

same material coarsely broken, the whole being arranged in a box of fire-brick, covered with perforated tiles and opened at the ends to admit two carbon electrodes an inch and a half in diameter. Through these, the current from a dynamo-electric machine of 30 horse-power is now made to traverse the central core of carbon fragments, whereby such a temperature is at once produced therein that platinum-iridium may be instantly melted, and the most refractory oxides already named are not only fused and volatilized, but reduced to their elemental state, with formation of carbonic oxide gas.

If alumina in the form of granulated corundum is mingled with the carbon in the electric path, aluminium is rapidly liberated, being in part carried off with the escaping gas, and in part condensed in the upper layer of charcoal. In this way are obtained considerable masses of nearly pure aluminium, and others of a crystalline compound of the metal with carbon. When, however, a portion of granulated copper is placed with the corundum, an alloy of the two metals is obtained, which is probably formed in the overlying stratum, but, at the close of the operation, is found in fused masses below. In this way, there is got, after the current has passed for an hour and a half through the furnace, from four to five pounds of an alloy containing from fifteen to twenty per cent. of aluminium, and free from iron. On substituting this alloy for copper, in a second operation, a compound with over thirty per cent. of aluminium is obtained. Already, the small experimental plant, with a 30 horse-power dynamo, is producing daily over five pounds of aluminium in the form of a rich and brittle alloy, which, by suitable additions of copper, is converted into different grades of aluminium bronze. The valuable qualities of these are so well known that it is only their great cost hitherto that has prevented their more general use in the arts. They are now offered for sale at Cleveland on a basis of five dollars a pound for the contained aluminium.

The reduction of silicon is even more easy than that of aluminium. When siliceous sand, mixed with carbon, is placed in the path of the electric current, a part of it is