

(28) A. H. asks: 1. By what means do experts determine how long ink has been written on paper, and is it possible to determine this with any degree of accuracy? A. Older writings are more difficult to remove from paper than those recently written. Experience has so much to do with this subject that it is very difficult in brief space to give a definite idea. 2. How do inks in general (especially mauve or aniline inks) affect the texture of paper? Can this effect be detected with a microscope? A. Inks differ principally in consideration of their ingredients, and, therefore, they are distinguished by their behavior with reagents. 3. When chlorine gas or hypochlorous acid is used for removing inks, it gives to the paper acted upon a yellowish cast. By what process can the paper be restored to its original appearance and whiteness? By what means is the polish restored, and what menstruum is best to wash the paper with after chlorine or hypochlorous acid has been used as the bleaching agent? A. A little gum water will frequently restore the appearance of the paper, but an expert can almost always distinguish the erasure. 4. Supposing I have removed a blot of ink from a sheet of white paper with a liquid. This liquid will remove the gloss of the paper in this particular spot only. Now, how can this spot be restored so that it will have the same gloss, evenness, and appearance of the rest of the paper? A. A little colorless size or gum water, with perhaps a little alum, has been used, but it is practically impossible to restore the condition of the paper so that an expert cannot detect the erasure.

(29) F. B. asks in regard to papier mache floor covering: 1. Will it hurt to use printed paper? A. According to the article "A Papier Mache Floor Covering," we find Manila paper recommended. It is very likely that newspaper would answer, but it is by no means as strong an article as the variety spoken of. 2. How thick will that covering be? A. The thickness depends upon whether more than a single thickness of the paper is used—probably from one-sixteenth to one-eighth of an inch in thickness. 3. How long will it be before it is ready for use? A. That depends entirely upon the drying; if artificial heat is applied, we should think that the whole operation could be carried through and the covering finished within a week.

(30) J. X. D. asks a receipt for making or mixing the colors used in printing cretonnes or upholstery goods, and how to apply them to the cloth. A. The designs on upholstery goods are either woven into a suitable pattern by using colored threads previously dyed, or else the designs are printed into the material by what is called roller printing. In the latter case too complicated processes are necessary to be described in this department.

(31) C. C. S. writes: 1. What is the cheapest and best way for a young man to become a machinist? A. Connect yourself with some shop where the trade can be learned. 2. What is a trade union? A. An organization of workmen for their mutual protection. They agree as to what prices shall be received, and compel their members to give their work up rather than receive a lower amount of pay, etc. 3. What is the best way to make cheap transmitters for a short line telephone? A. A simple transmitter has been made by placing two common nails across each other on a wooden plate, and attaching a pattern wire to each of the nails. Then, having the battery and telephone in circuit, talk on to the wood. In SCIENTIFIC AMERICAN SUPPLEMENT, No. 383, you will find Munro's transmitter described. See also "How to Make a Working Telephone," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 142. 4. If I heat a gun barrel red hot, will the bore of the gun become larger or smaller than it was when cold? A. The bore will expand as the barrel becomes heated.

(32) L. E. H. writes: Can you tell of any way by which thinsk used with rubber stamps can be made to resist moisture? Varnishing causes the ink to spread, and so does not answer the purpose. The objection to printing ink is that it destroys the rubber. A. The following ink is totally indelible. It consists of 16 parts of boiled linseed oil varnish, 6 parts of the finest lampblack, and 2 to 5 parts of iron perchloride. Diluted with 3/4 the quantity of boiled oil varnish, it can be used for a stamp. Of course it can only be used with rubber stamps, for the chlorine in the ink would injure metallic type.

(33) G. H. P. asks: 1. What can I do to soften spruce gum sufficiently for chewing? A. We would recommend you to remelt the gum, adding a little beeswax to the mixture. Lard, grease, and rosin are frequently added directly to the kettle during the first boiling. 2. How is gum done up in papers for the trade? A. When the mixture in the pot has become sufficiently thick, and is well stirred, it is rolled out in a sheet about one-quarter inch thick, and then chopped into pieces about one-half inch wide, three-quarters of an inch long. These pieces are wrapped in tissue paper and packed in wooden boxes.

(34) L. J. S. writes: We are using several large inspirators to feed our boilers, and we think they would work better if we were to place an oil cup on the steam supply pipe for inspirators; but as we use the steam from these boilers for heating our brewing water direct, we would like to know what oil to use that would not be detrimental to the water for said purposes, etc.? A. We fail to recognize any advantage to be derived by the use of an oil cup as suggested by you, but the best liquid to use would be glycerine.

(35) J. J. R. writes: What will soften the water in our well, and still leave it fit for drinking and cooking purposes? The water is very hard, and it is as much as we can do to wash with it. A. By adding lime to the water, and allowing the mixture to stand for 24 hours and then filtering, the condition of the water will be improved. See the article on "How to Soften Hard Water," SCIENTIFIC AMERICAN SUPPLEMENT, 270.

(36) A. W. asks for information regarding the "castor bean," its value, and mode of making oil ready for the market. A. See the article on "The Castor Bean Plant" in SCIENTIFIC AMERICAN SUPPLEMENT, No. 156. In a rough way the process is as follows:

The seeds having been thoroughly cleansed from the dust and particles of the pod with which they are contaminated, are placed in an iron tank and heated to such a degree as will liquefy the oil without any risk of scorching. They are then pressed, the oil escaping being known as "first quality." The pressed seed is heated up; on the following day it is again heated and pressed, and gives a "second quality" oil. Occasionally, too, the cake from the second pressing is treated with carbon disulphide, which extracts a small additional quantity of thick, dark, common oil. All qualities need purifying and clarifying. Castor oil is selling at 17 to 17 1/2 cents for barrels, and 17 1/4 to 18 cents for cases.

(37) N. E. C. writes: 1. Will you please explain the nature of ventriloquism? Why is it an accomplishment attained by so few? A. Ventriloquism is accomplished by modifying the tones of the voice, and this is done by varying the position of the tongue and the soft palate, dilating or contracting the mouth or pharynx, and either dividing the buccal or pharyngeal cavity into several compartments or throwing them into one. 2. Has the ventricle great development in persons possessing that accomplishment, or is it due to constant practice? A. It has been demonstrated that the vocal organs of the ventriloquist are the same as those of other men, nor is his use of them materially different from that of others. It is therefore due to practice.

(38) S. M. writes: Can you give a formula for a brilliant waterproof finishing polish to be used on veneer after it is rubbed down with pumice stone and water? The polish to be applied the same as French polish. Use linseed oil 1 1/4 lb., amber 1 lb., litharge 5 oz., white lead, pulverized, 5 oz., minium 5 oz. Boil the linseed oil in an untinned copper vessel, and suspend in it the litharge and minium in a small bag, which must not touch the bottom of the vessel. Continue the boiling until the oil has acquired a deep brown color, then take out of the bag and put in a clove of garlic; this is to be repeated 7 or 8 times, the boiling being always continued. Before the amber is added to the oil it is to be mixed with 2 oz. linseed oil and melted over a fire that is well kept up. When the mass is fluid, it is to be boiled and stirred continually for 2 or 3 minutes; afterward filter the mixture, and preserve it in bottles tightly corked. When this varnish is used, the wood must be previously well polished and covered with a thin coat of soot and spirits of turpentine. When the coat is dry, some of the varnish may be applied, which should be equally distributed on every part with a small, fine sponge. This operation must be repeated four times, being always careful that each coat will be well dried first. After the last coat of varnish, the wood must be dried in an oven and afterward polished.

(39) R. R. S. writes: Can you suggest anything that will deodorize kerosene oil of 150 degrees fire test without injuring the quality of the oil for lighting purposes? A. The oil you refer to probably only has a faint odor. Try the following: Chloride of lime is first introduced into the cask or other receptacle containing the oil, in the proportion of about 3 oz. of chloride to each gallon of liquid. In this manner chlorine gas is evolved in the oil or spirit. If necessary, the evolution of the gas may be assisted by pouring in hydrochloric acid and then agitating, so as to bring the whole of the liquid into intimate contact with the chlorine gas. The oil is then passed into another vessel containing slaked lime, which, having an affinity for the chlorine, absorbs the same.

(40) C. N. S. desires a recipe for a whitewash suitable for outbuildings on a farm; something that will not rub or wash off, and not injure trees and can be tinted. A. For one barrel of color wash use half a bushel white lime, three pecks hydraulic cement, ten pounds umber, ten pounds ocher, one pound Venetian red, one-quarter pound lampblack. Slake the lime, cut the lampblack with vinegar, and mix well together, then add the cement and fill the barrel with water. Let it stand twelve hours before using, and stir frequently while putting on. This wash is not a clear white, but a light stone color, which may be more or less changed by the other colors. This covers well, hardens without scaling, and will not wash off.

(41) M. N. B.—The copying property of inks is due principally to the addition of glycerine, sugar, or sometimes a little chloride of lime. But after taking this quality out by a series of impressions, we know of no way of restoring it.

(42) E. M. C. desires a recipe for cream candy. A. See the article on "Confectionery at Home," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 199.

(43) W. E. M. and F. X. M.—The following process will probably be the easiest for your working on stones and minerals: Take a piece of iron about 2 in. by 8 in., and 3/8 in. thick, and fasten it to a piece of wood so that the latter can be used as a handle. Then with sharp sand and water grind until a level surface free from hammer marks is obtained. The specimen to be polished is then bound in a frame of 6 in. smooth board just a trifle lower than the face, and the edges are filled with plaster of Paris. The grinding process is then continued with No. 60 emery until the surface is sufficiently smooth, then polished off with a little putty powder and felt. The felt can be nailed right over the rubber previously used. Minerals are generally broken by means of chisels and hammers, and then ground as previously described.

(44) C. D. T. writes for the best and most simple means for deodorizing mutton suet or tallow to be used in the manufacturing of pomades. A. Boil the tallow for ten minutes with about one-third its weight of water, each pint of water to contain a small quantity of common salt and a little powdered alum; strain the water off, and let the fat rest for some hours before using. Injecting steam is commonly used. Hydrogen peroxide would be likely to accomplish your object.

(45) H. W.—Distilled water obtained through a condenser of iron pipe and aerated is healthy, and often used on shipboard when short of other water supply. Lead pipe is not safe, as the distilled water

absorbs lead. Tin lined lead pipe is safe and gives pure water. You can make an air condenser by using an unusually large amount of surface in iron or tin lined lead pipe, which saves the cost of pumping water for cooling the coil.

(46) G. C. B. writes: 1. What is the largest telescope in the world? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 485. 2. My son's hair is very red; do you know of anything to change its color, or at least to make it look darker? A. You can lighten the hair by using hydrogen peroxide, or darken it by using Nacquet's Bismuthic Hair Dye, described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 356. 3. What is aniline? A. The coloring substance prepared from coal tar. 4. Please to state what will thin my son's hair, as it is very thick? A. There is nothing that we can recommend for this purpose.

(47) J. R. M.—Patterns for bronze statuary are modeled in wax, clay, or plaster of Paris, from which sections are moulded and cast in zinc or type metal. These sections are finished and fitted together in convenient sections or whole parts for moulding in sand, the only material suitable in which to cast bronze or brass.

(48) W. H. W.—The black iron work for fireplaces is japanned. The Japan varnish after spreading upon the work is baked in an oven at 260°, and becomes very hard. There is no lacquer or varnish that you can air dry that will stand the heat for fireplace iron.

(49) Z. T. D. asks: How much water per second will flow through a 14 inch pipe, 80 feet long, with 8 feet head? Also, 18 inch and 21 inch pipes, same conditions? A. The discharge for 14 inch pipe, 18 cubic feet per second. For 18 inch pipe, 34 cubic feet per second. For 21 inch pipe, 50 cubic feet per second.

(50) D. F. S. writes: I have a brass clock spring 1 inch wide, and wish to cut a few pieces twelve inches long and straighten them. How can this be done? A. Draw the spring over a piece of wood, at the same time scratch the divisions with a divider. Then hold the spring so that it will not slip on the piece of wood with a rounded back, and with a fine saw saw along the scratched lines until the hard task is done.

(51) A. S. R.—A force of 180,000 pounds per square inch has been obtained when gunpowder was burned in a chamber only equal to its own volume. By dividing 180,000 by the proportion of the volume of the powder to the volume of your chamber, you may approximate to the pressure which may be obtained. Thus with a chamber a thousand times larger than the volume of the powder, you may have 180 pounds pressure.

(52) J. D. & Co. ask a process to prevent the smuts from escaping in the air from a lamp-black house. A. Carry the outlet of your lampblack chamber to one side and into the top of a vertical shaft, where place a rose jet of water. Have the water drop vertically in an even spray, so as to produce a draught down the shaft. The water will gather the waste lampblack, which can be either utilized or run into the sewer. A vent at the bottom of the shaft may connect with a chimney or into the open air. A pump or city water supply will be required.

INDEX OF INVENTIONS

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