

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 This is for our information, and not for publication.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 Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(1) E. B. asks how to copper sheet pieces of sheet iron. A. Clean the article thoroughly by treatment in a bath of muriatic acid 1 part, water 4 parts, to remove all scale. Wash in hot water and tumble in sawdust wet with a solution of sulphate of copper in water, to which add as much sulphuric acid as is equal to the weight of the dry sulphate of copper. Use about 2 ounces of each to a gallon of water. You may also copper work that cannot be easily tumbled by dipping in the above solution hot. The work must be clean and free from grease.

(2) J. F. L. asks how to remove stains made on piece of linen by paraffine varnish, or coal tar such as used in roofing, etc. A. Paraffine is soluble in alcohol and ether. You will succeed best with a warm solvent. We would also suggest a trial with coal tar benzol. Moisten the cloth with the liquid all around the spot, and so work up to it. Do not pour directly upon it.

(3) E. L. C. V. desires (1) a recipe for a furniture (walnut and ebonized) polish not varnish. A. Mix thoroughly olive oil 1 pound, refined oil of amber 1 pound, and tincture of henna 1 ounce. Keep the mixture in a well stoppered glass bottle. Apply with a tuft of raw cotton and rub dry with a cotton rag. 2. What can be used to clean fly specks from lacquered brass work (chandeliers) without injury to the luster? A. Old ale is a good thing to wash any gilding with, as it acts at once on the fly dirt. Apply it with a soft rag.

(4) A. J. M.—When the minerals or rocks to be polished have been trimmed off as near to the desired shape as possible by means of a small steel hammer, the faces are first roughly ground on metal plates with the addition of coarse emery powder and water. When a smooth surface has thus been obtained, the final polish is effected by grinding on plates of glass with fine emery or rouge. This method is of course very slow, and is used only where occasional specimens are treated. Where any number are to be polished, a lathe is employed. The laps or wheels rotate horizontally, and are made of cast iron, copper, or lead, according to the hardness of the mineral under treatment. Where slices or large sections are to be made, a steel diamond saw is used. Lathes for amateur use are now manufactured, and cost from \$50 to \$250. The slicing apparatus costs from about \$35 upward. If you only care to polish an occasional specimen, or make a few rock sections for examination under the microscope, a cast iron plate, 8 inches in diameter, a plate of thick glass about the same size, cut preferably square, and an assortment of different grades of emery powder, will constitute the necessary outfit.

(5) C. S. L. asks: 1. Can a vacuum be held in a glass jar or any other kind of jar? A. It can be held, and is in incandescent electric lamp bulbs. 2. After pumping the air out, how can it be kept out? A. It can be kept out by hermetically sealing the jar. 3. How can you tell when the air is all expelled? A. By a pressure gauge attached to the tube, through which the air is pumped out.

(6) T. H. asks (1) a formula for the volume in cubic feet per minute escaping from a gas well, the pressure and opening being given. A. Assuming pressure of gas to be given in pounds per square inch within a few inches of the opening of the pipe, we have:

Q = 9.8 A √(h/d)

Q=cubic feet per second, A=area of cross section of pipe in square inches, h=pressure of gas, d=pressure of air which may be taken at 15 pounds per square inch. 2. The length of pipe and pressure given, a formula for volume discharged in cubic feet per minute. A. Assuming pressure of gas to be given in pounds per square inch at beginning of pipe:

Q = 9.8 A √(h / (1 + 18 \* (0.025 \* l/d - 1)))

Q=cubic feet per second, A=area of cross section of pipe in square inches, h=pressure of gas in pounds per square inch, d=pressure of air which may be taken at 15 pounds, l=length of pipe in feet, d=diameter of pipe in feet or fraction thereof.

(7) L. W. asks: 1. What is meant by a 10 per cent solution, 5 per cent solution, etc.? A. A ten per cent solution means ten parts of substance in one hundred of solution, and the same for other percentages. 2. In formulae giving a certain number of "parts" of a salt, and a certain number of parts of water or other liquid, how are these parts taken, by weight or by volume? A. The term "parts" in formula generally means parts by weight, whether referring to liquids or solids.

(8) A. S.—The plant, from your brief description, is undoubtedly a tall form of Aralia heterophylla, which is the only species shrubby at the base. Its leaves are merely bipinnate, while those of the shrubby A. spinosa are tripinnate. The other species of Aralia are herbaceous and unarmed.

(9) W. N. asks: What effect has common salt and water on steel in hardening, no matter how heavy or light the brine? A. The addition of salt to water raises the boiling point and makes it a more efficient and rapid cooler of the metal. Hence it is liable to crack heavy pieces, and tends to make the hardening penetrate deeper.

(10) C. P.—Indian red is made by calcining iron sulphate. It is a more or less pure iron peroxide.

(11) A. E. S.—We can send you "Fur, Fin, and Feather," with game laws of each State, for fifty cents. The following is an excellent harness liquid blacking: Dissolve by heat 4 ounces glue or gelatine and 3 ounces gum arabic in 3/4 pint water; add 7 ounces molasses and 5 ounces ivory black in fine powder; gently evaporate over a water bath until of a proper consistence, stirring all the time. Keep in corked bottles.

(12) E. N. asks how to produce cold in a small ice chest without the use of ice. A. Use one of the numerous freezing mixtures, such as equal parts of ammonium nitrate and water; or, eight parts of sodium sulphate with five parts of hydrochloric acid.

(13) J. T. P. asks how to cleanse and whiten harness lines made of Russia leather. A. Sponge the leather with dilute solution of oxalic acid, and then dress well with oil. The acid must be used sparingly, as it never benefits the texture of leather.

(14) W. S. A.—Gelatin, starch, and Irish moss soaked in warm water are among the substances generally used in making ice cream bricks. Ice mixed with the former requires a greater degree of heat to cause it to melt, and hence bricks of ice cream thus made stay hard longer on exposure than will ordinary ice cream.

(15) W. asks what curd soap is. A. Curd soaps contain no resin, and are generally made from tallow or lard, in about the proportions, fat 9 parts, alkali 1 part, and from 5 to 8 parts of water.

(16) E. P. E. asks: 1. What is the glue or liquid used for sticking fringes and plush on card for New Year? A. A good quality of glue dissolved in hot water is generally used. 2. Also the liquid used to gilt the edges of cards? A. A composition consisting of four parts of Armenian bole, and one of candied sugar, ground together with water to a proper consistence, and laid on by a brush with the white of an egg. This coating, when nearly dry, is smoothed by the burnisher. It is then slightly moistened by a sponge dipped in clean water and squeezed in the hand, after which gold leaf is applied. 3. The mixture to bronze gas fixtures? A. Mix vinegar or dilute sulphuric acid (1 acid, 12 water) with powdered black lead in a saucer or open vessel; apply this to the brass with a soft plate brush by gentle brushing. This will soon assume a polish, and is fit for lacquering. The brass must be made slightly warmer than for lacquering only. A little practice will enable the operator to bronze and lacquer with once heating. The color, black or green, varies with the thickness of black lead.

(17) A. O. R. desires a recipe of a compound that would harden wood, so that an article made of maple or any other wood, and in general of a shell-like form, would be capable of enduring considerable rough treatment. A. It has been found that wood acquires a remarkable hardness and toughness when it is placed in tanks and covered with quicklime, which is gradually slaked with water. Wood, such as is used in mines, takes about a week to become thoroughly impregnated.

(18) G. S. H. asks how to laundry shirts to give the fine gloss to the bosoms. A. Take of white wax 1 ounce, spermaceti 2 ounces, melt them together with a gentle heat. When you have prepared a sufficient amount of starch, in the usual way, for a dozen pieces, put into it a piece of the polish about the size of a large pea, using more or less, according to large or small washings. Or thick gum solution (made by pouring boiling water upon gum arabic) may be used. One tablespoon to a pint of starch gives clothes a beautiful gloss.

(19) E. C. N. writes: I have a white chip hat which is slightly sunburned. The local bleachery says it cannot be bleached. Is there not some way of making it white again? A. Straw hats and bonnets are bleached by putting them, previously washed in pure water, and still moist, into a box with burning sulphur; the fumes which arise unite with the water on the bonnets, and the sulphurous acid thus formed bleaches them.

(20) G. W. C. asks how to make water containing carbonate of lime soft and fit to drink. A. Boil it, and allow to settle and pour off. See "How to Soften Hard Water," contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 270. See also the articles on this subject in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 280, 348, and 392.

(21) E. R. asks what to use to polish cows' horns. A. Having scraped the work perfectly smooth and level, rub it with very fine sand paper, repeat the rubbing with a bit of felt dipped in finely powdered charcoal with water; and lastly, with rotten stone or putty powder and finish with a piece of soft wax leather, damped with a little sweet oil; or still better, rub it with subnitrate of bismuth by the palm of the hand.

(22) A. W. asks: 1. How can I remove paints from the floor of a room that has been used for a store room for the sale of paints? A. Take 1 pound American pearl ash, 3 pounds quick stone lime, slake the lime in water, then add the pearl ash, and make the whole about the consistence of paint. Lay the mixture over the whole body of the work which is required to be cleaned, with an old brush; let it remain for 12 or 14 hours, when the paint can be easily scraped off.

(23) N. B. asks: 1. Does the gradual, instead of instantaneous, disappearance of a fixed star behind a planet prove that the planet has an atmosphere? A. Not wholly. The condition of our at-

mosphere, the declination from the zenith, and the diameter of the telescopic aperture may have some influence in graduating the occultation. 2. Is it necessary that the star should change its color? A. If the light was affected by a planetary atmosphere, there would probably be a slight change in color. Diffraction may also have a share in the visible phenomena. 3. Mention a good work on taxidermy. A. Maynard's Manual of Taxidermy, which we can furnish for \$1.50.

(24) J. M. E. asks: An armature is running 1,200 revolutions per minute, carrying a load of 1,200 lamps. Will it require more power to run it 1,800 revolutions, carrying the same load, with the lamps at the same intensity, leaving bearing friction out of consideration? A. In general terms, a higher speed increases intensity of current and hence involves increased mechanical resistance. The lamps would also give more light at the higher speed. The friction of the air would increase at a higher speed. If the dynamo was of such construction that the lamps gave the same light at 1,800 as 1,200 revolutions, then the resistance to rotation, apart from that offered by the air and bearings, would be the same.

(25) A. J. M. asks an easy and simple means for cutting and polishing all kinds of ores, minerals, etc. A. A grindstone to cut to shape, a leathered board, with fine flour of emery to finish, and another leathered board, with crocus for polishing, is the most simple arrangement that we know of.

(26) H. M. asks (1) the best method to enlarge eye of an emery wheel from 1/4 to 1 inch. A. Chuck the wheel in a lathe and turn out the eye with a hard tool or, better, a diamond tool, with a very slow motion. 2. What is best to apply to gum belting that is glossy and begins to scale off or crack? A. We know of no restoration for gum or rubber belting that scales off or cracks. If it is new, it is of poor quality. If it is old, there is no help for it but renewal.

(27) S. H. J. writes: I have 6 inch reflecting telescope, mounted equatorially. How shall I set it relative to the north pole, so that the star following motion will always keep the star in field of view? A. You should have some means of moving the frame of the polar axis in azimuth and altitude, sufficient for the last adjustment. Then observe Polaris in its east or west position of mean altitude with the declination axis horizontal. Get the star in the center of the field, clamp the declination axis, and turn the telescope 180° on its polar axis. The difference in position in altitude is double the distance of correction required. When Polaris is on the meridian, the horizontal difference in the field is twice the correction required in azimuth. 2. In looking at the sun, I have hitherto used smoked glass as a protection for the eye, but it is very easily spoiled by a touch, rubbing off the carbon film. Where can I buy black glass that may be ground to a thin plate and used in lieu of smoked glass? A. You can buy colored glass for eye pieces at any optical establishment. A solar eye piece composed of 2 prisms cemented together is the best. The dark blue colored glass is the best.

(28) B. M. R. asks how to clean a white goat skin rug. I am afraid warm soap suds may injure the skin, though it is just what the long white hair needs. A. One washing with warm (not hot) suds will not materially hurt the skin itself. The skin may not seem quite so soft after the washing, but if the washing is done quickly, the skin will rinsed in cold water, and dried with only moderate warmth, being frequently turned and shaken, the difference will hardly be perceptible.

(29) S. R. D. writes: I have a gold solution for plating. I wish to separate the gold from the cyanide of potassium. A. Acidify in open air with excess of hydrochloric acid, add protosulphate of iron, heat, filter out precipitated gold, wash, dry, and ignite. Be careful not to inhale evolved gases.

(30) H. J. C. desires (1) a receipt for frost-proof ink. A. Aniline black 1 drachm, rub with a mixture of concentrated hydrochloric acid 1 drachm, pure alcohol 10 ounces. The deep blue solution obtained is diluted with a hot solution of concentrated glycerin 1 1/2 drachms, in 4 ounces of water. This ink does not injure steel pens, is unaffected by concentrated mineral acids or strong alkalies, and will not freeze at a temperature of 22 or 24 degrees below zero. 2. A receipt for liquid glue made without acid. A. An excellent liquid glue is made thus: Take of best white glue 16 ounces, white lead dry, 4 ounces, rain water 2 pints, alcohol 4 ounces. With constant stirring dissolve the glue and mix the lead in the water by means of a water bath. Add the alcohol, and continue the heat for a few minutes. Lastly pour into bottles while it is still hot.

(31) J. W. V. asks what material potters use to give a gloss or polish to their wares, something in the shape of a powder placed in their furnaces. A. Doubtless you refer to the salt glaze, which consists simply in throwing dry salt into the furnace while the articles are being baked. Other glazes are produced by dipping the articles into a specially prepared mixture, substantially glass ground into fine powder and suspended in water, receipts for which can be found in any of the works on pottery.

(32) C. W. S. desires a recipe for making lithographic ink. A. Melt 10 ounces of wax, 8 ounces of shellac, 5 ounces of mastic, 4 ounces each of pure tallow and hard tallow soap, 1/2 ounce Venetian turpentine. Mix with these 2 1/2 ounces of lampblack. This ink is rubbed up with water like water-colors, and forms an emulsion. You will find numerous receipts given in the "Techno-chemical Receipt Book," which we can send you, postpaid, for \$2.

(33) C. L. G. asks how to produce the harder grades of lithograph crayons. Several of the published formulas result in a good crayon for rough work, but not hard enough for fine work. A. We would advise the following: Pure wax 4 parts, dry white tallow soap 2 parts, white tallow 2 parts, gum lac 2 parts, lampblack enough to give a dark tint; occasionally, copal varnish 1 part. Concerning the de-

tails of preparation, see the article on Lithography, in Ure's Dictionary. For white wax we would recommend beeswax.

MINERALS, ETC.—Specimens have been received from the following correspondents and have been examined with the results stated.

J. M. U.—The sample of ore sent does not contain copper or any other valuable metallic ingredient.—W. G.—The specimen appears to be infusorial earth, and is of value as a polishing powder.—J. S. L.—The specimen is calcite, or crystallized carbonate of lime. It is of no value.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., OFFICE SCIENTIFIC AMERICAN, 361 Broadway, New York.

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August 31, 1886,

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