discovery of part of my process, I prefer to make a different kind of matrix."—*Mechanic's Magazine.*

THE MAGNESIUM LIGHT.

The *Photographic News* says:—We have on several occasions drawn attention to the metal magnesium, and have expressed a hope that some day it could be obtained in sufficient quantity, and at a sufficiently low price to render it available for the uses of the photographer. The wonderfully brilliant light which is produced by its combustion, the absolute innocuousness of the evolved products, and the ease with which the light can be obtained at any time, with no more trouble than is required to light a candle, all tend to shew that the perfection of artificial photographic light would result from the burning of this metal in a properly arranged lamp. Many attempts have been made, with varying degrees of success, to introduce an artificial light sufficiently powerful to enable photographs to be taken by its means at night, or in dark caverns, where no photography would otherwise be possible; and, in many cases, fair success has been met with. The light evolved by all such pyrotechnic mixtures is, however, very feeble, as compared with sunlight, unless an inordinate amount of material be employed; and, in this case, the fumes evolved are difficult to remove readily from the place where the light is produced; but unless they are perfectly removed their poisonous character makes them very dangerous. The magnesium light would be superior in both these respects. A thin wire simply held between the fingers can be lit as easily as a piece of paper, and burns like a candle; producing a light which is, according to Bunsen's estimate, only about thirteen times less intense than actual sunlight. No injurious fume is evolved during the combustion. A light white smoke is seen rising from the metallic flame; but this is nothing but magnesia, and is quite harmless. Moreover, the greater portion of the magnesia remains behind, as a friable solid, retaining somewhat the shape of the original wire.

We believe an arrangement of lamp for the magnesium light has already been devised. A spool of wire is gradually unwound, the end being pushed horizontally into the flame of a spirit lamp, where it ignites and continues to burn as long as it is fed with wire. It is in this feeding that the great difficulty has resided. Although it has long been well known—thanks to the labors of Deville and Caron—that magnesium could be procured even easier and at a less price than aluminum, by a slight and obvious modification of the apparatus used to prepare the latter metal, no one cared about risking the necessary outlay requisite to procure the metal in large quantities, when there was a doubt as to whether there would ever be sufficient demand to make the manufacture pay. In the *Comptes Rendus* for Feb. 23, 1857, Messrs. Deville and Caron give a detailed paper on the preparation of magnesium, in which they say that it can be prepared by the process employed for aluminum, which, however must be slightly modified, as magnesium is lighter than the scoria from which it is produced. A mixture of chloride of magnesium, chloride of sodium, and fluoride of calcium is made, and finely powdered. Sodium, in fragments, is then added and intimately mixed with the chlorides, and the whole is thrown, by means of a little iron spatula, into a red-hot earthen crucible, which is then closed with its cover. In a short time the reaction takes place. When all noise has ceased, the crucible is uncovered, and the mixture is stirred with an iron rod until the globules of magnesium are distinctly seen. The crucible is then allowed to cool, and when the saline mass is ready to solidify, it is again stirred with the iron rod, which collects the separate lumps of magnesium into one mass. The metal is then distilled in a current of hydrogen, and then fused in a flux composed of chloride of magnesium, chloride of sodium, and fluoride of calcium. The latter is added to increase the fusibility of the bath.

Messrs. Deville and Caron still worked at the subject, and more recently gave an improved process for the preparation of the metal, in which they recommend the omission of the alkaline chloride, and only use chloride of magnesium mixed with fluoride of calcium for the reduction by sodium, although they state that good results were also obtained by using a mixture of chlorides of magnesium and sodium. They give improved methods of separating the metal from the flux, and for melting and casting it into an ingot. Respecting the properties of magnesium, they describe it as a silver white metal, melting at about the same temperature as zinc, and like it boiling and distilling at a higher temperature. Like zinc it also takes fire and burns at a temperature a little above its melting point. The density of magnesium is 1·75. In the crude state it is brittle, but by distillation it is rendered pure and ductile.

SUBSTANCES FOR PREVENTING AND REMOVING BOILER INCRUSTATIONS.

The following is a list of substances which have been used, with more or less success, in preventing and removing the incrustations which are formed by using hard water in boilers:—

Potatoes.—By using about one-fiftieth of potatoes to the weight of water in a boiler, scale will be prevented, but not removed. Their action is mechanical; they coat the calcareous particles in the water, and prevent them from adhering to the metal.

Extract of Tannin.—A mixture has been used of 12 parts chloride of sodium, 2½ parts caustic soda, ⅛th extract of oak bark, ½ of potashes, for the boilers of stationary and locomotive engines. The principal agent in this appears to be the tannin of the extract of oak bark.

Pieces of Oak-wood, suspended in the boiler and renewed monthly, prevent all deposit, even from waters containing a large quantity of lime. The action depends principally upon the tannic acid.

Ammonia.—The muriate of ammonia softens old incrustations. Its action is chemicu; it decomposes the scale. In Holland it has been used with satisfaction in the boilers of locomotives. About two ounces placed in a boiler twice per week have kept it clean, without attacking the metal.

Fatty Oils.—It is stated that oils and tallow in a boiler prevent incrustations. A mixture composed of 3 parts of black lead, and 18 parts tallow, applied hot, in coating the interior of a boiler, has