

## Business and Personal.

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## Notes & Queries

### HINTS TO CORRESPONDENTS.

**Names and Address** must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

**References** to former articles or answers should give date of paper and page or number of question. **Inquiries** not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

**Special Information** requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter**, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

**Scientific American Supplements** referred to may be had at the office. Price 10 cents each. **Minerals** sent for examination should be distinctly marked or labeled.

(1) S. M.—For the city of New York, where Croton water is used in boilers, all that is needed to keep them in condition is thorough cleaning every 3 months. For hard water incrustation, you will find very full instructions in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 137, 286, 375, and 444.

(2) M. H. writes: What would be the rate of speed of water forced through a 10 inch main from a 15 inch cylinder, having a piston speed of 100 feet per minute, and what should pressure gauge vary? When the water leaves the cylinder, it is forced for about  $\frac{1}{4}$  miles through a 12 inch main, then the main contracts to 10 inches, and continues about  $\frac{1}{2}$  mile to reservoir; under 260 feet head our gauge at pump shows variation of 10 lb.; on main near junction of 10 and 12 inches, 20 lb. Can you explain the cause of different variations in different parts of the main, and why does not gauge at pump vary as much as elsewhere? A. The water in the 10 inch main will have a speed of 225 feet per minute. No pump runs so even that an air chamber can be dispensed with, especially upon so long a line of pipe. The pump stroke produces the variation in the gauge near the pump, which becomes cumulative near the junction of the 12 inch and 10 inch pipes. A large air chamber near the pump may relieve you of a source of danger to the pipes. Although your pump may be running nicely, your gauges show that the water is not flowing evenly in the pipes.

(3) G. P. writes: We want some plan to prevent the noise or work of our lodge room (I. O. O. F.) from being heard in the room below; we have a good floor and carpet, good partitions, walls plastered, etc., but are willing to go to quite an expense to remedy the present defect on this score. A. Probably you have no deafening under the floor. In such case, there only two ways that we can suggest for your trouble: To take up the floor and put in a plaster deafening between the seams. Next, to take up the carpet and lay 2 thicknesses of roof felting or paper boards (bookbinders' boards might do, or paper carpet lining). Then lay battens across the floor, and a new floor on the battens. Do not nail the battens to the old floor. Then lay the carpet lining, and the carpet on the lining.

(4) G. & S. ask: 1. What is the best method of cleansing water in a large tank before pumping into the boiler, to prevent sediment or crust forming therein? An engineer told us that he had used concentrated lye successfully for more than a year, using only sufficient lye to clear the water of lime. We use clear, hard well water. A. Concentrated lye, or caustic soda, is probably as good as anything that can be named for preventing incrustation in boilers, where hard water is used. If convenient, a little tannic acid may be added from time to time. This may be obtained by soaking oak bark in water. A pound of caustic soda and 2 quarts of oak bark decoction per week is probably enough for a forty horse boiler. Blow out once a day, and clean the boiler by opening the hand and man holes; wash and scrape out all scale and sediment once a month. 2. Will the lye in such quantity as stated, injure the boiler? A. The lye will not harm the boiler. The only harm is in not blowing out and cleaning often. 3. We have a feed grinder, the hardened steel step of which will heat when the burrs become a little worn, so that the pressure must be increased; the manufacturers advised us to put sulphur in tallow and use it instead of oil, and we have had as much trouble as before. Clear tallow does as well as anything we have used. The shaft runs at 1,000 revolutions in a babbitted box, which keeps nice and clean, but the steel step at the end makes all the trouble; and although there is an oil groove in the step, the pressure seems to be too great to allow the oil to do its duty. Please advise as to our best course. A. It is possible that the groove in the step is not deep enough or not sufficient to fully lubricate the bearing surface. Cut a second groove, and make both deeper than their width. Use good oil. Cold pressed sweet lard oil has been proved the best lubricator under heavy pressure. If the trouble is not overcome in this way, try a steel washer under the foot; it will divide the friction by doubling the surface. In this case both step and spindle should be grooved.

(5) N. W. C. desires a receipt for taking ink out of linen. A. Dip the part in boiling water, and rub it with crystals of oxalic acid; then soak in a weak solution of chloride of lime—say 1 ounce to the quart of water. Under any circumstances, as soon as the stain is removed, the linen should be thoroughly

rinsed in several waters. 2. How to make a hektograph or gelatin pad? A. Take:

Good ordinary glue.....100 parts.  
Glycerine..... 50 "  
Barium sulphate finely powdered (or the same amount of kaolin)..... 25 "  
Water.....375 "

First dissolve the glue in water, heat it, add then the glycerine. Use aniline ink.

(6) W. E. B. asks: 1. What is the best mode for the recovery of gold from jewelers' sweeps? If by fire, what is the best way to construct the furnace, and what the best flux? Also, what modes are practiced by sweep smelters, etc.? A. Sweeps are first ignited, in order to burn up all carbonaceous and to drive off all volatile constituents. The sweeps are then ground and mixed with litharge and sand, and reduced to lead bullion, which is then treated in the ordinary way by cupellation or zinc desilverization. The process is not one adapted to the ordinary jeweler's convenience, and it is best to send the sweeps after ignition directly to the refiner. You will find "The Goldsmith's Handbook," by George E. Gee, an excellent guide for manipulations in gold, etc.

(7) G. W. H. asks for the method of etching on copper and zinc, both in relief and otherwise. Also the method of printing. A. The copper plate is first covered with a ground of equal parts asphaltum, Burgundy pitch, and beeswax, and then etched out with solutions of nitric acid varying in strength. A special variety of printing press is necessary to the printing. A description of the process is given in Spens' Workshop Receipts, 1st series.

(8) H. W. G. asks the best way to take care of a flute. A. The great desirability in the proper care of musical instruments is their preservation at a uniform degree of temperature—not too moist, for that will tend to corrode and affect the flexible parts of the instrument; nor too warm, for an elevated degree of heat will warp and ultimately crack the wood. The intermediate effects naturally influence the tone of the flute, therefore it is desirable to preserve it in a box or bag.

(9) B. N. N. asks whether wood can be coated with India rubber. If so, how? A. A solution of rubber in carbon disulphide may be used to coat wood with. The liquid will evaporate off, leaving a film of rubber behind. 2. How to clarify or refine a barrel of the oil that is made from coal tar, known as "dead oil," and used by roofers to some extent? A. Try the following: Place in a close vessel 100 pounds of the crude coal oil, 25 quarts of water, 1 pound chloride of lime, 1 pound soda, and  $\frac{1}{4}$  pound manganese dioxide. The mixture is violently agitated, and allowed to rest for twenty-four hours. When the clear oil is decanted and distilled, mix the 100 pounds coal with 25 pounds resin oil; this is one of the principal points in the manipulation; it removes the gummy parts from the oil, and renders them inodorous.

(10) M. C. asks for a good receipt for staining violin. A. Stain with 1 quart alcohol, 3 ounces Brazil wood,  $\frac{1}{2}$  ounce dragon's blood,  $\frac{1}{4}$  ounce cochineal, 1 ounce saffron. Steep to full strength, and strain. 2. Also a good varnish. A. For varnish, rectified spirits of wine  $\frac{1}{2}$  gallon, add 6 ounces gum sandarac, 3 ounces gum mastic, and  $\frac{1}{2}$  ounce turpentine varnish; put the foregoing in a tin can by the stove, frequently shaking till well dissolved; strain, and keep for use. If you find this too hard, thin with more turpentine varnish.

(11) T. P. H. asks: How can I make canvas for a tent mildew and water proof? A. Three baths are prepared, the first by dissolving 1 part neutral aluminum sulphate in 10 parts cold water. For the second boil 1 part light resin, 1 part soda crystals, and 10 parts water till the soda is dissolved; add  $\frac{1}{2}$  part common salt, to separate the water and collect the soap; dissolve this soap with an equal amount of good palm oil soap in 30 parts water. This soap bath must be used hot. The third bath consists of water only. Soak the fabric thoroughly in the first or alum bath; next pass it through the soap bath, and lastly rinse in the water. Boiled linseed oil is sometimes used to render canvas waterproof. Paint the tent with it, using a brush.

(12) J. S. asks: 1. What is the silver soap (so-called for cleaning show cases, metals, and polished woods) made of, and what proportions? A. The following are among the many preparations used: Mix  $\frac{1}{4}$  pound jeweler's rouge with  $\frac{1}{2}$  pound prepared chalk. Or,  $\frac{1}{4}$  pound levigated putty powder,  $\frac{1}{2}$  pound burnt hartshorn, 1 pound prepared chalk, and 1 ounce rose pink. Or,  $\frac{1}{2}$  pound fine chalk, 3 ounces pipe clay, 2 ounces white lead,  $\frac{1}{4}$  ounce magnesia (carbonate), and the same quantity of jeweler's rouge. 2. Is the silver plating fluid made of one ounce of nitrate of silver, one ounce of cyanuret of potash, dissolved in water, injurious if used on teaspoons, knives, and forks? A. The solution is poisonous of itself, but as deposited on various articles, no injurious effects follow. The potassium cyanide is the poisonous ingredient, and not the silver.

(13) J. A. T. asks for a description of the process of lithographing, the preparing of the stone and method of printing, etc. A. There are two methods of lithographing in general use. In the one a drawing is made on the stone with a lithographic crayon or with lithographic ink; in the other method the design is made on lithographic paper, which, on being moistened and passed through the press, leaves its design on the surface of the stone reversed. In either method, water acidulated with nitrous acid, oil of vitriol, or hydrochloric acid is poured over the stone, and this, by removing the alkali from the chalk or ink, leaves the design on it in a permanent form, at the same time that it etches away a portion of the lights, and renders the surface more absorbent of water. The process of printing is as follows: Water is passed over the stone, the roller charged with printing ink is passed over the surface, the paper is applied, and copy is obtained by the action of the lithographic press. The same process must be had recourse to for each copy. The nature of the stone is such that it retains with great tenacity the resinous and oily substances contained in the ink or crayon employed to form the design, and also

to absorb the water freely; this, combined with the peculiar affinity between resinous and oily substances and their mutual power of repelling water, occasions the ink on the printing roller to adhere to the design and to leave untouched the lights. The stones are prepared for lithography by polishing in the ordinary way; the style of work for which they are intended determining the degree of labor bestowed on them. For crayon drawing the surface should have a fine grain, but the finish of the stone must depend upon the desired softness of the intended drawing; for writing or drawing on in ink the surface must receive a higher polish, and must be finished off with pumicestone and water.

(14) J. L.—Lava tips wherever made are not accurate in the measure of gas burned, only as near as the mechanical method of manufacture will allow. They are nearly correct at  $\frac{3}{4}$  inch water pressure.

(15) E. M. asks: What material is used to mix with graphite, to hold it in compact form, for the manufacture of lead pencils, etc.? A. Pure clay in varying quantities, to regulate the hardness of the pencils, is ground with the graphite, the mixture is pressed through small holes or in dies to form the pencil lead, then baked in closed muffles.

(16) V. T. writes: I find that scraps of zinc put in a stove fire will consume the soot and effectually clean out the stovepipe and flue. Would the same treatment of a tubular fire box boiler result in any injury to the boiler? A. We would not recommend a trial of this plan.

(17) W. E. F.—The method of making phosphorated Babbitt metal is only known to those that make it. Try placing in the bottom of a crucible a little pulverized bone and the Babbitt on top. Melt and stir. A few experiments will no doubt meet your requirements.

(18) W. L. B.—There have been published processes for hardening cast iron, principally by sprinkling the surface with cyanide of potassium and hardening from a low heat in water.

(19) W. C. P.—We know of no better way to harden leather for soles or stiffenings of shoes than by thorough tanning and on the lapstone. The best material to stick together leather board and stiffenings is an especial Para cement made for this purpose, but it is altogether better not to use any leather board.

(20) W. S. A. asks: What metal or mineral substance, a ball of which placed in a steam boiler will render it less liable to incrustations? A. Zinc.

(21) W. B. asks for a formula for a paste which will well and firmly stick labels on tin cans for packing and exportation. A. Try either of the following: Soften good glue in water, then boil it with strong vinegar, and thicken the liquid during boiling with fine wheat flour, so that a paste results. Or, starch paste with which a little Venice turpentine oil has been incorporated while it was warm. Or use a dilute solution of gelatin or of isinglass.

(22) W. B.—The Guibal (French) and the Schiele fan ventilators for mines have been largely introduced in English mines within the last thirty years. Previous to that, and as far back as the beginning of the century, various blowers and other devices for mechanical ventilation, more or less faulty, had been used in various places, but without entire success.

(23) J. B.—Leather belting is made by cutting out the leather lengthwise of the hide and passing the strips through an evener, which skives off sufficient from the fleshy side to make it uniform in thickness. Then the pieces are put in a stretching machine for a time, again trimmed straight and to the proper width, ends scarfed, glued, and riveted.

(24) R. I. F. and P. H. W. write: Take three wedges of equal dimensions, except one is cut off half way from edge to back. Place the two whole ones on their backs, their faces close together at the bottom, of course diverging upward; fill this space with the wedge that is cut off; consider all surfaces smooth and well lubricated, including horizontal plane on which wedges rest; apply pressure to back of center wedge—now, what will be resultant strains? What per cent will be conveyed in vertical stress on horizontal plane? A. The horizontal stress on the wedges at bottom will be, in parts of the vertical pressure, 1732. The vertical strain upon the plane is equal to the vertical pressure.

(25) J. W. K. writes: I have a profile of Abraham Lincoln, cast in brass, that I would like to give a smooth bronzed appearance to. Can you inform me by what process I can do it? A. If your casting is rough, you can smooth it only by filing and chiseling. Then possibly a bronze lacquer would serve your purpose, one kind of which you may make by dissolving  $\frac{1}{2}$  pound of shellac and  $\frac{1}{2}$  pound sandarac in 3 quarts alcohol, adding enough extract dragon's blood and turmeric to produce the desired color.

(26) R. J. P. writes: Would you suggest any alteration in the following proportion for a small steam launch? Length of keel 18 feet, beam 4 feet 6 inches, depth in center 24 inches, fitted with a vertical engine, cylinder 2 $\frac{1}{2}$  inches by 3 inches, ports 2 $\frac{1}{2}$  inches by  $\frac{1}{2}$  inch, exhaust 2 $\frac{1}{2}$  inches by  $\frac{1}{2}$  inch, lap on valve  $\frac{1}{2}$  inch. Vertical boiler with about 35 feet heating surface, carrying 120 to 130 pounds pressure. What speed ought I to get with it in smooth water? Should it be clinker built? If not, how? A. The clinker build is too light and frail for a steamboat. We cannot improve on your proportions. With a well proportioned wheel you may make 7 miles per hour.

(27) H. E. D.—There is an armor oil sold by gunsmiths, that will keep cutlery in good condition. The following is said to keep polished iron-work bright: Common resin melted with a little gallipoli oil and spirits of turpentine has been found to answer very well. The proportions should be such as to form a coating which will adhere firmly, not chip off, and yet admit of being detached by continued scratching,

(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 thinnk 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 should only have 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. In 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.

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