

them in furnaces best adapted for their production, namely, the electric steel furnace.

The progress made in the application of electricity to the production of pig iron has been much slower than in the manufacture of steel, since it was feasible only in countries possessing water-powers which could be developed at a reasonable figure. The central provinces of Canada are in this position because they possess the ore, the fluxes and the needed water-powers.

With a view of testing the feasibility of introducing the electric smelting of iron ores into these Provinces, the Dominion Government authorized the making of experiments with Canadian ores. It was not alone proven by these experiments that excellent pig iron could be produced in the electric furnace, but the remarkable discovery was made that, from a refractory ore high in sulphur, a pig iron containing only 0.005 % of sulphur could be produced. This is an exceedingly important result, since, by this new process, the large number of sulphurous magnetite deposits which abound in Canada, and which have hitherto been useless, are now rendered available for the production of high grade pig iron and steel. The world's supply of useful iron ores will thus be greatly increased by this electro-thermic process of smelting. The experiments made under the auspices of the Dominion Government at Sault Ste. Marie have been productive of another important result. Roasted nickeliferous pyrrhotite, carrying 2% of sulphur, has been smelted in the electric furnace into a pig iron virtually free from sulphur and containing from 3 to 4% of nickel. About 165 tons of this nickel iron were produced. This is the first instance in the history of metallurgy where the iron content of the pyrrhotite has been saved. Iron pyrites cinders—the sulphurous iron residue of the roasting of iron pyrites in the manufacture of sulphuric acid—which so far have been useless, may now be smelted by the electric process into excellent pig iron. These two instances are brilliant illustrations of the conservation of our iron ore resources.

Immediately after the publication of the results of our experiments at Sault Ste. Marie, Sweden—which has abundance of excellent iron ore and numerous water-powers, but, like Ontario and Quebec, lacks metallurgical fuel—was not slow to perceive the advantage which the introduction of electric smelting would prove in the development of its iron industry. Hence, without hesitation, it proceeded to take an active part in perfecting this method by the invention of a commercial furnace. In the report on the experiments at Sault Ste. Marie, definite suggestions were made as to the lines upon which a commercial furnace should be constructed; and these ideas were incorporated in a furnace designed