

House, and many of the fine old ceilings in deep relief of the Elizabethan era, are of this material.

The London *Ironmonger* gives the following description of the various processes practised in the manufacture of papier maché, at the works of Messrs. Loveridge & Shoolbred, at Wolverhampton:

"There are at present five principal varieties of *papier maché* known in the trade, viz., 1, sheets of paper pasted together upon models; 2, thick sheets or boards produced by pressing ordinary paper pulp between dies; 3, *fibrous slab*, which is made of the coarse varieties of fibre only, mixed with some earthy matter, and certain chemical agents introduced for the purpose of rendering the mass incombustible (a cementing size is added, and the whole well kneaded together with the aid of steam. The kneaded mass is passed repeatedly through iron rollers, which squeeze it out to a perfectly uniform thickness; it is then dried at a proper temperature); 4, *Carton pierre*, which is made of pulp or paper mixed with whiting and glue, pressed into plaster piece-molds, baked with paper, and, when sufficiently set, hardened by drying in a hot room; 5, *Martin's Ceramic papier maché*, a new composition, patented in 1858, which consists of paper pulp, rosin, glue, drying oil and sugar of lead, mixed in certain fixed proportions, and kneaded together; this composition is extremely plastic, and may be worked, pressed or moulded into any required form. It may be preserved in this plastic condition for several months, by keeping the air away and occasionally kneading the mass.

"The first mentioned variety of *papier maché* alone engages our attention here. A special kind of paper, of a porous texture, is manufactured for this purpose. An iron mould of somewhat smaller size than the object required, is greased with Russian tallow, a sheet of the paper is laid on to the greased surface of the mould, and covered over with a coat of paste made of the best biscuit flour and glue, which is spread evenly all over the sheet with the hands; another sheet is then laid on, and rubbed down evenly, so that the two sheets are closely pasted together at all points. After this the mould is taken to the drying chamber, where it is exposed to a temperature of about 120°; when quite dry, which it takes several hours to accomplish, it is carried back to the pasting-room, and another sheet laid on with another coat of paste, after which it is returned to the drying chamber, and the same operation is repeated over and over again until sufficient thickness is attained, which, for superior articles, such as are manufactured at these works, requires from thirty to forty sheets of paper, and of course as many coats of paste between. The shell is then removed from the mould, and planed to shape with a carpenter's plane, after which it is dipped in linseed oil and spirits of tar to harden it; this changes the color from gray to a dingy yellowish-brown tint. The article is then stoved, and seven or eight coats of varnish are laid on (with a stoving after each), which are cleared off each time, any inequalities of surface being finally removed with pumice-stone. The number of drying processes the articles have to go through consume so much time that it takes three or four weeks to fit them for ornamentation, which is applied in bronze-powder, gold or color, and for many articles also in mother-of-pearl. The ornamentation of these articles is sometimes effected in the highest style of the painter's art. It was in Wolverhampton that Bird, R. A., worked as a 'japaner,' the technical name given to an 'ornamentor;' and we believe some other of our great artists have sprung from the pursuit of this occupation.

"The gold-leaf is laid on with a solution of isinglass in water, the design then pencilled on with asphaltum, the superfluous gold removed with a dossil of cotton

dipped in water, which leaves intact the parts touched with asphaltum, and the latter finally removed with essence of turpentine. The cotton pledgets used are of course carefully collected, to recover the gold removed by them.

"After the application of every coat of color or varnish, the object so colored or varnished is dried in an oven or chamber, called a stove, and heated by flues to as high a temperature as can safely be employed without injuring the articles, or causing the varnish to blister. All articles so japanned, or, to use the technical term, 'stoved,' are more durable than they would be if simply left to dry in the air.

"For black grounds, drop ivory-black mixed with dark colored animé varnish is used; for colored grounds the ordinary painter's colors, ground with linseed oil or turpentine, and mixed with animé varnish. The colors most in use are white lead, cobalt blue, yellow, vermilion (used more particularly to imitate tortoise-shell), Indian red, verdigris, umber, and the intermediate tints produced by mixing two or several of them together. The varnishes most used are animé and copal. The grounds and varnishes are generally laid on with painting brushes, or flat brushes, made of fine soft bristles. Tin-plate articles intended for japanning, are first thoroughly cleansed from every trace of grease that may adhere to them, with turpentine or spirits of tar, then rubbed with sand-paper. They are then ready to receive the first coat, after which they are thoroughly dried in the stove.

"For black japanned works, the ground is prepared with a coating of black made as just now stated, by mixing drop ivory-black with dark-colored animé varnish, which gives a blacker surface than would be produced by the japan alone; and the object is then dried in the stove; from three to six coats of japan are afterwards successively applied, the work being always thoroughly dried again in the stove ovens between the laying on of every fresh coat.

"For brown japanned works, umber is mixed with the japan, to give the required tint; the process in all other respects being the same as for black japanned works.

"The colors are protected against atmospheric influences, and made to shine with greater brilliancy, by two or three coats of copal or animé varnish. Superior articles receive as many as five or six coats of varnish, and are finally polished.

"The ornamentation of all such articles as come under the head of toilet wares, is effected by the ordinary mode of painting with a camel's hair pencil, or some fitting substitute; where imitations of woods or marble is intended, the ordinary grainer's tools are used. Many patterns are produced upon the various articles by 'transfer printing.'"

SUPERHEATING STEAM IN LOCOMOTIVES.

The *Toronto Daily Leader*, of Tuesday, Sept. 3rd, in an article on the working of the locomotives on the Grand Trunk Railway of Canada, speaks of Mr. Martin, the Locomotive Superintendent of the Western Division, and of his recently patented superheating apparatus, as follows:

"This gentleman, whose experience has extended over a period of eighteen years, has devoted a great deal of attention to the improvement of the locomotive, with especial reference to the saving of fuel; and a visit to the Toronto workshops enables us to state the shape and the result of his labors in this direction.

"Fully alive to the drawbacks to the highly expansive