For Transparent Glue.—Use the above, substituting isinglass for glue.

Japanese Cement.—Mix the best powdered rice with a little cold water, then gradually add boiling water until a proper consistence is acquired, being particularly careful to keep it well stirred all the time; lastly, it must be boiled for one minute in a clean saucepan or earthen pipkin. This glue is beautifully white and almost transparent, for which reason it is well adapted for fancy paper work, which requires a strong and colorless cement.

Cement for Repairing Glass.—Dissolve fine glue in strong acetic acid to form a thin paste.

Bottle Wax.—1. Resin, 6½ parts; beeswax, ½ part; Venetian red or red lead, 1½ lb. 2. Shellac, 3 parts; Venice turpentine, 1¼ part; vermilion, 2¾ parts, or Venetian or red lead, q. s. 3. Resin, 6 parts; shellac and Venice turpentine, each, 2 parts; coloring matter to suit.

Cement for Metals, or Metals and Leather, Rubber, or Cloth.—Fuse together equal parts of gutta-percha and pitch. Use hot.

Glue to Fasten Leather, etc., to Metals.—1 part crushed nut galls digested 6 hours with 8 parts distilled water and strained. Glue is macerated in its own weight of water for 24 hours, and then dissolved. The warm infusion of nut galls is spread on the leather; the glue solution upon the roughened surface of the warm metal; the moist leather is then pressed upon it and dried.

Cement for Porcelain.—Use thick white-lead paint.

Simple and Useful Cement.—Alum and plaster of Paris, well mixed in water and used in the liquid state, form a hard composition and also a useful cement.

To Mend Crockery Ware.—One of the strongest cements, and easiest applied for this purpose, is lime and the white of an egg. To use it, take a sufficient quantity of the egg to mend one article at a time, shave off a quantity of lime, and mix thoroughly. Apply quickly to the edges and place firmly together, when it will very soon become set and strong. Mix but a small quantity at once, as it hardens very soon so that it cannot be used. Calcined plaster of Paris would answer the same purpose as lime.

Cement to Resist Petroleum.—A cement peculiarly adapted to stand petroleum or any of its distillates is made by boiling 3 parts of resin with 1 of caustic soda, and 5 of water. This forms a resin soap, which is afterward mixed with half its weight of plaster of Paris, zinc white, white lead, or precipitated chalk. The plaster hardens in about forty minutes.

Postage Stamp Mucilage.—Gum dextrin, 2 parts; water, 5 parts; acetic acid, 1 part; dissolve by aid of heat and add 1 part of spirits of wine.

Red Sealing Wax, Fine.—Melt cautiously 4 ozs. pale shellac in a copper vessel, at the lowest possible temperature; add 1¼ oz. of Venice turpentine, previously warmed, and stir in 3 ozs. vermilion; pour into metallic moulds and allow it to cool.

Red Sealing Wax, Common.—Resin, 4 lbs.; shellac, 2 lbs.; melt; mix in 1½ lbs. Venice turpentine and red lead.

Black Sealing Wax, Fine.—Shellac, 60 parts; Venice turpentine, 20 parts; melt shellac carefully; add Venice turpentine; stir in 30 parts of finely-powdered ivory black.

Black Sealing Wax, Common.—Resin, 6 lbs.; shellac, 2 lbs.; melt; add 2 lbs. Venice turpentine, and lamp black to color.

Gold Sealing Wax.—Melt cautiously 4 ozs. pale shellac in a copper vessel, at the lowest possible temperature; add 1¼ oz. of Venice turpentine, previously warmed; and stir in 3 oz. mica spangles; pour into metallic moulds, and allow it to cool.

Colored Sealing Wax.—4 ozs. pale shellac, 1¼ oz. white resin, 2 ozs. Venice turpentine; add a finely-powdered pigment of the required color.

Cement for Iron.—The following cement is recommended for repairing damaged places in cast-iron tanks, cisterns, etc.: 5 parts brimstone, 2 parts black-lead, and 2 parts cast-iron filings (previously sifted) are melted together, taking care that the brimstone does not catch fire. The damaged place, perfectly dry, is well-heated by laying a piece of red-hot iron upon it, and is then stopped with the cement, previously heated in a melting-ladle till it becomes soft.—*Metall-Arbeiter.*

An Insoluble Cement.—A very valuable cement has been discovered by Mr. A. C. Fox, of which details are published in *Dingler's Polytechnisches Journal.* It consists of a chromium preparation and isinglass, and forms a solid cement, which is not only insoluble in hot and cold water, but even in steam, while neither acids nor alkalies have any action upon it. The chromium preparation and the isinglass or gelatin do not come into contact until the moment the cement is desired, and when applied to adhesive envelopes, for which the author holds it to be especially adapted, the one material is put on the envelope covered by the flap (and, therefore, not touched by the tongue), while the isinglass, dissolved in acetic acid, is applied under the flap. The chromium preparation is made by dissolving crystallized chromic acid in water. You take:

Crystallized chromic acid	2·5 grammes.
Water	15 "
Ammonia	15 "

To this solution about 10 drops of sulphuric acid are added, and finally 30 grammes of sulphate of ammonia and 4 grammes of fine white paper. In the case of envelopes, this is applied to that portion lying under the flap, while a solution prepared by dissolving isinglass in dilute acetic acid (1 part acid to 7 parts water) is applied to the flap of the envelope. The latter is moistened, and then is pressed down upon the chromic preparation, when the two unite, forming, as we have said, a firm and insoluble cement.

FIREPROOF PAPER AND INK FOR DOCUMENTS.

FIREPROOF paper may be made, according to the *Pharmaceutische Zeitung*, from a pulp consisting of one part of vegetable fiber, two parts of asbestos, $\frac{1}{10}$ part of borax, $\frac{1}{5}$ part of alum. The ink is made from 85 parts of graphite, 0·8 part of copal varnish, 7·5 parts of copperas, 30 parts of tincture of nutgalls, and a sufficient quantity of indigo carmine.

REMOVAL OF STAINS AND GREASE SPOTS.

The following table gives, at a glance, the best means of cleansing all kinds of fabrics from any stain whatever:

KIND OF STAIN.	FROM LINEN.	FROM COLORED GOODS.		FROM SILKS.
		COTTON.	WOOLEN.	
Sugar, glue, blood and albumen.	Simple washing with water.			
Grease.	Soapsuds, alkaline lyes.	Lukewarm soapsuds.	Soapsuds, ammonia.	Benzine, ether, ammonia, potash magnesia, chalk, yolk of egg.
Varnish and oil paints.	Turpentine, or benzine, and soap.			Benzine, ether, soap; rub carefully.
Stearine.	Very strong alcohol, 95°.			
Vegetable colors red wine, fruit, red ink.	Sulphur vapors; warm chlorine water.	Wash out with warm soapsuds or ammonia water.		The same; rub gently and carefully.
Alizarine ink.	Tartaric acid; the older the stain the stronger the solution.	Dilute tartaric acid if the stuff will bear it.		The same; with care.
Iron rust, and ink made of galls	Warm oxalic acid solution; dilute hydrochloric acid, then tin turnings.	Repeated washings with a solution of citric acid, if the colors will bear it.	The same; dilute hydrochloric acid if the wool is dyed naturally.	Nothing can be done; and all attempts only make it worse.
Lime, lye, or alkalies.	Simply wash with water.	Drop dilute nitric acid upon it. The stain previously moistened can be rubbed off with the finger.		
Tannin, green nut-shells.	Javelle water; warm chlorine water; concentrated solution of tartaric acid.	Alternate washing with water and with more or less dilute chlorine water, according to the colors.		
Coal-tar, wagon grease.	Soap, oil of turpentine, alternating with a stream of water.	Rub with lard, then soap it well. After a time wash alternately with water and turpentine.		The same; but use benzine instead of turpentine, and the water must fall on it from some height.
Acids.	Red acid stains are destroyed by ammonia followed by thorough washing with water. Brown stains of nitric acid are permanent.			

With the above table, a few simple chemicals, and a good deal of care and perseverance, any one may set up a chemical cleaning establishment. Great pains must be taken when ether and benzine are employed to avoid their taking fire, the vapor of which when mixed with air is highly explosive. An open bottle of ether will take fire at a distance of several feet from an open flame, as a heavy invisible vapor issues from the bottle; when the vapor reaches the flame of a lamp the whole mass of vapor takes fire.—*Muster Zeit.*

ALUMINUM AT THE PARIS EXHIBITION.

ALTHOUGH discovered in 1827 already by Woehler, aluminum was only, in 1854, produced in larger quantity by Deville. At that time its lightness, malleability, its beautiful bluish-white color, and the fact that it is not stained, like silver, by sulphureted hydrogen, caused many to predict a great future to the aluminum industry. The only drawback seemed to be the expensiveness of the process by which it was obtained. This, it was hoped, could be overcome easily.

This hope was, however, not realized, and the price of aluminum is at present yet very high. Consequently, it was again dropped from the list of metals available for industrial purposes.

After the lapse of several years, attention having been again called to its superior fitness for making scales, weights, philosophical instruments, watches, several firms commenced to manufacture larger quantities of the metal, and at the Paris Exhibition, in 1867, aluminum, in shape of bars, foil, wire, as well as numerous ornaments and scientific instruments, was exhibited, and found universal favor.

Ten years have since elapsed, and the last Exhibition has shown that, even if the cost of aluminum is not materially reduced, it will, nevertheless, in the future be extensively used in the arts and industries. These are not, as in the Exhibition of 1867, exhibited by a few pioneers, intended to show what there could be done, but the exhibited articles were the production of a regularly established branch of industry.

France, however, seems to be the only country in which the manufacture of aluminum has been made to pay. A few firms, founded in England and Germany, have either closed up or manage barely to get along.

H. Merlé & Co. are the principal aluminum smelters in France, while the "Société Anonyme de l'Aluminum" are the largest producers of ornamental and other goods, and aluminum alloys. The former firm exhibits aluminum in

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