit for the purpose. In 1820 an unsuccessful attempt to use it was made at Mauch Chunk. In 1833, Frederick W. Geisenhainer of Schuylkill obtained a patent for the use of the hot blast with anthracite, and in 1835 produced the first iron made with this process. In 1841 C. E. Detmold adapted the consumption of the gases produced by the smelting to the use of anthracite; and since then it has become quite general, and has caused an almost incalculable saving to the community in the price of iron.

The view of the engines which pump the blast will give an idea of the immense power which the Phoenix company has at command. Twice every day the furnace is tapped, and the stream of liquid iron flows out into moulds formed in the sand, making the iron into pigs — so called from a fancied resemblance to the form of these animals. This makes the first process, and in many smelting establishments this is all that is done, the iron in this form being sold and entering into the general consumption.

The next process is "boiling," which is a modification of "puddling," and is generally used in the best iron-works in this country. The process of puddling was invented by Henry Cort, an Englishman, and patented by him in 1783 and 1784, as a new process for "shingling, welding, and manufacturing iron and steel into bars, plates, and rods of purer quality and in larger quantity than heretofore, by a more effectual application of fire and machinery." For this invention Cort has been called "the father of the iron-trade of the British nation," and it is estimated that his invention has, during this century, given employment to six millions of persons, and increased the wealth of Great Britain by three thousand millions of dollars. In his experiments for perfecting his process Mr. Cort spent his fortune, and though it proved so valuable, he died poor, having been involved by the government in a lawsuit concerning his patent, which beggared him. Six years before