The iron and other impurities in the carbon are volatilized at the high temperature of the electric furnace and leave the carbon very pure and converted into graphite. As much as 1,000 electrical horse-power is consumed in one of these furnaces, producing a temperature of over 2,209°C.

The manufacture of carborundum, graphite, siloxicon and other products of the Acheson electric furnaces at Niagara is more fully described in Chapter vi.

Calcium carbide has been one of the most important products of the electric furnace, and its manufacture still consumes more electrical power than that of any other product. It was a financial crisis in the carbide industry that led to the electric smelting of iron, steel, and the other iron alloys.*

A few years ago the production of calcium carbide became larger than the demand, and this forced some manufacturers to turn their attention to other methods of utilizing their electric furnaces. With this object experiments were made in France and elsewhere about the year 1900 on the production of ferro-chrome,† ferro-silicon, and the other ferro alloys; and these experiments were so successful that not only have the new processes been able to compete with existing methods, but, in the case of ferro-chrome at any rate, the electric product has captured the market.

The ferros are alloys of iron, with manganese, chromium, silicon, or some other metal, and they usually contain a notable amount of carbon, being, in fact, cast iron, in which part of the iron has been replaced by another metal. Some of these are used in the production of open-hearth and Bessemer steel, and others for the production of special alloy steels. Ferro-nickel, ferro-tungsten, ferro-titanium and ferro-molybdenum have also been employed in steel making.

The carbide furnaces, which were lined with carbon, were satisfactory for the production of these carburized materials, but certain changes were necessary before they could be used for the manufacture of steel. In France, Heroult,‡ and in Sweden, Kjellin§ succeeded in adapting the furnace to the production of

*Albert Keller, The Application of the Electric Furnace in Metallurgy, Journ. Iron and Steel Inst., 1903, No. I., p. 161.

†Ibid, pp. 162 and 166-169.

‡Heroult Steel Furnace. Electrochemist and Metallurgist, vol. i. (1901), p. 196, Electrochemical Industry, vol. 1, (1902-3), pp. 63, 287, 449.

§Kjellin Steel Furnace. Electrochemist and Metallurgist, vol. i. (1901), p. 90; Electrochemical Industry, vol. i. (1902-3), pp. 141, 376, 462, 576.