MANUFACTURE OF MORTAR BRICKS.

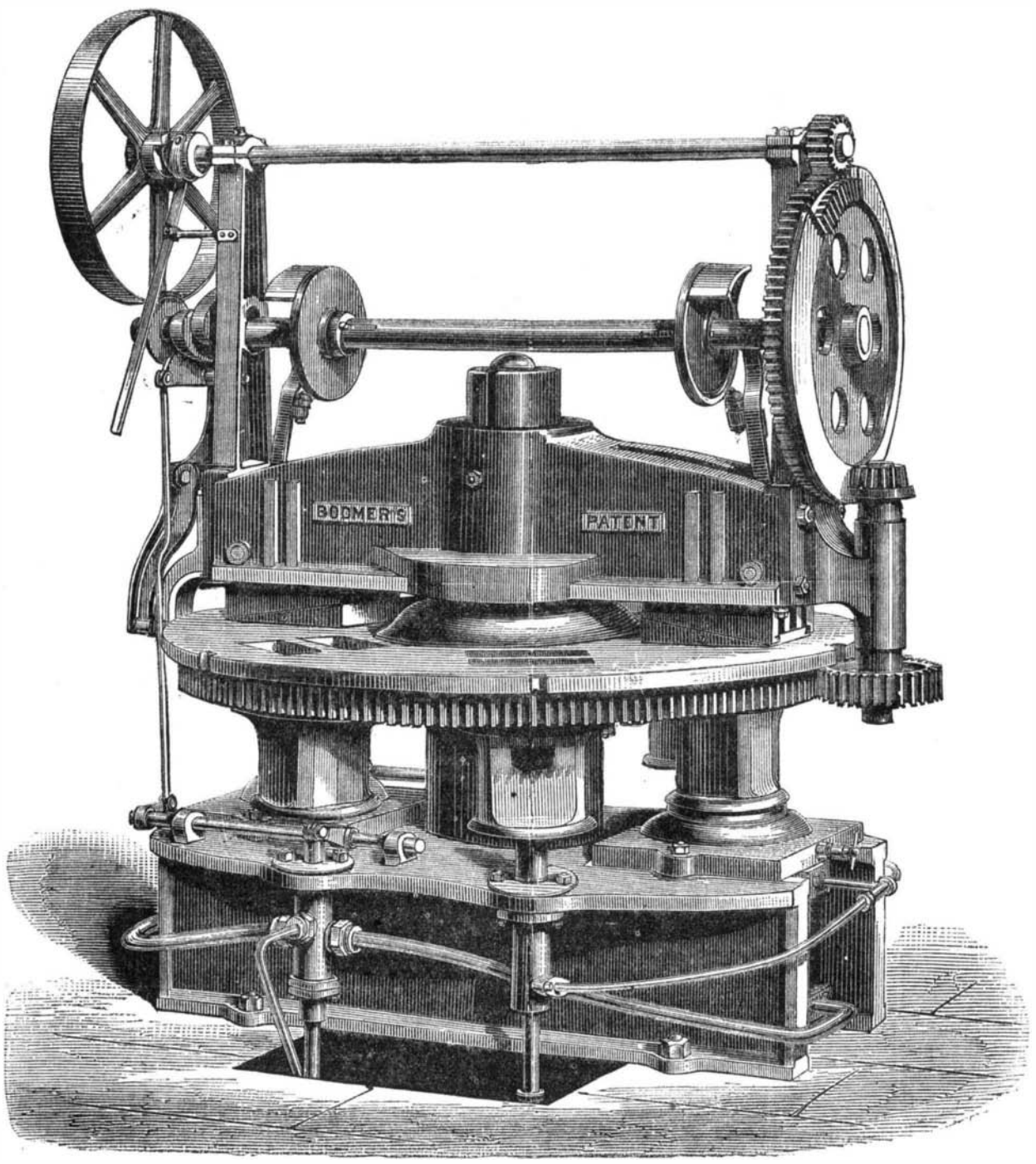
Among the objects at the International Exhibition, London, which, though very interesting, are so modest in appearance as to be passed over by most without notice, are a number of bricks made not only without straw, but without burning.

The bricks are practically mortar, seeing that the materials of which mortar is commonly made are those which alone enter into their composition. Sand and lime form one variety of brick; sand, lime, and Portland cement make another. Pressure and air drying are the only operations, beyond the first mixing, that are necessary. At first thought it might be objected to such bricks that they would probably be too friable or too soft for use; but the sight of a piece of good old mortar should convince the doubtful that the hardening influences of time and carbonic acid—resulting in the production of a marble-like carbonate, and possibly silicate, of lime—are quite equal to those of the kiln. Bricks are also formed by pressure of mixtures of subdivided slag with lime, Portland cement, and blast furnace slag cement respectively The slag cement itself is composed of from eight to ten parts of slag, and one part of lime. But little surprise need be felt at the employment of slag in the preparation of cement, since the chief condition for success is the presence of a silicate capable of decomposition by lime—a condition which is fulfilled by powdered slag.

The bricks give a good result on application of the usual tests. They have a good sound ring, are very hard, and can be made of various shades of color, or even enameled, we should imagine, by a little ingenuity.

The process of mortar brick making by the machine is simple. Hoppers are filled by hand with the materials employed, each into its separate hopper. From this point to the removal of the finished bricks all operations are automatic. Measured portions of each ingredient are caused to fall upon a traveling belt which delivers the mixture into an apparatus, in which it is thoroughly incorporated, and from which it is deposited upon a second traveling belt, which carries it to the press, where measured quantities are delivered into the molds. The press is hydraulic, consisting of a circular table revolving horizontally, and of course stopping when pressure is applied. The table contains six pairs of molds, making, therefore, one sixth of a revolution between the stoppages for application of pressure. Two pairs of molds are subject to pressure at once, two other pairs being automatically filled, and the bricks rising out of the remaining two pairs, simultaneously. The bricks are removed by hand to barrows, and conveyed to the yard, where they are left to harden. The time required for this varies according to the quality of the lime used, and also according to the weather, from one to two months, but the hardening goes on for years. Seven strokes per minute are made by the press, giving in that time twenty-eight bricks, or about 80,000 per week, as the result of the labor of two men and four boys, exclusive of wheelers and pilers. When sand is used, from one sixth to one eighth of its weight of lime is necessary; but with slag, as little as one sixteenth of its weight of lime may be employed to produce a good quality of building brick, weighing about 58 cwt. per thousand.

Bricks of this kind have long been in use in the United States. The machine above represented, which we copy from *Iron*, is made by Messrs. Bodmer, Hammersmith, England.



HYDRAULIC PRESS FOR MAKING MORTAR BRICKS.

Improvements in Sugar Making.

The methods of purification employed in the sugar manufacture depend almost entirely upon the action of lime and its elimination by carbonic acid. These processes leave, in the saccharine products, a certain proportion of organic matters and mineral salts, which oppose, to a certain degree, the crystalization of the sugar, causing also the formation of molasses and the mingling of the sugar with the residue. M. P. Lagrange has recently devised a method which is based on the elimination, by the joint action of baryta and phosphate of ammonia of the organic salts of lime, of certain vegetable acids combined with potash and soda, and of the alkaline sulphates existing in the sugar products. By this process, without the aid of lime or salts of lime, M. Lagrange believes that he is enabled to obtain the products, and to secure the best conditions of alkalinity, without forming glucose at the expense of crystalizable sugar. In factories, therefore, devoted to the manufacture of cane sugar, it would seem that this improvement is of considerable importance, as doing away with the serious difficulties and large losses due to the glucose formation and the lime salts.

M. Marguérite has recently patented a process for obtaining sugar from molasses by the addition to the latter of certain salts which provoke crystalization. The process is said to be especially valuable in treating third quality sirups as well as molasses. The operation consists in adding to the spent molasses (containing, say, fifty per cent of sugar, fifteen per cent of salts, and twenty per cent of water) crystalized sulphate of magnesia in the proportion of twenty per cent by weight, together with a little water, to make a solution of the sulphate marking 10° Baumé. The whole is then subjected to centrifugal action in a machine having either perforated sides or very fine wire cloth. The sulphates of lime and potash precipitated are retained, and the liquor is then filtered through charcoal and boiled *in vacuo*. After cooling, a certain quantity of pounded sugar is added to form nuclei, and the sirup is lastly subjected to the ordinary temperature of fillings, the heat being alternately raised and lowered.

After a few days, crystalization becomes exceedingly abundant, and continues to increase for some time, after which the hydro-extractor is employed. Other salts, such as sulphate and chloride of magnesium, chloride of manganese, sulphates of iron and zinc, and their chlorides, and also the acetates, nitrates, and ammonia salts, though these are not so desirable, may all be used instead of the sulphate of magnesia, the proportions of which vary according to the nature of the molasses.

The crystalization of the sugar results from elimination of the potash, the salts of which are prejudicial, its place being taken by the magnesia, whose salts are favorable thereto.

WORK has begun in earnest on the Centennial grounds in Philadelphia. Daisies and clover have disappeared, leaving a vast expanse of level, bare, red earth, crossed by railroad tracks, and dotted here and there with shanties.

The New Lake or Sea in Africa.

The French government has recently voted the sum necessary for the formation of a great inland sea in Algeria, 190 miles long by 36 broad, to the south of Biskra. It is thought, by the *Revue des Deux Mondes*, that the result of this measure will be a great improvement in the climate of the interior, a great addition to the facilities for inland transport, and the introduction of commerce and civilization into the very heart of Africa. The Chott Mal-Rir, *Chott* implying the bed of a lagoon, the proposed site of this inland sea is found to be at least 90 feet below the Mediterranean; while the Chott Sellem, with which it communicates, which lies between it and the sea, is 54 feet lower still. A chain of *chotts*, of smaller area but equal depression, extends thence to within 12 miles of the coast of Tunis, at the Gulf of Gabes, and a canal connecting the nearest *chott* with the sea would admit the waters of the Mediterranean, and convert the desolate region of Chott Mal-Rir into a great inland sea. The estimated cost is only three millions of dollars, and the engineering difficulties, after the experience gained during the construction of the Suez canal, would be inconsiderable.

At a recent sitting of the Academy of Sciences, Paris, M. de Lesseps stated that, on the war budget being presented, a sum of $5,000 would be applied for to cover the expenses of the definitive survey of the basin. The engineers intrusted with the operation of cutting through the Isthmus of Gabes will then start from Biskra, with the aid, not only of the Governor General of Algeria, but also of the Bey of Tunis, equally interested in the success of the enterprise.

It has heretofore been suggested in the SCIENTIFIC AMERICAN that, while it was very practicable to cut the proposed canal and admit the water of the Mediterranean to the desert, the ultimate result, owing to the rapid evaporation, might simply be the formation of an immense deposit of salt. This appears to be also the view taken by M. Ch. Honyvet, who, at the above sitting of the Academy, gave a paper on the subject. He observes that the Mediterranean may, of course, be tapped as they propose, and an immense inland sea formed; but that a vast surface of evaporation will thus be exposed to the sun's rays; and that, as the loss of water by this action can only be replaced by the sea through the canal, the end of the whole operation will be the formation of a thick crust of salt at the bottom, whereby all navigation will be stopped in a short time, and millions will have been spent to create a gigantic salt pit, and nothing more.

Artificial Furs.

Mr. Tussaud, of London suggests an ingenious way way of preparing the hair or fur of animals for use without employing the skin. The process consists in first soaking the fur in lime water to loosen the adhesion of the hairs. After washing and drying, the piece is stretched upon a board, fur side up, and a solution of glue laid over it, care being taken not to disturb the natural position of the hairs. After the glue has hardened, the skin may be pulled off, leaving the ends of the hairs exposed. The latter are then washed with proper substances to remove fat, bulbs, etc. An artificial skin of gutta percha, or other waterproof substance, is next laid on top of the glue and allowed to dry so as to form a continuous membrane, when the glue is washed out with warm water. These artificial skins are entirely free from any animal odor, and are more durable, lighter, and more pliable than the natural ones.

THE Mikado is making almost as good a thing out of his reformation as Henry the Eighth did of his. One of the discarded gods of Japan is advertised for sale in a Japanese paper in the following terms: "For sale, at Kama-Kura, a very fine idol with six arms. It is 15 feet high, and was cast in bronze, at Sheffield." Sheffield now shares with Birmingham the doubtful honor of supplying, with impartial generosity, missionaries and bibles to the more inquiring among the heathen, and idols to those who prefer to walk in the old ways.