

much as Moissan sometimes used, it is more than is often available for scientific experimental work. In such a furnace it is easy to produce a temperature more than double that usually obtainable by the combustion of fuel, and it is, therefore, an invaluable apparatus in the hands of the metallurgist and the chemist.

Moissan also experimented on the reduction of metals from their oxides, and found, as had, indeed, been stated by C. F. Mabery* in 1885, and by Dr. W. Borchers, in 1891, that carbon will reduce any metal from its oxide at the temperature of the electric furnace. Not only will carbon reduce any metal from its oxide, but at this high temperature carbon will also combine with the metal itself to form a carbide. The production and properties of many of these carbides were studied by Moissan.

One of the most spectacular of his experiments was the production of the diamond. This is a crystallized form of carbon, and if a suitable solvent were available it should be possible to crystallize carbon as diamonds. Moissan found such a solvent in iron and certain other metals. In the electric furnace these metals dissolve notable quantities of carbon, and by cooling them under suitable conditions Moissan was able to obtain some of the carbon as microscopical diamonds, which he isolated by dissolving the metal in acids. The present writer, in common with other experimenters, has repeated this production of the diamond, and has also seen what appeared to be a diamond, which had been found imbedded in a piece of iron or steel produced by ordinary smelting methods.

Although diamonds are not yet manufactured in ton lots, Moissan's researches on the conversion of carbon into graphite, and on the production of calcium carbide, have been followed by important commercial developments. The formation of calcium carbide in the electric furnace was independently achieved in 1893 by T. L. Willson, who developed the manufacture of the carbide on commercial lines.†

Fig. 7 illustrates the Willson carbide furnace, consisting of an iron crucible, A, the base of which has a carbon lining, D. The crucible is connected to one cable from the dynamo or transformer, while the other cable is connected to a large carbon electrode, B C, suspended within the crucible. The arc being started between C and D, the charge of powdered lime and coke is fed in

*C. F. Mabery, (*loc. cit.*).

†Industries and Iron, 1896, vol. XX., p. 122.