

Gysinge, and Kortfors, Sweden, La Praz and Livet, France, and Turin, Italy.

The chief advantages urged by Mr. Brown in favor of the electric process, is its adaptability to other ores, the simplicity of construction, the intensity of temperature, (1000° C. higher than the blast furnace) and the easy control of the regulation of the heat supply.

The processes differ in the manner in which the electric energy is employed to generate heat. The Kjellin method is by induction and electrodes are dispensed with. In the Heroult process at Kortfors and Praz, the iron and scrap is carbonized by means of carburite under the heat of the massive electrodes. The Turin or Stassano process depends on the radiation of heat from an electric arc placed above a charge, the whole apparatus being rotated during the reduction.

The most important experiments were those made by Keller at Livet. His furnace is of the resistance type and consists of two iron shafts lined with refractory material, the bases provided with carbon blocks with electrodes projecting inwards. The charge is loaded above and descends continuously, and as the shafts are connected by a lateral canal the reduced metal may be tapped. By an ingenious short-circuiting in which the molten metal plays a part, Mr. Keller enables the furnace to be worked continuously without varying the load on the alternator. His final type of furnace has a plurality of hearths and utilises the gases escaping for the preliminary drying of the charge.

The finding is very encouraging indeed. Mr. Harbord reports that—

(1.) Steel equal to the best Sheffield crucible steel can be produced by three distinct processes, at a cost considerably less.

(2.) At present, however, structural steel to compete with Siemens or Bessemer steel cannot be economically produced in the electric furnaces.

(3) Pig iron can be produced on a commercial scale at a price to compete with the blast furnace, only when electric energy is very cheap and the fuel very dear.

With the cost of electric energy \$10 per E. H. P. per year, and coke at \$7 per ton, the cost is approximately the same as in a modern blast furnace. And it must be borne in mind that as yet the electric process is in its infancy, and no direct effort at commercial competition has yet been made.