

and iron turnings? A. Place the turnings in a large demijohn and pour acid on them. For five hundred feet you will need 129 pounds of oil of vitriol and about 70 pounds of iron. The evolution flask must be arranged with doubly perforated cork, etc., so that acid can be introduced without interfering with the progress of the work.

(977) G. H. B. asks for the government receipt for mixing whitewash so it won't wash off. A. Slake 1/2 bushel lime with boiling water, keeping it covered during the process, strain and add 1 peck salt dissolved in warm water and 3 pounds rice flour boiled in water to a thin paste, 1/2 pound Spanish whiting, and 1 pound clear glue dissolved in warm water. Allow it to stand several days and apply hot.

(978) L. F. asks how to make combustible paper. A. Soak the paper in a saturated solution of nitrate of potash. This makes touch paper. To make paper that will burn and disappear with the explosion, it must be treated with strong nitric and sulphuric acids, and washed thus, converting it into nitro-cellulose or gun cotton. The process of making the latter is fully described in the SCIENTIFIC AMERICAN of February 23, 1889.

(979) F. C. G. writes: I have knitted some small shoes out of druggists' cotton cord, in delicate shades and bright colors, for the market. Can you tell me through your valuable paper, or otherwise, how to preserve their delicate coloring? I have been saturating them in hot borax water preparatory to putting on the gum arabic: they fade. There is something that is used with the borax that will preserve the color, but I am unable to tell what that is. A. We would suggest the use of alum, or chloride of tin as a mordant, but we fear that the cotton will still fade.

(980) O. A. B. asks: 1. How cement used for cementing the rubber tires to the fellicies of bicycles is made. A. Dissolve 1 part gutta percha in bisulphide of carbon q. s. Mix with 20 parts asphalt or shellac and warm over water bath, until it is melted to a thick paste. 2. How to make liquid cement for cementing rubber. A. Unvulcanized India rubber is masticated by powerful rolling and grinding machinery, until disintegrated, and then is dissolved in coal tar naphtha. After it has been used as a cement, the cemented place may be treated with a solution of chloride of sulphur in bisulphide of carbon. In our SUPPLEMENT, No. 249, an excellent description of India rubber manipulation is given.

(981) J. R. writes: We have an artesian well in our city park on the bluff, 165 or 170 ft. above, but adjacent to the river. What effect, as regards flow of water, would a pipe have, attached direct to mouth of the well, perfectly air-tight, and leading down over the hill 80 or 100 ft.? Would flow of water be greater than to let it flow free into reservoir on a level with the mouth of well, or equal to a well bored on a level with discharge of pipe 100 ft. below mouth of well? A. It would be between the two. The "head" independent of friction would be equal to that of the lower level well, but friction would impede the full flow due to such head or pressure.

(982) C. R. R. writes: When shellac is melted over fire not hot enough to burn, it becomes thick and soapy, and will not pour into a mould. What plan could you suggest that we pursue with it, to form it into sticks about 5 in. long and 1/2 in. in diameter, and get them solid and without a flaw? Is there any way of melting shellac, without burning, so as to get it thin as water or molasses? We have been "stuck" on this problem for several months. A. You cannot melt shellac as specified; it can, by an admixture of some ingredients, such as Venice turpentine, be made more fluid, but pure shellac is never perfectly liquefied by heat alone. Try rolling it into shape under hot water.

(983) D. W. W. Co.—For a cheap lining for your packages, we know of nothing better than bichromatized glue. Make a glue sizing of suitable consistency and add about 5 per cent of bichromate of potash to render it insoluble in water. Coat your packages with this size and allow them to dry in a light place. After they are dry, expose them to the direct rays of the sun for an hour or so. This coating would not answer for packages for containing articles of food. A small percentage of glycerine added to the size would increase its flexibility. If you desire to add a pigment to give it more color, you can use whiting, chrome yellow, or any of the iron oxide paints.

(984) J. A. McC. asks how to bronze steam pipes, used for steam heating. A. The pipes are painted with ordinary chrome yellow, and when nearly dry gold bronze powder is rubbed upon the surface with a piece of fur. When thoroughly dry, the surface is varnished with a very thin copal or mastic varnish.

(985) P. G. O'G. asks: 1. A reliable formula for a liquid stove polish, odorless as nearly as possible. A. Mix two parts copperas, one of bone black, one of pulverized graphite, with sufficient water to form a creamy paste. 2. In what oil or acid graphite is soluble to greatest extent? A. There is no solvent for plumbago.

(986) J. G.—For fire proofing wood make a solution of 27 parts sulphate of zinc, 11 parts potash, 22 of alum, 11 parts manganic oxide in warm water, to which add 11 parts of sulphuric acid, gradually. Soak the wood for three hours in the warm solution and dry in the air.

(987) B. W. I.—Carry the water line, 4 in. in a 3 ft. boiler, 5 in. in a 4 ft. boiler, 6 in. in a 5 ft. boiler, and 7 in. in a 6 ft. boiler, above the top of the tubes at the front. Back end of boiler should pitch down from 1 to 2 inches.

(988) E. F. C.—Pure water or rain water dissolves iron in boilers faster than waters containing lime or magnesia, the carbonates being the best preservatives. Rain water sometimes contains acids in a very slight degree, derived from smoke and soot upon roofs of buildings or from the smoke of chimneys.

(989) R. L.—Uranus passed its perihelion in 1883. Its next will occur in 1906. Distance from the sun at perihelion about 1,631,864,000 miles. Neptune

passed its perihelion in 1884. Its next perihelion will occur in 2048. Distance from the sun at perihelion about 2,755,207,000 miles. The specimen sent is gneiss, containing quartz, hornblende, and pyrites, of no value.

(990) M. L. asks (1) how to erase a stain out of a wall, which was caused by blisters having been sent forth at that spot only, which were filled with dirty water. I have touched it up, but after ten days the blisters were reproduced, then I used shellac, but without any effect. A. From your description it would appear that there is a permanent source of trouble in or back of the wall. If so, the blistering cannot well be prevented except by removing the original trouble. It may be due to lumps of unslaked lime in the mortar used in plastering the wall. These may have to be cut out and the holes replastered. 2. Which is the best oil and how much of it should I use to oil a brownstone front 20 feet wide by 4 stories high, and how many coats should I give it? A. Give two coats of boiled oil. The quantity used will depend entirely on the stone. Try a small portion of it to determine the amount absorbed. 3. How to make gold fluid so that the bronze will not turn green in the bottles? A. Copal varnish is the proper vehicle. It is best not to mix it with the bronze powder until you are ready to apply it.

(991) M. H. S. asks for a preparation which will render paper—ordinary straw—impervious to water, when mixed either with the pulp in its manufacture or coated with it after its manufacture. A. Mix the pulp with glue containing bichromate of potash equal to ten per cent of the weight of dry glue used. Conduct operations as much in the dark or in an obscure place as possible, and afterward expose the paper to the light. This will to some extent effect your purpose. Or dry the paper as thoroughly as possible and dip it in hot paraffin. According to the texture of the paper, these methods of treatment will affect a greater or less depth of its material.

(992) P. N. writes: Will you advise us whether limestone that will produce a fine quality of white lime can be used for making a cement that would be of any commercial value? A. Probably it is not specially adapted to the purpose. By proper admixture with clay or ground slag a species of Portland cement might be made from it. 2. Our boiler is fed from a well 50 feet deep in solid rock. On the boiler being cleaned, if the sediment taken from it is allowed to stand a few minutes exposed to the air, it becomes quite firm and hard. Do you think these rocks would make a cement? A. It is impossible to say. The mere hardening in the air tells nothing in your case. 3. How is hydraulic cement made? A. By burning the proper limestone in kilns, crushing, and grinding.

(993) W. A. B. writes: I have a fruit drier revolving within a chamber, which necessarily becomes very hot and causes the journals to heat, thereby causing much loss of time. Will you please to answer through the columns of your paper, if you know of any lubricant which might be used and which would not evaporate in the chamber, the temperature being about 200°? A. Use heavy cylinder oil, or tallow, arranged to feed in by a gravity sight feed lubricator. Or use best quality of graphite mixed with tallow.

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