

fixed by alcohol in which a small quantity of acid, either nitric or acetic, has been mixed, being poured over the whole surface and drained off at one corner.

When the alcohol has completely evaporated, which will generally be the case in a very short time, the glass is quietly immersed horizontally, in a large pan of clean water, and left until the chromic solution has dissolved off, and nothing remains besides the enamel colours on the glass; it is then allowed to dry by itself near a heated stove, and when dry is ready to be placed in the kiln for firing.

It may be stated that enamel of any colour can be used, and that by careful registering, a variety of colours can be printed one after the other, so as to obtain a perfect imitation of a picture; also that borders of any description can be subsequently added, without any liability to remove or even diminish the intensity of the colour in the first firing.

It will be easy to perceive that this mode of obtaining an image on glass, in an absolutely permanent substance, and of any description, colour, or size, may prove of considerable advantage and utility for the decoration of private houses, and also for public buildings. Now that, by means of the photographic art, the most correct views of any object or of any building or scene—even portraits—can be faithfully and easily obtained; when we see every day the results of the labours of photographers in all parts of the world, in the shape of beautiful prints; when we can be made acquainted, without leaving home, with the actual costume, habitations, scenery, manners almost of all countries, for instance, China and Japan, which have but recently opened their doors to European civilisation: when, through the same means, we are able to see for the first time, and the learned are able to translate from, the graphic reproduction with which photography furnishes us of those early inscriptions engraved on the rocks in Asia, and by the Egyptians on their splendid monuments, I need only point out the usefulness of the mode of fixing those images, in an indelible manner, for ornamental as well as for scientific purposes.

In large cities, like London, where houses are built so close to one another, in how many places may not the process become available, by enabling any one to introduce, for a moderate expense, pleasing or instructive images where common plain ground glass is now used, to shut out the sight of a disagreeable object, a dead wall, or an unpleasant neighbour, without diminishing the amount of light more than is convenient.

In the library, fitting subjects might be introduced on the windows by a judicious selection of the portraits of favourite authors, or of famous scenery at home or abroad. In the dining room, also, appropriate pictures could be selected, such as flowers, fruit, or game subjects, so disposed as to harmonise with the decoration of the room. Even for domestic purposes, for lamps, or screens, or any object in glass, the process will be found useful, especially on account of its rapidity, which will enable the manufacturer to execute and to deliver an order at a very few days notice.—*Journal of the Society of Arts.*

ON FILTRATION AND FILTERING MEDIA.

The following article on this subject will be found worthy of the perusal and consideration of all those who are interested in obtaining pure water for con-

sumption. We may remark that animal charcoal has long been employed as a filtering agent, not only for water, but also for the purpose of removing impurities from other liquids:—

A paper was recently read before the the Society of Arts of London, "On Filtration and Filtering Media," by Julius G. Dahlke. From various modern works upon the civilization of the Egyptians, Chinese, Japanese, and other ancient Oriental nations, we learn that at a very early period filters were used by them. These appear to have been vessels made of unglazed earthenware, or of porous stone. There is no evidence to show either that they were acquainted with the true nature of those matters which should be separated from water intended for the use of man, or that they had studied the subject of filtration in a scientific spirit. In this neglect Europe imitated them until near the close of the seventeenth or beginning of the eighteenth century, when the French began to pay attention to the subject, and employed silk, wool, cotton, sponge and sand as their filtering media. But about the middle of last century a *lias* was discovered in Picardy, which, owing to its effective action, came largely into use. The mode of using it was particularly simple, being in the form of a false bottom placed in the cistern, through which the water descended. Afterwards the attention of Englishmen was directed to the subject, and about seventy years ago filters were introduced which contained three layers of media, viz., sand, gravel and charcoal. These were for filtering by descent, but another system was subsequently adopted and patented for filtering by ascent; this however, was complicated, and never became in any way largely known.

During the past seventy years, gravel, sand, and charcoal used as a mixture have been the agents most in vogue amongst filter makers, and it is only lately that due attention has been paid to charcoal as the most efficient filtering medium. Its use is much more frequent now, because not only has it a powerful detergent effect, but it possesses also the peculiar advantage of not becoming foul, while it protects from decomposition other bodies in contact with it. It has been often asked why animal charcoal is so effective as a filtering medium? Some attribute this to the presence of so much carbon; but that is an insufficient reason, as shown by the fact that, although coke contains more carbon than sand, yet it is not superior as a filtering agent. Animal charcoal filters about three and a half times more rapidly than either coke or sand, while it is also greatly superior in this, that it removes many inorganic impurities held in solution, over which the former substances exert no power. It appears that the more porosity a filtering medium possesses in itself, the more rapidly does it filter, and the greater is the effect it produces on the water. The latter will be still more decided when, with a greater porosity, peculiar substances are combined. This leads me to believe that we may attribute the extraordinary filtering quality of animal charcoal to the fact that its principal component parts are lime and carbon, so combined as to secure a wonderfully fine porosity. Vegetable charcoal, although very porous and containing far more carbon, has less effect upon water.

The art of filtration may be classed into three systems, viz:—1st, where the action takes place